



T-MOBILE SITE NUMBER:

DN02415A

T-MOBILE SITE NAME:

KEEBLER

CCI SITE#:

877103

SITE ADDRESS:

231 MAIN STREET
COLORADO SPRINGS, CO 80911



APPROVAL SIGNATURE BLOCK

THE FOLLOWING PARTIES HAVE REVIEWED THESE DOCUMENTS:

SITE ACQUISITION SPECIALIST:	APPROVED: <input type="checkbox"/> REJECTED: <input type="checkbox"/>	DATE:
RF ENGINEER:	APPROVED: <input type="checkbox"/> REJECTED: <input type="checkbox"/>	DATE:
CONSTRUCTION MANAGER:	APPROVED: <input type="checkbox"/> REJECTED: <input type="checkbox"/>	DATE:
OPERATIONS:	APPROVED: <input type="checkbox"/> REJECTED: <input type="checkbox"/>	DATE:
PROJECT MANAGER:	APPROVED: <input type="checkbox"/> REJECTED: <input type="checkbox"/>	DATE:

The application was not submitted until 12/26/18. AL-97-024 allows for the use.

DRAWINGS ARE NO LONGER TO BE "APPROVED WITH COMMENTS" - IF YOU HAVE ANY REDLINES TO THESE DRAWINGS THEN YOU MUST SELECT REJECTED.

T-Mobile

T-MOBILE SITE NUMBER: DN02415A
T-MOBILE SITE NAME: KEEBLER
SITE TYPE: MONOPOLE
TOWER HEIGHT: 60.0 FT

CROWN CASTLE BU #: 877103
SITE ADDRESS: 231 MAIN STREET
 COLORADO SPRINGS, CO 80911
COUNTY: EL PASO
JURISDICTION: COUNTY OF EL PASO,
 CO / PPRBD

T-MOBILE 2018 NSD LAT: 38° 45' 6.34", LONG: -104° 44' 31.64"

T-Mobile
 18400 E. 22ND AVENUE
 AURORA, CO 80011

CROWN CASTLE
 116 INVERNESS DR. EAST STE# 280
 ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
 DN02415A

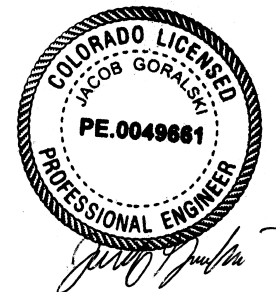
BU #: 877103
 KEEBLER/COLORADO
 SPGS/CSP209

231 MAIN STREET
 COLORADO SPRINGS, CO
 80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



11/29/2018
JACOB GORALSKI, PLLC
 CONSULTING ENGINEER
 JACOB GORALSKI, PLLC
 CO PE# 0049661
 1106 COLBI ST.
 KENNEDALE, TX 76060
 (817) 456-2621

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: **1**

SITE INFORMATION

SITE NAME: KEEBLER/COLORADO SPGS/CSP209
SITE ADDRESS: 231 MAIN STREET
 COLORADO SPRINGS, CO 80911
COUNTY: EL PASO
MAP/PARCEL #: 65141-03-028
AREA OF CONSTRUCTION: EXISTING
LATITUDE: 38° 45' 6.34"
LONGITUDE: -104° 44' 31.64"
LAT/LONG TYPE: NAD83
GROUND ELEVATION: 5,724 FT
CURRENT ZONING: ----
JURISDICTION: COUNTY OF EL PASO, CO / PPRBD
OCCUPANCY CLASSIFICATION: U
TYPE OF CONSTRUCTION: VB
A.D.A. COMPLIANCE: FACILITY IS UNMANNED AND NOT FOR HUMAN
 HABITATION
PROPERTY OWNER: GLOBAL SIGNAL ACQUISITIONS IV LLC
 PO BOX 277455
 ATLANTA, GA 303384-7455
TOWER OPERATOR: CROWN CASTLE, USA
 2000 CORPORATE DRIVE
 CANONSBURG, PA 15317
CARRIER/APPLICANT: T-MOBILE
 18400 E. 22ND AVENUE
 AURORA, CO 80011
CROWN CASTLE APPLICATION ID: 443531
ELECTRIC PROVIDER: COLORADO SPRINGS UTILITIES
 (800) 238-5434
TELCO PROVIDER: CENTURYLINK
 (800) 244-1111

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	EQUIPMENT SITE PLAN
C-1.2	FINAL SITE PLAN
C-1.3	EQUIPMENT PLAN & DIMENSION PLAN
C-2	TOWER ELEVATION & ANTENNA PLAN
C-3	EQUIPMENT ELEVATION
C-4	PLUMBING & CABLE SPECIFICATIONS
C-5	EQUIPMENT DETAILS
C-6	EQUIPMENT DETAILS
C-7	EQUIPMENT DETAILS
C-8	MOUNT SPECIFICATION
E-1	ELECTRICAL PLAN
E-2	ELECTRICAL SPECIFICATIONS
G-1	EQUIPMENT AND ANTENNA GROUNDING PLAN
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR FULL SIZE. 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:

- INSTALL (6) PANEL ANTENNAS
- INSTALL (6) RRUs
- INSTALL (2) COVP
- INSTALL (2) HYBRID CABLE LINES
- INSTALL NEW PLATFORM MOUNT

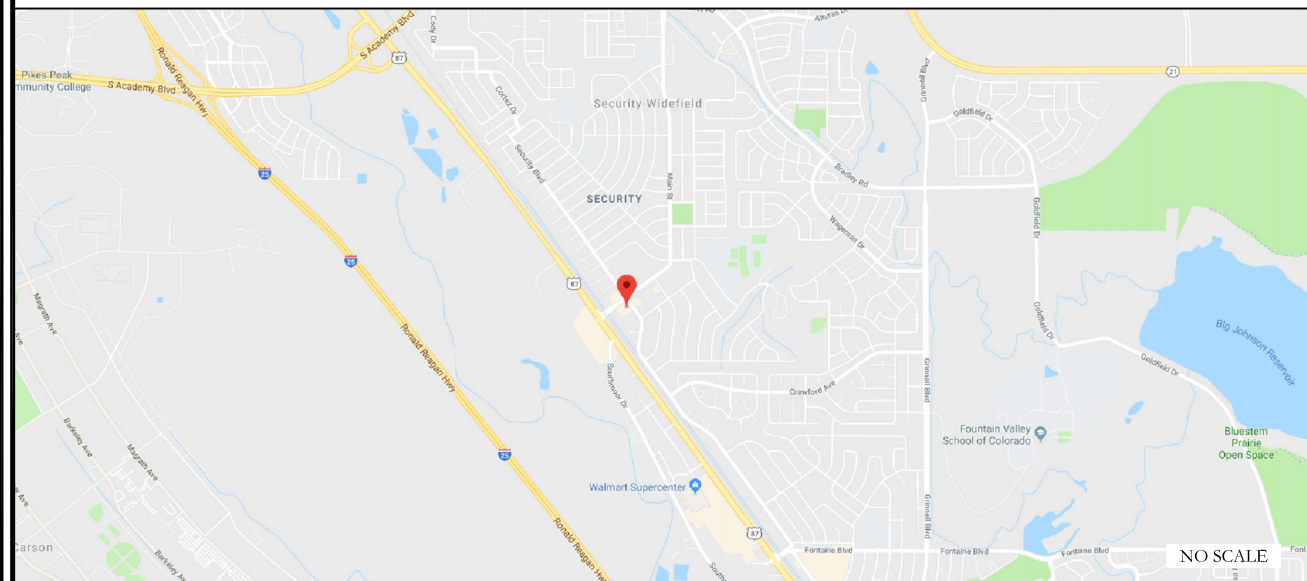
GROUND SCOPE OF WORK:

- INSTALLATION OF NEW 8'-0"x8'-0" MODULAR EQUIPMENT PLATFORM WITHIN A NEW 10'-0"x15'-0" LEASE AREA WITHIN THE EXISTING FENCED COMPOUND

DESIGN PACKAGE BASED ON THE RFDS
 REVISION: R.01
 DATE: 4/19/2018 1:23:16 PM

DESIGN PACKAGE BASED ON THE APPLICATION
 ID: 443531
 REVISION: 2

LOCATION MAP



DRIVING DIRECTIONS FROM T-MOBILE LOCAL OFFICE (18400 E. 22ND AVENUE AURORA, CO 80011): HEAD EAST ON E 22ND AVE TOWARD TOWER RD TURN LEFT AT THE 1ST CROSS STREET ONTO TOWER RD TURN RIGHT TO MERGE ONTO I-70 E MERGE ONTO I-70 E TAKE EXIT 289 TOWARD FT COLLINS/COLO SPRINGS USE THE RIGHT 2 LANES TO TURN RIGHT (SIGNS FOR COLO SPRINGS) USE THE RIGHT 3 LANES TO TAKE THE RAMP ONTO E-470 S USE THE RIGHT 2 LANES TO TAKE EXIT 1A FOR INTERSTATE 25 S TOWARD COLO SPRINGS MERGE ONTO I-25 S TAKE EXIT 135 FOR CO-83/ACADEMY BLVD USE THE LEFT 2 LANES TO KEEP LEFT AT THE FORK AND CONTINUE TOWARD S ACADEMY BLVD USE THE LEFT 2 LANES TO TURN LEFT ONTO S ACADEMY BLVD TAKE THE US-85 EXIT TOWARD FOUNTAIN TURN RIGHT ONTO US-85 S/US-87 S (SIGNS FOR FOUNTAIN) TURN LEFT ONTO MAIN ST TURN RIGHT DESTINATION WILL BE ON THE RIGHT

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: BY OTHERS

MOUNT ANALYSIS: BY OTHERS



CALL COLORADO ONE CALL
 (800) 922-1987
 CALL 3 WORKING DAYS
 BEFORE YOU DIG



SITE PHOTO



PROJECT TEAM

DESIGNER FIRM: BROADUS SERVICES
 4 COUNTRY PLACE CIRCLE
 DALWORTHINGTON GARDENS, TX 76016
 PH: (817) 349-3449
ENGINEER FIRM: JACOB GORALSKI, PLLC
 1106 COLBI ST.
 KENNEDALE, TX 76060
 PH: (817) 456-2621
 CONTACT: JACOB GORALSKI, PLLC
 116 INVERNESS DR. EAST STE# 280
 ENGLEWOOD, CO 80112
 GRANT STEINHAUSER - PROJECT MANAGER
 GRANT.STEINHAUSER@CROWNCastle.COM
 (719) 466-9629
 WALT RAYPOLE - CONSTRUCTION MANAGER
 WALT.RAYPOLE@CROWNCastle.COM
 (719) 466-9629
 BRANDON SAENZ - A&E PROJECT MANAGER
 BRANDON.SAENZ.CONTRACTOR@CROWNCastle.COM
 (720) 450-3003
T-MOBILE CONTACTS: MACKENZIE KEYS -
 MACKENZIE.KEYS2@T-MOBILE.COM

T-Mobile
 18400 E. 22ND AVENUE
 AURORA, CO 80011

CROWN CASTLE
 116 INVERNESS DR. EAST STE# 280
 ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

BU #: **877103**
KEEBLER/COLORADO
SPGS/CSP209

231 MAIN STREET
 COLORADO SPRINGS, CO
 80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG

COLORADO LICENSED
JACOB GORALSKI
PE.0049661
PROFESSIONAL ENGINEER

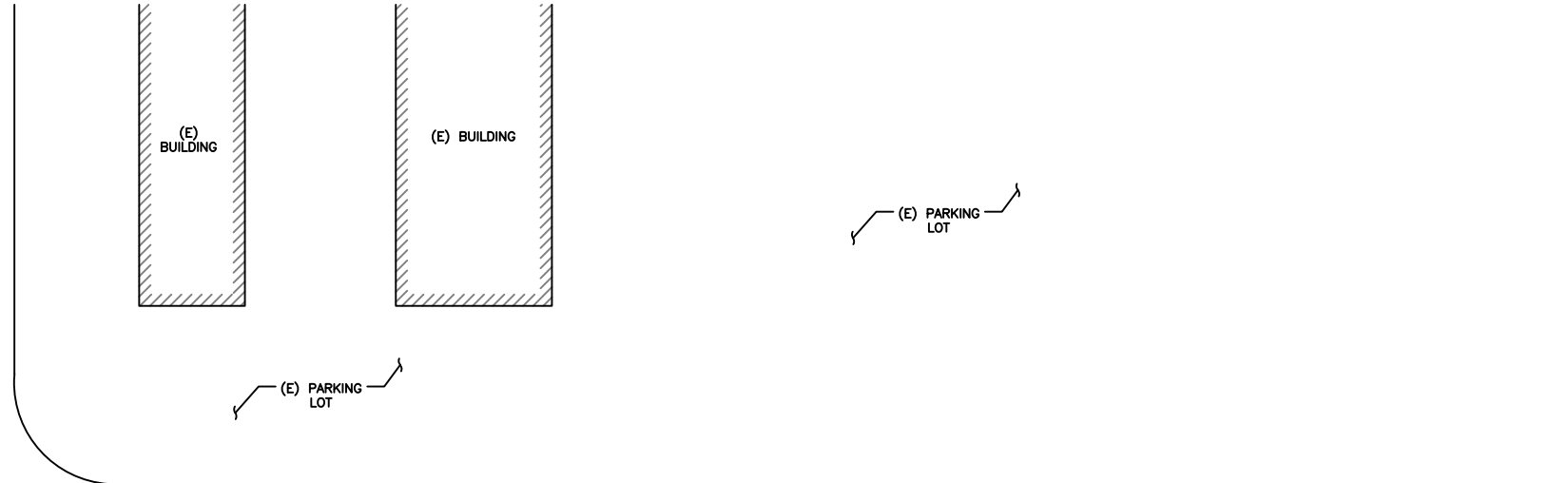
Jacob Goralski

11/29/2018

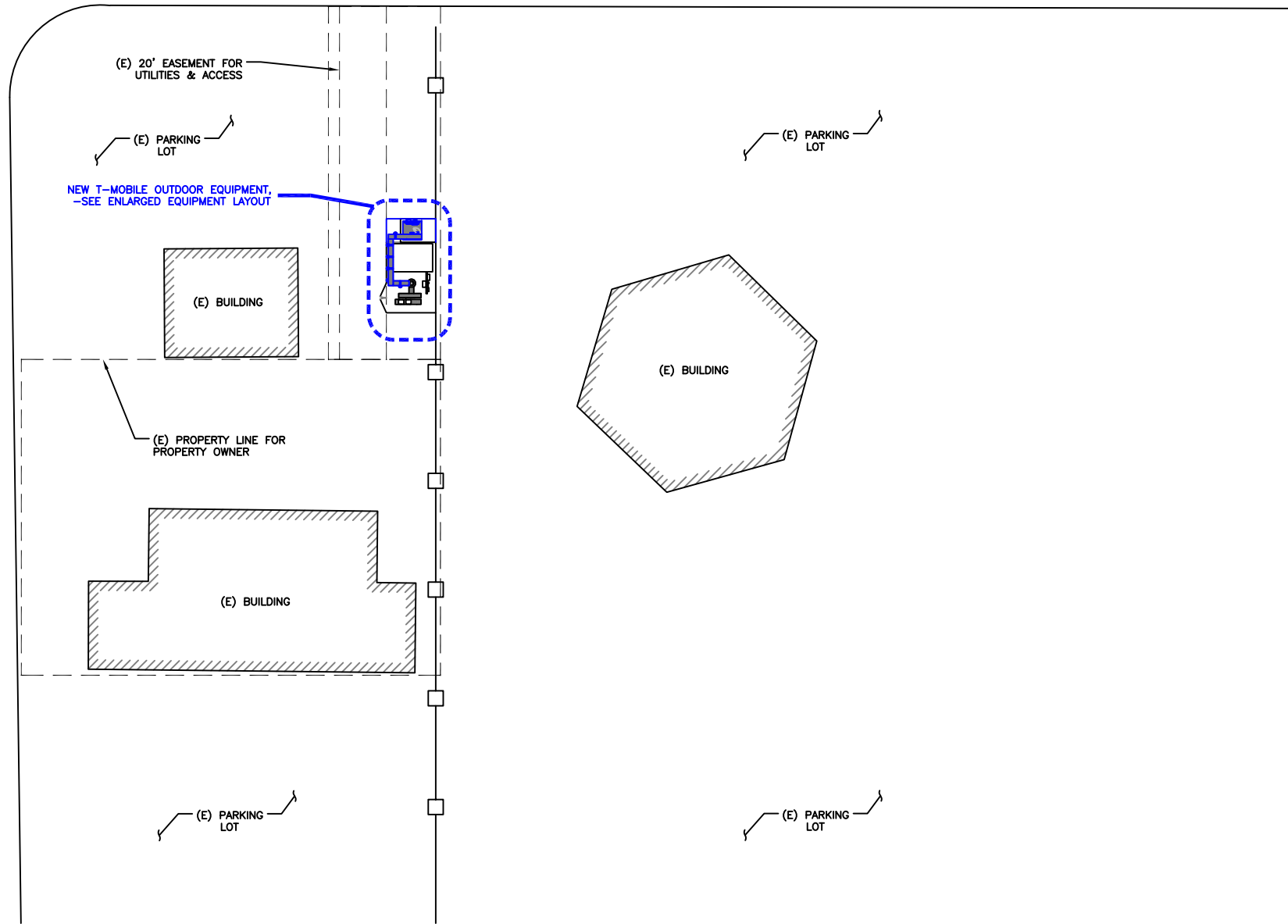
JACOB GORALSKI, PLLC
 CONSULTING ENGINEER
 JACOB GORALSKI, PLLC
 CO PE# 0049661
 1106 COLBI ST.
 KENNEDALE, TX 76060
 (817) 456-2621

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.

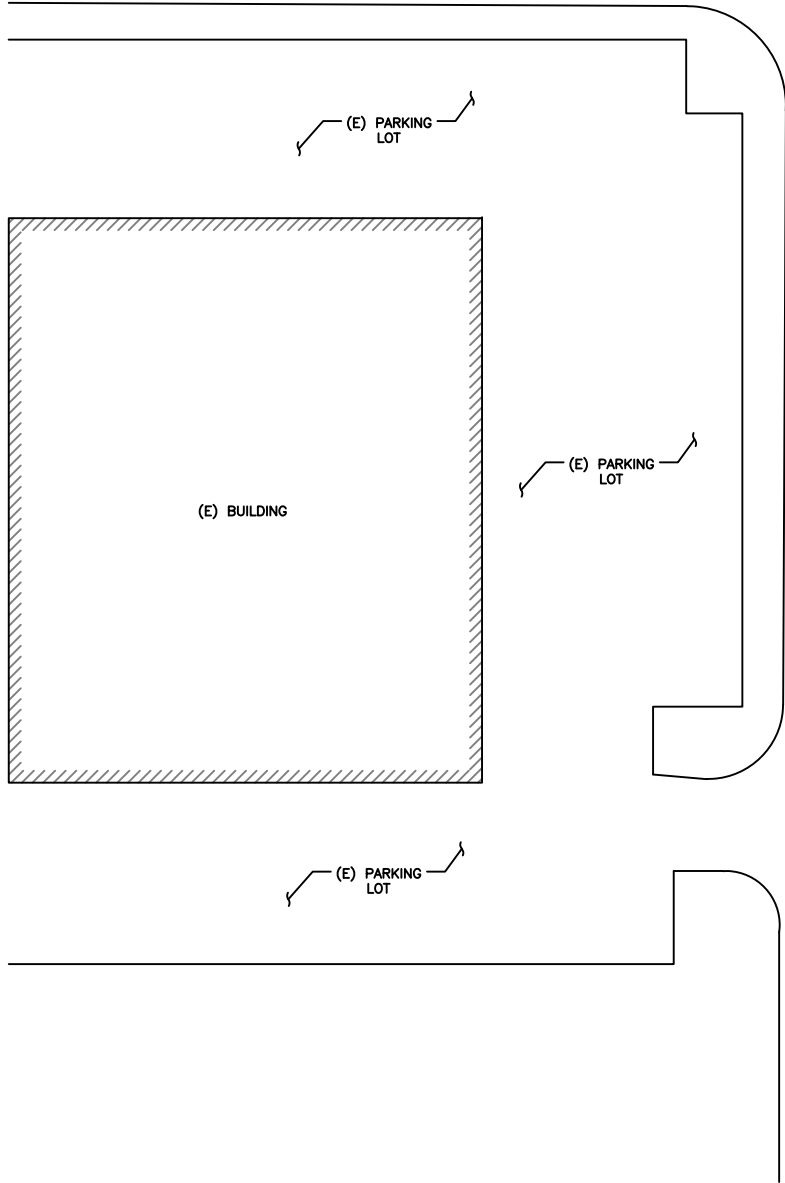
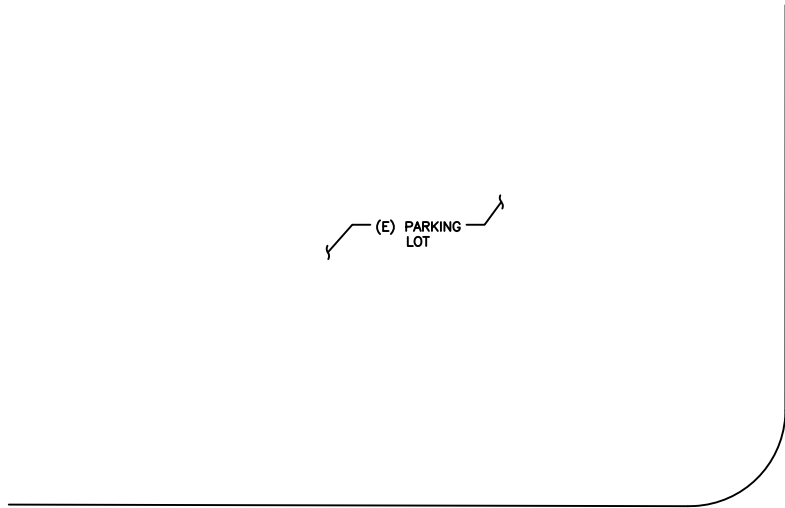
SHEET NUMBER: **C-1.1** REVISION: **1**



SECURITY BLVD.



MAIN STREET



1 OVERALL SITE PLAN
 SCALE: NOT TO SCALE



T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
**KEEBLER/COLORADO
 SPGS/CSP209**

231 MAIN STREET
 COLORADO SPRINGS, CO
 80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG

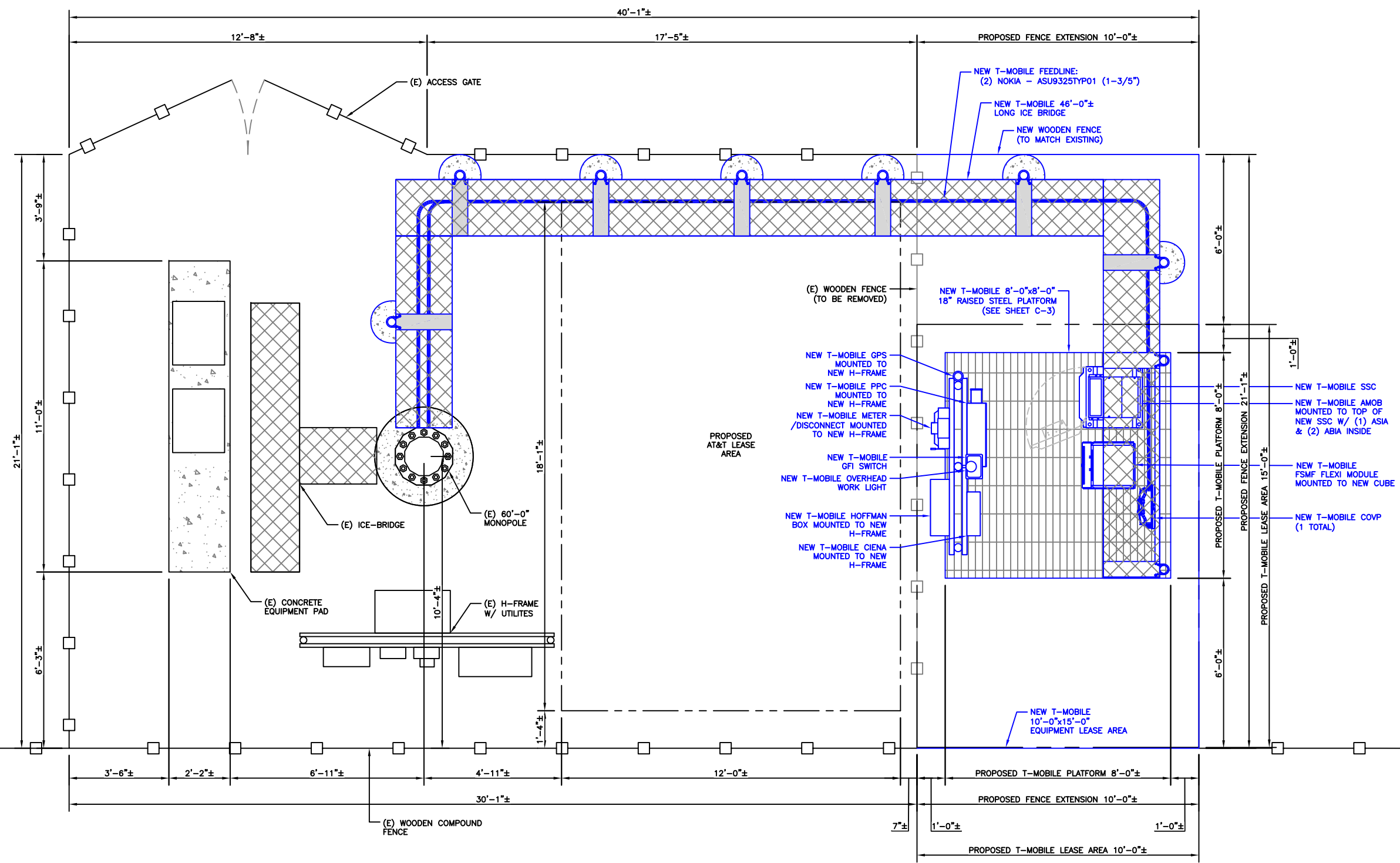


11/29/2018

JACOB GORALSKI, PLLC
 CONSULTING ENGINEER
 JACOB GORALSKI, PLLC
 CO PE# 0049661
 1106 COLBI ST.
 KENNEDALE, TX 76060
 (817) 456-2621

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-1.2** REVISION: **1**



1 FINAL SITE PLAN
 SCALE: 1/2"=1'-0" (FULL SIZE)
 1/4"=1'-0" (11x17)



T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
**KEEBLER/COLORADO
 SPGS/CSP209**

231 MAIN STREET
 COLORADO SPRINGS, CO
 80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG

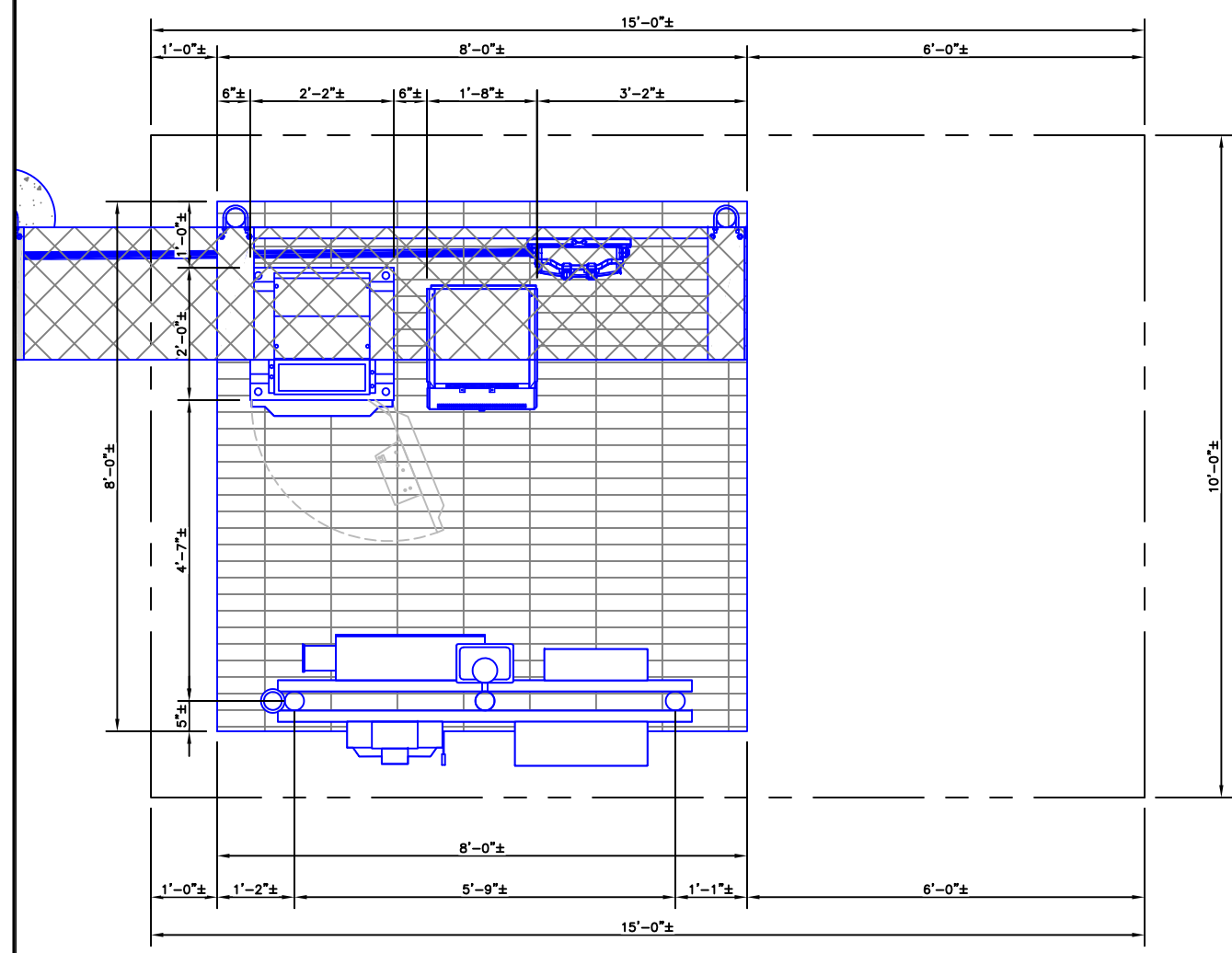
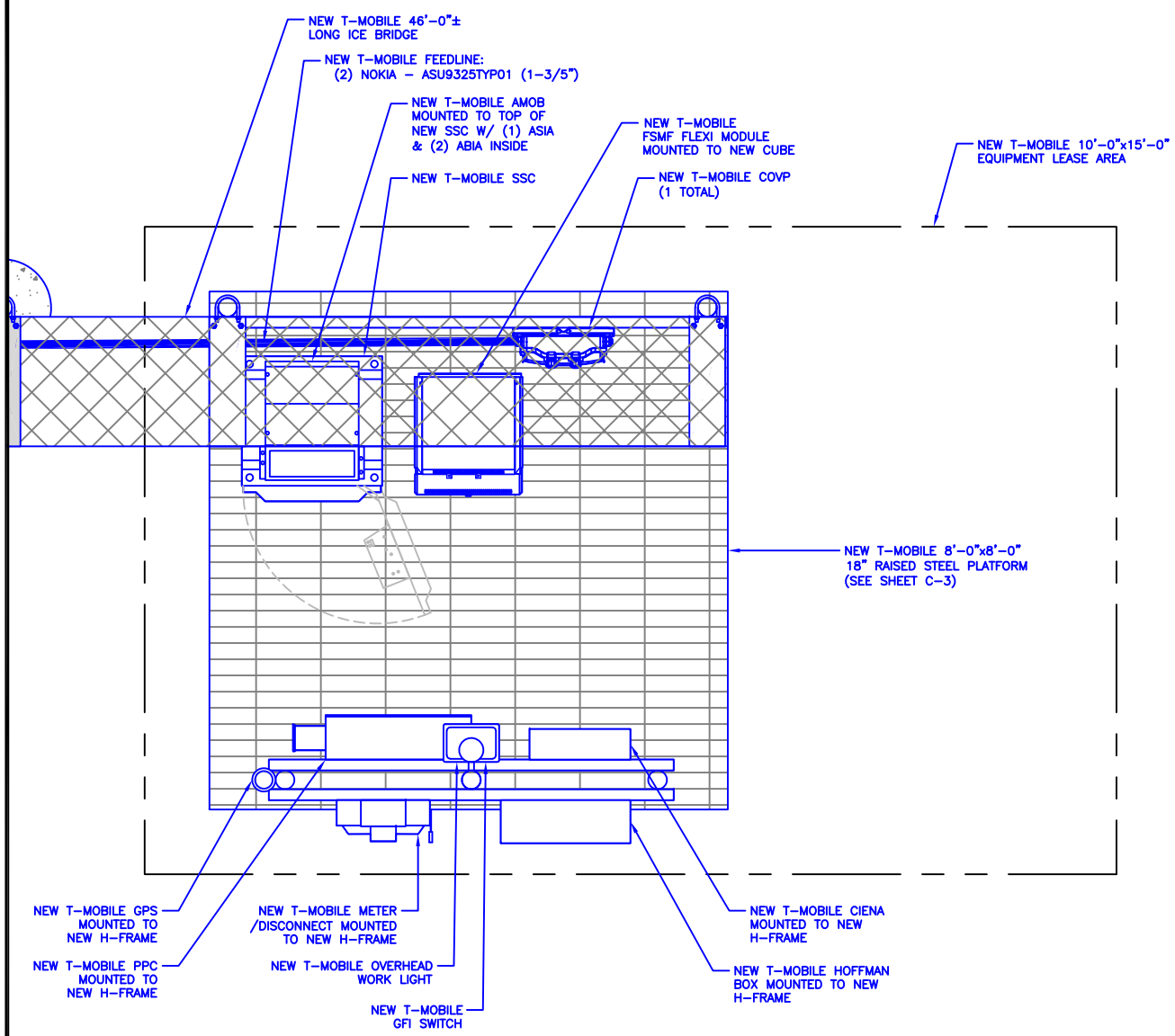
**COLORADO LICENSED
 JACOB GORALSKI
 PE.0049661
 PROFESSIONAL ENGINEER**

Jacob Goralski

11/29/2018

JACOB GORALSKI, PLLC
 CONSULTING ENGINEER
 JACOB GORALSKI, PLLC
 CO PE# 0049661
 1106 COLBI ST.
 KENNEDALE, TX 76060
 (817) 456-2621

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.



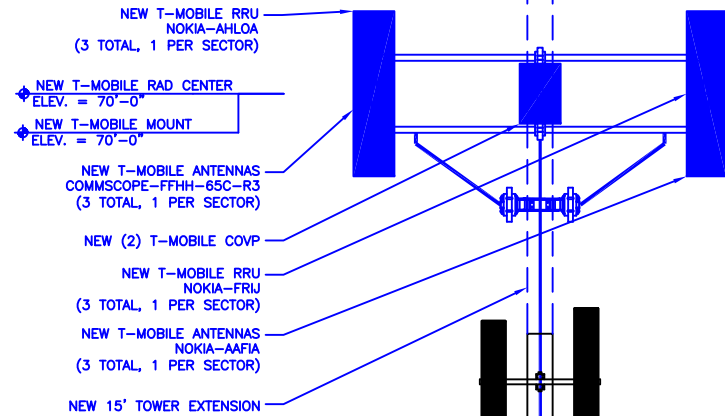
1 EQUIPMENT PLAN
 SCALE: 3/4"=1'-0" (FULL SIZE)
 3/8"=1'-0" (11x17)



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



OVERALL HEIGHT OF STRUCTURE
ELEV. = 75'-0"



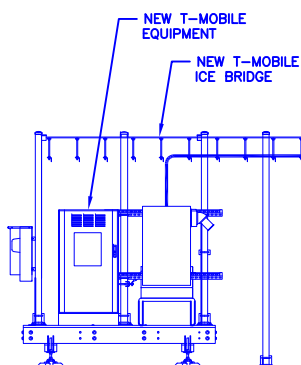
NOTE:
CROWN TO DETERMINE FINAL RAD CENTER AT LATER DATE, APP & RFDS TO MATCH DRAWINGS

INSTALLER NOTE:
DIRECT TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB.

NEW T-MOBILE FEEDLINE:
(2) NOKIA - ASU9325TYP01 (1-3/5")
ROUTED INSIDE TOWER

T-MOBILE EQUIPMENT

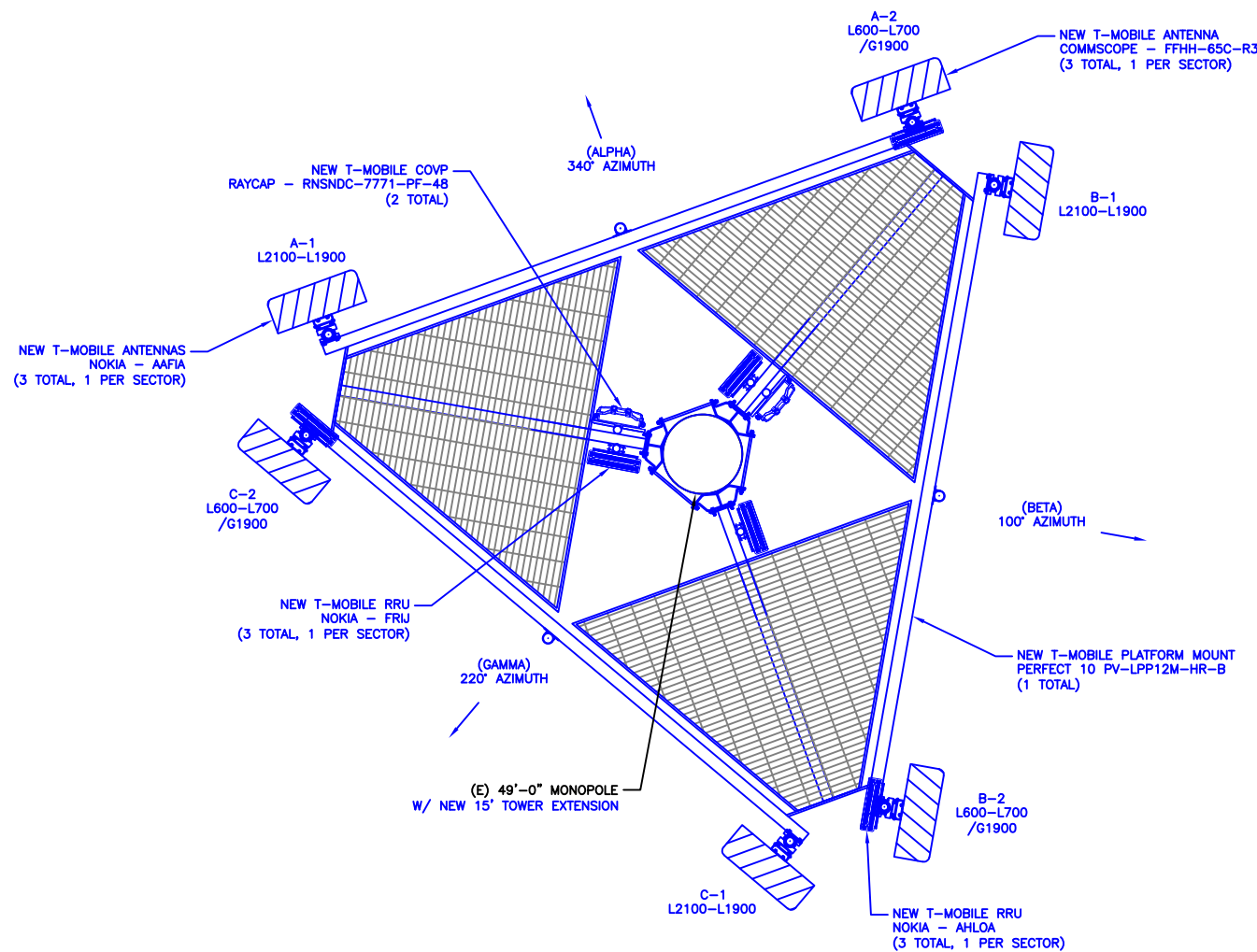
ANTENNA CL: 70'-0"
MOUNT CL: 70'-0"



1 FINAL ELEVATION
SCALE: NOT TO SCALE

ANTENNA SCHEDULE						
SECTOR	ALPHA		BETA		GAMMA	
ANTENNA POSITION	A-1	A-2	B-1	B-2	C-1	C-2
ANTENNA TYPES	L2100-L1900	L700-L600 /U2100	L2100-L1900	L700-L600 /U2100	L2100-L1900	L700-L600 /U2100
AZIMUTH	340°	340°	100°	100°	220°	220°
RAD CENTER (AGL)	70'-0"	70'-0"	70'-0"	70'-0"	70'-0"	70'-0"
MODEL	NOKIA - AAFIA	COMMSCOPE - FFHH-65C-R3	NOKIA - AAFIA	COMMSCOPE - FFHH-65C-R3	NOKIA - AAFIA	COMMSCOPE - FFHH-65C-R3
FEEDER LENGTH	±125'-0"	±125'-0"	±125'-0"	±125'-0"	±125'-0"	±125'-0"
FEEDER TYPE	HYBRID CABLE	HYBRID CABLE	HYBRID CABLE	HYBRID CABLE	HYBRID CABLE	HYBRID CABLE

2 ANTENNA SCHEDULE
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE



T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE

116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

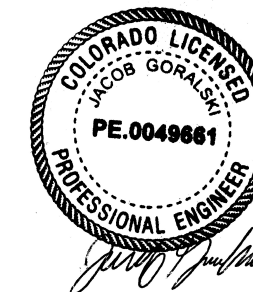
BU #: 877103
**KEEBLER/COLORADO
SPGS/CSP209**

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



11/29/2018

JACOB GORALSKI, PLLC

CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

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:

1

T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
**KEEBLER/COLORADO
 SPGS/CSP209**

231 MAIN STREET
 COLORADO SPRINGS, CO
 80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

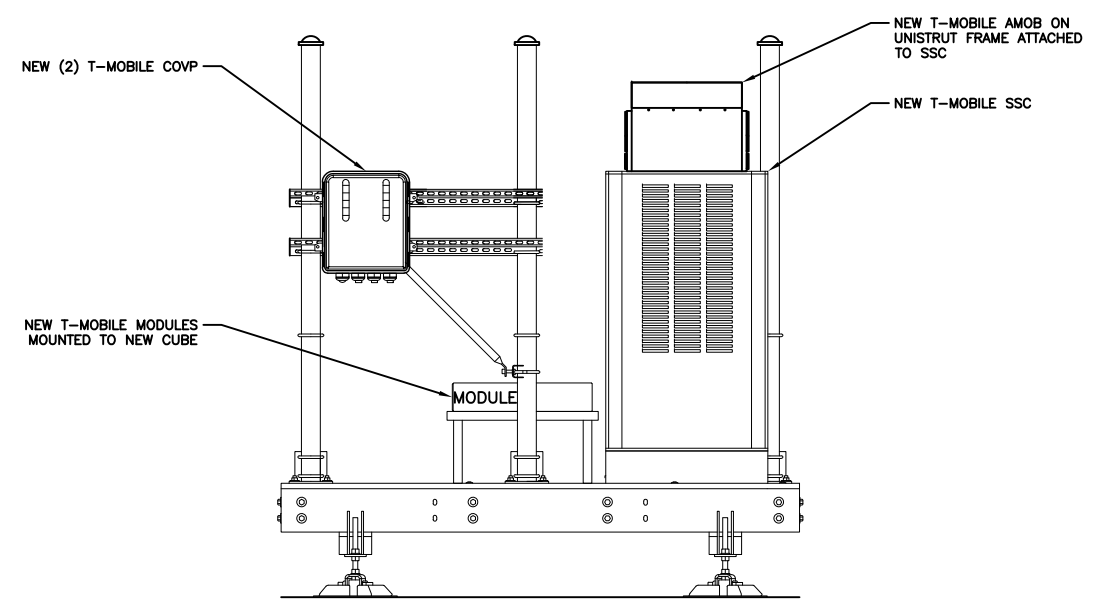
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



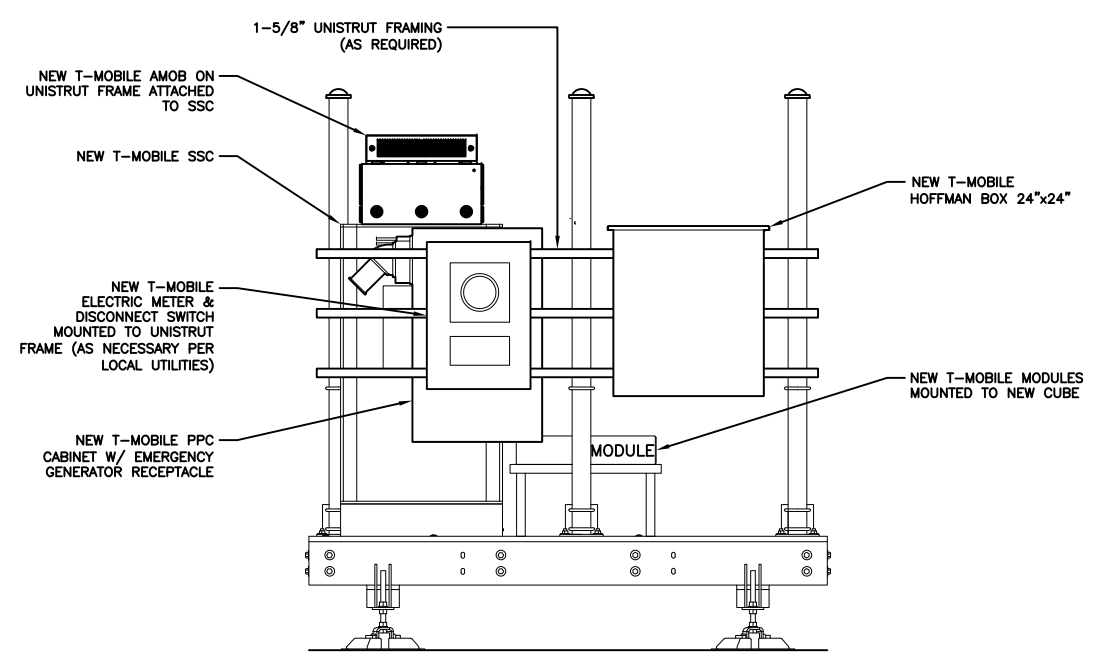
11/29/2018
JACOB GORALSKI, PLLC
 CONSULTING ENGINEER
 JACOB GORALSKI, PLLC
 CO PE# 0049661
 1106 COLBI ST.
 KENNEDALE, TX 76060
 (817) 456-2621

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.

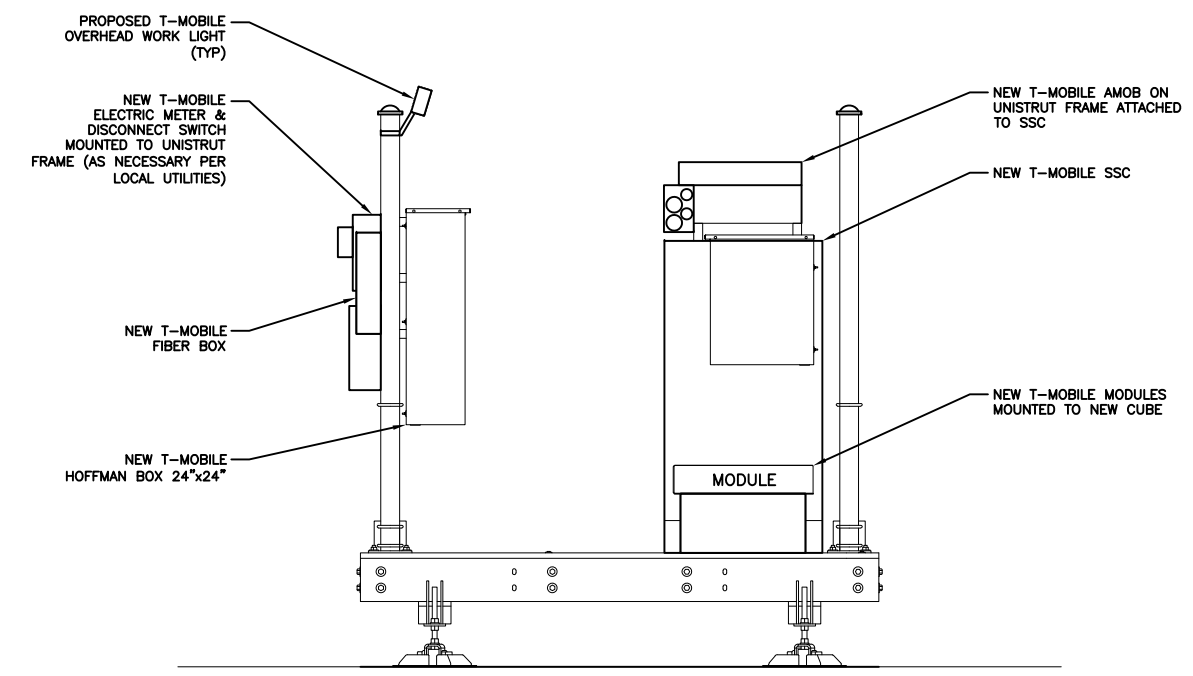
SHEET NUMBER: **C-3** REVISION: **1**



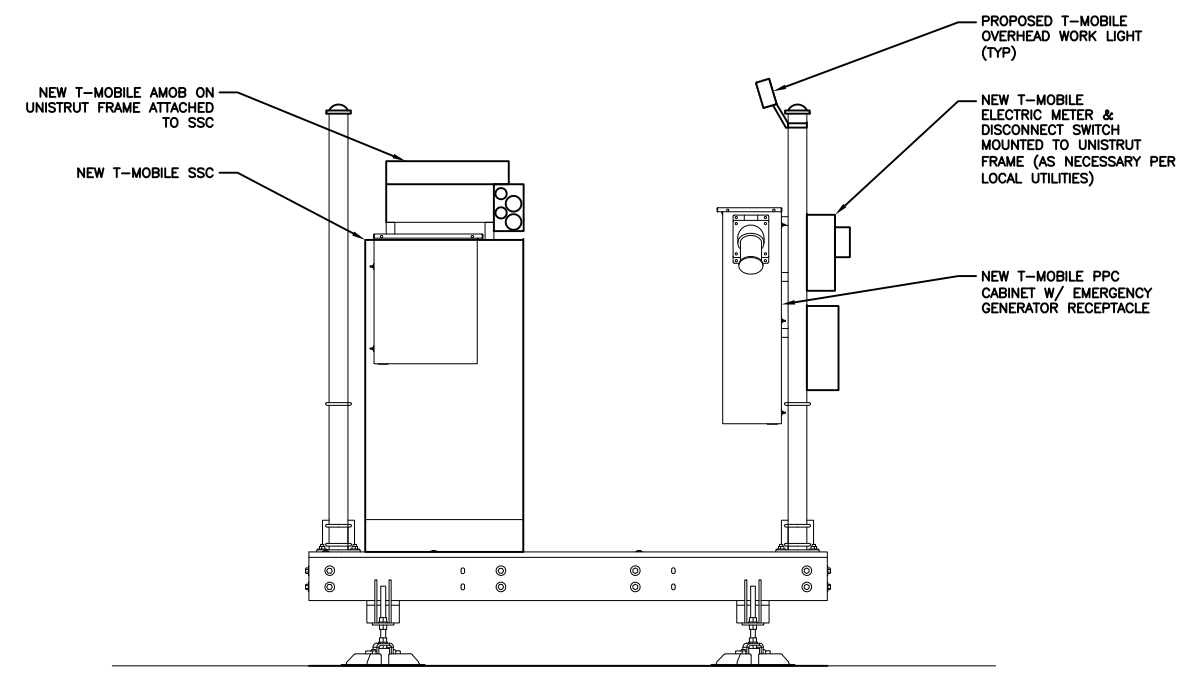
1 EQUIPMENT ELEVATION-NORTH
 SCALE: NOT TO SCALE



2 EQUIPMENT ELEVATION-SOUTH
 SCALE: NOT TO SCALE



3 EQUIPMENT ELEVATION-WEST
 SCALE: NOT TO SCALE



4 EQUIPMENT ELEVATION-EAST
 SCALE: NOT TO SCALE

T-MOBILE SITE NUMBER:
DN02415A

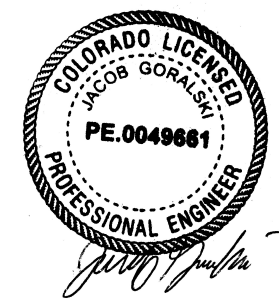
BU #: 877103
**KEEBLER/COLORADO
SPGS/CSP209**

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

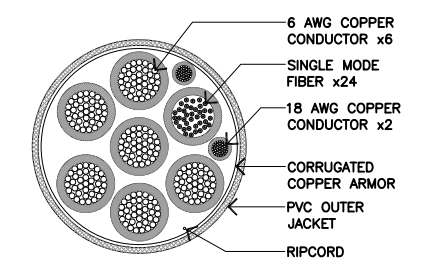
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



11/29/2018
JACOB GORALSKI, PLLC
CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

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.

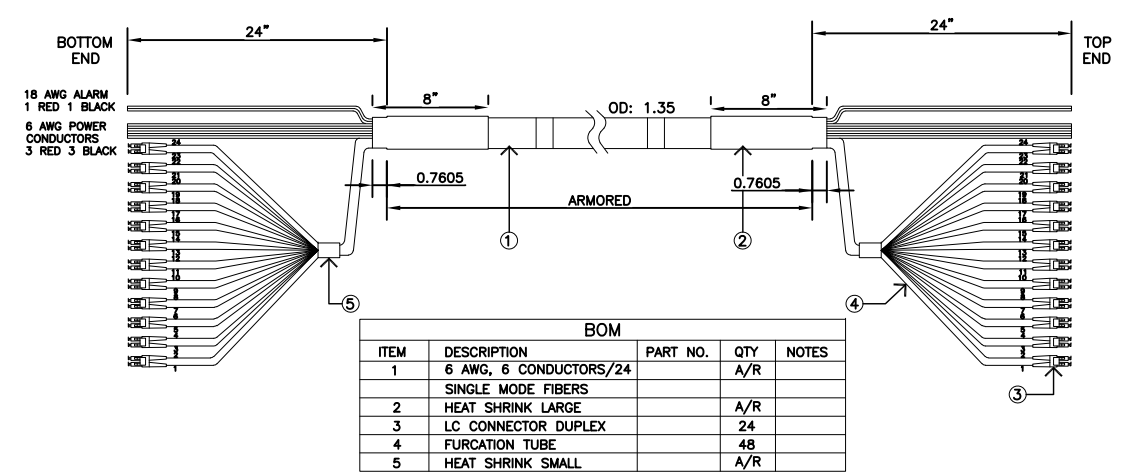
CABLE TYPE	NUMBER, SIZE (AWG) VOLTAGE OUTER JACKET SHIELDING MAX SHIELD RESISTANCE (ohm/ft @ 20 c) DRAIN RIPCORD DC CONDUCTOR MATERIAL DC CONDUCTOR SIZE (AWG) MAX DC RESISTANCE (ohm/1000 ft) COLOR CODE ALARM CONDUCTOR MATERIAL ALARM CONDUCTOR SIZE (AWG) MAX DC RESISTANCE (ohm/1000 ft) COLOR CODE FIBER CABLES OUTER DIAMETER (in) - NOMINAL WEIGHT (lb/ft) MINIMUM BEND RADIUS (in) BEND MOMENT (lb/ft) TENSILE STRENGTH (lb) CRUSH RESISTANCE, FOTP-41 (N/mm) STRENGTH MEMBER OPERATING TEMPERATURE RANGE (LOW) OPERATING TEMPERATURE RANGE (HIGH) +80°C	6/C #6 + 2/C #18 600 PVC CORRUGATED COPPER 0.0035 N/A KEVLAR COPPER 6 0.411 @ 20°C BLACK/RED COPPER 18 6.7 TBD SM 1.24 1.05 15 TBD 325 22 NO -40°C
FIBER TYPE		LOW WATER PEAK, SINGLE MODE, LOOSE TUBE
FIBER STANDARD COMPLIANCE		ITU-T REC. G.652.D, G657.A2 IEC 60793-2-50 TYPE B.1.3 & TYPE B.6 A&B
FIBER COATING DIAMETER (um)		.242 +/- 0.007mm 0.9 +/- 0.0005mm
FIBER COUNT		24
NUMBER OF FIBER SUBUNITS		1
FIBER COUNT EACH UNITS		24
FIBER OUTER JACKETS		FR JACKET
MAX ATTENUATION, 1310 mm (dB/Km)		LESS THAN EQUA 0.5
MAX ATTENUATION, 1550 MM (dB/Km)		LESS THAN EQUA 0.5



NOTE: CABLE CROSS SECTION NOT DRAWN TO SCALE

CABLE TYPE: 6/#6, 2/#18, 24 FIBER

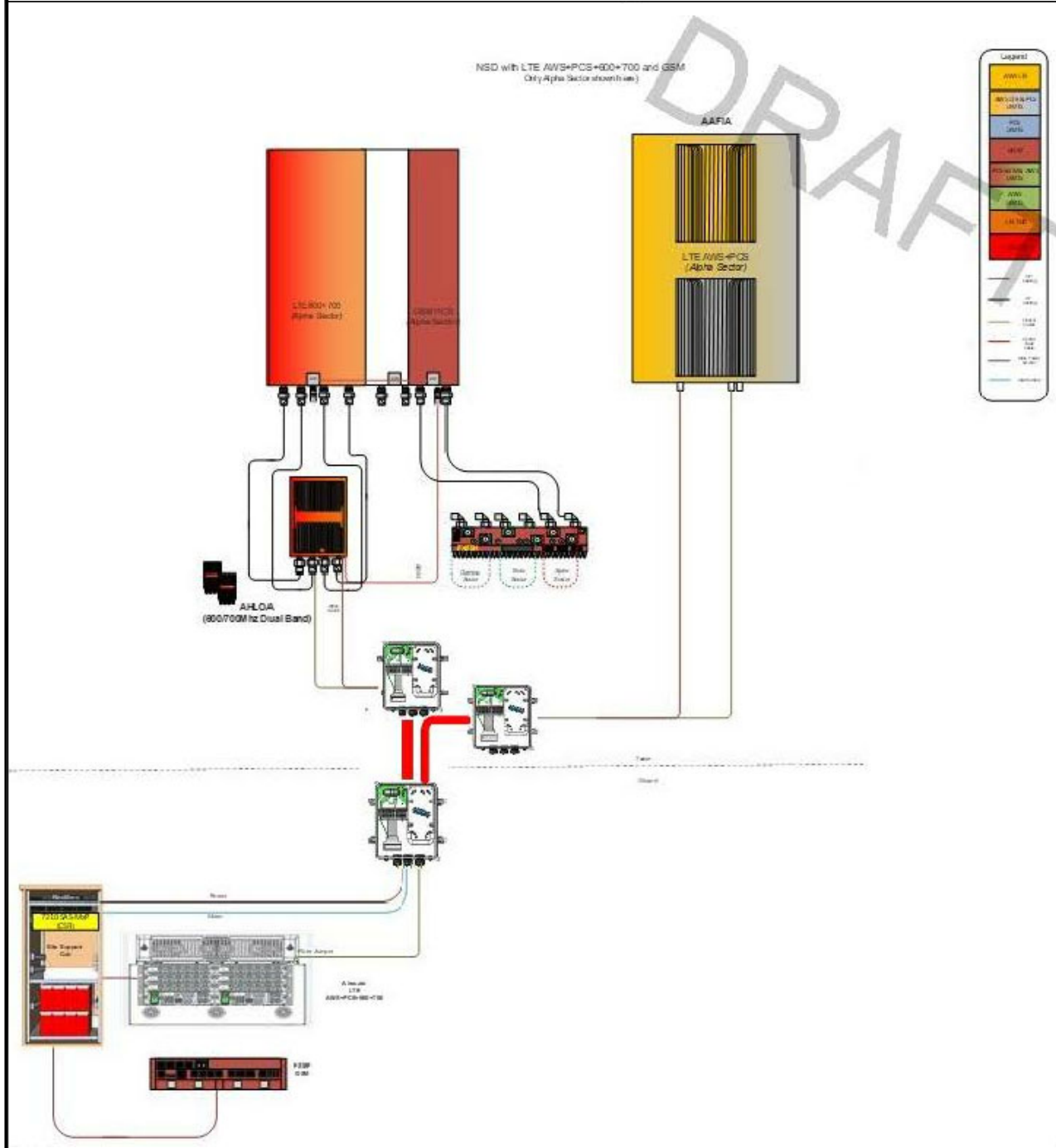
CABLE ASSY LENGTH (L)	TOLERANCE (FT)	PACKAGING METHOD
50	+0.50 / -0.50	COIL
100	+1.00 / -1.00	REEL
125	+1.25 / -1.25	REEL
150	+1.50 / -1.50	REEL
175	+1.75 / -1.75	REEL



- NOTES:
- DIMENSIONS ARE IN INCHES.
 - 12 DUPLEX LC CONNECTORS PER END, 4 DUPLEX LC CONNECTORS PER GROUP, TOTAL OF 3 GROUPS.
 - TOTAL OF 12 PAIRS OF SINGLE MODE FIBERS.
 - TOTAL OF 6 AC CABLES 3 RED & 3 BLACK.
 - TOP END AND BOTTOM END ARE IDENTICAL.
 - EACH AND EVERY FIBERS MUST BE LABELED FROM #1 TO #24 AT BOTH ENDS.
 - LABEL BOTH ENDS WITH: SERIAL NUMBER, PART NUMBER AND CUSTOMER NAME.
 - INSERTION LOSS AND RETURN LOSS SHALL BE MEASURED 100% SAMPLING FOR ALL PRODUCTION.
 - TEST AND MEASUREMENT REPORT SHALL BE FURNISHED WITH CABLE ASSEMBLY.
 - ALL CONNECTORS SHALL BE SHIPPED WITH FURRULES PROTECTED WITH REMOVABLE CAPS.
 - ALL FIBER BREAKOUT WILL BE PROTECTED FROM WATER PENETRATION.

COLORS IDENTIFIED AT THE BASE OF EACH BOOT IDENTICAL AT BOTH ENDS

FIBER	COLOR	FIBER	COLOR
1	BLUE	13	RED
2	BLUE	14	RED
3	ORANGE	15	BLACK
4	ORANGE	16	BLACK
5	GREEN	17	YELLOW
6	GREEN	18	YELLOW
7	BROWN	19	PURPLE
8	BROWN	20	PURPLE
9	GREY	21	TAN
10	GREY	22	TAN
11	WHITE	23	PINK
12	WHITE	24	PINK



AAFIA Prototype - Specifications



Dimension	Nokia 16TRX Dual
Band	806 - 825 (B1)
Antenna Config (col x row x pol)	XX XX XX XX (B6) XX XX XX XX (B5) 2x2x2x2x2
Power	16x1.25W* (20W)
Instantaneous Bandwidth	90MHz DL / 70MHz UL (B6)
Realistic Use Case	25MHz per band
Diversity Range (all beams affected)	2-12 degrees
HT/SW Availability	3Q1.8 (L183P)
Size (HxWxD) in	71" x 20" x 4"
Weight / Wind Sail	342lbs / 1.84m ²

AAFIA is a dual band Massive MIMO with 16 TRX per band

© Nokia 2017 Confidential

1 NOKIA - AAFIA
SCALE: NOT TO SCALE

FFHH-65C-R3
8-port sector antenna, 4x 617-698 and 4x 1695-2360 MHz, 65° HPBW, 3x RET, 600 MHz-Ready Antenna Technology



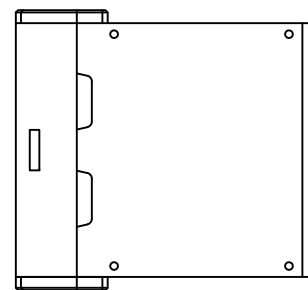
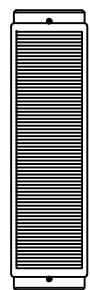
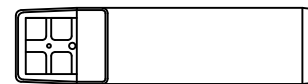
Electrical Specifications

Frequency Band, MHz	617-698	698-806	1695-1880	1850-1990	1920-2200	2300-2360
Gain, dBi	15.3	15.5	17.8	18.2	18.5	19.6
Beamwidth, Horizontal, degrees	67	63	65	66	64	55
Beamwidth, Vertical, degrees	10.2	9.1	5.7	5.3	4.9	4.4
Beam Tilt, degrees	2-13	2-13	2-12	2-12	2-12	2-12
USLS (First Lobe), dB	19	17	20	19	19	21
Front-to-Back Ratio at 180°, dB	32	29	35	40	40	41
Isolation, dB	28	28	28	28	28	28
Isolation, Intersystem, dB	28	28	28	28	28	28
VSWR Return Loss, dB	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0	1.5 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port at 50°C, maximum, watts	250	250	250	250	250	200
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	617-698	698-806	1695-1880	1850-1990	1920-2200	2300-2360
Gain by all Beam Tilts, average, dBi	15.0	15.2	17.4	17.9	18.5	19.3
Gain by all Beam Tilts Tolerance, dB	±0.6	±0.5	±0.4	±0.5	±0.6	±0.5
Gain by Beam Tilt, average, dBi	2° 14.8	2° 15.0	2° 17.2	2° 17.6	2° 18.1	2° 18.8
	8° 15.1	8° 15.3	7° 17.5	7° 18.0	7° 18.6	7° 19.4
	13° 15.0	13° 15.1	12° 17.4	12° 17.8	12° 18.4	12° 19.2
Beamwidth, Horizontal Tolerance, degrees	±2.7	±4.8	±5.5	±5.2	±4.9	±6.4
Beamwidth, Vertical Tolerance, degrees	±0.6	±0.7	±0.4	±0.3	±0.4	±0.1
USLS, beampeak to 20° above beampeak, dB	17	12	15	16	16	18
Front-to-Back Total Power at 180° ± 30°, dB	23	21	29	31	31	31
CPR at Boresight, dB	24	23	21	20	21	22
CPR at Sector, dB	6	10	9	9	9	8

2 COMMSCOPE - FFHH-65C-R3
SCALE: NOT TO SCALE



NOKIA - FXFB
WEIGHT: 55.1 LBS
SIZE (LxWxH): 5.2x19.3x22.0 IN.

3 NOKIA - FXFB
SCALE: NOT TO SCALE

AirScale Dual RRH 4T4R B12/71 240W AHLOA



Product Code: 0243314	Support Frequency Bands
Band 12 adjusted: UL 698 - 716 MHz, DL 728 - 744 MHz	Band 71: UL 698 - 716 MHz, DL 717 MHz - 733 MHz
Number of TX/RX paths/ports: 4 ports, 2T4R, 2T4R, 4T4R for both bands	
Instantaneous Bandwidth: 17 MHz for B12 and 33MHz for B71	
Occupied Bandwidth: 1.5 MHz below B12 180° future use	
Occupied Bandwidth: 1.5 MHz below B71 180° future use	
Output Power: 240W per TR shared between bands	
Supply Voltage Range: DC 48V, 7.58Vdc, 40Vdc	
Typical Power Consumption: 240W (ETD) Base Power Load at 47dBm	
Antenna Ports: 4 ports, 4 x 10-	
Optical Ports: 2 x SFP+ 10 Gbps	
ALD Control Interface: 2000 baud RS-485 (DC on AW1 & AW2)	
Other Interfaces: External Alarm NGR-2514 inputs, 1 Output DC Circular Power Connector	
Physical: 260mm x 320mm x 150mm (approximately) 28kg with no covers or brackets	
Operating Temperature Range: -40°C to 55°C (with no solar load)	
Surge Protection: Class II SA	
Installation Options: Pole, Wall, Rack Mount	

© Nokia 2017 Confidential

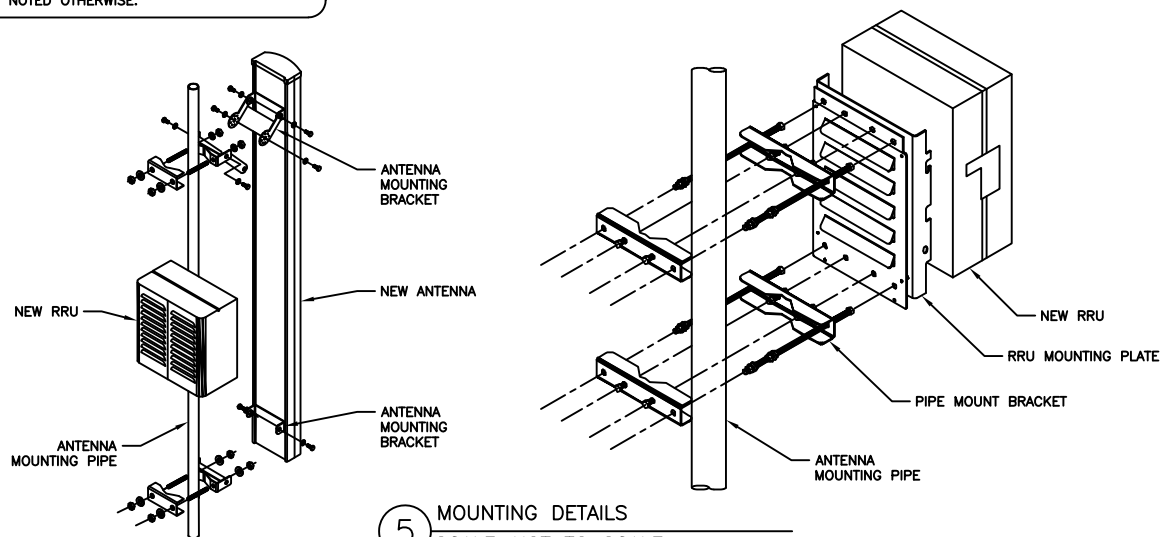
4 NOKIA - AHLOA
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRUs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRU PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

NOTE:

ANTENNA NOT SHOWN FOR CLARITY



5 MOUNTING DETAILS
SCALE: NOT TO SCALE

DATA SHEET DC Surge Protection for RRH/RFM (High-Capacity Junction Box)
ASU9338TYP01 (RNSNDC-7771-PF-48)
Overtoltage Protection & Fiber Management Junction Box

The deployment of Remote Radio Head (RRH) and Remote Flexi Modules (RFM) architecture poses unique challenges to the mobile telecom industry. Raycap's innovative RRH protection solutions mitigate the risk of damage due to lightning and provide high levels of availability and reliability to radio equipment.

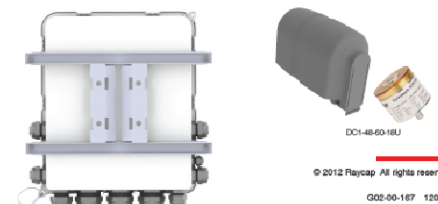


Features

- Employs the Strikescorb® 30-V1-HV Surge Protective Device (SPD) specifically designed for the Remote Radio Head (RRH) and Remote Flexi Modules (RFM) installation environment and certified for use in DC applications and at low DC operating voltages (48V).
- The Strikescorb 30-V1-HV is a Class I SPD, certified by VDE per the IEC 61043-1 standard as suitable for installation in areas where direct lightning exposure is expected. Strikescorb 30-V1-HV is able to withstand direct lightning currents of up to 5kA (10/350) and induced surge currents of up to 60kA (8/20).
- Provides very low let through / clamping voltage - unique for a Class I product - as it does not employ spark gaps or other switching elements. Strikescorb offers unique protection levels to the RRH equipment as well as the Base Band Units.
- Stock unit ships with all glands necessary for use with hybrid cable. This includes the top and base of towers, and the central unit on roof top applications.
- Fully recognized to the UL 1449 3rd Edition Safety Standard.
- Patent pending design.

Benefits

- Offers unique maintenance-free protection against direct lightning currents.
- Protects up to 9 RRHs/RFMs and connects up to 18 fiber pairs.
- Utilizes an IP 67 rated enclosure, allowing for indoor or outdoor installation on a roof or tower top.
- Configurable cable ports are designed to accommodate NSN high-capacity/low-capacity hybrid trunk cables (combined power and fiber optic), Coax Reuse, and NSN hybrid jumper cables.
- Lightweight aerodynamic design provides maximum flexibility for tower top installation.



© 2012 Raycap All rights reserved.

6 RAYCAP - RNSDC-7771-PF-48
SCALE: NOT TO SCALE

T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE
116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
KEEBLER/COLORADO
SPGS/CSP209

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG

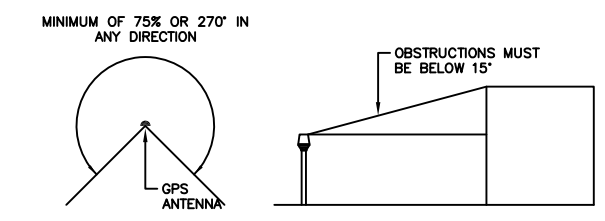
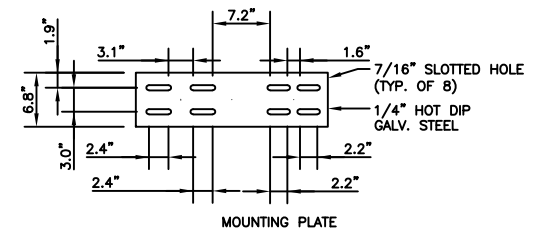
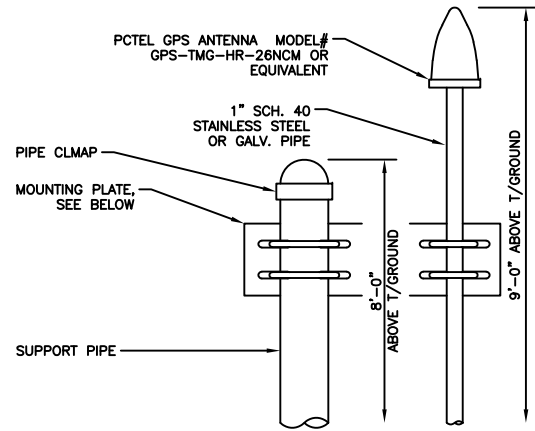
COLORADO LICENSED
JACOB GORALSKI
PE.0049661
PROFESSIONAL ENGINEER

11/29/2018

JACOB GORALSKI, PLLC
CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

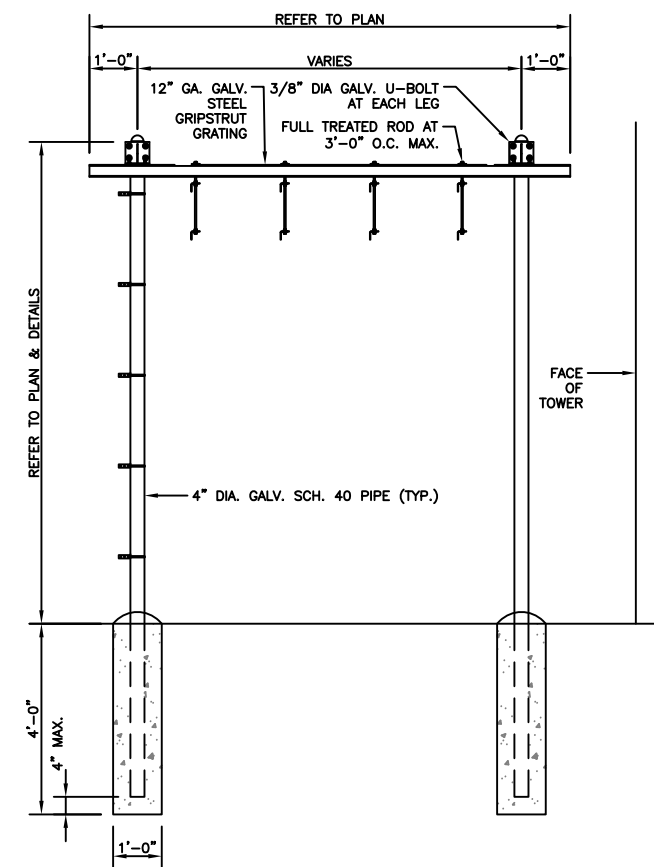
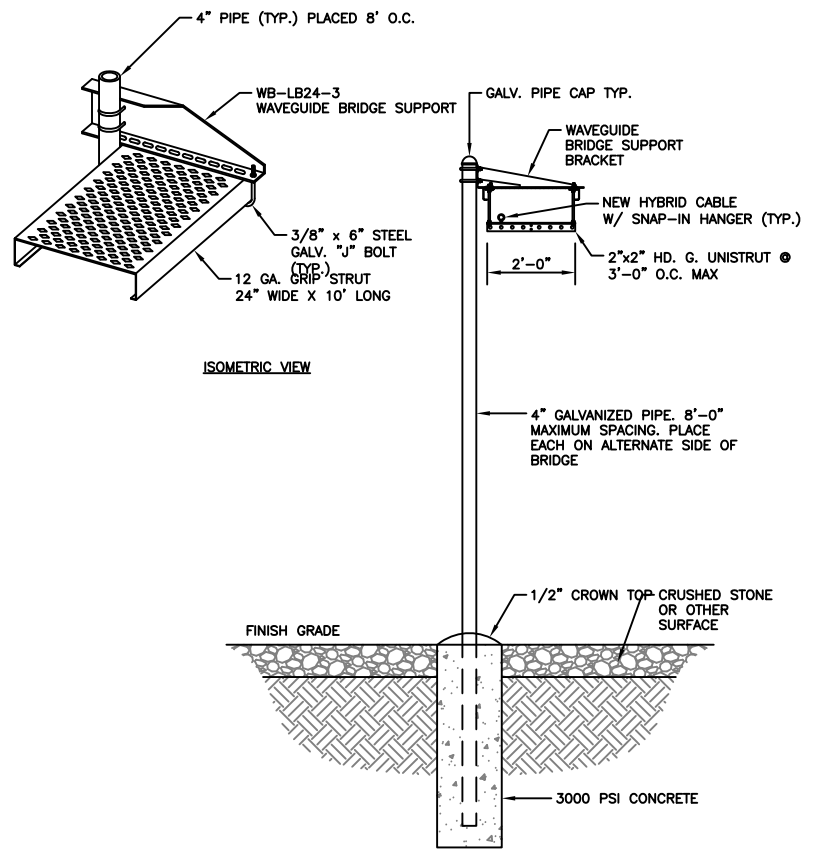
IT IS A VIOLATION OF LAW FOR ANY PERSON,
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

SHEET NUMBER: C-5
REVISION: 1

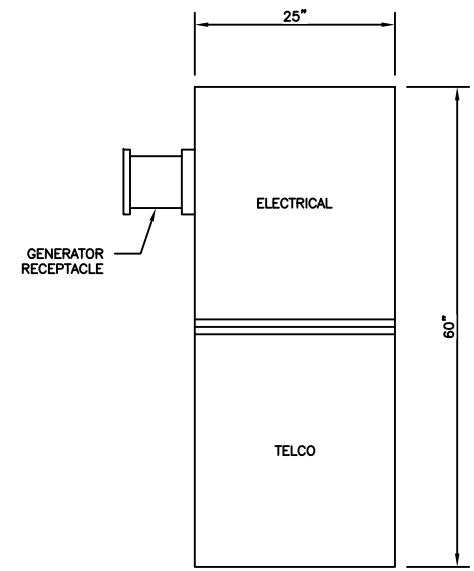


- NOTES:**
1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
 2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 1-1/4\"/>

1 GPS ANTENNA DETAIL
SCALE: NOT TO SCALE



2 ICE BRIDGE DETAIL
SCALE: NOT TO SCALE



POWER PEDESTAL CABINET
200 A POWER TRANSFER
CABINET W/O TELCO

GENERAL
CONSTRUCTION: SINGLE LAYER AL. ENCLOSURE, TYPE 3R
DIMENSIONS (WxHxD): 20 x 40 x 10 INCH
WEIGHT: APPROX. 75 LBS (WITHOUT PACKAGING)
FINISH: POLYESTER POWDER PAINT
DOOR LATCH: 3-POINT LATCHING, PAD LOCKABLE
SAFETY: UL50 (CABINET)

ENVIRONMENT
OPERATING TEMPERATURE: -40°C TO +46°C (-40°F TO 115°F)
HUMIDITY (RELATIVE): 95%, NON-CONDENSING (MAX.)
PROTECTION CLASS: TYPE 3R

AC SECTION
VOLTAGE: 240/120V SINGLE PHASE (3 WIRE + GROUND)
CURRENT: 200A
AIC RATING: UTILITY 65,000 AMPS, PANLOC 10,000 AMPS
GENERATOR INTERFACE: PANLOC™ (LEFT MOUNT)
SERVICE DISCONNECT: SQUARE D 200 AMP
MANUAL TRANSFER SWITCH

OTHER FEATURES
LOAD CENTER: SQUARE D 200 AMP, QO SERIES, 24 POSITION
SURGE PROTECTION DEVICE (SPD) - 1 EA. AC DATA 2080
SQUARE D 30 AMP, 2 POLE BREAKER FOR SPD
GROUND BAR
SILKSCREENED DEAD-FRONT
CAPTIVE DEAD-FRONT FASTENERS

NOTE:
1. WEIGHT OF CABINET IS 150 LBS.
2. NORTHERN TECHNOLOGIES, INC.
PPC#CS7S2-WB36-R OR APPROVAL
EQUAL SEE PPC CABINET DIAGRAM
(1/E-2) FOR BREAKER REQUIREMENTS.

NOTE:
1. WEIGHT OF CABINET IS 150 LBS.
2. NORTHERN TECHNOLOGIES, INC.
PPC#CS7S2-WB36-R OR APPROVAL
EQUAL SEE AC PANEL FOR BREAKER
REQUIREMENTS.

3 NOT USED
SCALE: NOT TO SCALE

4 PPC UNIT
SCALE: NOT TO SCALE

T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE
116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
**KEEBLER/COLORADO
SPGS/CSP209**

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



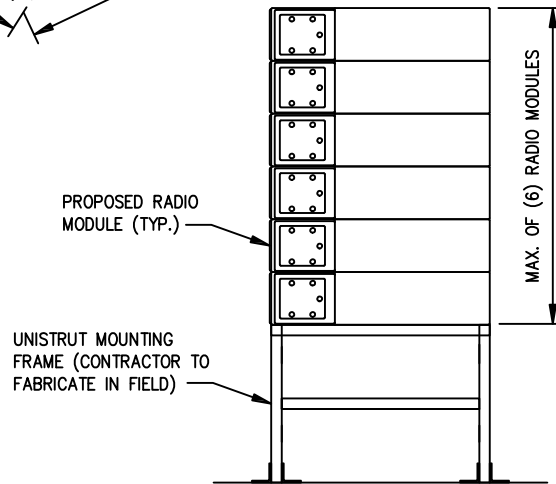
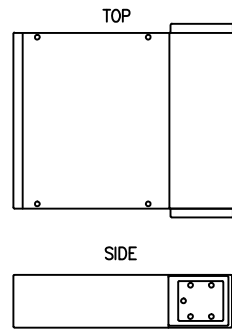
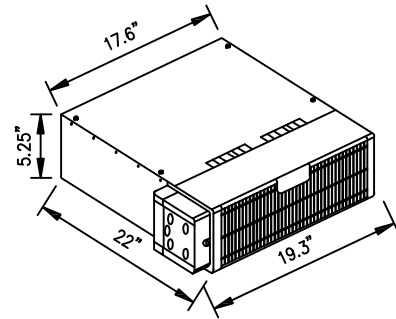
11/29/2018
JACOB GORALSKI, PLLC
CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

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.

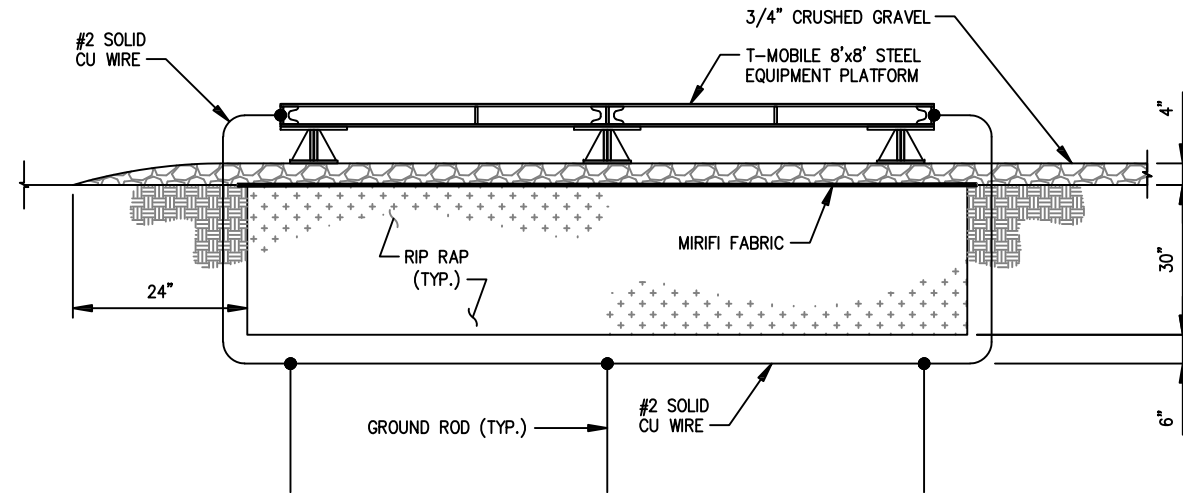
SHEET NUMBER: **C-6** REVISION: **1**

NOKIA FLEXI SYSTEM RADIO MODULES:
FBBC, FRIA, FRIE, FSME, FSMF, FXFB, FXFC

CLEARANCES: FRONT: 23.6"
BACK: 8"
TOP: 1.2"
SIDES: 4"
WEIGHT: 44 lbs.
NOTE: MODULE CAN BE INSTALLED VERTICALLY AND HORIZONTALLY



1 NOKIA FLEXI SYSTEM / RADIO MODULE STACKED SLEEVE DETAIL
SCALE: NOT TO SCALE

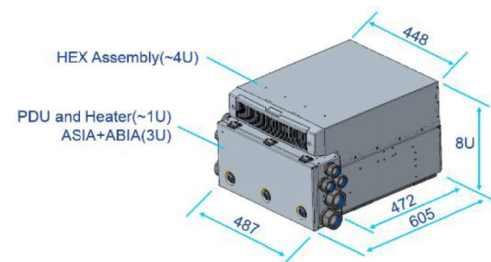


NOTE:
ROAD BASE BACKFILL
COMPACTED ±95%

2 STEEL EQUIPMENT PLATFORM GROUND DETAIL
SCALE: NOT TO SCALE

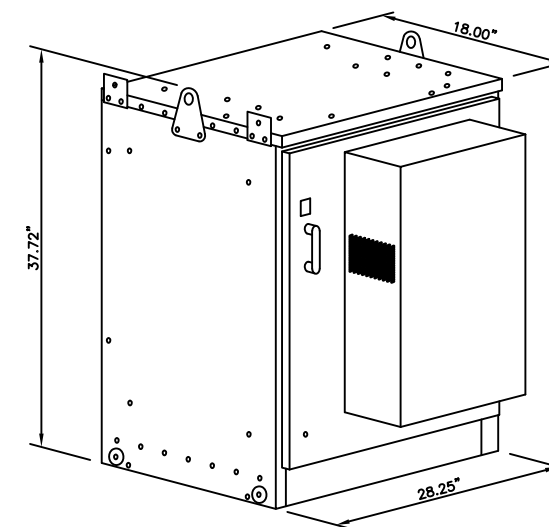
AirScale Subrack Outdoor AMOB datasheet

Datasheet			
Environmental protection	IP55	Height	8U (354 mm)
Feature description:		Width (front cover)	487mm
• Outdoor Subrack for AirScale System Module Indoor plug-in units		Width (cabinet)	448mm (fits into 19 inch rack) 487mm (without conduit plugs or fittings)
• High performance Heat Exchanger "HEX"		Depth	Total 605mm (472mm from rack mounting surface)
• Compatible with Flexi BTS mechanics stack/plinth/wall/pole/rack installation		Weights	23 kg AMOB enclosure 3 kg ASIA (Core Module) 2 kg ABIA (Expansion Module) 32 kg 1/2 Capacity (1 Core + 3 Expansion) 41 kg Full Capacity (2 Core + 6 Expansion)
• Compatible with the 3rd part 19" racks and cabinets if it follows clearances and airflow requirements		Ingress Protection	IP55
• Possible to install AMOB inside FCOA cabinet		Operating Temperature	-40°C up to +35°C (without solar radiation)
• Service doors on front and rear sides		Installation Temperature	-20°C - +55°C
		Airflow Direction	Back to front airflow direction supported for Horizontal(FCOA, 19" rack, Flexi stack) Front to back airflow direction supported for Vertical(wall and pole mounting case)
		Clearances for cooling	40 mm Minimum on the back and front side
		Cold start	~2h from -40°C to -5°C *Optional 2nd heater can be added to meet NAM requirement, cold start from -40°C to -5°C in 1 hour instead of 2 hours
		Nominal supply voltage	-40.5 ... -57 VDC
		Input voltage range	Extended Service Voltage Range supported -36Vdc ... -60Vdc Floating
		Volume	104.5L
		Mass capacity	Support Max 18Kg inside
		Power consumption	Typical max ~265W (all fans at highest speed) Cold start ~60W (heater On 55W + fans at low speed)
		Conduit cable entry	2x1.5" + 3x 1" on each left and right side



3 © Nokia 2016 Confidential

3 AMOB SPECIFICATIONS
SCALE: NOT TO SCALE



NOTES:
1. WEIGHT OF CABINET (WITHOUT BATTERIES) IS 232 LBS.
2. BASE FRAME NOT SHOWN.

4 200AMP SITE SUPPORT CABINET
SCALE: NOT TO SCALE

T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE
116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

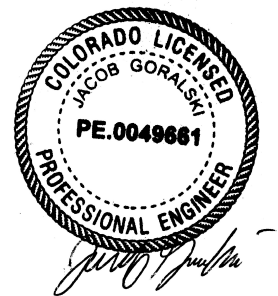
T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
**KEEBLER/COLORADO
SPGS/CSP209**

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:				
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



11/29/2018
JACOB GORALSKI, PLLC
CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

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-7** REVISION: **1**

PV-LPP
L.I.F.E. MOUNT™ LOW PROFILE PLATFORM

TABLE 1: PLATFORM CONFIGURATIONS

PART NUMBER	DESCRIPTION	MIN POLE OD	MAX POLE OD	WEIGHT (LBS)	INCLUDED PARTS							
					PIPE-312X150	PIPE-238X174	PIPE-238X174	PV-RM1045	PV-RM3060	PV-LPP12M	PV-LPP14M	PV-PHK12B
PV-LPP12M-B	12'6" FACE PLATFORM	10"	34"	1267	3	-	-	-	1	-	-	0
PV-LPP14M-B	14'6" FACE PLATFORM	10"	35"	1365	3	-	-	-	3	-	-	0
PV-LPP14L-B	14'6" FACE PLATFORM, LARGE POLE	33"	60"	1370	-	3	-	-	1	3	-	0
PV-LPP12M-HR-B	12'6" FACE PLATFORM W/ HANDRAIL	10"	34"	1522	3	-	3	-	1	-	3	1
PV-LPP14M-HR-B	14'6" FACE PLATFORM W/ HANDRAIL	10"	35"	1641	-	3	-	3	1	-	3	1
PV-LPP14L-HR-B	14'6" FACE PLATFORM W/ HANDRAIL, LARGE POLE	33"	60"	1647	-	3	-	3	1	3	-	1

TABLE 2: ANTENNA PIPE OPTIONS***

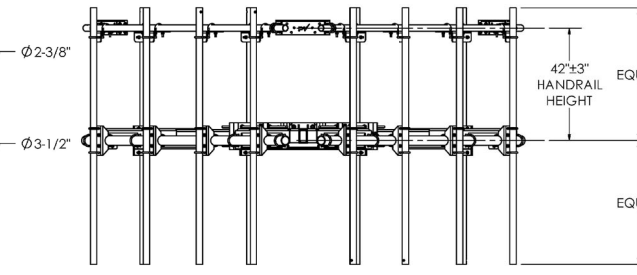
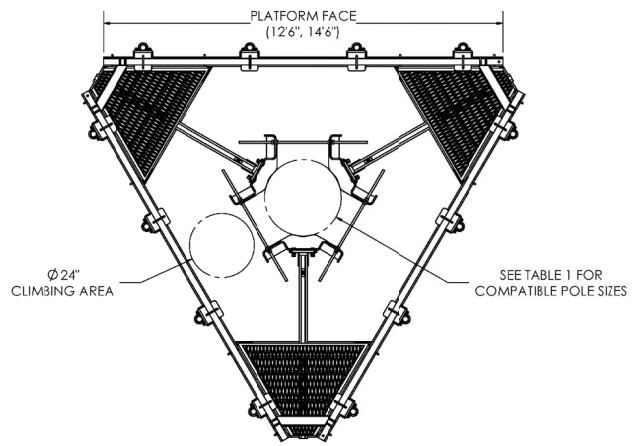
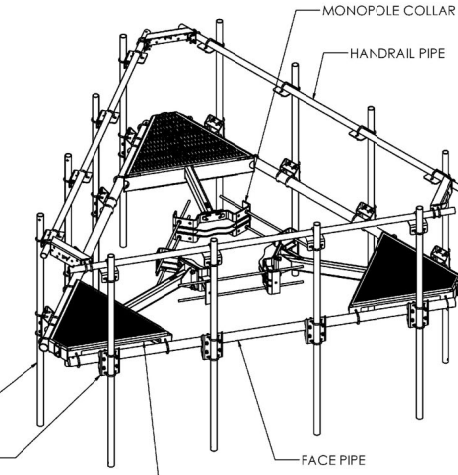
OD	LENGTH	ANTENNA PIPE	WEIGHT (LBS)
2-3/8"	72"	PIPE-238X72	22
	96"	PIPE-238X96	29
	126"	PIPE-238X126	36
2-7/8"	84"	PIPE-278X84	41
	96"	PIPE-278X96	46.5
	126"	PIPE-278X126	61
3-1/2"	72"	PIPE-312X72	46
	96"	PIPE-312X96	61
	126"	PIPE-312X126	80

***PLATFORM WITH HANDRAIL KITS ARE COMPATIBLE WITH 2-3/8" OD HANDRAIL PIPE ONLY

TABLE 3: CROSSOVER BRACKETS

PART NUMBER	COMPATIBLE ANTENNA PIPE	WEIGHT (LBS)
PV-XP-2030-HD	2-3/8" OD	12.5
PV-XP-2530-HD	2-7/8" OD	12.75
PV-XP-3030-HD	3-1/2" OD	13

ANTENNA PIPE (SOLD SEPARATELY)
CROSSOVER BRACKET (SOLD SEPARATELY)



REV	DESCRIPTION	DATE
1	UPDATED LOADING, TEMPLATE	1/16/18
2	VIEW LOADING	1/19/17
3	HEAVY-S LOADING	4/13/15
4	L.I.F.E. MOUNT™ UPDATE	2/22/16
5	REDESIGNED COLLAR	12/30/15

MOUNT CLASSIFICATIONS:

REFERENCE STRUCTURAL LETTER (LPP-STL-01-R1) FOR ADDITIONAL LOADING REQUIREMENTS

- MOUNT CLASSIFICATION INFORMATION:**
- MAX STRUCTURE HEIGHT: 400ft
 - STRUCTURE CLASS: I OR II
 - EXPOSURE CATEGORY: B OR C
 - TOPOGRAPHIC CATEGORY: 1
 - DESIGN WIND PRESSURE (NO ICE): 135psf
 - DESIGN WIND PRESSURE (ICED): 15psf
 - DESIGN ICE THICKNESS: 2.75in Radial

APPROVED MOUNT CLASSIFICATIONS*

REQUIRED EXTREME ICE LOAD (LBS)	APPROVED MOUNT CLASSIFICATIONS (4 PIPE)				
	REQUIRED EXTREME WIND LOAD (LBS)				
	700	750	1150	1550	1800
0	M750R(0)-4(6)	M750R(0)-4(6)	M1150R(0)-4(6)	M1550R(0)-4(6)	M1800R(0)-4(6)
600	M750R(600)-4(6)	M750R(600)-4(6)	M1150R(600)-4(6)	M1550R(600)-4(6)	M1800R(600)-4(6)
800	M750R(800)-4(6)	M750R(800)-4(6)	M1150R(800)-4(6)	M1550R(800)-4(6)	M1800R(800)-4(6)
1100	M750R(1100)-4(6)	M750R(1100)-4(6)	M1150R(1100)-4(6)	M1550R(1100)-4(6)	M1800R(1100)-4(6)
1250	M750R(1250)-4(6)	M750R(1250)-4(6)	M1150R(1250)-4(6)	M1550R(1250)-4(6)	M1800R(1250)-4(6)

* HEAVY-S

APPLIES TO ALL PV-LPP12M, PV-LPP14M, AND PV-LPP14L SERIES PLATFORMS WITH ANTENNAS AND APPURTENANCES SYMMETRICALLY MOUNTED ABOUT THE PLATFORM CENTERLINE.

POLE THICKNESS LIMITATIONS:
ON POLES WITH WALL THICKNESS EQUAL TO OR GREATER THAN THE VALUES LISTED BELOW, THE PERFECT VISION PV-LPP MOUNT SERIES IS STRUCTURALLY CAPABLE OF SUPPORTING THE ABOVE LOADING SCENARIOS WITHOUT THE NEED FOR AN ADDITIONAL KICKER BRACE.

FOR THIN WALL POLES, USE PV-PKKB PLATFORM KICKER BRACE TO AVOID POLE CRIMPING FAILURES. KICKER BRACE CAN BE INSTALLED ABOVE OR BELOW PLATFORM.

MOUNT CLASSIFICATION	MINIMUM POLE THICKNESS
M750R-4(6)	1/4"
M800R-4(6)	1/4"
M900R-4(6)	1/4"
M950R-4(6)	1/4"
M1000R-4(6)	5/16"
M1400R-4(6)	5/16"
M1000R(i)-4(6)	5/16"
M1500R(i)-4(6)	5/16"

PLATFORM EPA:

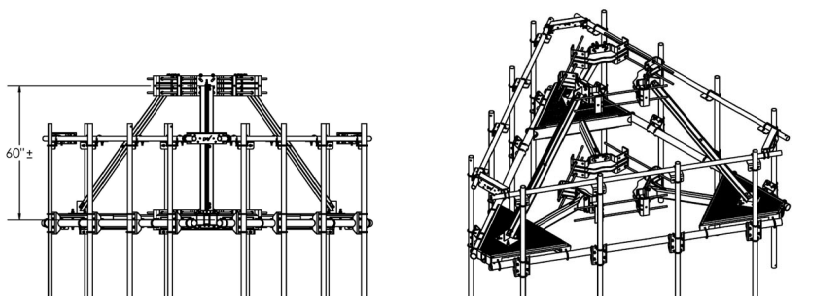
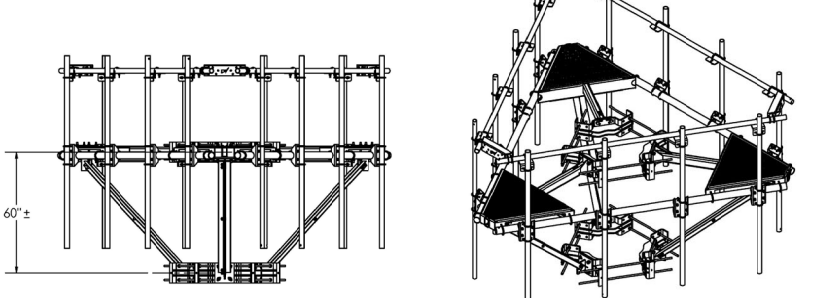
PLATFORM TYPE	NO ICE (FT ²)	1/2" RADIAL ICE (FT ²)
12'6" FACE	20.3*	25.8*
12'6" FACE WITH HANDRAIL	34.4**	43.0**
14'6" FACE	22.1*	28.1*
14'6" FACE WITH HANDRAIL	36.8**	46.2**

* DOES NOT INCLUDE CROSSOVER PLATES OR ANTENNA PIPES
** DOES NOT INCLUDE ANTENNA PIPES

KICKER ATTACHMENT:

SEE CLASSIFICATIONS SECTION FOR KICKER REQUIREMENT DETAILS.

INSTALL KICKER ABOVE OR BELOW PLATFORM



1 PERFECT 10 PV-LPP12M-HR-B
SCALE: NOT TO SCALE

REV	DESCRIPTION	DATE
1	UPDATED LOADING, TEMPLATE	1/16/18
2	VIEW LOADING	1/19/17
3	HEAVY-S LOADING	4/13/15
4	L.I.F.E. MOUNT™ UPDATE	2/22/16
5	REDESIGNED COLLAR	12/30/15

T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE
116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
**KEEBLER/COLORADO
SPGS/CSP209**

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

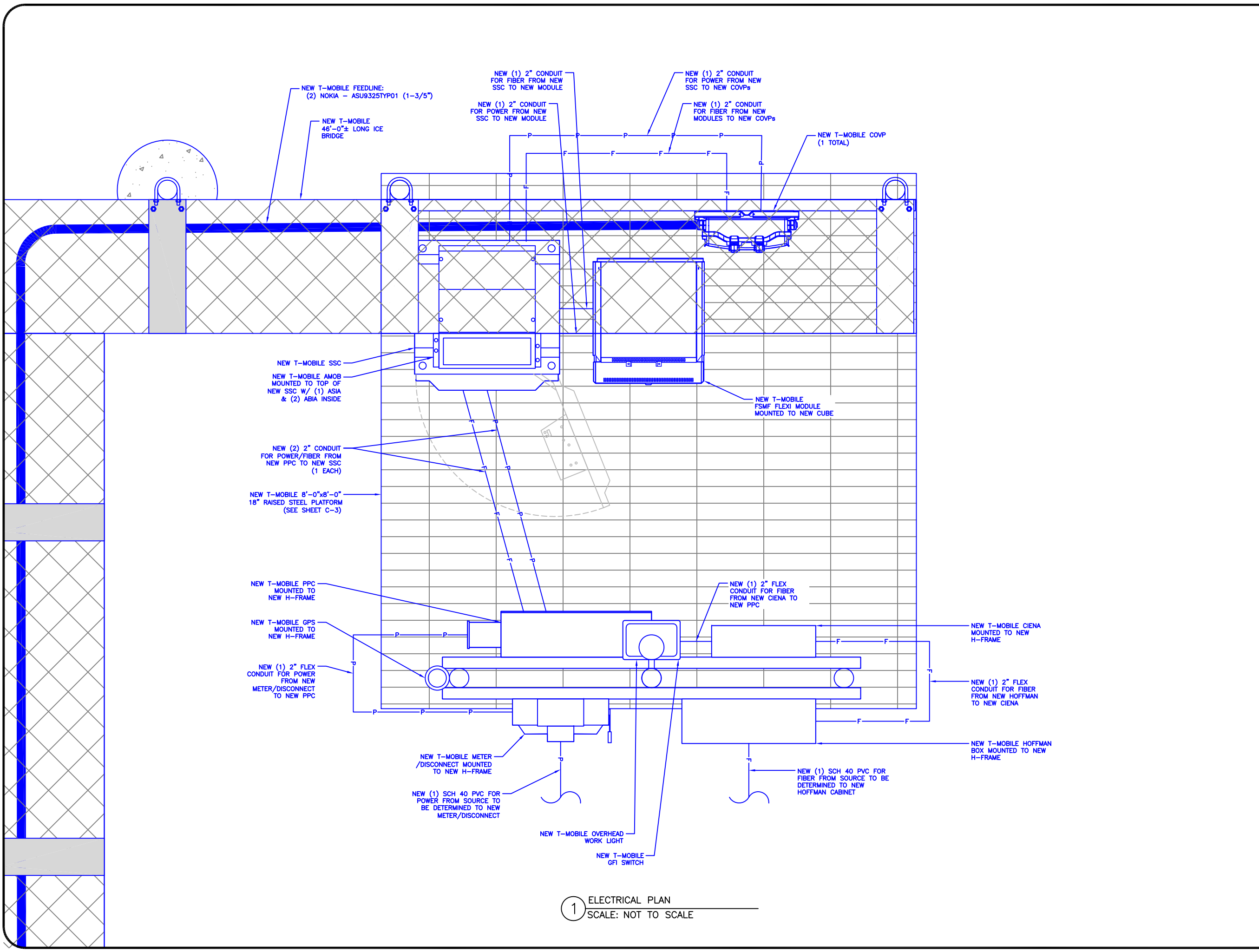
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG

**COLORADO LICENSED
JACOB GORALSKI
PE.0049661
PROFESSIONAL ENGINEER**

11/29/2018
JACOB GORALSKI, PLLC
CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

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: **1**



1 ELECTRICAL PLAN
SCALE: NOT TO SCALE

T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE
116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

BU #: **877103**
KEEBLER/COLORADO
SPGS/CSP209

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

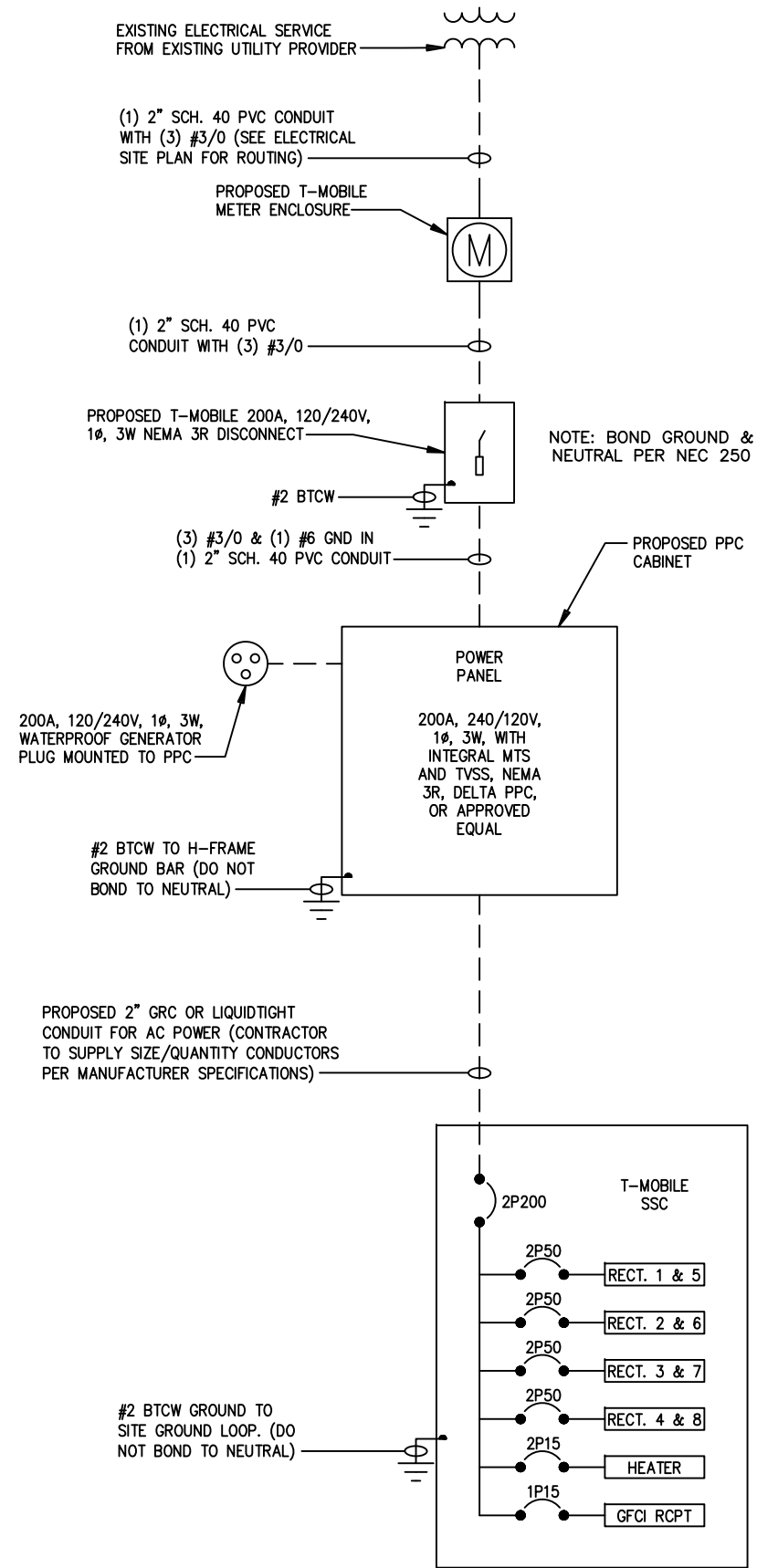
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG

COLORADO LICENSED
JACOB GORALSKI
PE.0049661
PROFESSIONAL ENGINEER

11/29/2018
JACOB GORALSKI, PLLC
CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

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: **E-1** REVISION: **1**



NOTE:
CONTRACTOR TO COORDINATE WITH LOCAL UTILITY PROVIDER PRIOR TO CONSTRUCTION

1 ELECTRICAL ONE LINE DIAGRAM
SCALE: NOT TO SCALE

PANEL: PPC

120/240 VOLTS, 1 PHASE, 3 WIRE, S/N, 200A AMP MCB NEMA 3R ENCL
MINIMUM AIC RATING - 22,000A

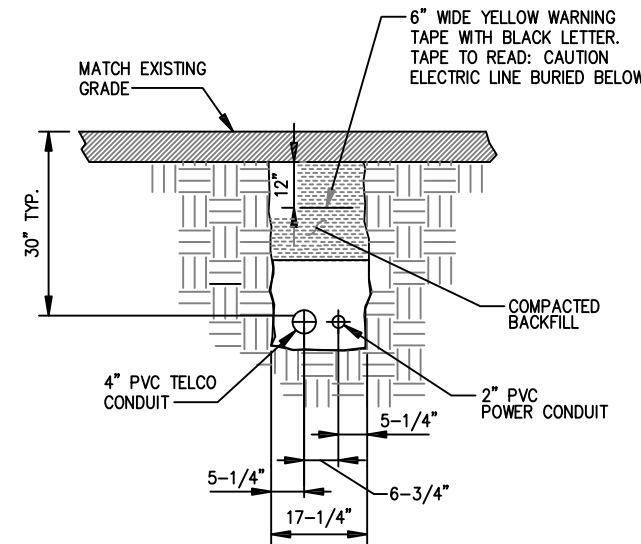
DESCRIPTION	BKR	POLE	CKT	VA	φ	VA	CKT	POLE	BKR	DESCRIPTION
SURGE PROTECTOR	30	2	1	--	A	50	2	1	10	FAN
2P BRANCH	--	--	3	--	B		4			SPACE
RECEPTACLE/LIGHTS	15	1	5	230	A		6			SPACE
SPACE	20	1	7		B	1000	8	2	20	HEATER
SPACE			9		A	1000	10	--	--	2P BRANCH
SPACE			11		B	15,000	12	2	200	(N) DELTA SUPPORT CABINET
SPACE			13		A	15,000	14	--	--	--
SPACE			15		B	--	16	--	--	2P BRANCH
SPACE			17		A	--	18	--	--	--
SPACE			19		B	--	20	--	--	--
SPACE			21		A	--	22	--	--	--
SPACE			23		B	--	24	--	--	--

PANEL LOAD CALCULATIONS:

LIGHTS: 50 VOLTAMPS x 1.25 = 63 VA
 RECEPTACLE: 180 VOLTAMPS x 1.00 = 180 VA
 MISC. EQUIPMENT: 32050 VOLTAMPS x 1.00 = 32,050 VA

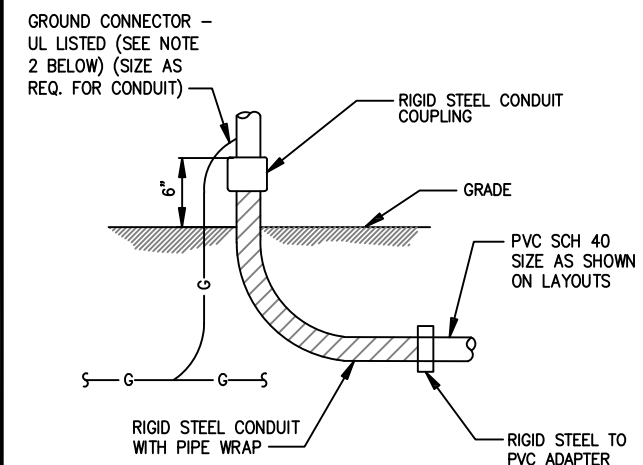
TOTAL CALCULATED CONNECTED LOAD: 32,280 VA
 TOTAL CALCULATED DEMAND LOAD: 32,293 VA
 TOTAL CALCULATED DEMAND LOAD: 135A 120/240V 1PH 3W

2 BREAKER PANEL SCHEDULE
SCALE: NOT TO SCALE



NOTE:
NUMBER AND SIZE OF CONDUITS MAY VARY. SEE DWG E-1 FOR CONDUIT SIZE AND LOCATION. CONFIRM DIMENSIONS SHOWN WITH UTILITY COMPANY

3 CONDUIT TRENCH DETAIL
SCALE: NOT TO SCALE



NOTES:
 1. ALL CONDUIT ABOVE GRADE MUST BE RIGID STEEL OR LIQUIDTIGHT.
 2. ALL NEW STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 G90 AFTER FABRICATION.
 3. FIELD ABRASIONS SHALL BE TOUCH UP PAINTED WITH ZINC RICH GALVANIZING REPAIR PAINT IN ACCORDANCE WITH ASTM A780.
 4. ALL EXPOSED ENDS OF CONDUITS SHALL HAVE WEATHER PROOF CAPS. DO NOT USE DUCT TAPE.
 5. PROVIDE 200LB. TEST PULL WIRES IN EACH TELEPHONE AND POWER CONDUIT. STUB CONDUITS INTO ENCLOSURE AND LABEL.

4 UNDERGROUND CONDUIT STUB-UP
SCALE: NOT TO SCALE

T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE
116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

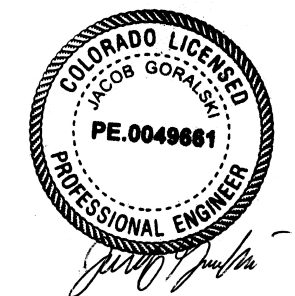
BU #: 877103
KEEBLER/COLORADO
SPGS/CSP209

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

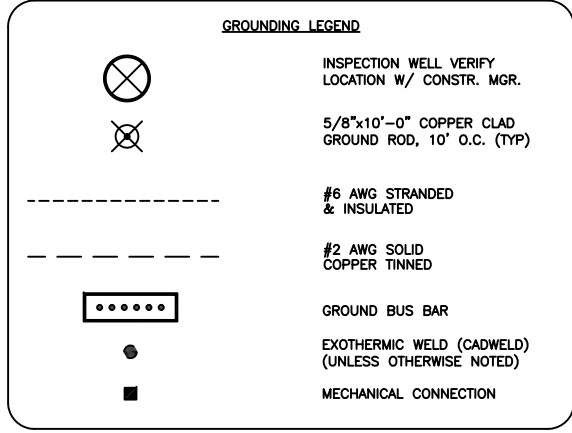
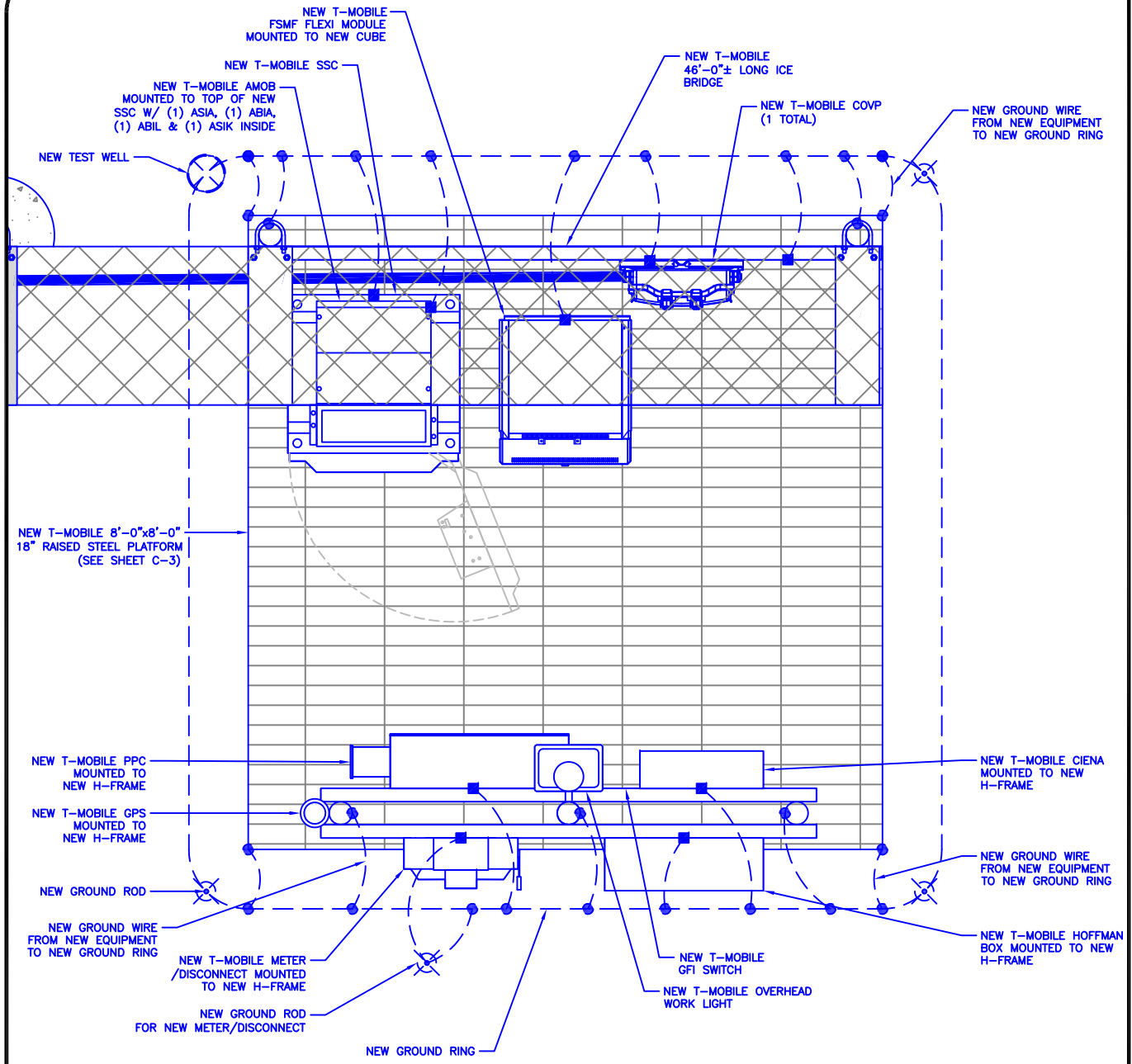
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



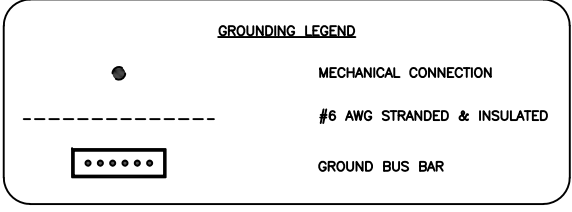
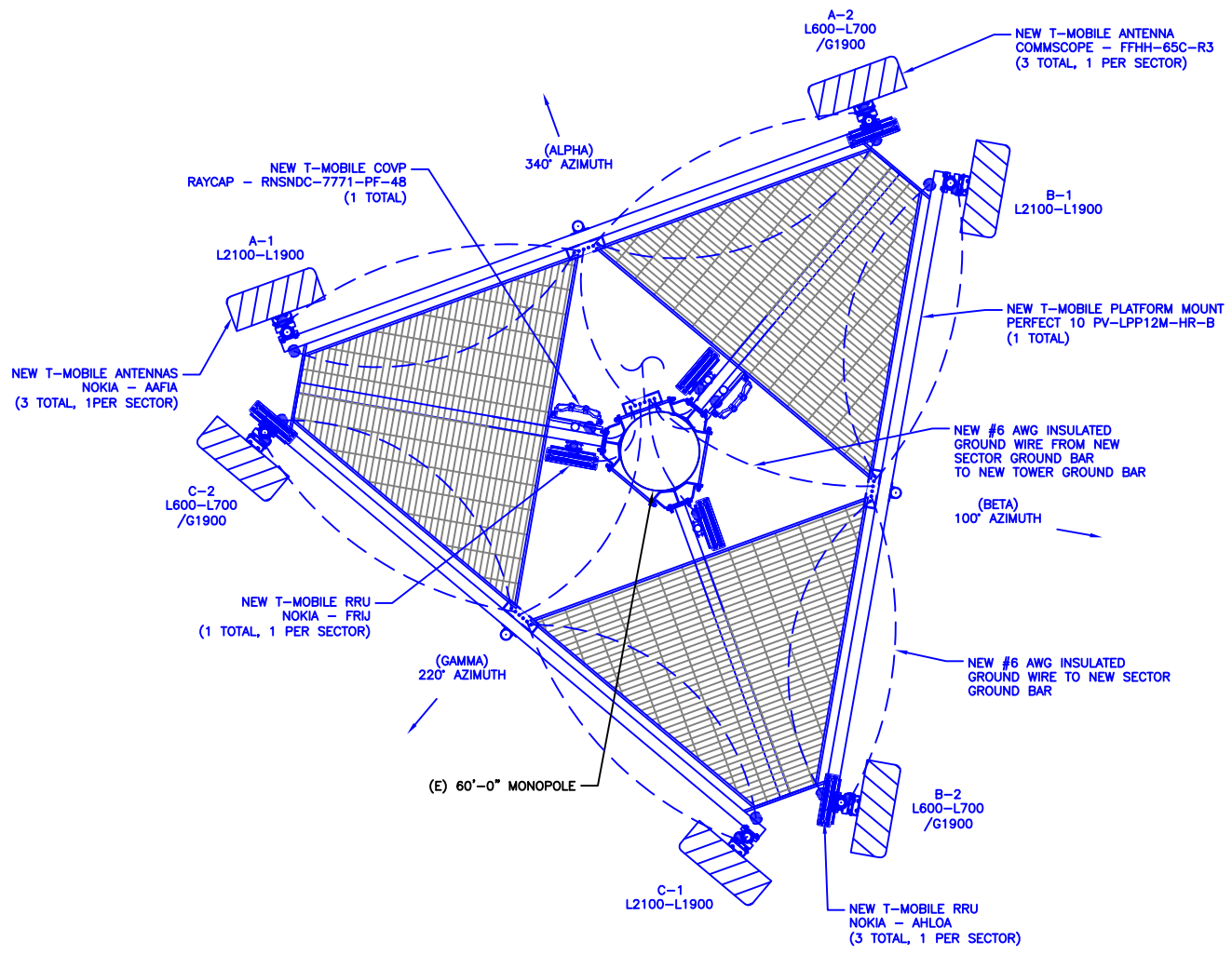
11/29/2018
 JACOB GORALSKI, PLLC
 CONSULTING ENGINEER
 JACOB GORALSKI, PLLC
 CO PE# 0049661
 1106 COLBI ST.
 KENNEDALE, TX 76060
 (817) 456-2621

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: E-2 REVISION: 1



1 EQUIPMENT GROUNDING DIAGRAM
SCALE: NOT TO SCALE



2 ANTENNA GROUNDING PLAN
SCALE: NOT TO SCALE



T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE
116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
**KEEBLER/COLORADO
SPGS/CSP209**

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

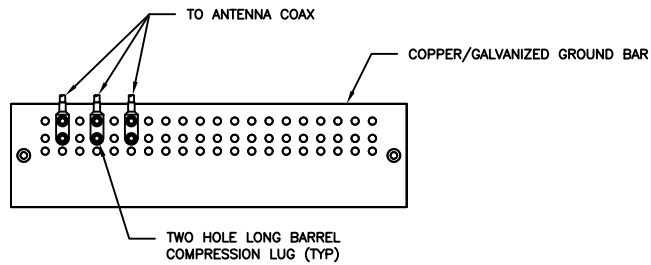
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



11/29/2018
JACOB GORALSKI, PLLC
CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

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.

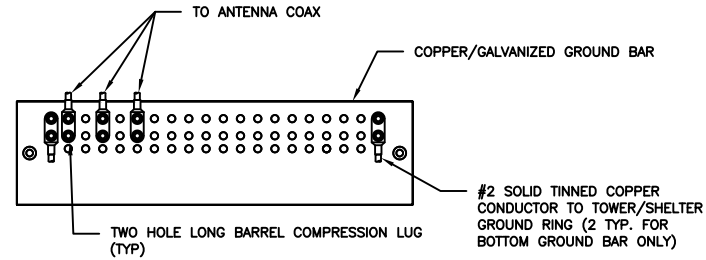
SHEET NUMBER: **G-1** REVISION: **1**



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.

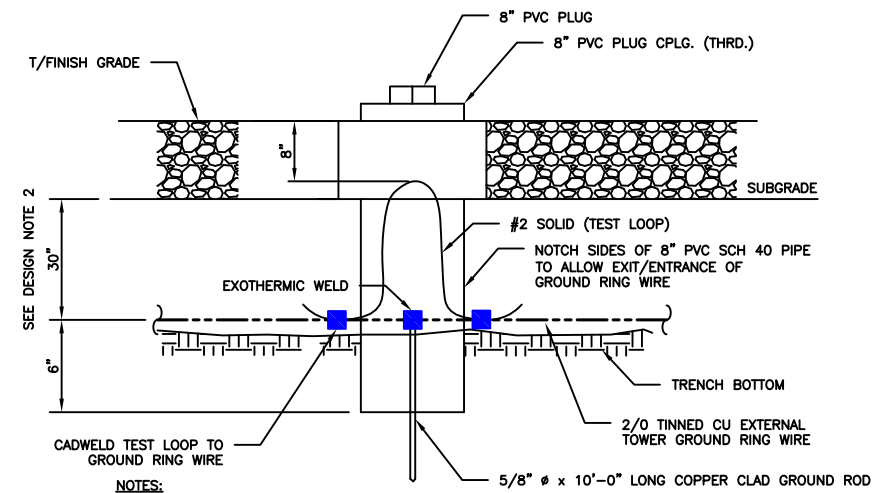
1 ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



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.

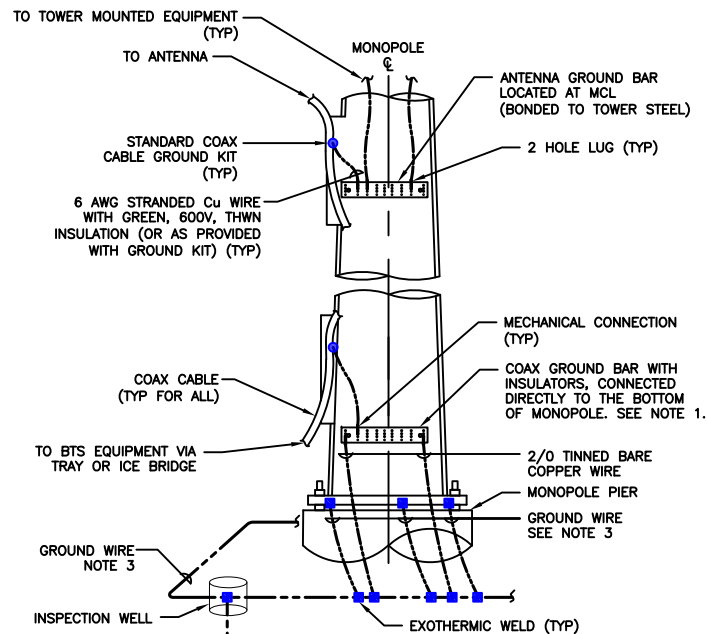
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



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)

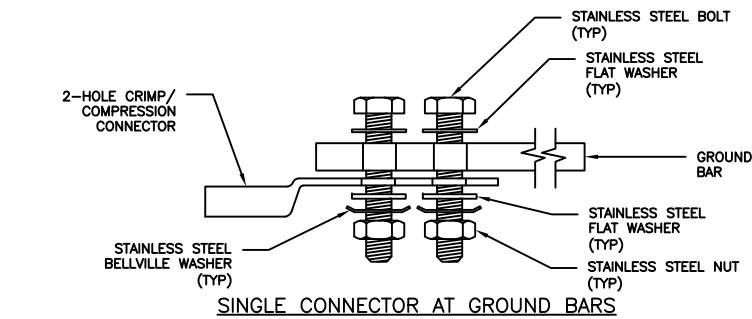
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



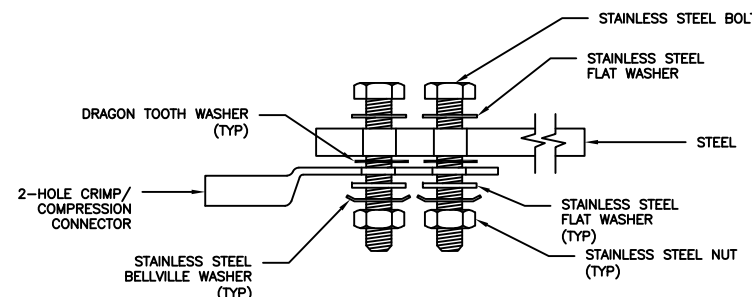
NOTES:

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 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.

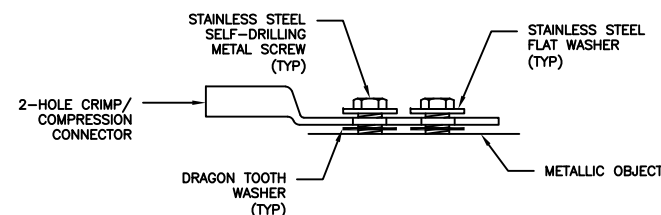
4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

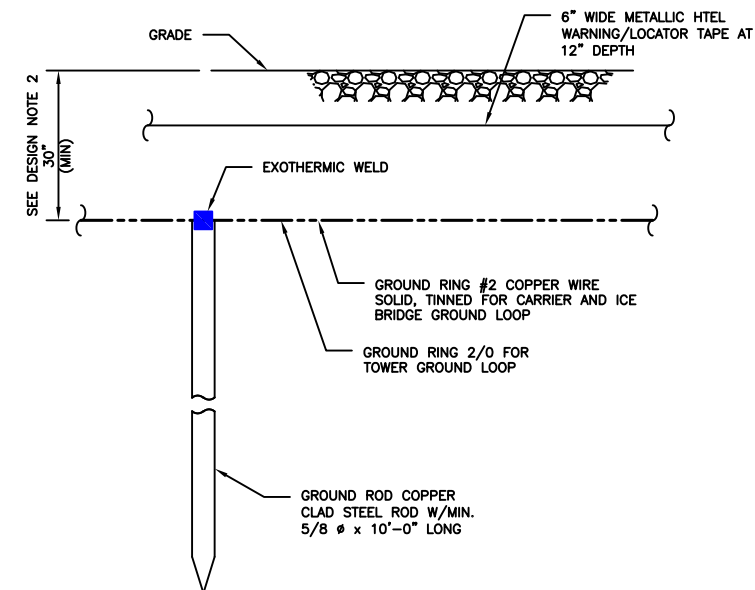


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

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

T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE

116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
**KEEBLER/COLORADO
SPGS/CSP209**

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



11/29/2018

JACOB GORALSKI, PLLC

CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

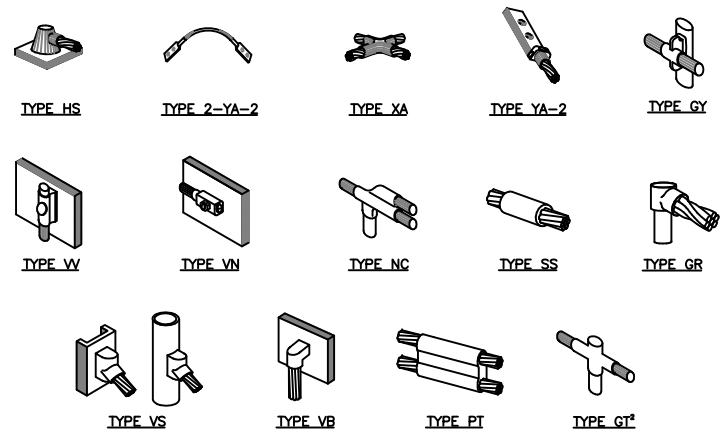
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER:

G-2

REVISION:

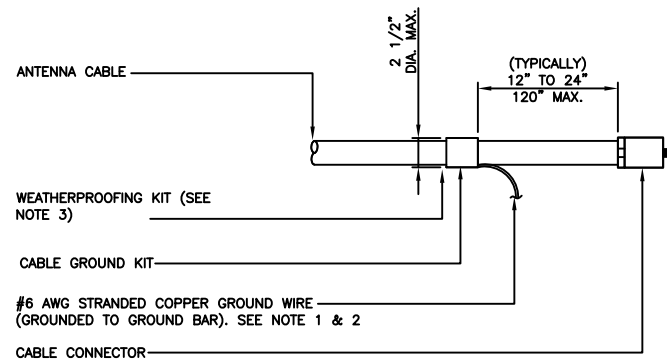
1



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.

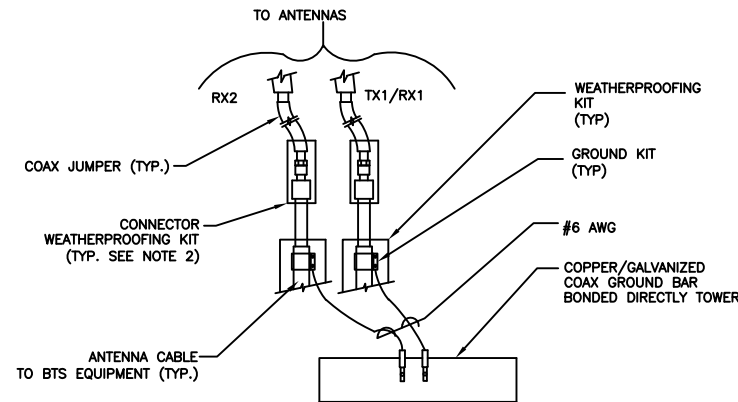
1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE



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.

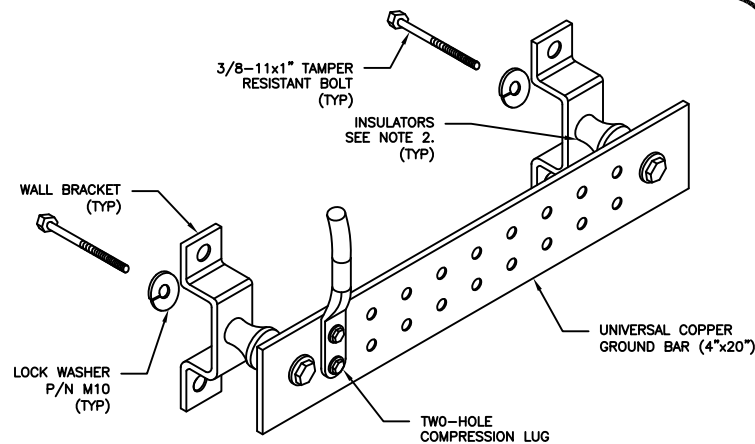
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. 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.

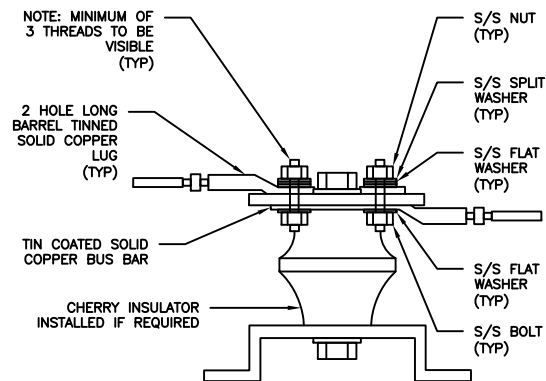
4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



NOTES:

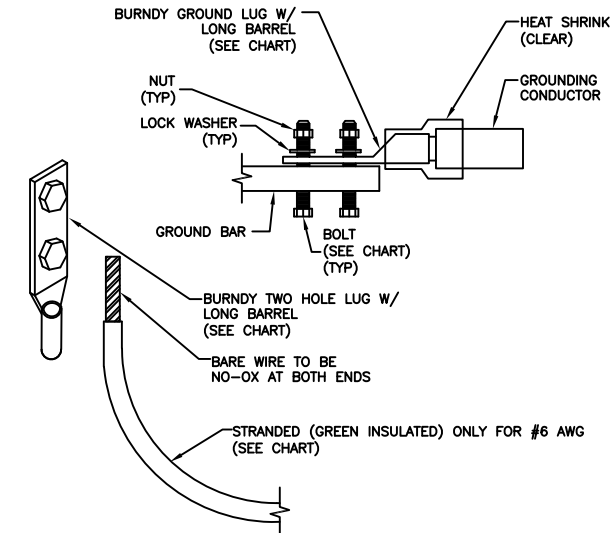
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY GAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING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

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE

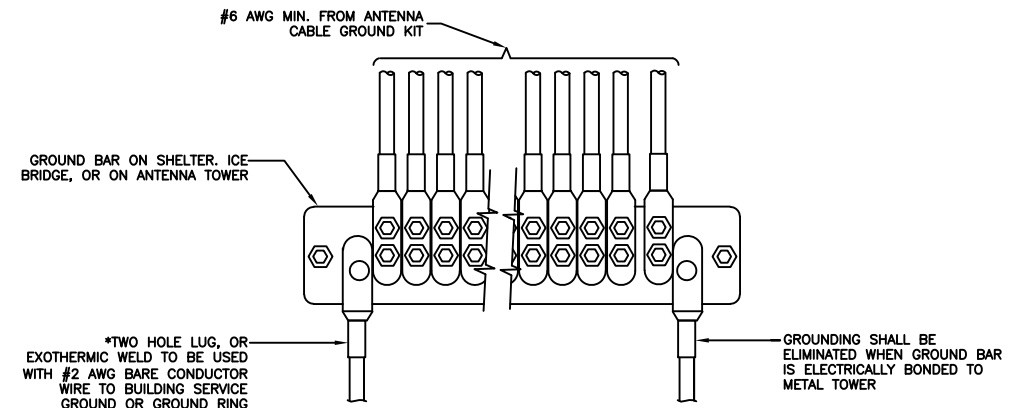
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



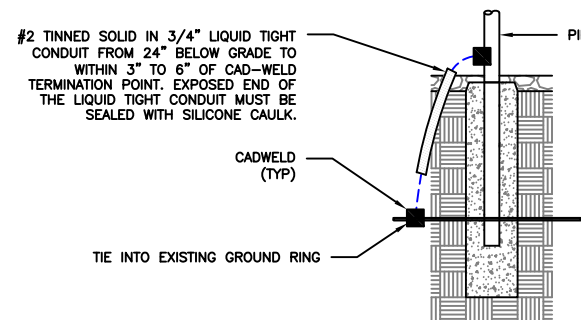
NOTES:

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

T-Mobile
18400 E. 22ND AVENUE
AURORA, CO 80011

CROWN CASTLE
116 INVERNESS DR. EAST STE# 280
ENGLEWOOD, CO 80112

T-MOBILE SITE NUMBER:
DN02415A

BU #: 877103
**KEEBLER/COLORADO
SPGS/CSP209**

231 MAIN STREET
COLORADO SPRINGS, CO
80911

EXISTING 60.0 FT MONOPOLE

ISSUED FOR:				
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07-10-2018	JAS	PRELIMINARY	ELG
B	08-17-2018	JAS	PRELIMINARY	ELG
0	08-29-2018	JAS	FINAL	ELG
1	11-20-2018	JAS	FINAL	ELG



11/29/2018
JACOB GORALSKI, PLLC
CONSULTING ENGINEER
JACOB GORALSKI, PLLC
CO PE# 0049661
1106 COLBI ST.
KENNEDALE, TX 76060
(817) 456-2621

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: **G-3** REVISION: **1**