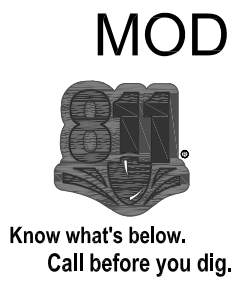




THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO T-MOBILE SERVICES IS STRICTLY PROHIBITED.



SITE NAME: CHEROKEE TANK
SITE NUMBER: DN02030B
SITE ADDRESS: 2710 PETERSON RD.
COLORADO SPRINGS, CO 80922
COORDINATES: 38.87088450°,-104.70237500°

SHEET INDEX

Table with columns: SHEET NO., TITLE. Rows include T1 (TITLE SHEET), A1.0 (OVERALL SITE PLAN), A1.1 (EX. & NEW ENLARGED EQUIPMENT PLAN), A2.0 (EX. & NEW SOUTH ELEVATIONS), A3.0 (EX. & NEW ANTENNA LAYOUT AND RFDS CONFIGURATION), A3.1 (RFDS CONFIGURATION), A3.2 (RFDS CONFIGURATION), A4.0 (DETAILS), A5.0 (DETAILS), A6.0 (ANTENNA SPECIFICATION DETAILS), A6.1 (ANTENNA SPECIFICATION DETAILS), A6.2 (ANTENNA SPECIFICATION DETAILS), G1.0 (GROUNDING NOTES SCHEMATIC AND DETAILS), GN1 (GENERAL NOTES).

PROJECT INFORMATION:
SITE NAME: CHEROKEE TANK
SITE ID: DN02030B
SITE ADDRESS: 2710 PETERSON RD. COLORADO SPRINGS, CO 80922

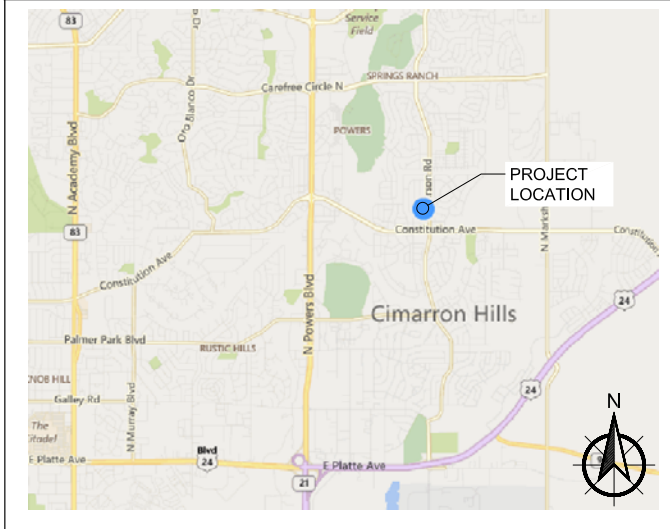
Table with columns: NO., DATE, D/C, DESCRIPTION. Rows: 1 (06-05-17, GW/CM, PRELIM. CONST.), 2 (06-20-17, CM, REVISED PRELIM.).

PLANS PREPARED BY:
CENTERLINE SOLUTIONS
16035 TABLE MOUNTAIN PARKWAY GOLDEN, CO 80403
303.993.3293
WWW.CENTERLINESOLUTIONS.COM

LICENSURE NUMBER:
NOT APPROVED FOR CONSTRUCTION
ALL SCALES ARE SET FOR 11" X 17" SHEET

VICINITY MAP

SITE INFORMATION



PROPERTY OWNER: CHEROKEE WATER DISTRICT, 1335 VALLEY ST., COLORADO SPRINGS, CO 80915
APPLICANT: T-MOBILE WEST LLC, 18400 EAST 22ND AVENUE, AURORA, CO 80011, PH: 303.313.6923
SITE ACQUISITION CONSULTANT: CENTERLINE SOLUTIONS, 16035 TABLE MOUNTAIN PARKWAY, GOLDEN, CO 80403, PM: COLE MOSSMAN: 303.993.3293, PE: KHRISTOPHER SCOTT, PE, EE: PATRICK KEARNS, PE
CONSTRUCTION MANAGEMENT: T-MOBILE WEST LLC, 2323 DELGANY STREET, DENVER, CO 80216, SCOTT TOMLINSON, PH: 970.290.5157
JURISDICTION: EL PASO COUNTY
ASSESSOR'S PARCEL #: 5331400002
POWER PROVIDER: COLORADO SPRINGS UTILITIES
Approved By: Craig Dossey, Executive Director, Date: 11/14/2017, El Paso County Planning & Community Development
A&E: CENTERLINE SOLUTIONS, 16035 TABLE MOUNTAIN PARKWAY, GOLDEN, CO 80403, PM: COLE MOSSMAN: 303.993.3293, PE: KHRISTOPHER SCOTT, PE, EE: PATRICK KEARNS, PE
CONSTRUCTION MANAGEMENT: T-MOBILE WEST LLC, 2323 DELGANY STREET, DENVER, CO 80216, SCOTT TOMLINSON, PH: 970.290.5157
RFDS DATE: 06/08/2017
GOVERNING CODES, AS APPLICABLE: 2009 IBC, 2009 IFC, 2009 IMC, 2009 IECC, 2014 NEC, PPRBD 2011
ZONING DESIGNATION: NOT REQUIRED PER IBC 1103.2.9.

SITE PHOTO



PROJECT DESCRIPTION

CONSTRUCTION OF A NEW T-MOBILE "NON-INHABITABLE" TELECOMMUNICATIONS SITE CONSISTING OF INSTALLING (9) NEW ANTENNAS, (12) RRU'S, (2) COVP'S. ON AN EXISTING WATER TANK AND AN EXISTING 34'-6" MONOPOLE.

DRIVING DIRECTIONS TO SITE

FROM 2323 DELGANY STREET DENVER, CO 80216: DEPART ON DELGANY STREET TOWARD PARK AVENUE. NEXT TURN RIGHT ON PARK AVE, BEAR RIGHT ON FOX ST, TAKE RAMP FOR I-25 S/ US-87 S. AT EXIT 153, TAKE RAMP RIGHT AND FOLLOW SIGNS FOR INTERQUEST PARKWAY, KEEP STRAIGHT ONTO CO-83 N/ INTERQUEST PKWY, TURN RIGHT ON N POWERS BLVD, TURN LEFT ONTO CAREFREE CIRCLE, TURN RIGHT ON PETERSON RD, THEN RIGHT ON BATTLE MOUNTAIN RD, SITE WILL BE ON YOUR LEFT.

GENERAL CONSTRUCTION NOTES

- 1. THE FACILITY IS AN UNOCCUPIED WIRELESS FACILITY.
- 2. PLANS ARE NOT TO BE SCALED AND ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY, UNLESS NOTED OTHERWISE. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- 3. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTORS SHALL VISIT THE JOB SITE AND BE RESPONSIBLE FOR ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE IMPLEMENTATION ENGINEER AND ARCHITECT/ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
- 4. THE CONTRACTOR SHALL RECEIVE, IN WRITING, AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
- 5. CONTRACTOR SHALL CONTACT LOCAL DIGGERS HOTLINE 48 HOURS PRIOR TO PROCEEDING WITH ANY EXCAVATION, SITE WORK OR CONSTRUCTION.
- 6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
- 7. ALL WORK PERFORMED AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. MECHANICAL AND ELECTRICAL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

DRAWN BY: GW, CHK BY: CM, APV BY: KS

SHEET TITLE:
TITLE SHEET

SHEET NUMBER:
T1.0



1 T-MOBILE LEASE AREA PHOTO

SCALE: NTS
SCALE: NTS



18400 EAST 22ND AVENUE
AURORA, CO 80011

PROJECT INFORMATION:

SITE NAME:
CHEROKEE TANK
SITE ID:
DN02030B

SITE ADDRESS:
2710 PETERSON RD.
COLORADO SRPINGS, CO 80922

NO.	DATE	D/C	DESCRIPTION
1	06-05-17	GW/CM	PRELIM. CONST.
2	06-20-17	CM	REVISED PRELIM.

PLANS PREPARED BY:



16035 TABLE MOUNTAIN PARKWAY
GOLDEN, CO 80403
303.993.3293
WWW.CENTERLINESOLUTIONS.COM

LICENSURE NUMBER:

**NOT APPROVED FOR
CONSTRUCTION**

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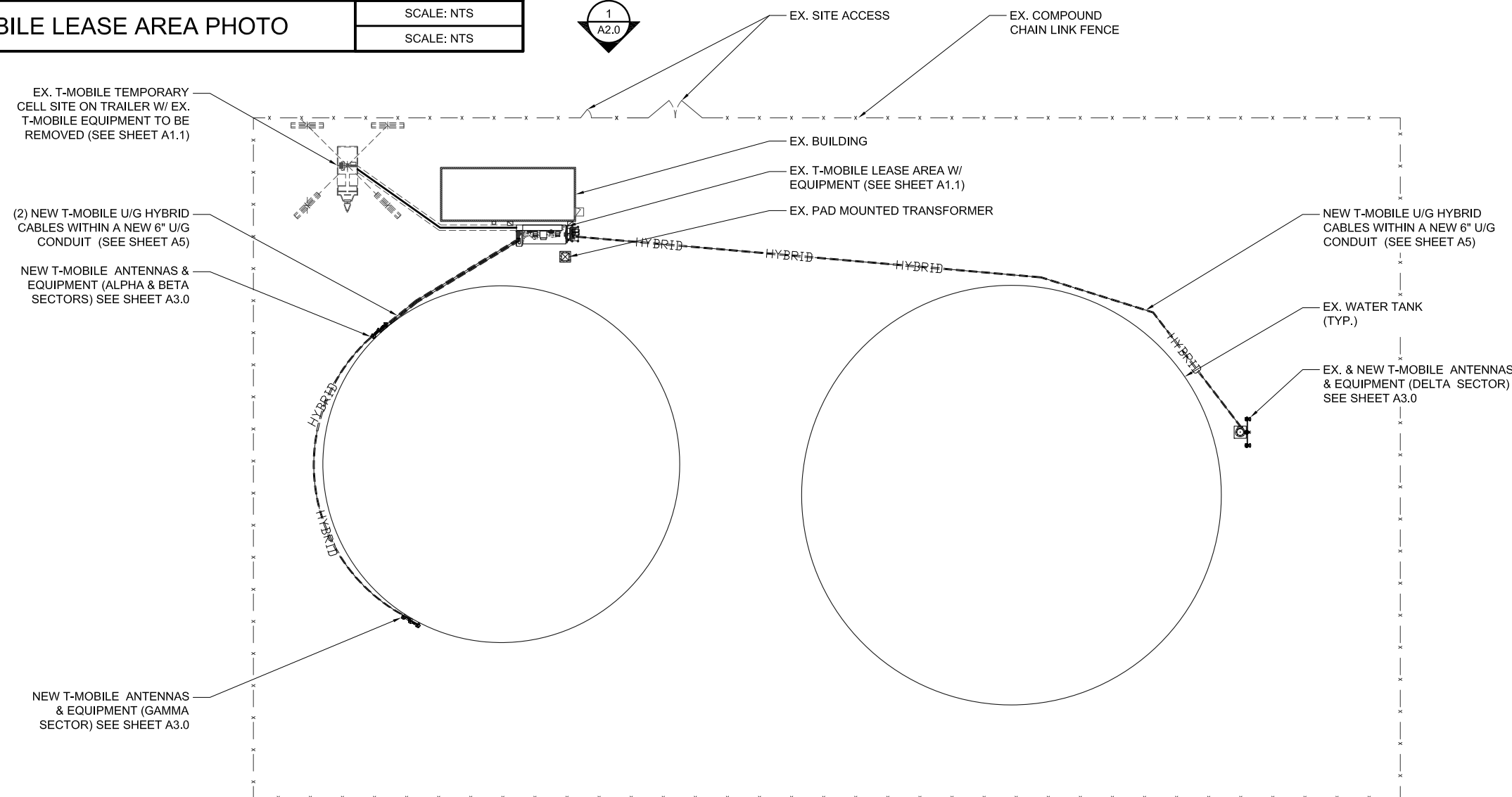
DRAWN BY:	CHK BY:	APV BY:
GW	CM	KS

SHEET TITLE:

OVERALL SITE PLAN

SHEET NUMBER:

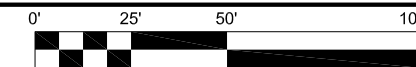
A1.0



NOTE:
GROUND SURVEY WAS NOT PERFORMED AT THIS TIME. SITE PLAN DERIVED FROM: EXISTING DRAWINGS, GIS, AERIAL IMAGES & SITE PHOTOS.

2 OVERALL SITE PLAN

SCALE: 1" = 50'-0" (11X17)
SCALE: 1" = 25'-0" (22X34)



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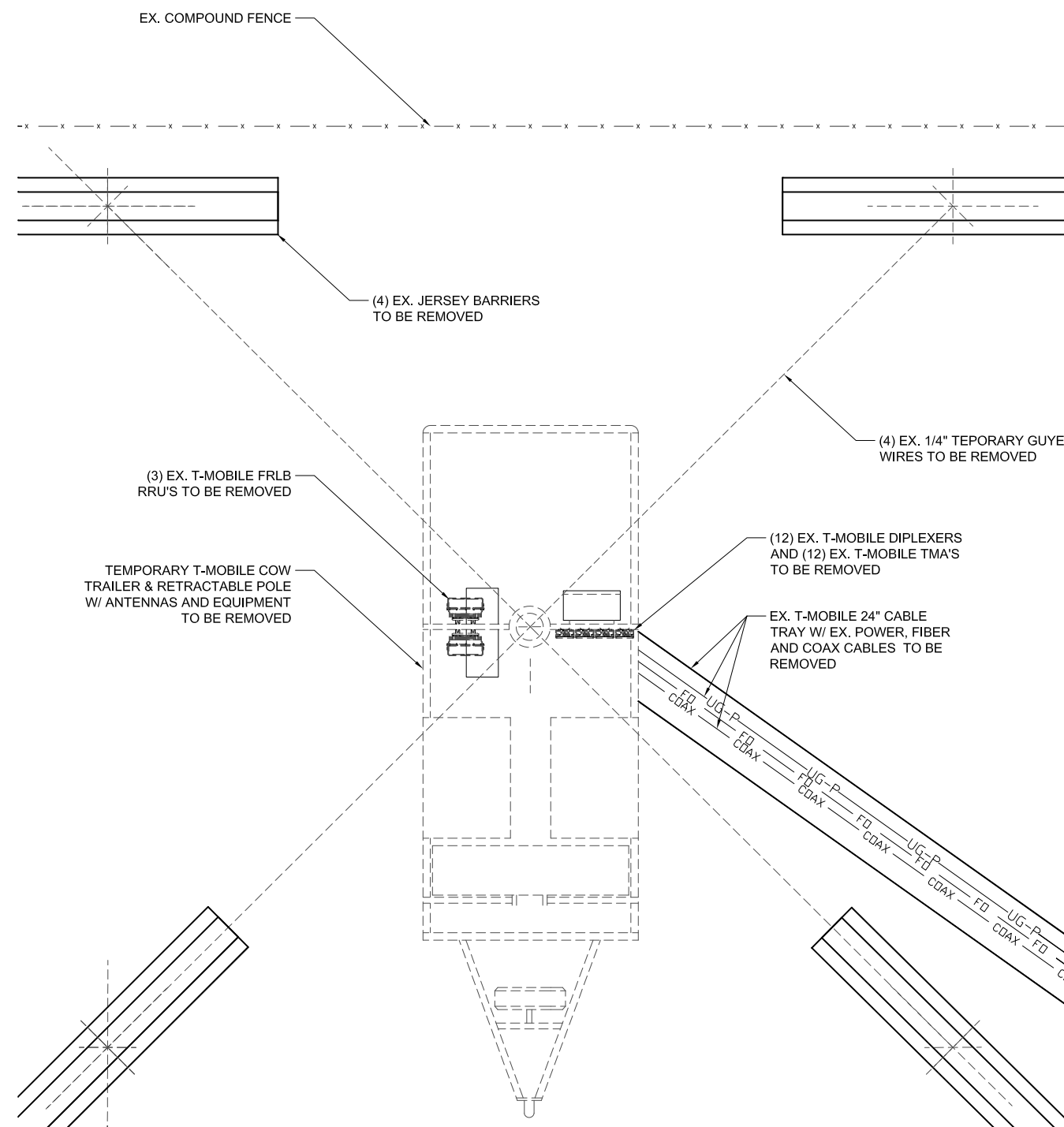
DRAWN BY:	CHK BY:	APV BY:
GW	CM	KS

SHEET TITLE:

**EX. & NEW
ENLARGED
EQUIPMENT PLAN**

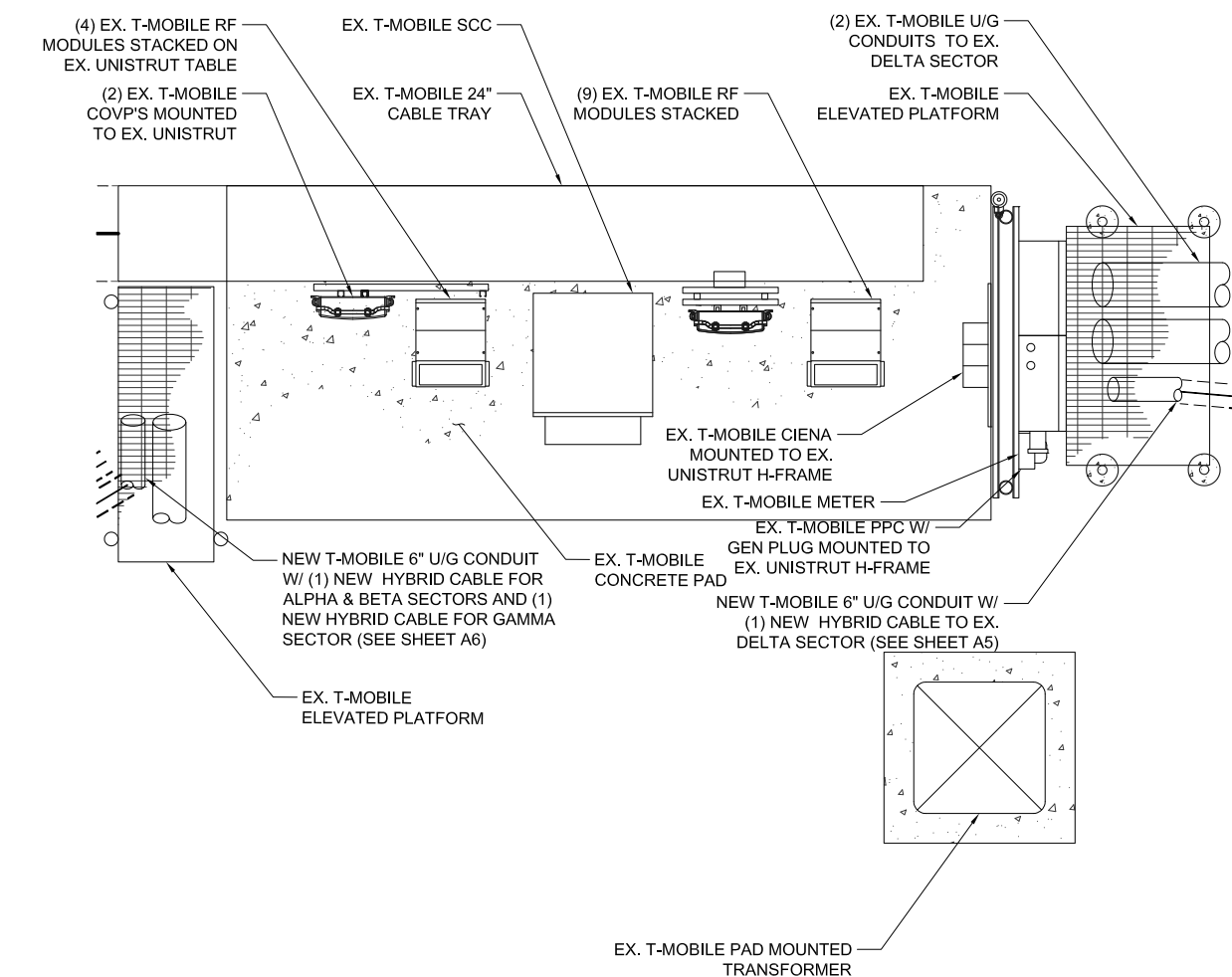
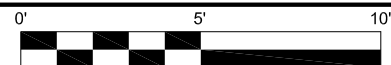
SHEET NUMBER:

A1.1



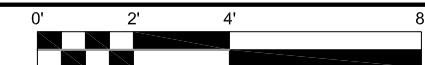
2 EX. ENLARGED EQUIP. LAYOUT

SCALE: 3/16" = 1'-0" (11X17)
SCALE: 3/8" = 1'-0" (22X34)



2 NEW ENLARGED EQUIP. LAYOUT

SCALE: 1/4" = 1'-0" (11X17)
SCALE: 1/2" = 1'-0" (22X34)



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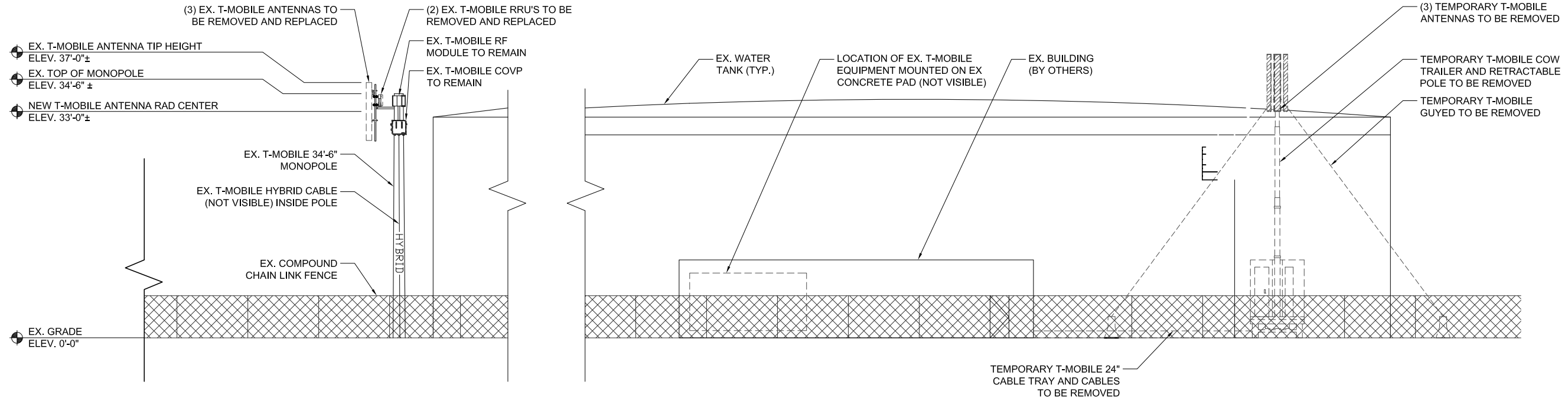
DRAWN BY:	CHK BY:	APV BY:
GW	CM	KS

SHEET TITLE:

ELEVATIONS

SHEET NUMBER:

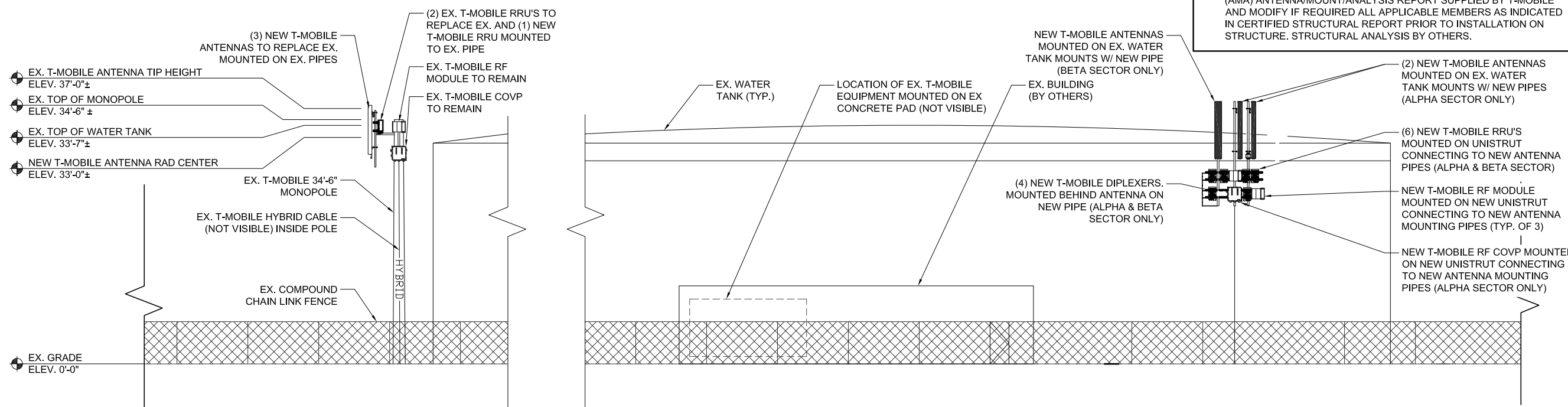
A2.0



1 EX. PARTIAL SOUTH ELEVATION

SCALE: 1/16" = 1'-0" (11X17)

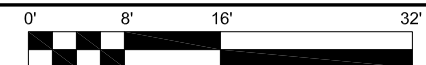
SCALE: 1/8" = 1'-0" (22X34)



2 NEW PARTIAL SOUTH ELEVATION

SCALE: 1/16" = 1'-0" (11X17)

SCALE: 1/8" = 1'-0" (22X34)





18400 EAST 22ND AVENUE
AURORA, CO 80011

PROJECT INFORMATION:

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PLANS PREPARED BY:



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GOLDEN, CO 80403
303.993.3293
WWW.CENTERLINESOLUTIONS.COM

LICENSURE NUMBER:

NOT APPROVED FOR CONSTRUCTION

ALL SCALES ARE SET FOR 11" X 17" SHEET

DRAWN BY: GW CHK BY: CM APV BY: KS

SHEET TITLE:

EXISTING & NEW ANTENNA LAYOUTS

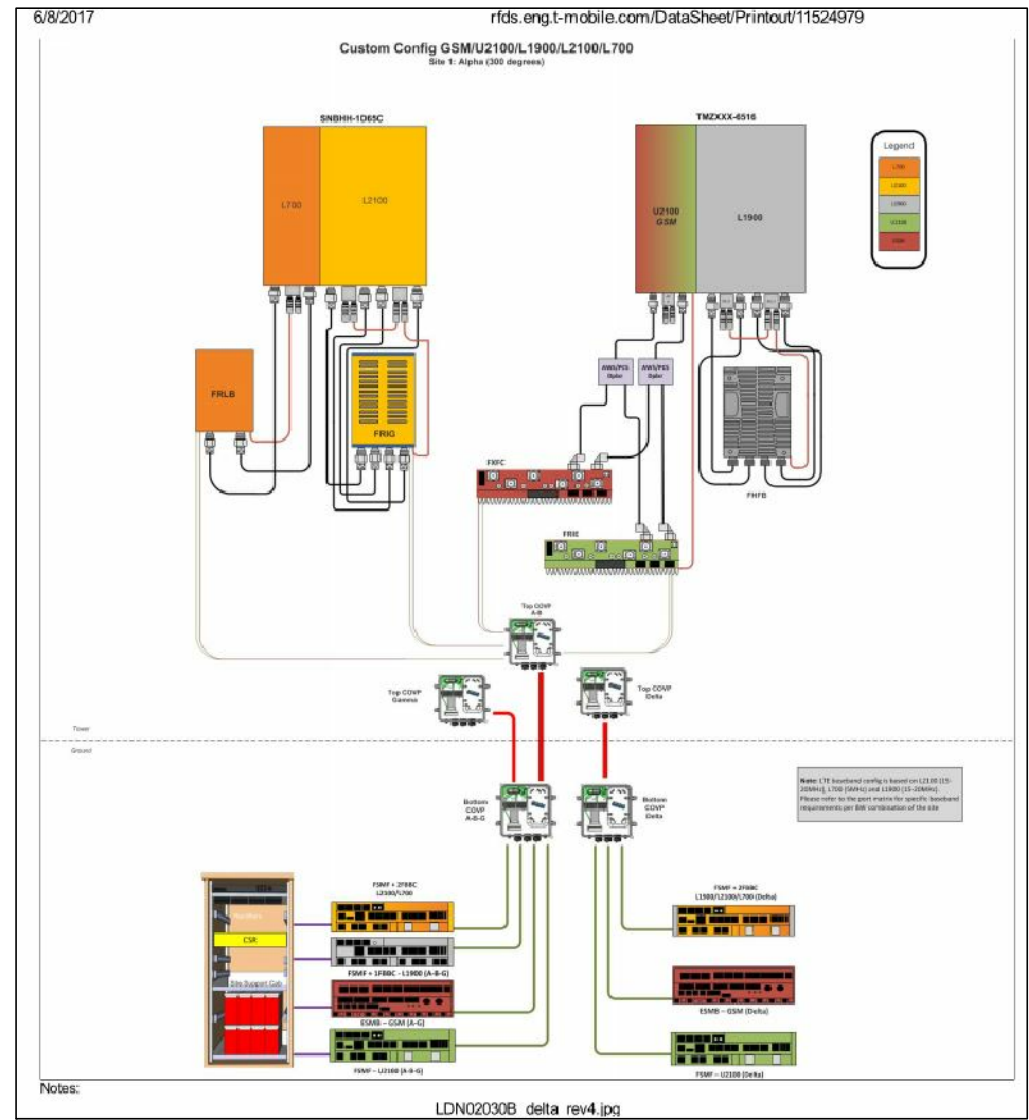
SHEET NUMBER:

A3.0

SECTOR	POSITION	TECHNOLOGY	AZIMUTH	RAD CENTER	ANTENNA (MANUFACTURER - MODEL #)	MECH. TILT	ELEC. TILT	FEED LINE TYPE AND LENGTH
ALPHA	A1	U2100 / L1900 / G1900	300°	33'-0"	ANDREW - TMZXXX-6516-A3M	0°	2°/2°/2°	(1) NEW HIGH-CAP HYBRID CABLE (100' LONG)
	A2	L700 / L2100	300°	33'-0"	ANDREW - SBNHH-1D65C	0°	3°/2°/2°	(1) NEW HIGH-CAP HYBRID CABLE (100' LONG)
BETA	B1	L700 / U2100 / L2100 / L1900	0°	33'-0"	ANDREW - SBNHH-1D65C	0°	2°/2°/2°	(1) NEW HIGH-CAP HYBRID CABLE (SHARED WITH ALPHA SECTOR)
	C1	L1900	210°	33'-0"	ANDREW - TMBXX-6517-A2M	0°	7°/6°	(1) NEW HIGH-CAP HYBRID CABLE (225' LONG)
GAMMA	C2	L700 / U2100 / G1900	210°	33'-0"	ANDREW - SBNHH-1D65C	0°	6°	(1) NEW HIGH-CAP HYBRID CABLE (225' LONG)
	C3	L2100	210°	33'-0"	ANDREW - TMBXX-6517-A2M	0°	6°	(1) NEW HIGH-CAP HYBRID CABLE (225' LONG)
DELTA	D1	L1900	90°	33'-0"	ANDREW - TMBX-6517-R2M	0°	2°	(1) EX. HIGH-CAP HYBRID CABLE (310' LONG)
	D2	L700 / U2100 / G1900	90°	33'-0"	ANDREW - SBNHH-1D65C	0°	3°/2°/2°	(1) EX. HIGH-CAP HYBRID CABLE (310' LONG)
	D3	L2100	90°	33'-0"	ANDREW - TMBXX-6517-A2M	0°	2°	(1) EX. HIGH-CAP HYBRID CABLE (310' LONG)

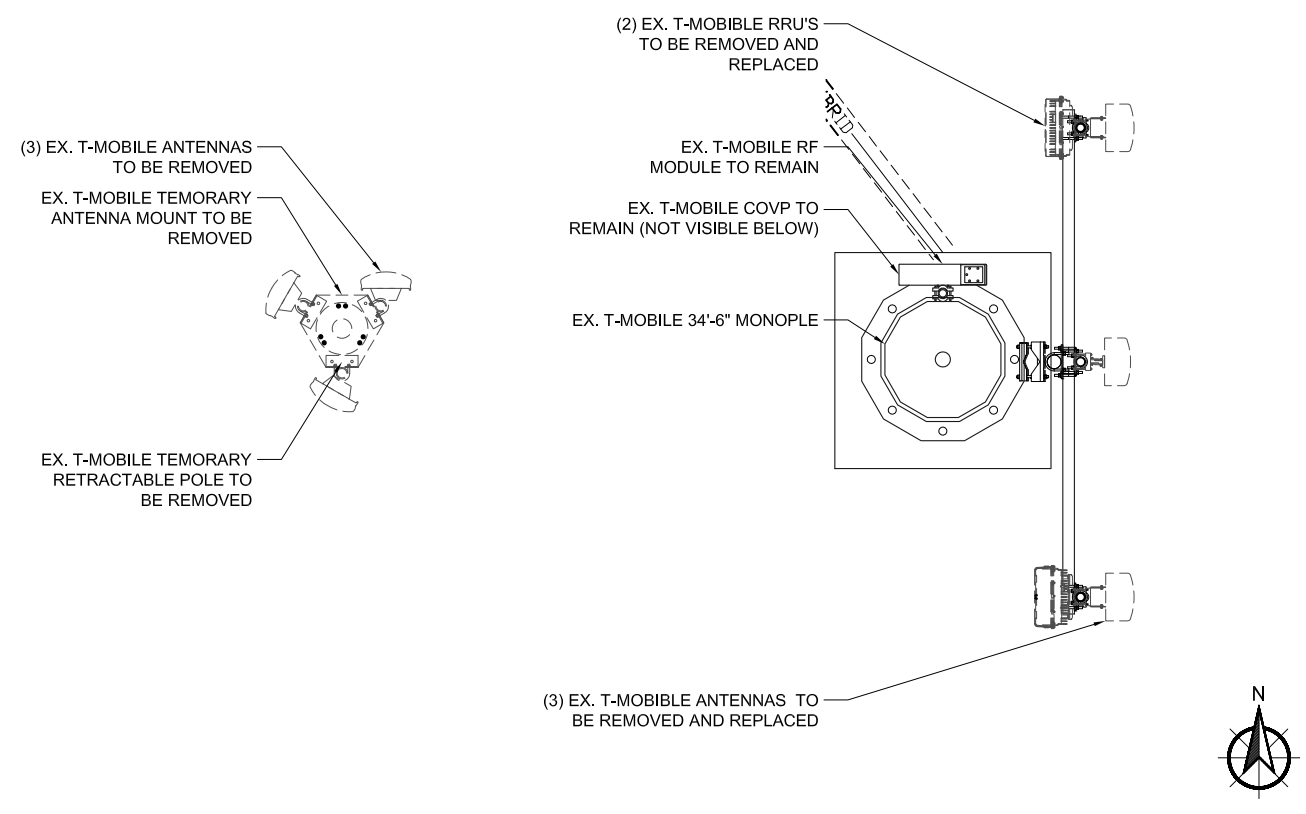
3 ANTENNA TABLE

SCALE: NTS
SCALE: NTS



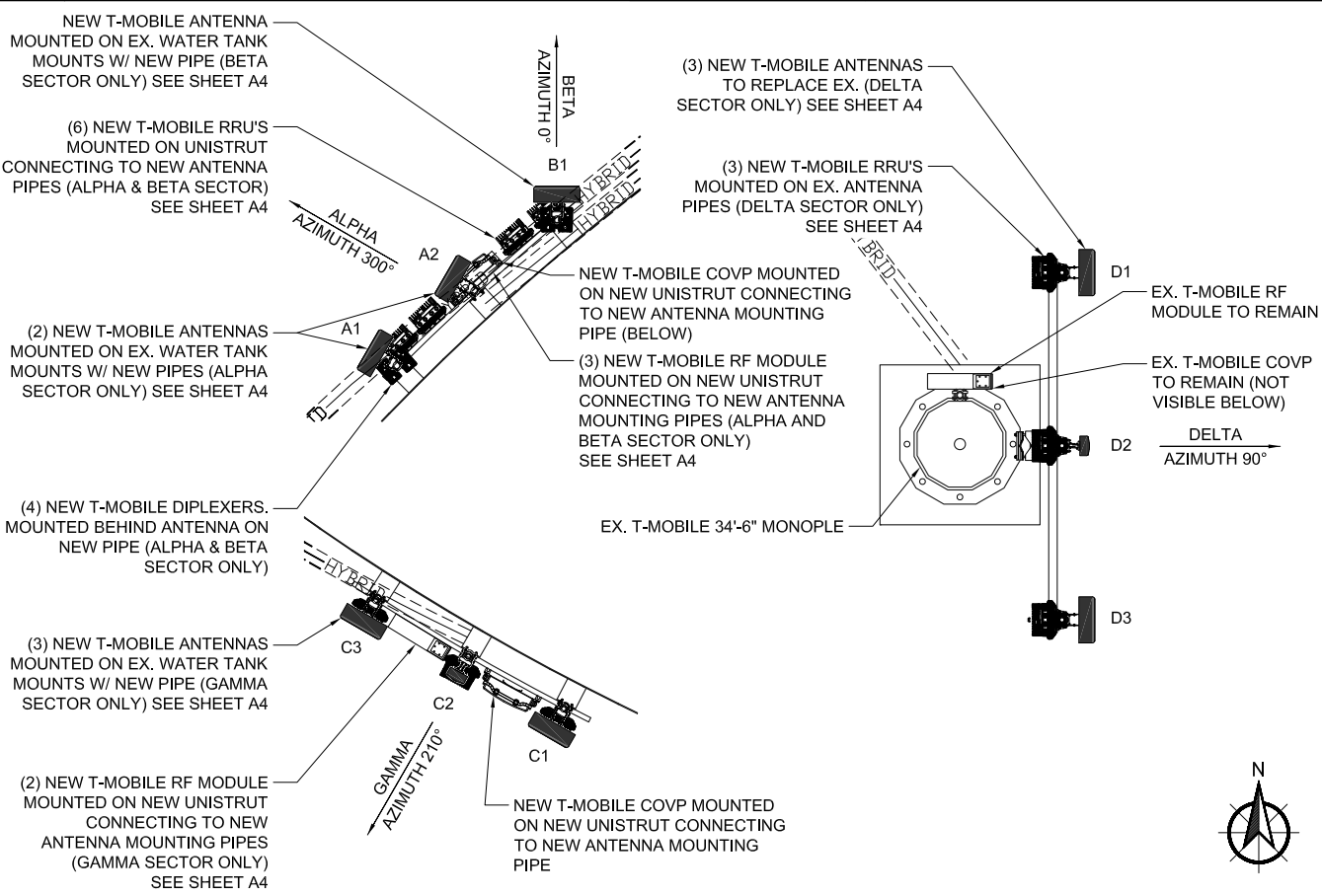
4 RFDS CONFIGURATION (ALPHA SECTOR)

SCALE: NTS
SCALE: NTS



1 EXISTING ANTENNA LAYOUT

SCALE: 1/4" = 1'-0" (11X17)
SCALE: 1/2" = 1'-0" (22X34)



2 NEW ANTENNA LAYOUT

SCALE: 3/16" = 1'-0" (11X17)
SCALE: 3/8" = 1'-0" (22X34)

4

PROJECT INFORMATION:

SITE NAME:
CHEROKEE TANK
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SITE ADDRESS:
2710 PETERSON RD.
COLORADO SPRINGS, CO 80922

NO.	DATE	D/C	DESCRIPTION
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DRAWN BY:	CHK BY:	APV BY:
GW	CM	KS

SHEET TITLE:

RFDS CONFIGURATIONS

SHEET NUMBER:

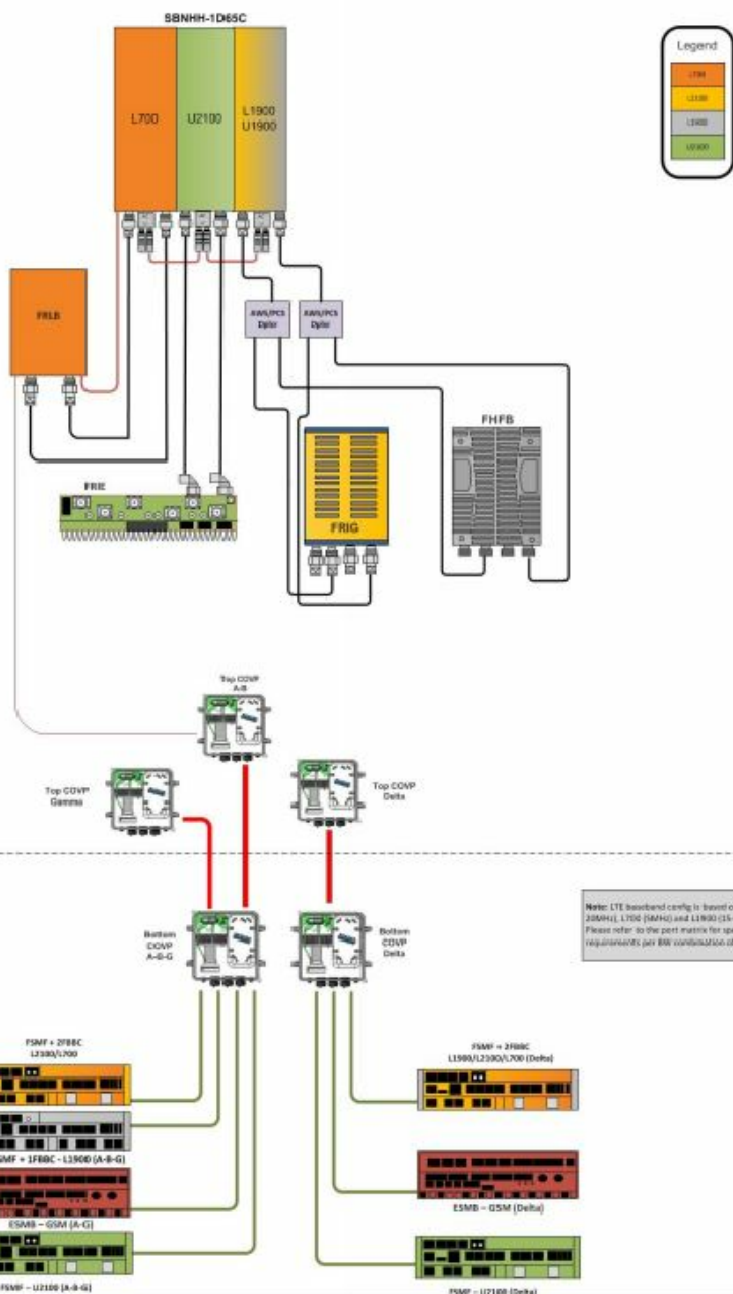
A3.1

6/8/2017

rfds.eng.t-mobile.com/DataSheet/Printout/11524979

Custom Config U2100/L1900/L2100/L700

Site1: Beta (0 degree/No GSM)



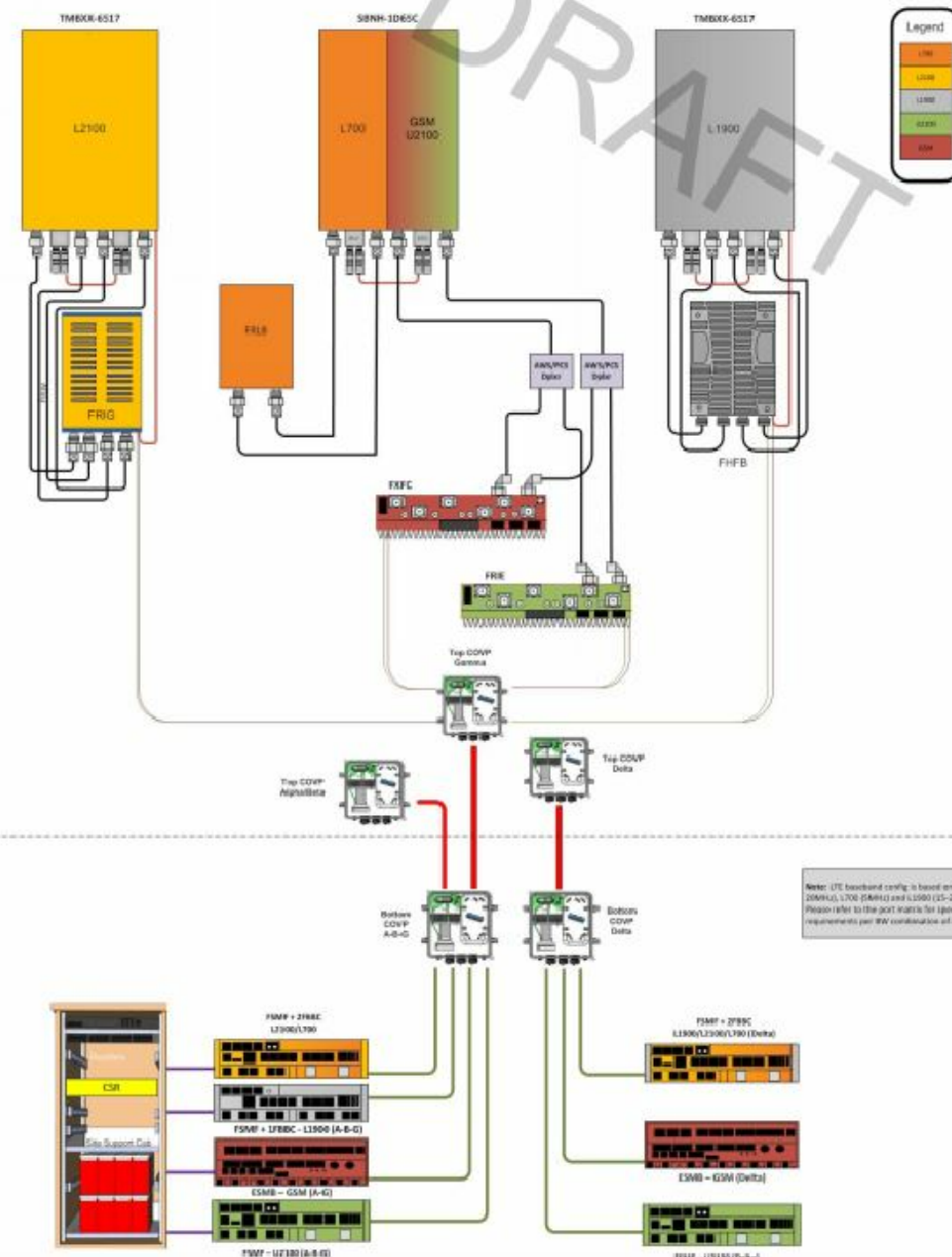
Note: LTE baseband config is based on L2100 (15-20MHz), L700 (20MHz) and L1900 (15-20MHz). Please refer to the port matrix for specific baseband requirements per FR configuration of the site.

Notes:

2030B_gamma_rev4.jpg

Custom Config GSM/U2100/L1900/L2100/L700

Site: Gamma (210 degree)



Note: LTE baseband config is based on L2100 (15-20MHz), L700 (20MHz) and L1900 (15-20MHz). Please refer to the port matrix for specific baseband requirements per FR configuration of the site.

Notes:

2030B_beta_rev4.jpg



18400 EAST 22ND AVENUE
AURORA, CO 80011

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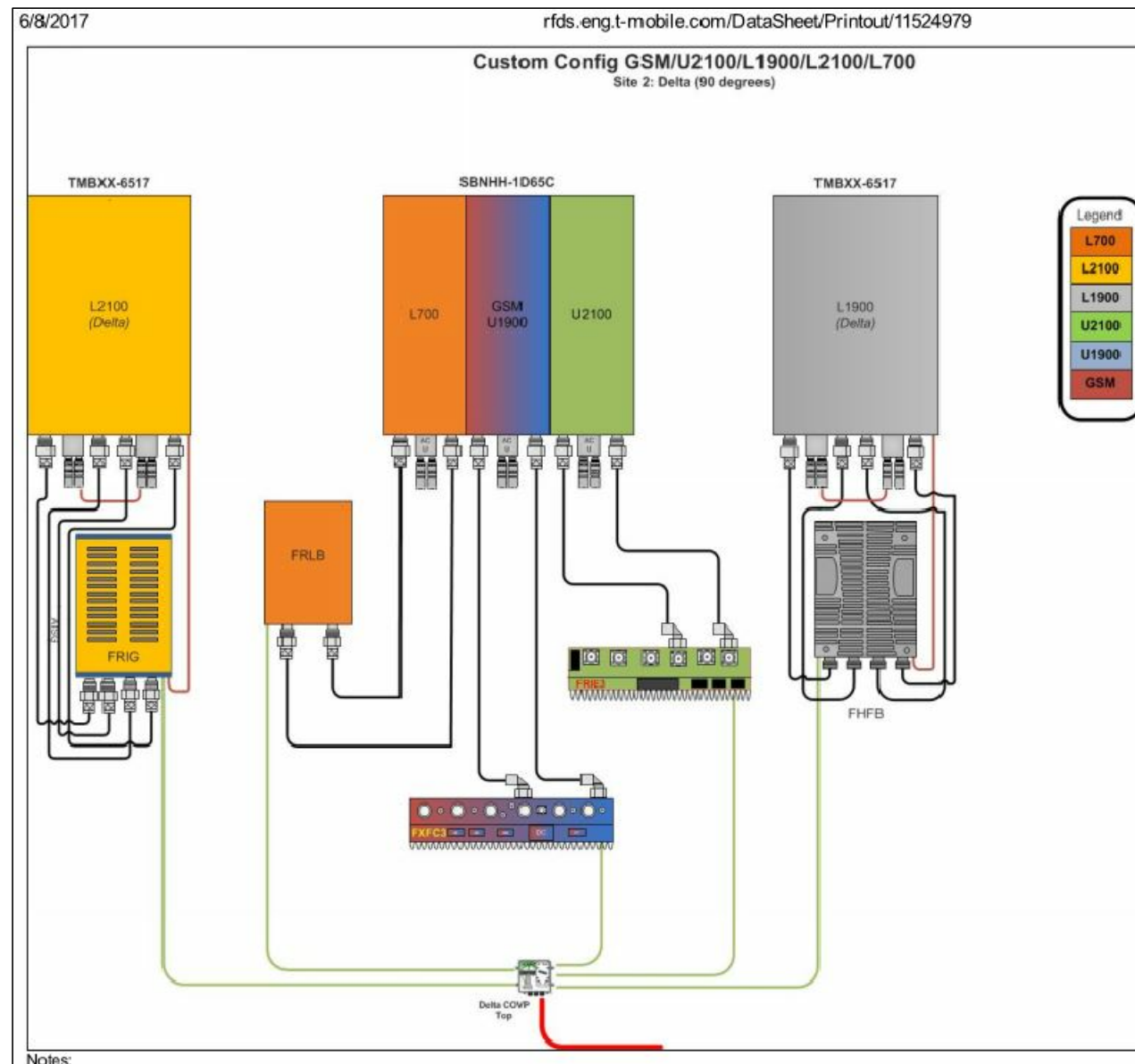
DRAWN BY:	CHK BY:	APV BY:
GW	CM	KS

SHEET TITLE:

**RFDS
CONFIGURATIONS**

SHEET NUMBER:

A3.2

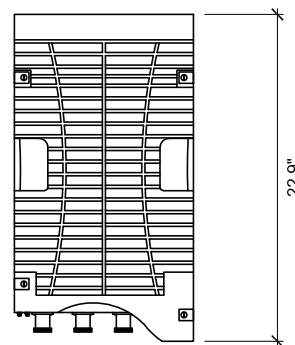
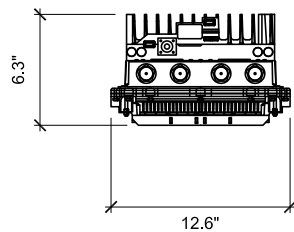


1 RFDS CONFIGURATION (DELTA SECTOR)

SCALE: NTS
SCALE: NTS

2 NOT USED

SCALE: NTS
SCALE: NTS



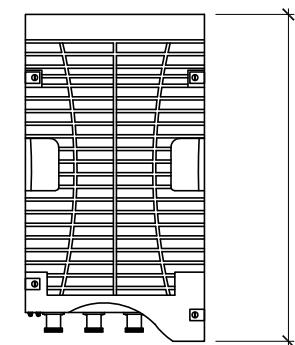
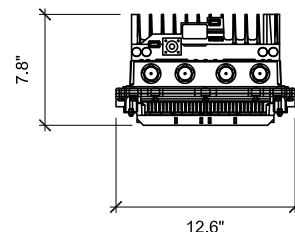
NOTE:
FRBG TO BE VERTICALLY
MOUNTED ONLY

DIMENSION	VALUE
HEIGHT	22.9 INCHES (W/ BRACKET 34.3 INCHES)
WIDTH	12.6 INCHES
DEPTH	6.3 INCHES
WEIGHT	53 LBS (W/ BRACKET 57 LBS)

CHARACTERISTIC	FRBG CAPABILITY
NOMINAL SUPPLY VOLTAGE	-48.0 VDC
NOMINAL INPUT VOLT RANGE	-40.5 TO -57.0 VDC
EXTENDED INPUT VOLT RANGE	-36.0 TO -40.5 VDC -57.0 TO -60.0 VDC
VOLTAGE	14.5 V (ANT 1, ANT 3, RET)
POWER PER PORT	40 W

1 RRU SPECIFICATIONS (FRBG)

SCALE: NTS
SCALE: NTS



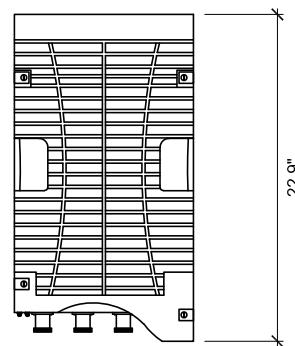
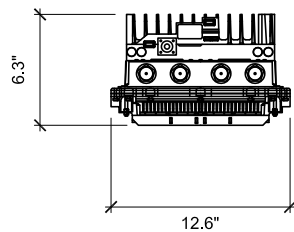
NOTE:
FHFB TO BE VERTICALLY
MOUNTED ONLY

DIMENSION	VALUE
HEIGHT	23 INCHES (W/ BRACKET 34.3 INCHES)
WIDTH	12.6 INCHES
DEPTH	7.8 INCHES
WEIGHT	48.5 LBS (W/ BRACKET 51 LBS)

CHARACTERISTIC	FHFB CAPABILITY
NOMINAL SUPPLY VOLTAGE	-48.0 VDC
NOMINAL INPUT VOLT RANGE	-40.5 TO -57.0 VDC
EXTENDED INPUT VOLT RANGE	-36.0 TO -40.5 VDC -57.0 TO -60.0 VDC
VOLTAGE	14.5 V
POWER SUPPLY	2.0 (MAIN ANT ONLY)

2 RRU SPECIFICATIONS (FHFB)

SCALE: NTS
SCALE: NTS



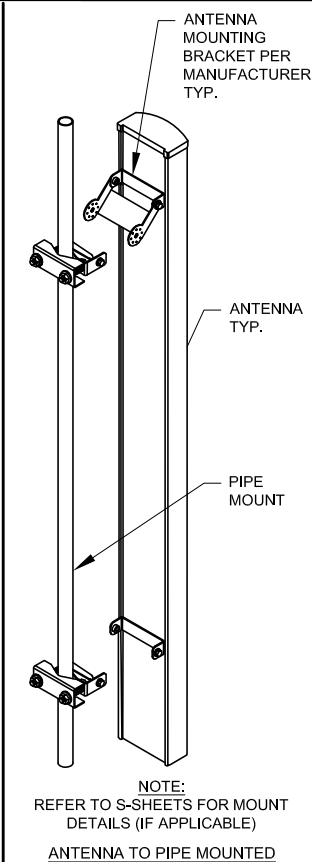
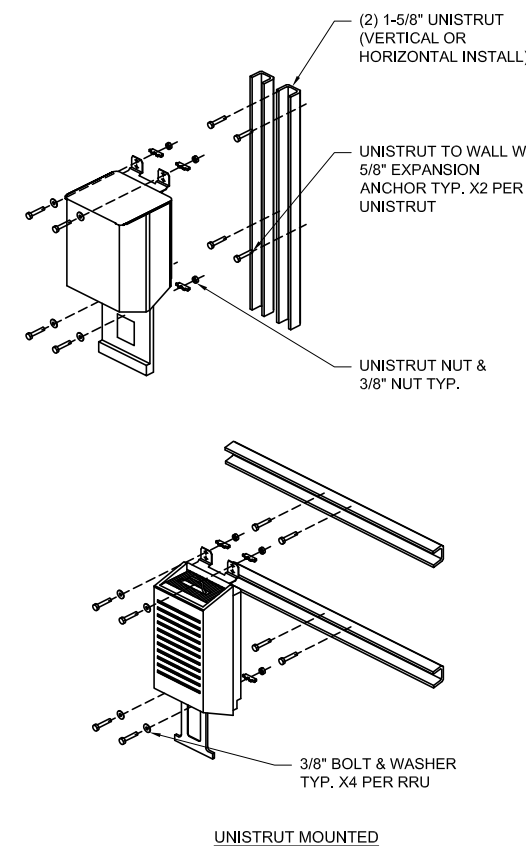
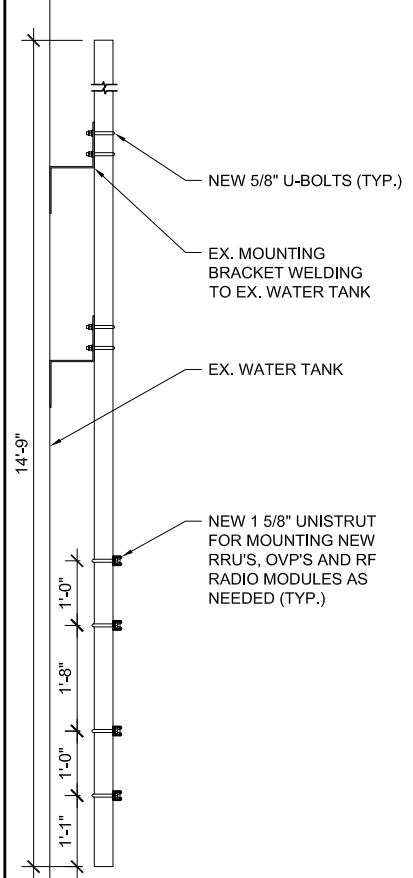
NOTE:
FRBG TO BE VERTICALLY
MOUNTED ONLY

DIMENSION	VALUE
HEIGHT	22.9 INCHES (W/ BRACKET 34.3 INCHES)
WIDTH	12.6 INCHES
DEPTH	6.3 INCHES
WEIGHT	53 LBS (W/ BRACKET 57 LBS)

CHARACTERISTIC	FRBG CAPABILITY
NOMINAL SUPPLY VOLTAGE	-48.0 VDC
NOMINAL INPUT VOLT RANGE	-40.5 TO -57.0 VDC
EXTENDED INPUT VOLT RANGE	-36.0 TO -40.5 VDC -57.0 TO -60.0 VDC
VOLTAGE	14.5 V (ANT 1, ANT 3, RET)
POWER PER PORT	40 W

3 RRU SPECIFICATIONS (FRIJ)

SCALE: NTS
SCALE: NTS



4 RRU & ANTENNA MOUNTING DETAIL

SCALE: NTS
SCALE: NTS



18400 EAST 22ND AVENUE
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PLANS PREPARED BY:



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DRAWN BY: GW CHK BY: CM APV BY: KS

SHEET TITLE:

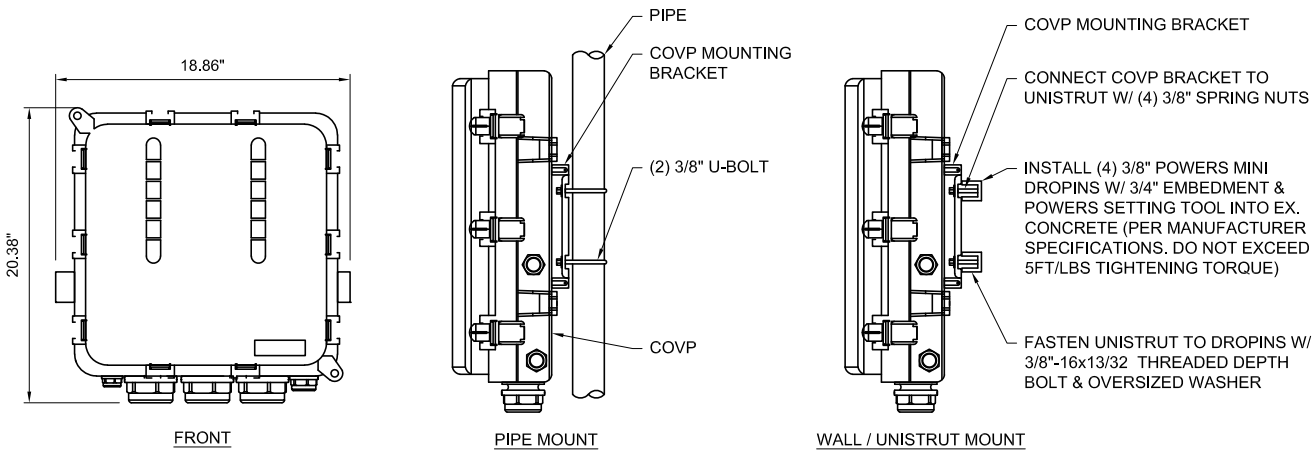
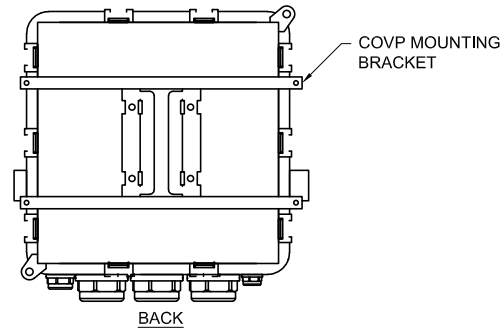
DETAILS

SHEET NUMBER:

A4.0

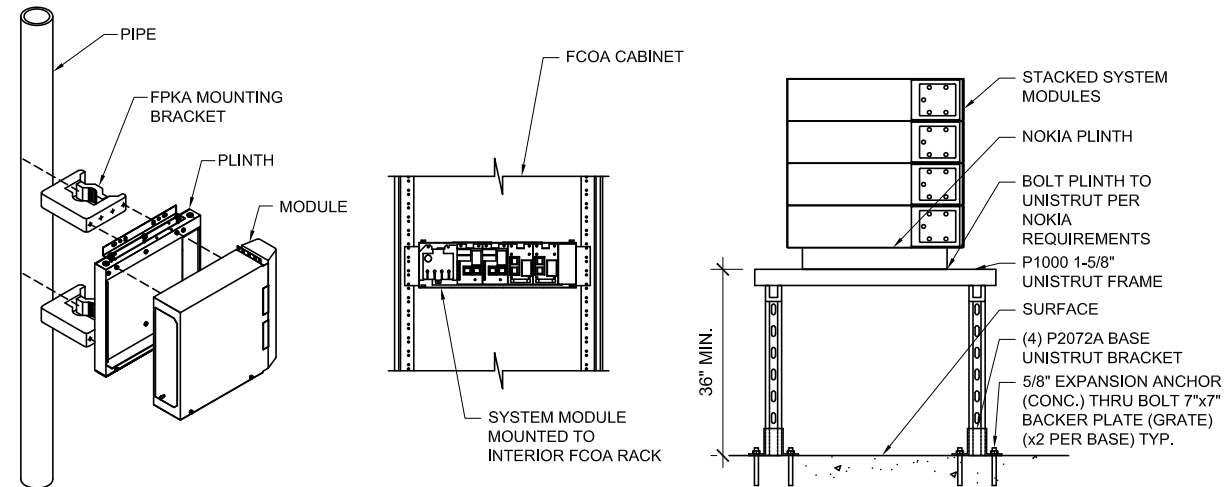
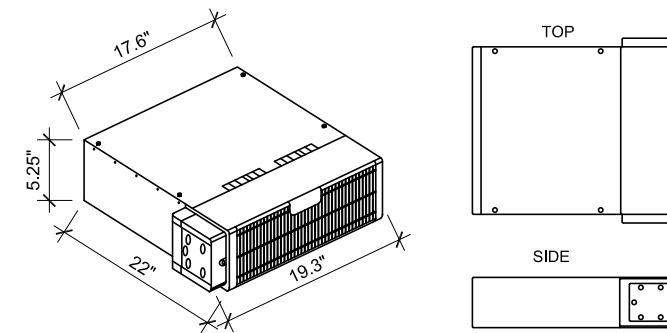
RAYCAP: ASU9338TYP01 (RNSNDC-7771-PF-48)

NOMINAL OPERATING VOLTAGE: 48 VDC
 NOMINAL DISCHARGE CURRENT: 20 kA 8/20ms
 MAXIMUM DISCHARGE CURRENT: 60 kA 8/20ms
 MAXIMUM CONTINUOUS OPERATING VOLTAGE: 75 VDC
 VOLTAGE PROTECTION RATING: 400 V
 CLEARANCE: FRONT: 36"
 TOTAL WEIGHT: 19 lbs



NOKIA FLEXI SYSTEM/RADIO MODULES
 FSMF, FSME, FRIE & FXFC

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



18400 EAST 22ND AVENUE
 AURORA, CO 80011

PROJECT INFORMATION:
 SITE NAME: CHEROKEE TANK
 SITE ID: DN02030B

SITE ADDRESS:
 2710 PETERSON RD.
 COLORADO SPRINGS, CO 80922

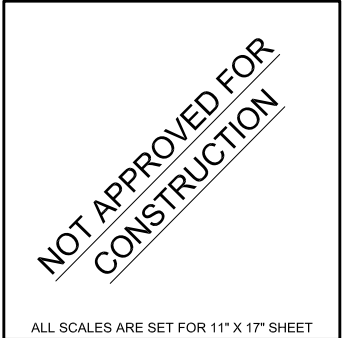
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2	06-20-17	CM	REVISED PRELIM.

PLANS PREPARED BY:



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DRAWN BY:	CHK BY:	APV BY:
GW	CM	KS

SHEET TITLE:

DETAILS

SHEET NUMBER:

A5.0

1 COVP SPECIFICATIONS & MOUNTING DETAILS

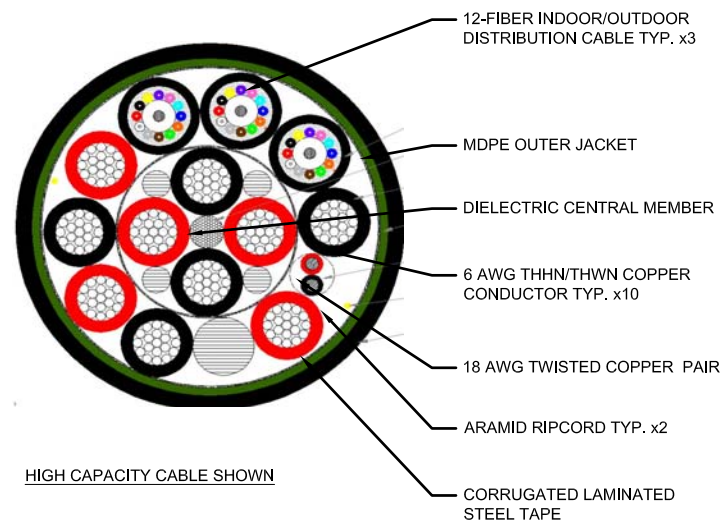
SCALE: NTS
 SCALE: NTS

2 SYSTEM RADIO MODULE SPECIFICATIONS

SCALE: NTS
 SCALE: NTS

HCS:

HIGH CAPACITY (1-1/4" OD, 1.33 LB/FT)
 • 10x6 AWG CONDUCTORS
 • 18 FIBER PAIRS (36 PAIRS)



HIGH CAPACITY CABLE SHOWN

3 HYBRID CABLE DETAIL

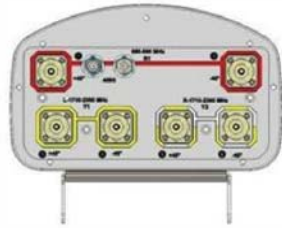
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 SCALE: NTS

4 NOT USED

SCALE: NTS
 SCALE: NTS

Product Specifications

COMMSCOPE®



Andrew Solutions
SBNHH-1D65C

Andrew® DualPol® Tri-band Teletilt® SmartBeam® Antenna, 1 x 698–896 MHz and 2 x 1710–2360 MHz, 65° horizontal beamwidth, RET compatible

- Three DualPol® antennas under one radome
- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	15.7	15.5	16.8	17.2	17.4	17.5
Beamwidth, Horizontal, degrees	65	63	68	63	61	58
Beamwidth, Vertical, degrees	9.0	7.6	5.6	5.3	5.1	4.4
Beam Tilt, degrees	0–11	0–11	0–7	0–7	0–7	0–7
USLS, typical, dB	15	15	14	13	13	13
Front-to-Back Ratio, Copolarization 180° ± 20°, dB	29	30	27	26	24	24
CPR at Boresight, dB	18	18	18	18	18	18
CPR at Sector, dB	10	10	10	10	10	4
Isolation, dB	30	30	29	29	29	29
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR Return Loss, dB	1.5:1 14.0	1.5:1 14.0	1.5:1 14.0	1.5:1 14.0	1.5:1 14.0	1.5:1 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-150	-150	-150	-150	-150	-150
Input Power per Port, maximum, watts	400	400	300	300	300	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm
Lightning Protection	dc Ground	dc Ground	dc Ground	dc Ground	dc Ground	dc Ground

Mechanical Specifications

Color Radome Material	Light gray Fiberglass, UV resistant
Connector Interface Location Quantity	7-16 DIN Female Bottom 6
Wind Loading, maximum	879.0 N @ 150 km/h 197.6 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h 150.0 mph

Dimensions

Depth	181.0 mm 7.1 in
Length	2438.40 mm 96.00 in
Width	301.00 mm 11.85 in
Net Weight	30.00 kg 66.14 lb

Remote Electrical Tilt (RET) Information

Annual Failure Rate, maximum	0.01%
Power Consumption, during motor movements, maximum	11.0 W
Power Consumption, idle state, maximum	2.0 W
Power Input	10–30 V
Protocol	3GPP/AISG 2.0 Multi-RET

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March 29, 2013

ANDREW
A CommScope Company

TMBXX-6517-R2M
DualPol®, Quad Panel Antenna

**DualPol®
Teletilt®**

- Patented cross dipole and feed system
- Fully compatible with Andrew Teletilt® remote control antenna system
- Rugged, reliable design with excellent PIM suppression
- Includes factory installed AISG 2.0 RET actuator

ELECTRICAL

Frequency Range (MHz):	1710–2155
Characteristic Impedance (Ohms):	50
Azimuth BW (Deg):	65 ± 6
Elevation BW (Deg):	4.8 ± 0.8
Gain (dBi):	18.7 ± 0.8
Polarization:	±45°
Front-to-Back Ratio (dB)	0° 2° 4° 6°
Copol, 180° ± 30°:	>25 >25 >25 >24
Total Power, 180° ± 30°:	>24 >24 >24 >23
Upper Sidelobe (dB)	0° 2° 4° 6°
Main Beam to +20°:	>17 >17 >16 >14
VSWR / Return Loss (dB):	1.35:1 / 16.5
Port-to-Port Isolation (dB):	>30
Electrical Tilt Range (Deg):*	0–6
Electrical DownTilt Accuracy (Deg):	± 0.9
Cross-pol (dB)	0° 2° 4° 6°
3 dB Beamwidth:	>13 >13 >12 >12
Intermodulation Products (dBc)	
3rd Order, 2 x 20 Watts:	155
Max. Input Power (Watts):	250
Lightning Protection:	DC Ground

PERFORMANCE TRACKING

Gain Variation (dB) (between UL and DL frequency pair):	1.0
Electrical Tilt Accuracy (Deg) (between UL and DL frequency pair within 0.5°):	<0.5
Azimuth HPBW (Deg) (between UL and DL frequency pair):	9

MECHANICAL

Net Weight (kg / lbs):	20.2 / 44.4
Dimensions—LxWxD: (with actuator)	2135 x 305 x 166 mm 84.0 x 12 x 6.5 inch
Length without actuator	1903 mm / 74.9 inch
Max. Wind Area (m² / ft²):	0.28 / 3.0
Max. Wind Load (N / lbf):	747.2 / 168
Max. Wind Speed (km/h / mph):	241 / 150
Hardware Material:	Hot Dip Galvanized
Connector Type:	7-16 DIN, Female (4)
Color:	Off White
Standard Mounting Hardware:	TM600899A-2



*Specifications may vary when using 0° or 1° electrical tilt.

Andrew Wireless Solutions www.commscope.com
Customer Service 24 hours
U.S.A., Canada, Mexico: 1-800-255-1479
U.K.: 0800 250055
Other Europe: +44 592 792 812
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TMBXX-6517-R2M

10/17/2008
Page 1 of 3

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18400 EAST 22ND AVENUE
AURORA, CO 80011

PROJECT INFORMATION:

SITE NAME:
CHEROKEE TANK
SITE ID:
DN02030B

SITE ADDRESS:
2710 PETERSON RD.
COLORADO SPRINGS, CO 80922

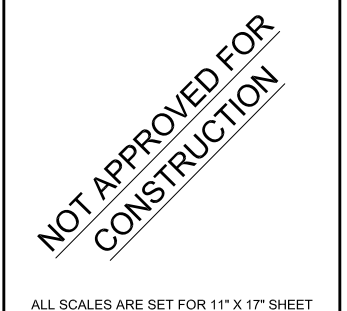
NO.	DATE	D/C	DESCRIPTION
1	06-05-17	GW/CM	PRELIM. CONST.
2	06-20-17	CM	REVISED PRELIM.

PLANS PREPARED BY:



16035 TABLE MOUNTAIN PARKWAY
GOLDEN, CO 80403
303.993.3293
WWW.CENTERLINESOLUTIONS.COM

LICENSURE NUMBER:



ALL SCALES ARE SET FOR 11" X 17" SHEET

DRAWN BY:	CHK BY:	APV BY:
GW	CM	KS

SHEET TITLE:

**ANTENNA
SPECIFICATIONS**

SHEET NUMBER:

A6.0

1 ANTENNA SPECIFICATIONS

SCALE: NTS

SCALE: NTS

2 ANTENNA SPECIFICATIONS

SCALE: NTS

SCALE: NTS



TMBX-6517-R2M

DualPol® Panel Antenna



- Patented cross dipole and feed system
- Rugged, reliable design with excellent PIM suppression
- Includes factory installed AISG RET actuator
- Fully compatible with Andrew Teletilt® remote control antenna system

ELECTRICAL

Frequency Range (MHz):	1710-2155
Characteristic Impedance (Ohms):	50
Azimuth BW (Deg):	65 ± 6
Elevation BW (Deg):	4.8 ± 0.8
Gain (dBi) :	18.7 ± 0.7
Polarization:	±45°
Front-to-Back Ratio (dB)	0° 2° 4° 6°
Copol, 180° ± 30°:	>25 >25 >25 >25
Total Power, 180° ± 30°:	>25 >25 >25 >25
Upper Sidelobe (dB)	0° 2° 4° 6°
Main Beam to +20°:	>18 >18 >17 >15
VSWR / Return Loss (dB):	1.35:1 / 16.5
Port-to-Port Isolation (dB):	>30
Electrical Tilt Range (Deg):*	0-6
Electrical Downfill Accuracy (Deg):	± 0.6
Cross-pol (dB)	0° 2° 4° 6°
3 dB Beamwidth:	>15 >15 >13 >12
Intermodulation Products (dBc)	
3rd Order, 2 x 20 Watts:	155
Max. Input Power (Watts):	250
Lightning Protection:	DC Ground

PERFORMANCE TRACKING

Gain Variation (dB) (between UL and DL frequency pair):	1.0
Electrical Tilt Accuracy (Deg) (between UL and DL frequency pair within 0.5°):	<0.5
Azimuth HPBW (Deg) (between UL and DL frequency pair):	9

MECHANICAL

Net Weight (kg / lbs):	7.0 / 15.4
Dimensions-LxWxD: (with actuator)	2105 x 168 x 84 mm
	82.9 x 6.6 x 3.3 Inch
Max. Wind Area (m² / ft²):	0.17 / 1.8
Max. Wind Load (N / lbf):	453.7 / 102.0
Max. Wind Speed (km/h / mph):	241 / 150
Hardware Material:	Hot Dip Galvanized
Connector Type:	7-16 DIN, Female (2)
Color:	Off White
Standard Mounting Hardware:	TM602030A



*Specifications may vary when using 0° or 1° electrical tilt.

Andrew Corporation 2601 Telecom Parkway Richardson, Texas U.S.A. 75083-3521 Tel: 214.831.0310	Fax: 214.688.0089 Toll Free Tel: 1.800.676.5342 Fax: 1.800.229.4706 www.andrew.com	3/9/2007 Page 1 of 3 atlechs@andrew.com
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Information correct at date of issue but may be subject to change without notice.

Product Specifications



SBNH-1D65C
Andrew® Dualband Antenna, 698-896 MHz and 1710-2360 MHz, 65° horizontal beamwidth, internal RETs.



Electrical Specifications

Frequency Band, MHz	698-806	806-896	1710-1880	1850-1990	1920-2180	2300-2360
Gain, dBi	16.1	15.4	17.6	18.0	18.4	18.3
Beamwidth, Horizontal, degrees	66	64	71	65	63	58
Beamwidth, Vertical, degrees	8.8	7.8	5.7	5.2	5.0	4.4
Beam Tilt, degrees	0-11	0-11	0-7	0-7	0-7	0-7
USLS, dB	12	12	16	15	16	16
Front-to-Back Ratio at 180°, dB	29	32	31	29	27	31
CPR at Boresight, dB	28	23	18	18	15	21
CPR at Sector, dB	14	9	14	12	11	4
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	25	25	25	25	25	25
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, maximum, watts	400	400	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°

*CommScope® supports the NGMN recommendations on Base Station Antenna Standards (BASTA). To see performance values stated per the BASTA recommendations, please contact your CommScope® representative

Mechanical Specifications

Color Radome Material	Light gray Fiberglass, UV resistant
Connector Interface Location Quantity	7-16 DIN Female Bottom 4
Wind Loading, maximum	879.0 N @ 150 km/h 197.6 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h 150.0 mph
Antenna Dimensions, L x W x D	2449.0 mm x 301.0 mm x 181.0 mm 96.4 in x 11.9 in x 7.1 in
Net Weight	22.5 kg 49.6 lb



18400 EAST 22ND AVENUE
AURORA, CO 80011

PROJECT INFORMATION:

SITE NAME:
CHEROKEE TANK
SITE ID:
DN02030B

SITE ADDRESS:
2710 PETERSON RD.
COLORADO SPRINGS, CO 80922

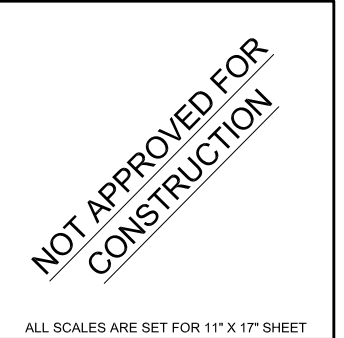
NO.	DATE	D/C	DESCRIPTION
1	06-05-17	GW/CM	PRELIM. CONST.
2	06-20-17	CM	REVISED PRELIM.

PLANS PREPARED BY:



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GOLDEN, CO 80403
303.993.3293
WWW.CENTERLINESOLUTIONS.COM

LICENSURE NUMBER:



ALL SCALES ARE SET FOR 11" X 17" SHEET

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GW	CM	KS

SHEET TITLE:

**ANTENNA
SPECIFICATIONS**

SHEET NUMBER:

A6.1

Product Specifications



TMZXXX-6516-A3M

DualPol® Hex Port Antenna, 1710–2155 MHz, 65° horizontal beamwidth, RET compatible variable electrical tilt

- Two DualPol® antennas under one radome
- Each antenna is independently capable of field adjustable electrical tilt
- Continuous wideband operation
- Fully compatible with Andrew Teletilt® remote control system
- Includes factory installed RET actuator compliant with AISG 1.1 and 2.0, factory set to AISG 1.1 mode

CHARACTERISTICS

General Specifications

Antenna Type	DualPol® hex port
Brand	DualPol® Teletilt®
Operating Frequency Band	1710 – 2155 MHz

Electrical Specifications

Frequency Band, MHz	1710–2155
Beamwidth, Horizontal, degrees	63
Beamwidth, Horizontal Tolerance, degrees	±8
Gain, dBd	15.3
Gain, dBi	17.4
Gain Tolerance, dB	±0.8
Beamwidth, Vertical, degrees	7.3
Beamwidth, Vertical Tolerance, degrees	±1.2
Beam Tilt, degrees	2–8
Beam Tilt Tolerance, degrees	±0.3
Upper Sidelobe Suppression (USLS) by Beam Tilt, dB	2 ° 4 ° 6 ° 8 ° 16 18 18 18
Front-to-Back Ratio, Copolarization 180° ± 30° by Beam Tilt, dB	2 ° 4 ° 6 ° 8 ° 30 30 30 30
Cross Polarization Ratio (CPR) at 3 dB Horizontal Beamwidth by Beam Tilt, dB	2 ° 4 ° 6 ° 8 ° 13 13 12 12
Isolation, dB	30
VSWR Return Loss, db	1.35:1 16.5
Intermodulation Products, 3rd Order, 2 x 20 W, dBc	155
Input Power, maximum, watts	250
Polarization	±45°
Impedance, ohms	50
Lightning Protection	dc Ground

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4/13/2010

Product Specifications



TMZXXX-6516-A3M

Performance Tracking Between Uplink And Downlink Frequency Pair

Beam Tilt Accuracy	0.50 °
Gain Variation	1.6 dB
Horizontal Beamwidth	16.0 °

Mechanical Specifications

Color	Off white
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity	6
Wind Loading, maximum	992.0 N @ 100 mph 223.0 lbf @ 100 mph
Wind Speed, maximum	241.4 km/h 150.0 mph

Dimensions

Depth	90.0 mm 3.5 in
Length	1309.0 mm 51.5 in
Length with Actuator	1524.0 mm 60.0 in
Width	500.0 mm 19.7 in
Net Weight	17.4 kg 38.4 lb

Remote Electrical Tilt (RET) Information

RET System	Teletilt®
------------	-----------

INCLUDED PRODUCTS

- TM600899A-2**
Downtilt Mounting Kit for 4.5 in (114.3 mm) OD round members

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page 2 of 2
4/13/2010

T-Mobile

18400 EAST 22ND AVENUE
AURORA, CO 80011

PROJECT INFORMATION:

SITE NAME:
CHEROKEE TANK
SITE ID:
DN02030B

SITE ADDRESS:
2710 PETERSON RD.
COLORADO SPRINGS, CO 80922

NO.	DATE	D/C	DESCRIPTION
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2	06-20-17	CM	REVISED PRELIM.

PLANS PREPARED BY:



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GOLDEN, CO 80403
303.993.3293
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GW	CM	KS

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**ANTENNA
SPECIFICATIONS**

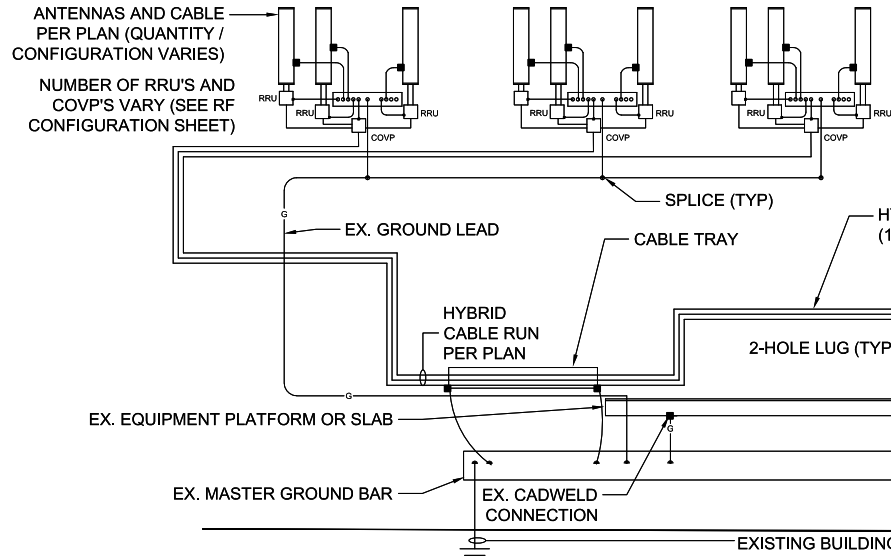
SHEET NUMBER:

A6.2

GROUNDING NOTES:

1. ALL DETAILS ARE SHOWN IN GENERAL TERMS. ACTUAL GROUNDING INSTALLATION & CONSTRUCTION MAY VARY DUE TO SPECIFIC SITE CONDITIONS.
2. COAX GROUND BARS: EXTEND (2 EACH) #2 TINNED, SOLID BCW FROM BURIED GROUND RING UP TO EACH GROUND & MAKE MECHANICAL CONNECTIONS TO GROUND BARS.
3. BEFORE ATTACHING A NEW GROUND TO AN EXISTING, CONTRACTOR IS REQUIRED TO PERFORM A GROUND TEST TO DETERMINE IF AMOUNT OF RESISTANCE PRESENT IS WITHIN ALLOWABLE LIMITS (<5 OHMS). NEW SYSTEM MUST BE TIED OFF AT 2 POINTS BY EXOTHERMIC WELD WITH INSPECTION PORTS INSTALLED AT EACH BONDED POINT. A SECOND GROUND TEST IS REQUIRED AFTER INSTALLING NEW GROUND & MUST BE WITHIN ALLOWABLE LIMITS (<5 OHMS).

4. GROUND ROD SPACING IS 10'-0" MAX.
5. THE BURIED GROUND RING CONDUCTORS & TOP OF GROUND RODS SHALL BE BURIED A MINIMUM DEPTH OF 2'-6" BELOW FINISHED GRADE, OR 6" BELOW FROST LINE, WHICHEVER IS DEEPER.
6. THE BURIED GROUND RING CONDUCTORS SHALL BE #2 SOLID BARE TINNED COPPER.
7. PROVIDE 10R OF GROUND WIRE COILED UP AT TERMINATING LOCATION FOR FUTURE CONNECTIONS TO EQUIPMENT (CABINETS, MONOPOLE, COAX BRIDGE, FENCING, ETC) BEING INSTALLED AT A LATER DATE THAN THE GROUNDING INSTALLATION.
8. THE #2 AWG GREEN ICSW MAY BE RUN IN THE CABLE TRAY PARALLEL TO COAX CABLE. DO NOT ATTACH OR FASTEN THE GROUND WIRE TO THE COAX CABLE.
9. THE #2 AWG GREEN ICSW MAY BE RUN IN THE CABLE TRAY PARALLEL TO COAX CABLE. DO NOT ATTACH OR FASTEN THE GROUND WIRE TO THE COAX CABLE.



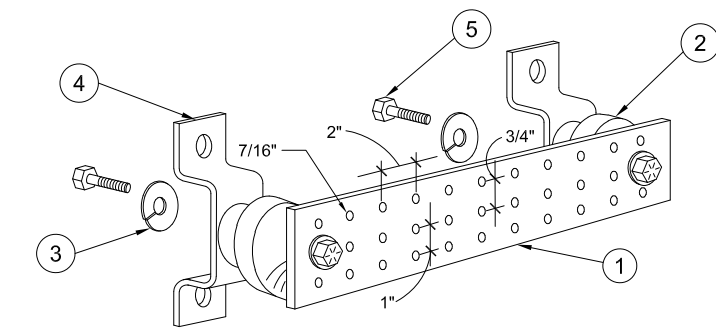
NOTES:

1. THIS IS A DIAGRAMMATIC REPRESENTATION ONLY. SEE SITE PLAN FOR FINAL EQUIPMENT LAYOUT.
2. OBSERVE N.E.C. AND LOCAL UTILITY REQUIREMENTS FOR ELECTRICAL SERVICE GROUNDING.

1 TYPICAL GROUNDING SCHEMATIC AND GROUNDING NOTES

SCALE: NTS

SCALE: NTS



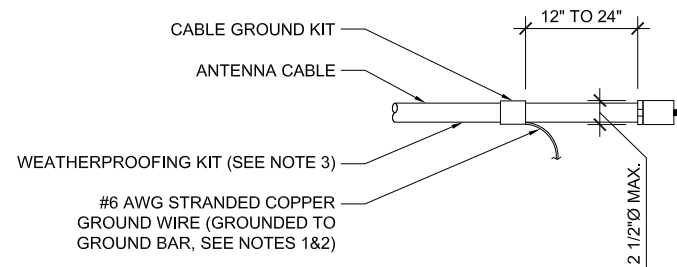
KEY / NOTES:

1. TINNED COPPER GROUND BUSBAR, 1/4" X 4" X 12" OR APPROVED EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
 2. SPACERS AS REQUIRED.
 3. 5/8" LOCKWASHERS.
 4. WALL MOUNTING BRACKET.
 5. 5/8-11 X 1" HHCS BOLTS.
- GROUND BAR TO BE PURCHASED FROM ROHN.

2 TYPICAL GROUND BAR DETAIL

SCALE: NTS

SCALE: NTS



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 ANDREW SUREGROUND TYPE KIT WITH TWO-HOLE LUG.
3. WEATHER PROOFING SHALL INCORPORATE PPC WEATHER PROOFING TAPE KIT, COLD SHRINK SHALL NOT BE USED.

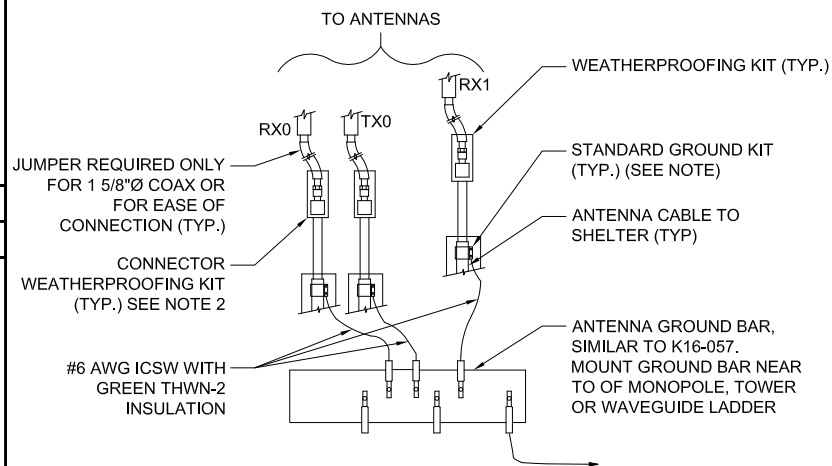
3 TYPICAL CABLE GROUNDING

SCALE: NTS

SCALE: NTS

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 ANDREWS. (TYPE & PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.)



4 TYPICAL GROUND WIRE TO GROUND BAR

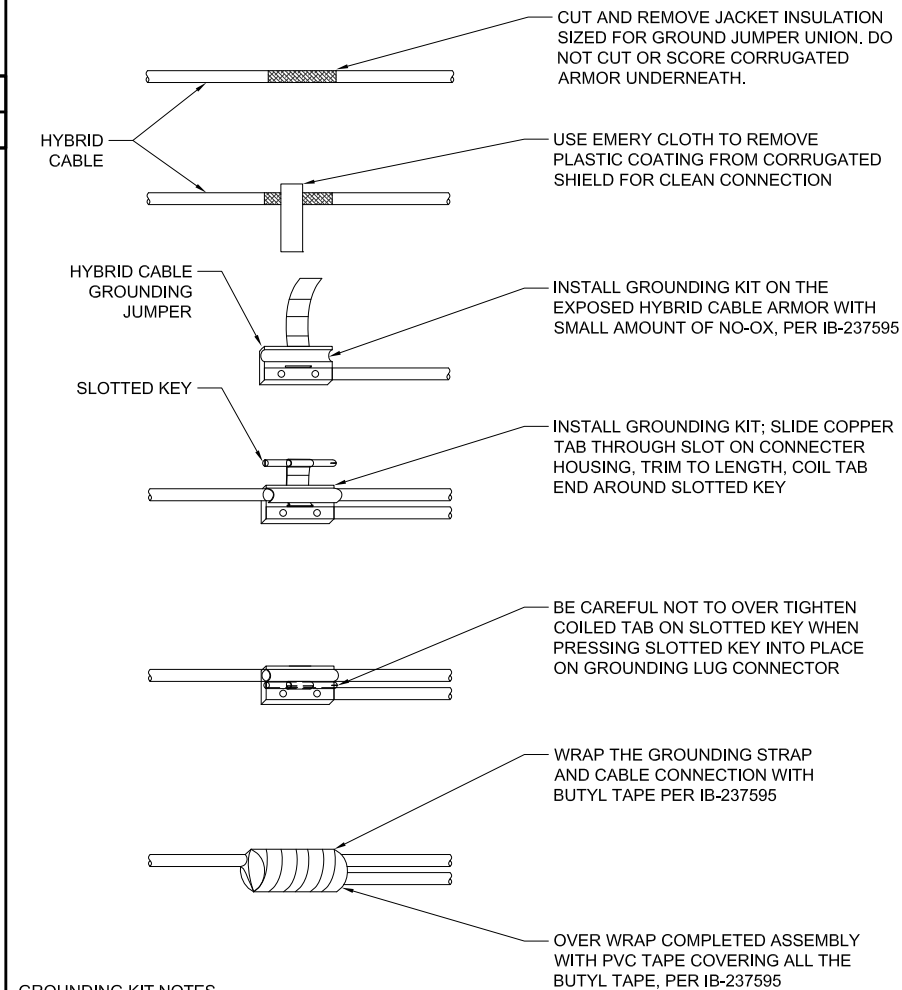
SCALE: NTS

SCALE: NTS

5 EXTERIOR TWO HOLE LUG CONNECTION

SCALE: NTS

SCALE: NTS



GROUNDING KIT NOTES

- THE NUMBER OF GROUNDING KITS REQUIRED IS DETERMINED BY THE LENGTH OF THE HYBRID TRUNK CABLE.
- UP TO 125' REQUIRES 2 KITS; ONE TOP / ONE BOTTOM.
- 150' TO 225' REQUIRES 3 KITS; ONE TOP / ONE BOTTOM / ONE MIDDLE.
- 250' TO 325' REQUIRES 4 KITS; ONE TOP / ONE BOTTOM / TWO MIDDLE.
- 350' TO 400' REQUIRES 5 KITS; ONE TOP / ONE BOTTOM / THREE MIDDLE.
- 425' TO 500' REQUIRES 6 KITS; ONE TOP / ONE BOTTOM / FOUR MIDDLE.

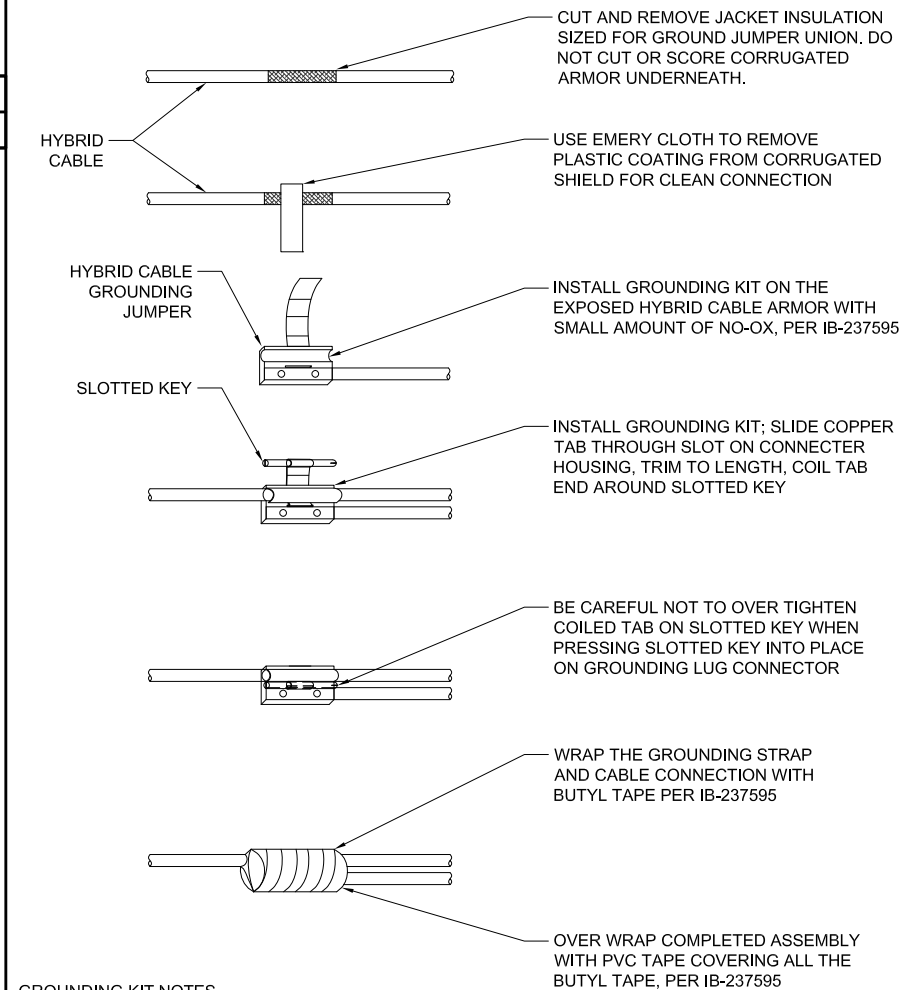
MAKE THE FINAL GROUND JUMPER LUG ATTACHMENT TO THE GROUND BAR USING NO-OX AND STAINLESS STEEL HARDWARE.

5

EXTERIOR TWO HOLE LUG CONNECTION

SCALE: NTS

SCALE: NTS



GROUNDING KIT NOTES

- THE NUMBER OF GROUNDING KITS REQUIRED IS DETERMINED BY THE LENGTH OF THE HYBRID TRUNK CABLE.
- UP TO 125' REQUIRES 2 KITS; ONE TOP / ONE BOTTOM.
- 150' TO 225' REQUIRES 3 KITS; ONE TOP / ONE BOTTOM / ONE MIDDLE.
- 250' TO 325' REQUIRES 4 KITS; ONE TOP / ONE BOTTOM / TWO MIDDLE.
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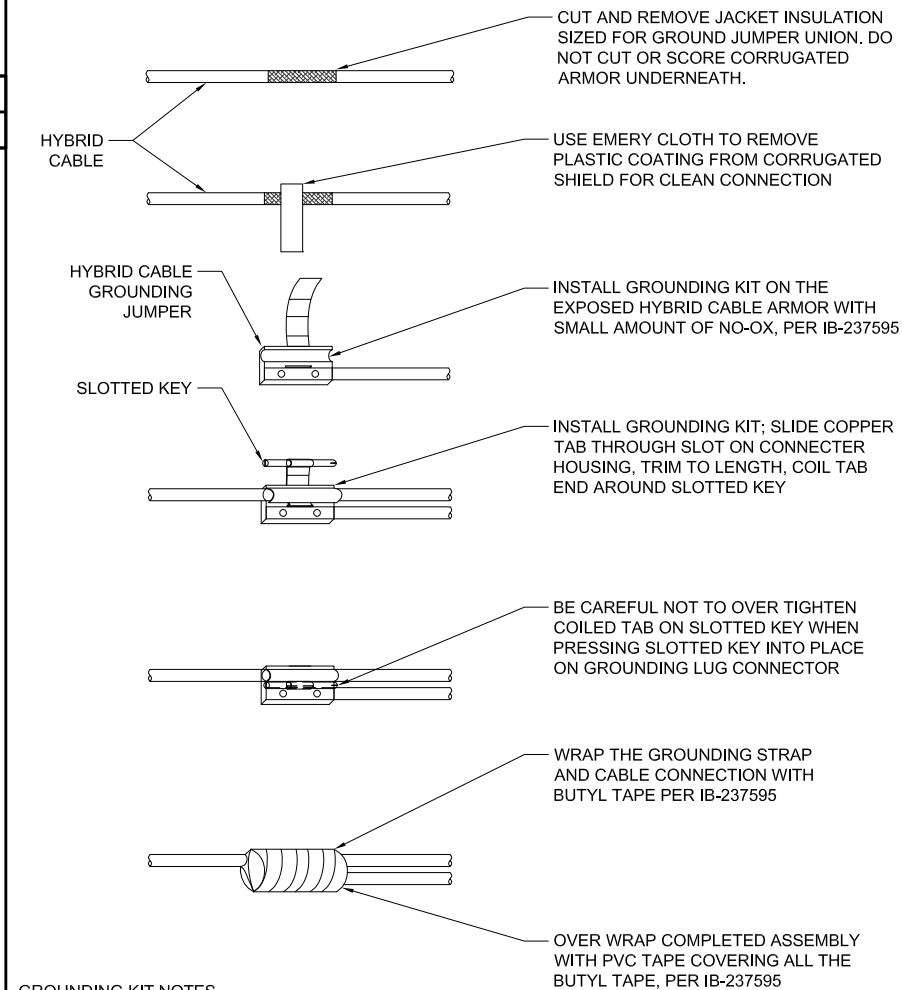
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MAKE THE FINAL GROUND JUMPER LUG ATTACHMENT TO THE GROUND BAR USING NO-OX AND STAINLESS STEEL HARDWARE.



18400 EAST 22ND AVENUE
AURORA, CO 80011

PROJECT INFORMATION:

SITE NAME:
CHEROKEE TANK
SITE ID:
DN02030B

SITE ADDRESS:
2710 PETERSON RD.
COLORADO SRPINGS, CO 80922

NO.	DATE	D/C	DESCRIPTION
1	06-05-17	GW/CM	PRELIM. CONST.
2	06-20-17	CM	REVISED PRELIM.

PLANS PREPARED BY:



16035 TABLE MOUNTAIN PARKWAY
GOLDEN, CO 80403
303.993.3293
WWW.CENTERLINESOLUTIONS.COM

LICENSURE NUMBER:

NOT APPROVED FOR CONSTRUCTION

ALL SCALES ARE SET FOR 11" X 17" SHEET

DRAWN BY:	CHK BY:	APV BY:
GW	CM	KS

SHEET TITLE:
GROUNDING NOTES SCHEMATIC AND DETAILS

SHEET NUMBER:
G1.0

GENERAL CONSTRUCTION NOTES

- THE FACILITY IS AN UNOCCUPIED WIRELESS FACILITY.
- PLANS ARE NOT TO BE SCALED AND ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY, UNLESS NOTED OTHERWISE. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTORS SHALL VISIT THE JOB SITE AND BE RESPONSIBLE FOR ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE IMPLEMENTATION ENGINEER AND ARCHITECT/ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
- THE CONTRACTOR SHALL RECEIVE, IN WRITING, AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
- CONTRACTOR SHALL CONTACT LOCAL DIGGERS HOTLINE 48 HOURS PRIOR TO PROCEEDING WITH ANY EXCAVATION, SITE WORK OR CONSTRUCTION.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
- ALL WORK PERFORMED AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. MECHANICAL AND ELECTRICAL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
- THE GENERAL CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK, USING THE BEST SKILLS AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT INCLUDING CONTACT AND COORDINATION WITH THE CONSTRUCTION FIELD ENGINEER AND WITH THE LANDLORD'S AUTHORIZED REPRESENTATIVE. DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.
- REPRESENTATIONS OF TRUE NORTH, OTHER THAN THOSE FOUND ON THE PLOT OF SURVEY DRAWING, SHALL NOT BE USED TO IDENTIFY OR ESTABLISH THE BEARING OF TRUE NORTH AT THE SITE. THE CONTRACTOR SHALL RELY SOLELY ON THE PLOT OF SURVEY DRAWING AND ANY SURVEYOR'S MARKINGS AT THE SITE FOR THE ESTABLISHMENT OF TRUE NORTH, AND SHALL NOTIFY THE ARCHITECT/ENGINEER PRIOR TO PROCEEDING WITH THE WORK IF ANY DISCREPANCY IS FOUND BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND THE TRUE NORTH ORIENTATION AS DEPICTED ON THE PLAT OF SURVEY. THE CONTRACTOR SHALL ASSUME SOLE LIABILITY FOR ANY FAILURE TO NOTIFY THE ARCHITECT/ENGINEER.

STRUCTURAL NOTES

GENERAL CONDITIONS

- DESIGN AND CONSTRUCTION OF ALL WORK SHALL CONFORM TO THE APPROVED EDITION OF THE IBC EDITION AND ALL OTHER APPLICABLE STATE CODES, ORDINANCES, AND REGULATIONS. IN CASE OF CONFLICT BETWEEN THE CODES, STANDARDS, AND REGULATIONS, SPECIFICATIONS, GENERAL NOTES AND/OR MANUFACTURER'S REQUIREMENTS. USE THE MOST STRINGENT PROVISION.
- IT IS THE EXPRESS INTENT OF THE PARTIES INVOLVED IN THIS PROJECT THAT THE CONTRACTOR OR SUBCONTRACTOR OR INDEPENDENT CONTRACTOR OR THEIR RESPECTIVE EMPLOYEES SHALL EXCULPATE THE ARCHITECT, THE ENGINEER, THE CONSTRUCTION MANAGER, THE OWNER, AND THEIR AGENTS, FROM ANY LIABILITY WHATSOEVER AND HOLD THEM HARMLESS AGAINST LOSS, DAMAGES, LIABILITY OR ANY EXPENSE ARISING IN ANY MATTER FROM THE WRONGFUL OR NEGLIGENT ACT, OR FAILURE TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, OR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OR FAILURE TO CONFORM TO THE STATE SCAFFOLDING ACT IN CONNECTION WITH THE WORK.
- DO NOT SCALE DRAWINGS.
- VERIFY ALL EQUIPMENT MOUNTING DIMENSIONS PER MANUFACTURER DRAWINGS.
- SUBMIT ONE SEPIA AND TWO PRINTS OF ALL STRUCTURAL SHOP DRAWINGS. MARKED UP SEPIA SHALL BE RETURNED.

STRUCTURAL STEEL NOTES:

- CHANNELS, ANGLES AND PLATES SHALL BE ASTM A36 MATERIAL, UNLESS NOTED OTHERWISE.
- SQUARE AND RECTANGULAR TUBE STEEL HSS SECTIONS SHALL BE ASTM A500, GRADE B (Fy = 46 ksi) MATERIAL.
- ROUND PIPE SECTIONS SHALL BE ASTM A53, GRADE B (Fy =35 ksi) MATERIAL.
- DESIGN, FABRICATION, AND ERECTION SHALL BE IN ACCORDANCE WITH THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS", WITH COMMENTARY AND THE "CODE OF STANDARD PRACTICE".
- ALL STEEL SHALL HAVE ONE COAT OF SHOP PRIMER. DO NOT PAINT AREAS WITHIN 3" OF BOLTS, WELDS OR HEADED STUDS.
- BOLTS SHALL BE HIGH STRENGTH BOLTS, A325, CONFORMING TO ASTM SPECIFICATIONS. ALL CONNECTIONS SHALL HAVE A MINIMUM OF 2 BOLTS.
- WELDING SHALL BE CONDUCTED BY CERTIFIED WELDERS AND SHALL CONFORM TO THE AWS CODES FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION.
- WELDS SHALL BE MADE USING E70XX ELECTRODES AND SHALL BE 3/16" MINIMUM UNLESS OTHERWISE NOTED.
- WELDING SHALL BE PERFORMED IN ACCORDANCE WITH A WELDED PROCEDURE SPECIFICATION (WPS) AS PER AWS D1.1, D1.3 AND D1.4.
- ONLY PRE-QUALIFIED WELDING PROCEDURES SHALL BE USED.
- UNLESS SPECIFICALLY ADDRESSED IN THE SPECIFICATIONS OR THE DETAILS, ALL STEEL ITEMS PERMANENTLY EXPOSED TO EARTH OR WEATHER SHALL BE CORROSION-RESISTANT BY GALVANIZING OR BY THE USE OF STAINLESS STEEL.
- ALL FIELD WELDS ON GALVANIZED MATERIAL SHALL BE BRUSH-COATED WITH A ZINC-RICH PAINT.

FRP NOTES:

- ALL FRP MATERIAL SHALL BE EXTREN SERIES 500 OR EQUIVALENT, PRODUCED BY THE PULTRUSION METHOD.
- ALL ADHESIVE RESIN SHALL BE PLEXUS METHACRYLATE OR AN EQUIVALENT ADHESIVE RESIN THAT IS COMPATIBLE WITH THE RESIN MATRIX USED IN THE STRUCTURAL SHAPES.
- ALL FRP CONNECTIONS SHALL BE FULLY-BONDED AT EACH SIDE WITH A 1/4" PLATE AND A MINIMUM OF (2) 3/8" DIAMETER FLATHEAD FRP SCREWS PER MEMBER.

- ISOPLAST NUTS AND BOLTS SHALL BE TIGHTENED TO A SNUG-TIGHT FIT PLUS AN ADDITIONAL 1/2 TURN, PRIOR TO BEING LOCKED WITH EPOXY.
- ALL PANELS / SHEATHING SHALL BE FULLY BONDED WITH 3/8" FLATHEAD FRP SCREWS AT 12" O.C.
- ALL FIELD CUT AND DRILLED EDGES, HOLES AND ABRASIONS SHALL BE SEALED WITH A CATALYZED EPOXY RESIN COMPATIBLE WITH THE MANUFACTURER'S ORIGINAL RESIN.

STANDARDS FOR ALL CONCRETE WORK

- ALL CONCRETE WORK SHALL CONFORM WITH ACI 318 OR LATEST. DETAIL REINFORCING IN CONFORMANCE WITH ACI, SP66 LATEST.
- NO SPLICES OF REINFORCEMENT SHALL BE MADE EXCEPT AS DETAILED OR AUTHORIZED BY THE STRUCTURAL ENGINEER. LAP SPLICES WHERE PERMITTED SHALL BE A MINIMUM OF 30 BAR DIAMETERS.
- PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING AT POSITIONS SHOW ON DRAWINGS.
- WIRE FABRIC REINFORCEMENT MUST LAP ONE FULL MESH AT SIDE AND END LAPS SHALL BE TIED TOGETHER.
- CURE AFTER FINISHING CONCRETE. KEEP MOIST FOR 7 DAYS AFTER POURING.
- COMPACT STRUCTURAL FILL 95% PROCTOR DENSITY PRIOR TO PLACING CONCRETE UNDER SLABS.
- 1/4" CHAMFER ON ALL CORNERS AND EDGES.
- ALL CONCRETE SHALL BE PORTLAND, TYPE 1 CEMENT WITH A MINIMUM OF 28 DAY STRENGTH OF 3000 PSI., 4" SLUMP AND A MINIMUM AIR ENTRAPMENT OF 4%.
- ALL REINFORCING STEEL SHALL BE GRADE 60. ALL REINFORCING MESH SHALL CONFORM TO ASTM A 185.

ELECTRICAL NOTES

- SUBMITTAL OF BID INDICATES CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT. CONTRACTOR IS RESPONSIBLE FOR ALL FIELD VERIFICATION.
- THESE PLANS ARE DIAGRAMMATIC ONLY, AND NOT TO BE SCALED.
- ELECTRICAL CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC. FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.
- ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE OR GROUP OF EQUIPMENT. MATERIALS SHALL BE LISTED AND APPROVED BY UNDER-WRITER'S LABORATORY AND SHALL BEAR THE INSPECTION LABEL "J" WHERE SUBJECT TO SUCH APPROVAL MATERIALS SHALL MEET WITH APPROVAL OF THE DIVISION OF INDUSTRIAL SAFETY AND ALL GOVERNING BODIES HAVING JURISDICTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA AND NBFU.
- ALL CONDUIT INSTALLED SHALL BE SURFACE MOUNTED UNLESS OTHERWISE NOTED.
- ELECTRICAL CONTRACTOR SHALL CARRY OUT HIS WORK WITH ACCORDANCE WITH ALL GOVERNING STATE, COUNTY, LOCAL CODES AND O.S.H.A.
- ELECTRICAL CONTRACTOR SHALL SECURE ALL NECESSARY ELECTRICAL PERMITS, AND PAY ALL REQUIRED FEES.
- COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF NO LESS THAN ONE YEAR AFTER THE DATE OF JOB COMPLETION. ANY WORK, MATERIAL, OR EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE, UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR.
- ALL CONDUIT ONLY (C.O.) SHALL HAVE A PULL WIRE OR ROPE, AND TRUE TAPE.
- PROVIDE THE OWNER WITH ONE SET OF COMPLETE DIMENSIONS AND CIRCUITS, WITHIN 10 WORKING DAYS OF PROJECT COMPLETION. ELECTRICAL "AS BUILT" DRAWINGS, SHOWING ACTUAL LOCATION OF CONDUITS.
- ALL BROCHURES, OPERATING MANUALS, CATALOGS, SHOP DRAWINGS, ETC. SHALL BE TURNED OVER TO PROJECT MANAGER AT JOB COMPLETION.
- USE T-TAP CONNECTIONS ON ALL MULTI-CIRCUITS WITH COMMON NEUTRAL CONDUCTOR FOR LIGHTING FIXTURE. ALL CONDUCTORS SHALL BE COPPER.
- THE EXTERIOR GROUND RING SHALL BE TESTED PER CCI SPECIFICATIONS AND SHALL HAVE A RESISTANCE TO EARTH OF 5 OHMS OR LESS. IF NOT NOTIFY ENGINEER.
- ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THAN THE MAXIMUM SHORT =CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AND A MINIMUM OF 10,000 A.I.C.
- THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY ALL APPLICABLE CODES.
- PATCH, REPAIR, AND PAINT ANY AREA THAT HAS BEEN DAMAGED IN THE COURSE OF THE ELECTRICAL WORK.
- IN DRILLING HOLES INTO CONCRETE (WHETHER FOR FASTENING OR ANCHORING PURPOSES OR PENETRATIONS THROUGH THE FLOOR FOR CONDUIT RUNS, PIPE RUNS, ETC.) IT MUST BE CLEARLY UNDERSTOOD THAT TENDONS AND RE-BARS WILL NOT BE DRILLED INTO, CUT, OR DAMAGED UNDER ANY CIRCUMSTANCES.
- LOCATION OF TENDONS AN RE-BARS ARE NOT DEFINITELY KNOWN AND THEREFORE MUST BE SEARCHED FOR BY APPROPRIATE METHODS AND EQUIPMENT VIA X-RAY, OR OTHER DEVICES THAT CAN ACCURATELY LOCATE THE REINFORCING STEEL TENDONS.
- PENETRATIONS IN FIRE RATED WALLS SHALL BE FIRE STOPPED IN ACCORDANCE WITH APPLICABLE LOCAL BUILDING CODES. USING U.L. RATED MATERIALS.

- ELECTRICAL CONTRACTOR IS TO COORDINATE WITH UTILITY COMPANY FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOK-UP COSTS SHALL BE PAID BY THE CONTRACTOR.

- ELECTRICAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR CATALOG CUT-SHEETS ON ALL NON-SPECIFIED ORIGINAL MATERIALS AND EQUIPMENT, TO PROJECT MANAGER PRIOR TO COMMENCEMENT OF THE WORK.
- UPON COMPLETION OF WORK, CONDUCT CONTINUITY AND SHORT CIRCUIT, AS WELL AS, GROUNDING TEST, GROUNDING TEST SHALL BE PERFORMED BY INDEPENDENT TESTING AGENCY, WITH WRITTEN REPORT SUBMITTED TO THE PROJECT MANAGER FOR REVIEW AND APPROVAL.
- CLEAN PREMISES DAILY OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK PREMISES IN A COMPLETE AND UNDAMAGED CONDITION.
- ALL EXTERIOR WALL PENETRATIONS SHALL BE SEALED WITH POLYSEAM SEALANT.
- ALL #2 TINNED BARE COPPER DOWNLEADS TO BE PROTECTED BY 1/2" P.V.C. PIPE AND SECURED.
- COMPRESSION FITTINGS TO BE USED ON ALL CONDUITS (NO SET SCREWS).
- ALL #6 STRANDED COPPER WITH GREEN INSULATION TO BE ATTACHED WITH CRIMPED DOUBLE LUG, ATTACHED WITH NUTS, BOLTS AND STAR WASHERS TYPICAL AND NO-OX GREASE BETWEEN LUG AND BUS BAR.
- ALL ABOVE GROUND CONDUIT SHALL BE RIGID GALVANIZED CONDUIT WITH WEATHERPROOF FITTINGS.

GROUNDING

- ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, T-MOBILE GROUNDING AND BONDING STANDARDS, AND THE NATIONAL ELECTRICAL CODE.
- PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
- ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN
- GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUND RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN #2 AWG COPPER. ROOFTOP GROUND RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).
- TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING
- ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE GROUNDING SYSTEM. EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
- APPLY CORROSION-RESISTANCE FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED.
- A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
- BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE 6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
- DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
- ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
- THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
- DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
- IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS
- CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

T-Mobile

18400 EAST 22ND AVENUE
AURORA, CO 80011

PROJECT INFORMATION:

SITE NAME:
CHEROKEE TANK
SITE ID:
DN02030B

SITE ADDRESS:
2710 PETERSON RD.
COLORADO SRPINGS, CO 80922

NO.	DATE	D/C	DESCRIPTION
1	06-05-17	GW/CM	PRELIM. CONST.
2	06-20-17	CM	REVISED PRELIM.

PLANS PREPARED BY:

 **CENTERLINE**
SOLUTIONS

16035 TABLE MOUNTAIN PARKWAY
GOLDEN, CO 80403
303.993.3293
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LICENSURE NUMBER:

**NOT APPROVED FOR
CONSTRUCTION**

ALL SCALES ARE SET FOR 11" X 17" SHEET

DRAWN BY:	CHK BY:	APV BY:
GW	CM	KS

SHEET TITLE:

GENERAL NOTES

SHEET NUMBER:

GN1

T-Mobile Site Name: Cherokee Tank
T-Mobile Site Number: DN02030B



Existing View of Alpha Sector



New View with New T-Mobile Antennas

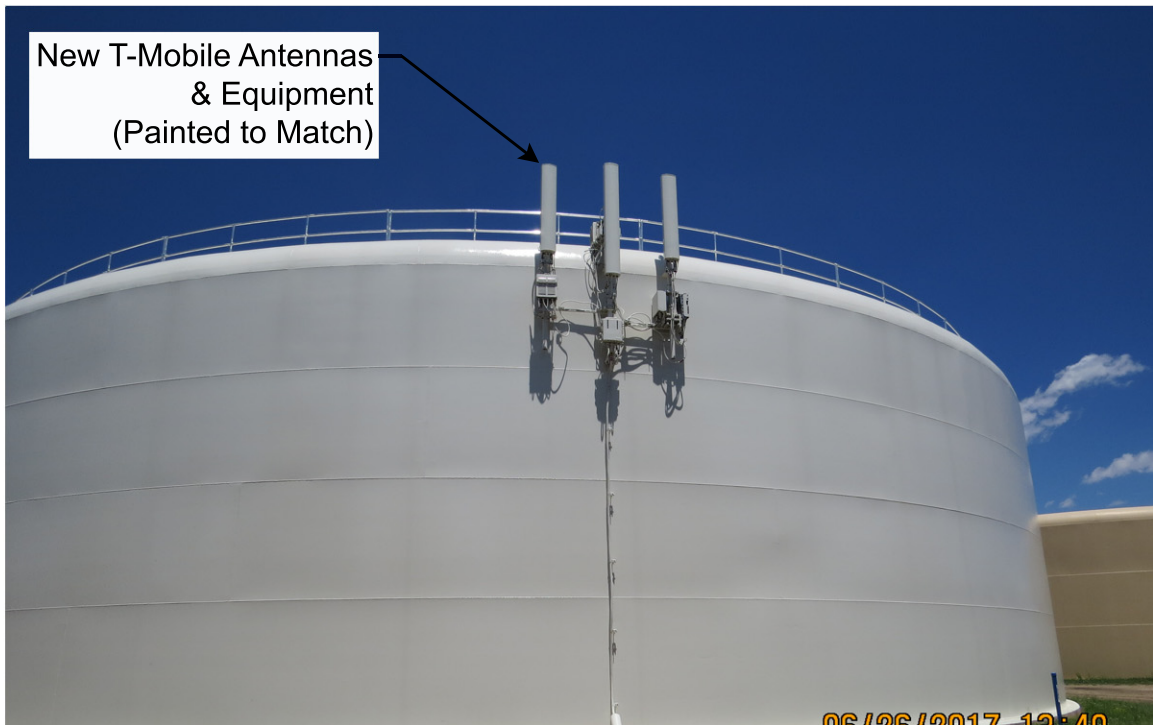


(This photo simulation is for illustrative purposes only)

T-Mobile Site Name: Cherokee Tank
T-Mobile Site Number: DN02030B



Existing View of Gamma Sector



New T-Mobile Antennas
& Equipment
(Painted to Match)

New View with New T-Mobile Antennas



(This photo simulation is for illustrative purposes only)