T-Mobile

T-MOBILE SITE #:

DN03014A

T-MOBILE SITE NAME:

BLACK FOREST CO

L600 PROJECT

SITE ADDRESS:

14775 BLACK FOREST ROAD
COLORADO SPRINGS, CO 80461

SCOPE OF WORK

THE SCOPE OF WORK WORK CONSISTS OF:

1. REMOVE (3) EXISTING PANEL ANTENNAS.
2. INSTALL (3) NEW PANEL ANTENNAS.
3. INSTALL (3) NEW AHLOA & NEW RF JUMPERS.
4. REMOVE EXISTING (2) FSMF, (3) FBBC & (3) FRLB.
5. INSTALL NEW (3) ABIA, (1) ASIA.

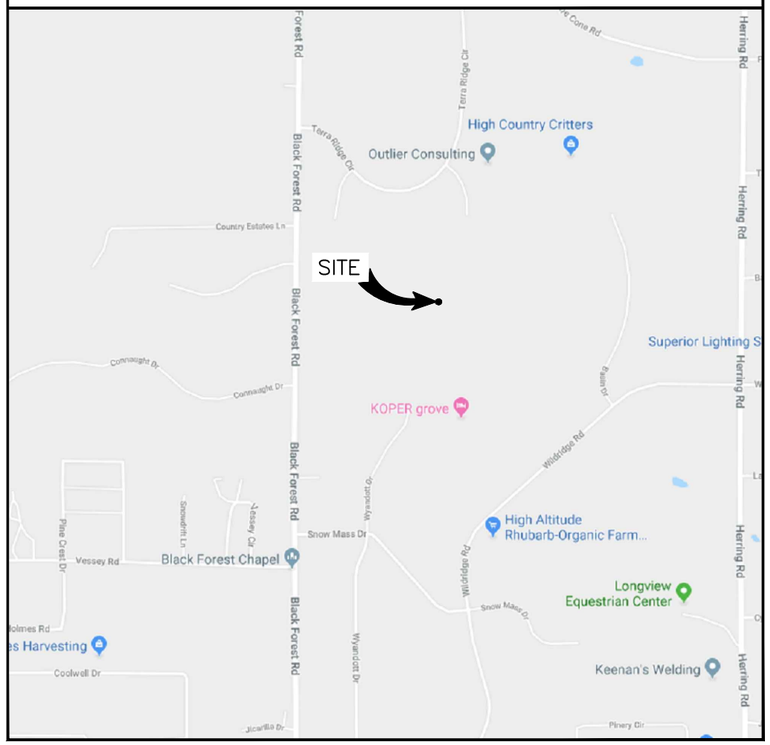
DRIVING DIRECTIONS

DRIVING DIRECTIONS FROM T-MOBILE OFFICE
AT: 18400 E. 22ND AVENUE, AURORA, CO 80011:

1.	DEPART E 22ND AVE TOWARD TOWER RD.	243 FEET
2.	TURN LEFT ONTO TOWER RD.	0.6 MILES
3.	TAKE RAMP RIGHT FOR I-70 E / US-36 E	3.1 MILES
4.	AT EXIT 289, TAKE RAMP RIGHT FOR E-470 TOWARD COLO SPGS / FT COLLINS	0.2 MILES
5.	TURN RIGHT ONTO E-470 S	0.1 MILES
6.	TAKE RAMP LEFT AND FOLLOW SIGNS FOR E-470 SOUTH, TOLL ROAD	14.6 MILES
7.	AT EXIT 5, TAKE RAMP RIGHT AND FOLLOW SIGNS FOR CO-83	0.5 MILES
8.	TURN LEFT ONTO CO-83 S / S PARKER RD., PASS VALERO IN	36.4 MILES
9.	TURN LEFT ONTO HODGEN RD	3.3 MILES
10.	TURN RIGHT ONTO BLACK FOREST RD / BLACK FOREST DR	2.1 MILES
11.	TURN LEFT ONTO 21ST AVE, UNPAVED ROAD	0.2 MILES
12.	TURN LEFT ONTO WYANDOTT DR., UNPAVED ROAD	0.3 MILES
13.	ARRIVE @ 14775 BLACK FOREST ROAD	

DESTINATION WILL BE ON THE LEFT
TOTAL TRAVEL ESTIMATE: 72.0 MI, 1 HR 55 MINUTES

AERIAL MAP



SITE

SHEET INDEX

NO.	SHEET DESCRIPTION
T-1	TITLE SHEET
A-1	COMPOUND PLAN
A-1A	EXISTING & PROPOSED EQUIPMENT LAYOUT
A-2	ELEVATION & DETAILS
A-2A	EXISTING & PROPOSED ANTENNA PLANS
A-3	ANTENNA & CABLE SCHEDULE
A-4	NEW EQUIPMENT SPECIFICATIONS
A-5	NEW EQUIPMENT SPECIFICATIONS
EG-1	PROPOSED SITE GROUNDING DIAGRAM
SP-1	GENERAL NOTES & SPECIFICATIONS

GENERAL NOTES:

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS AT THE PROJECT SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

THE SEAL CERTIFIES ONLY THE CIVIL ENGINEERING DESIGN AND RELATED DETAILS SHOWN ON THESE PLANS. THIS SEAL DOES NOT CERTIFY ANY ARCHITECTURAL, ELECTRICAL, MECHANICAL, STRUCTURAL DESIGN, AND RELATED DETAILS INCLUDED IN THESE PLANS.

FOR SITES WHERE A CRANE IS NECESSARY, THE CONTRACTOR SHALL CONFIRM AN UNOBSTRUCTED ROUTE FOR THE CRANE FROM PUBLIC ROAD TO TOWER SITE PRIOR TO CONSTRUCTION. NO AERIAL OBSTRUCTIONS UNDER FIFTEEN FEET ABOVE GRADE, INCLUDING AERIAL UTILITY LINES, ARE ALLOWED ALONG SAID CRANE ROUTE.

GC SHALL CONTACT THE A&E FIRM PRIOR TO BIDWALK AND CONSTRUCTION START TO CONFIRM THAT DRAWINGS ARE THE MOST RECENT SET.

PROFESSIONAL LICENSURE

I CERTIFY THAT THESE DRAWINGS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND CONTROL AND TO THE BEST OF MY KNOWLEDGE AND BELIEF COMPLY WITH THE REQUIREMENTS OF THE GOVERNING LOCAL BUILDING CODE.

LICENSED PROFESSIONAL

EXPIRES: SIGNED:

PROJECT INFORMATION

SITE INFORMATION:

LATITUDE: N 39° 02' 46.40" (NAD 83)

LONGITUDE: W 104° 41' 40.10" (NAD 83)

SITE TYPE: SELF SUPPORT TOWER

ATC PROJECT MANAGER: HERBERT HAMLIN
Herbert.Hamlin@americantower.com
PHONE: (303) 618-3202

ENGINEERING CONTACT: INFINIGY ENGINEERING, PLLC.
CHRIS LIPS
1490 W. 121ST AVENUE, SUITE 101
WESTMINSTER, CO 80234
PHONE: (303) 219-1178

TOWER OWNER: AMERICAN TOWER CORPORATION
1658 COLE BLVD., SUITE 205
LAKEWOOD, CO 80401

ALL WORK AND MATERIALS SHALL BE PERFORMED AND 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 THE LATEST EDITIONS OF THE FOLLOWING CODES:

CODES:

1. INTERNATIONAL BUILDING CODE 2012
2. NATIONAL ELECTRIC CODE (NEC)
3. AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
4. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION
5. TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL TOWER AND ANTENNA SUPPORTING STRUCTURES
6. TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

811 Know what's below. Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN COLORADO, CALL COLORADO 811
TOLL FREE: 1-800-922-1987 OR www.co811.org
COLORADO STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

PLANS PREPARED FOR:

T-Mobile
T-MOBILE WEST LLC
18400 EAST 22ND AVENUE
AURORA, CO 80011

PLANS PREPARED BY:

INFINIGY ENGINEERING, PLLC
1490 W. 121st AVE., SUITE 101
WESTMINSTER, COLORADO 80234
JOB NUMBER 317-701

MLA PARTNER:

AMERICAN TOWER CORPORATION

ENGINEERING LICENSE:

COLORADO LICENSED
CHRISTOPHER J. WARREN
47849
5/3/19
PROFESSIONAL ENGINEER

DRAWING NOTICE:

THESE DOCUMENTS ARE CONFIDENTIAL AND ARE THE SOLE PROPERTY OF T-MOBILE AND MAY NOT BE REPRODUCED, DISSEMINATED OR REDISTRIBUTED WITHOUT THE EXPRESS WRITTEN CONSENT OF T-MOBILE.

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	05/03/19	CTL	0

SITE NAME: BLACK FOREST CO

T-MOBILE SITE #: DN03014A

ATC SITE #: 88791

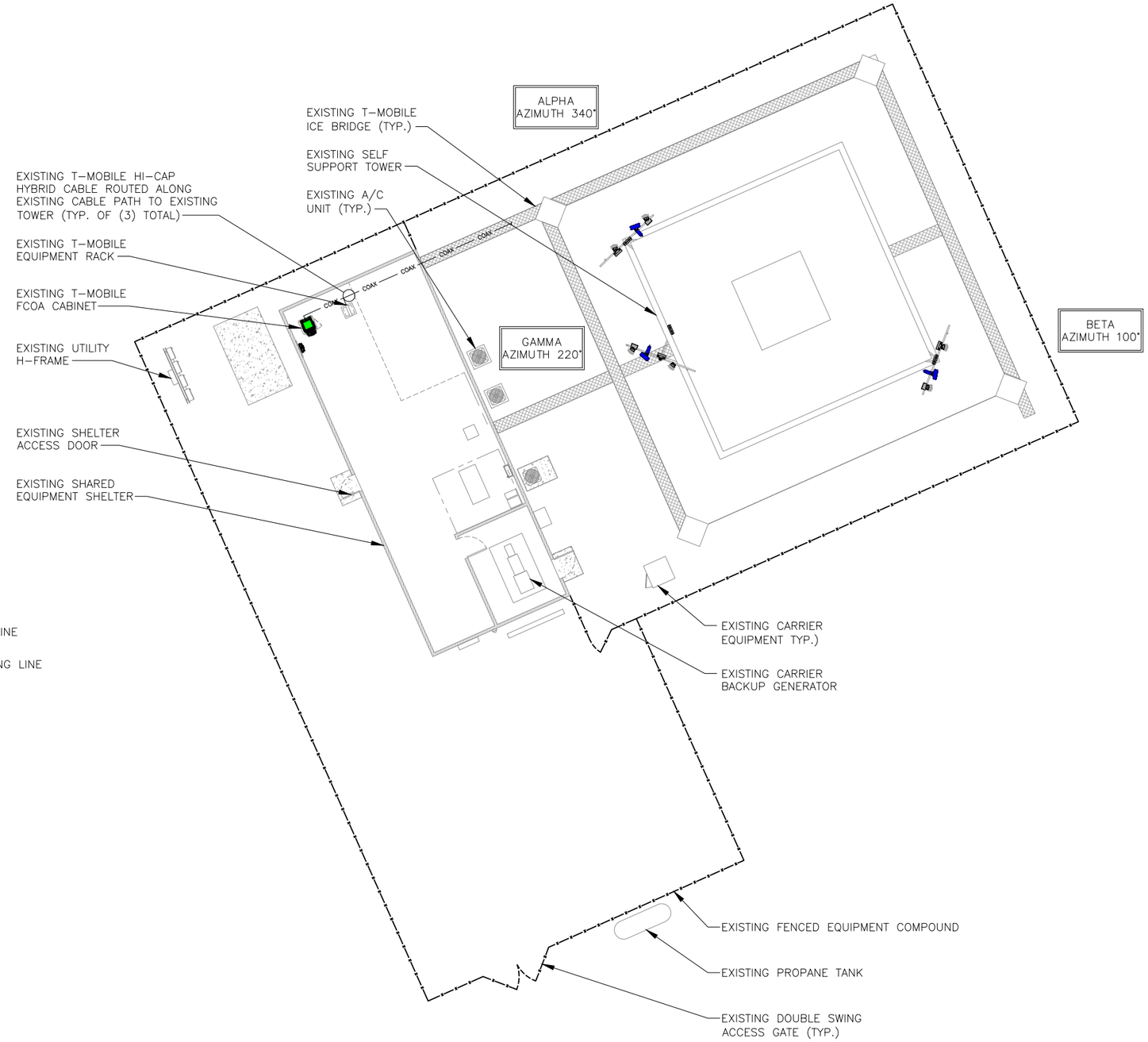
SITE ADDRESS: 14775 BLACK FOREST ROAD COLORADO SPRINGS, CO 80461

SHEET DESCRIPTION: TITLE SHEET & PROJECT DATA

SHEET NUMBER: T-1

LEGEND & SYMBOLS

- UTILITY POLE
- SIGN
- TELCO PEDESTAL
- FIRE HYDRANT
- LIGHT STANDARD
- INLET
- CATCH BASIN
- MANHOLE
- TRAFFIC SIGNAL
- ROW MARKER
- IRON PIPE SET
- IRON PIPE FOUND
- BUFFALO BOX
- VALVE BOX
- HORIZONTAL CONTROL POINT
- HANDICAPPED PARKING SPACE
- DT 10" DECIDUOUS TREE W/SIZE
- CT 10" CONIFEROUS TREE W/SIZE
- BRUSH
- TREE LINE
- 666 CONTOUR W/ELEVATION
- EXISTING GUARDRAIL
- x CHAIN LINK FENCE
- IRON FENCE
- WOOD FENCE
- OE/OT OVERHEAD WIRES
- LOT LINE
- PROPERTY LINE
- LEASE AREA LINE
- UTILITY EASEMENT LINE
- CENTER LINE
- UE UNDERGROUND ELECTRIC LINE
- UG UNDERGROUND GAS LINE
- FO UNDERGROUND FIBER LINE
- UT UNDERGROUND TELCO LINE
- UF UNDERGROUND FIBER LINE
- SS/SA UNDERGROUND STORM/SANITARY SEWER LINE
- W UNDERGROUND WATER LINE
- COM UNDERGROUND COMMUNICATION/MONITORING LINE
- CONCRETE
- ASPHALT
- GRAVEL
- CULTIVATED FIELD
- GRASS AREA
- ICE BRIDGE
- STEEL PLATFORM



INFORMATION CONTAINED WITHIN DRAWINGS IS BASED ON PROVIDED INFORMATION AND IS NOT THE RESULT OF A FIELD SURVEY. CONTRACTOR TO VERIFY FIELD CONDITIONS PRIOR TO CONSTRUCTION.

APN: TBD

NORTH

COMPOUND PLAN

22"x34" SCALE: 1" = 20'-0"
11"x17" SCALE: 1" = 40'-0"

20' 10' 0' 20'

1

PLANS PREPARED FOR:

T-MOBILE WEST LLC
18400 EAST 22ND AVENUE
AURORA, CO 80011

PLANS PREPARED BY:

INFINIGY ENGINEERING, PLLC
1490 W. 121st AVE., SUITE 101
WESTMINSTER, COLORADO 80234
JOB NUMBER 317-701

MLA PARTNER:

AMERICAN TOWER CORPORATION

ENGINEERING LICENSE:

COLORADO LICENSED
CHRISTOPHER J. WARREN
47849
5/3/19
PROFESSIONAL ENGINEER

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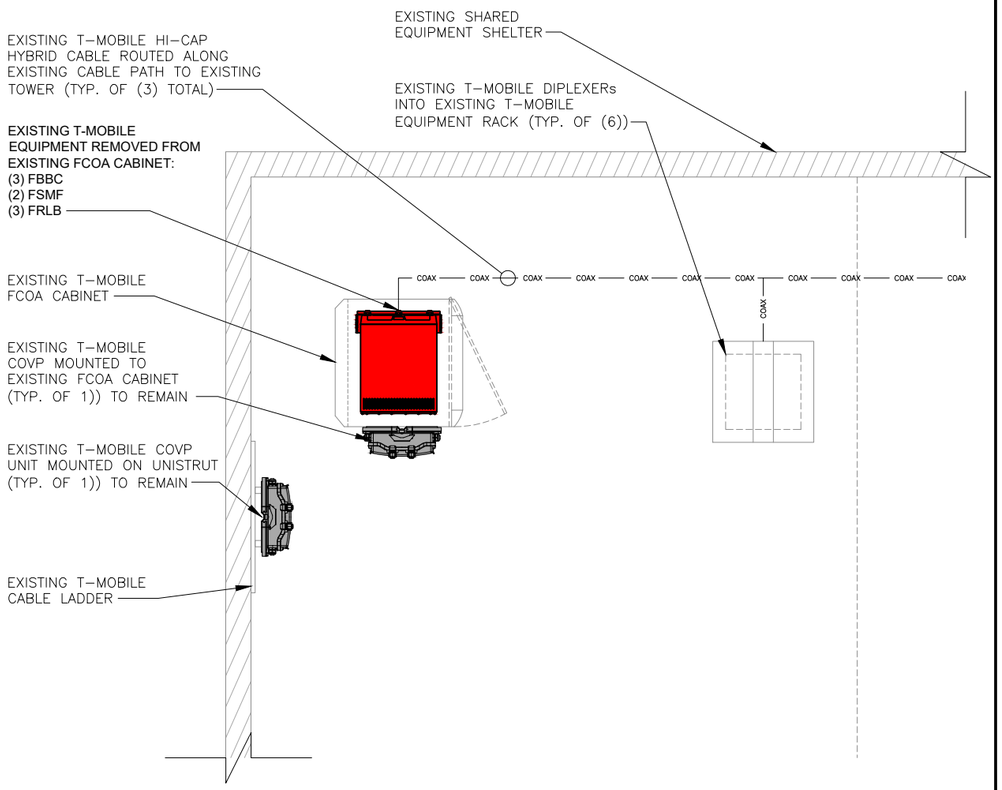
SHEET DESCRIPTION: COMPOUND PLAN

SHEET NUMBER: A-1

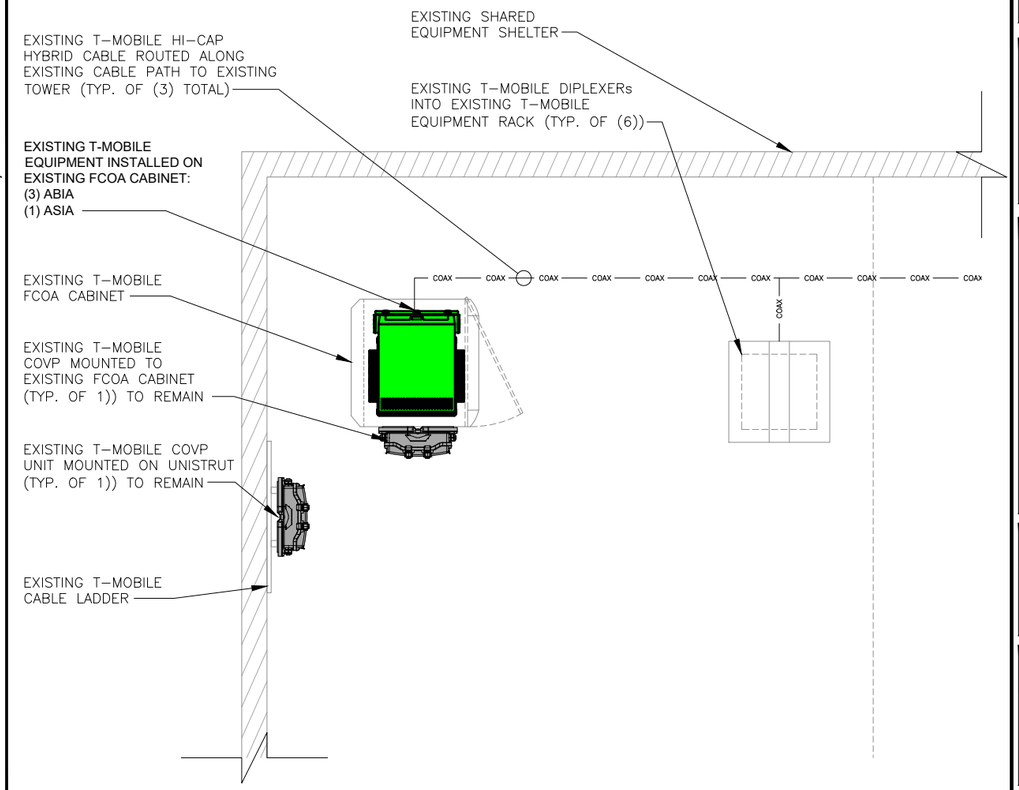


EXISTING EQUIPMENT LAYOUT

22"x34" SCALE: 1" = 1'-6"
11"x17" SCALE: 1" = 3'-0"

3'-0" 1'-6" 0" 3'-0"

1



PROPOSED EQUIPMENT LAYOUT

22"x34" SCALE: 1" = 1'-6"
11"x17" SCALE: 1" = 3'-0"

3'-0" 1'-6" 0" 3'-0"

2

PLANS PREPARED FOR:

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18400 EAST 22ND AVENUE
AURORA, CO 80011

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T-MOBILE SITE #:

DN03014A

ATC SITE #:

88791

SITE ADDRESS:

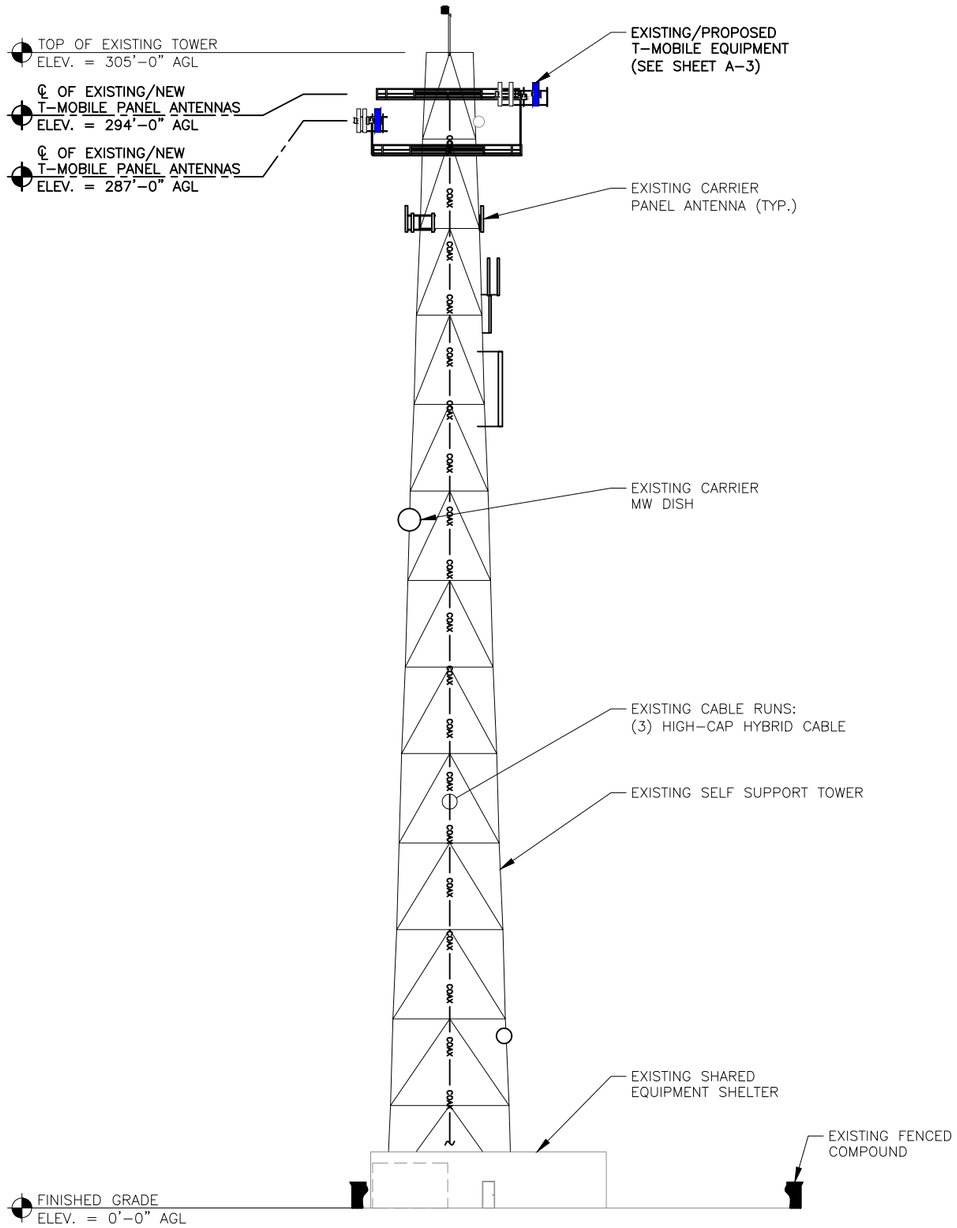
14775 BLACK FOREST ROAD
COLORADO SPRINGS, CO 80461

SHEET DESCRIPTION:

EXISTING & PROPOSED ENLARGED EQUIPMENT LAYOUT

SHEET NUMBER:

A-2



SPECIAL NOTES:

1. GC TO VERIFY ALL HEIGHTS AND AZIMUTHS IN FIELD PRIOR TO CONSTRUCTION. GC SHALL NOTIFY T-MOBILE AND ENGINEER OF DISCREPANCIES IMMEDIATELY.
2. STRUCTURAL/ DESIGN & ANALYSIS SHALL BE PERFORMED & APPROVED BY TOWER OWNER AND MANUFACTURER (STRUCTURAL ANALYSIS BY OTHERS)
3. STRUCTURAL ANALYSIS PERFORMED BY OTHERS. CONTRACTOR TO THOROUGHLY REVIEW THE TOWER STRUCTURAL ANALYSIS FOR INFORMATION PERTAINING TO TOWER UPGRADES, MOUNTING TYPES, ANTENNA HEIGHTS, AND CABLE ROUTING, ANY OTHER DISCREPANCIES BETWEEN THE DRAWINGS, STRUCTURAL ANALYSIS, AND TOWER PLANS SHOULD BE BROUGHT TO THE ATTENTION OF THE PROJECT MANAGER PRIOR TO BIDDING AND INSTALLATION.

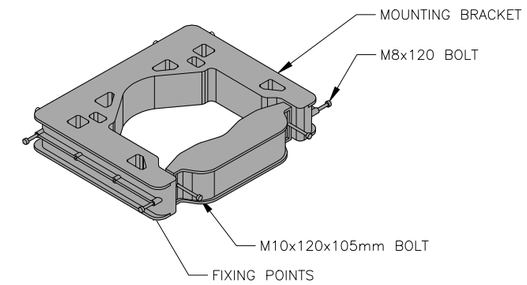
NOTE:
EXISTING/PROPOSED GROUND LEVEL EQUIPMENT NOT SHOWN FOR CLARITY

TOWER ELEVATION

22"x34" SCALE: 1" = 40'-0"
11"x17" SCALE: 1" = 80'-0"

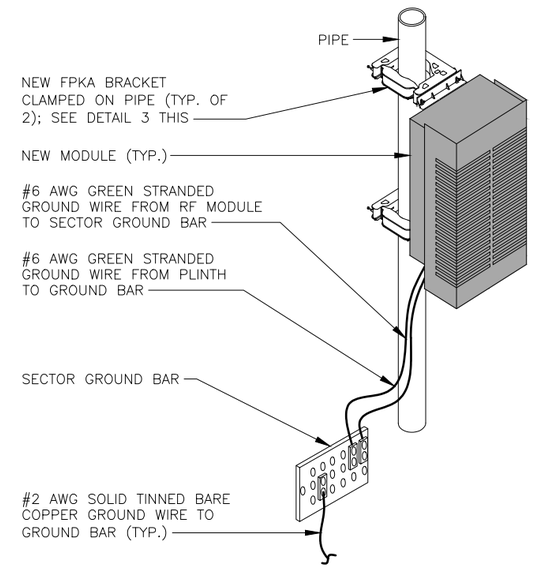
40' 20' 0' 40'

1



FPKA BRACKET DETAIL

NOT TO SCALE | 2



TYPICAL AHLOA UNIT MOUNTING DETAIL

NOT TO SCALE | 3

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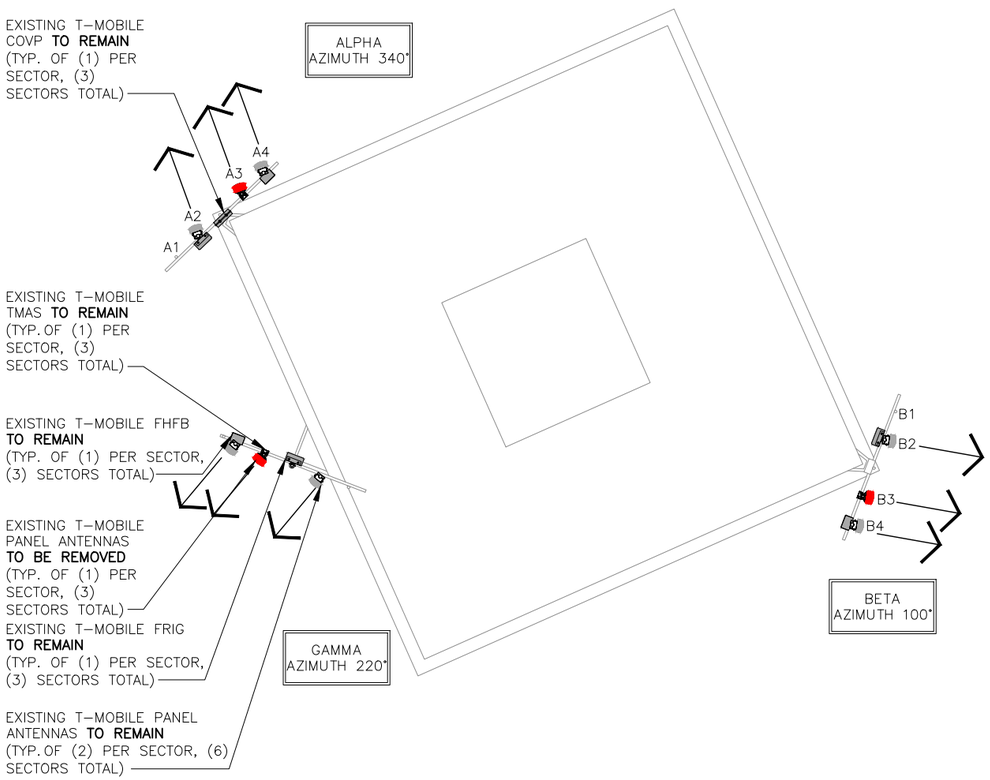
COLORADO SPRINGS, CO 80461

SHEET DESCRIPTION:
ELEVATION & DETAILS

SHEET NUMBER:
A-2A

LEGEND

- EXISTING FRIG
- EXISTING FHFB
- EXISTING TMA
- EXISTING COVP
- EXISTING ANTENNA
- EXISTING ANTENNA TO BE REMOVED



EXISTING T-MOBILE ANTENNA CONFIGURATION

22"x34" SCALE: 1" = 1'-0"
11"x17" SCALE: 1/2" = 1'-0"

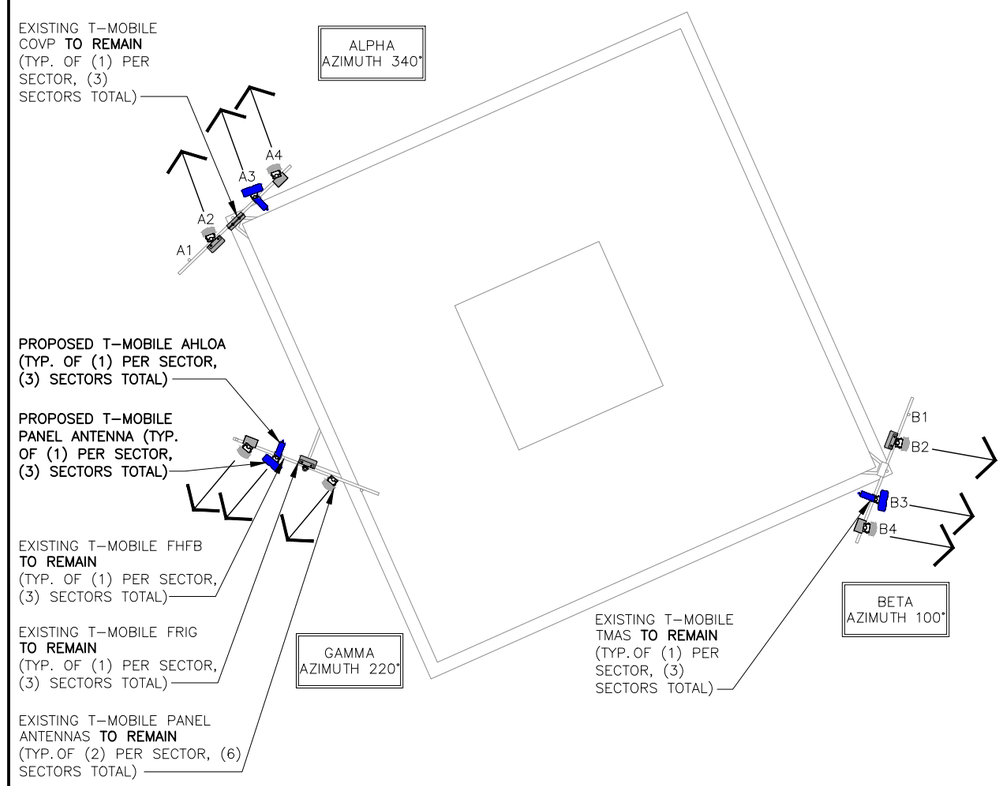
1' 6" 0" 1'

1

LEGEND

- EXISTING FRIG
- EXISTING FHFB
- EXISTING TMA
- EXISTING COVP
- EXISTING ANTENNA
- NEW ANTENNA
- NEW AHLOA

SPECIAL NOTES:
STRUCTURAL ANALYSIS PERFORMED BY OTHERS. CONTRACTOR TO THOROUGHLY REVIEW THE TOWER & MOUNT STRUCTURAL ANALYSIS FOR INFORMATION PERTAINING TO MOUNT UPGRADES, MOUNTING TYPES, ANTENNA HEIGHTS, AND CABLE ROUTING, ANY OTHER DISCREPANCIES BETWEEN THE DRAWINGS, STRUCTURAL ANALYSIS, AND TOWER PLANS SHOULD BE BROUGHT TO THE ATTENTION OF THE PROJECT MANAGER PRIOR TO BIDDING AND INSTALLATION.



PROPOSED T-MOBILE ANTENNA CONFIGURATION

22"x34" SCALE: 1" = 1'-0"
11"x17" SCALE: 1/2" = 1'-0"

1' 6" 0" 1'

2

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ATC SITE #:
88791

SITE ADDRESS:
14775 BLACK FOREST ROAD
COLORADO SPRINGS, CO 80461

SHEET DESCRIPTION:
EXISTING & PROPOSED ANTENNA PLANS

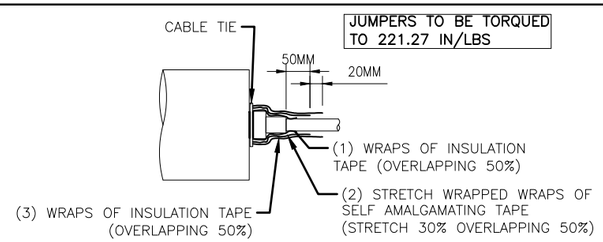
SHEET NUMBER:
A-3

NEW AND EXISTING ANTENNA AND CABLE SCHEDULE

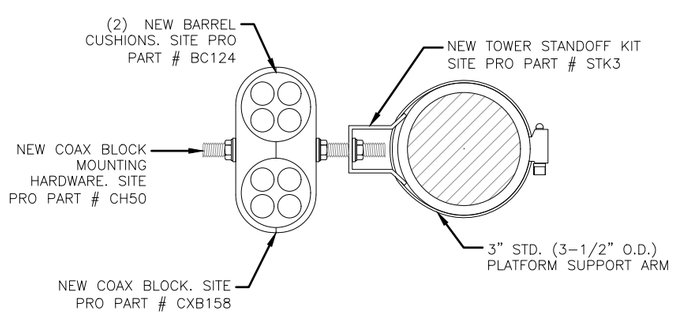
SECTOR	POS.	AZIMUTH	RAD CENTER	TECHNOLOGY	ANTENNA	STATUS	RRU TYPE	DIPLEXERS (TOWER LEVEL)	COVP	CABLE STATUS	COAX CABLE LENGTH	HCS FACTORY LENGTH	JUMPER LENGTH
ALPHA	A1	–	–	–	–	–	–	–	(3) COVP (*)	EXISTING HYBRID CABLE TO REMAIN	EXISTING	EXISTING	< 15'–0"
	A2	340°	294'	LTE 2100	(1) ANDREW TMBXX–6517–A2M	EXISTING	(1) FRIG	–					< 15'–0"
	A3	**340°**	**294'**	**LTE 600/700 N600 GSM/UMTS 1900**	**(1) COMMSCOPE FFHH–65C–R3**	**NEW**	**(1) AHLOA**	(1) COMMSCOPE TWIN STYLE 3C–TMAT1921B78–21A (E15Z01P33)					< 15'–0"
	A4	340°	294'	LTE 1900	(1) ANDREW TMBXX–6517–A2M	EXISTING	(1) FHFB	–					< 15'–0"
BETA	B1	–	–	–	–	–	–	–					< 15'–0"
	B2	100°	294'	LTE 2100	(1) ANDREW TMBXX–6517–A2M	EXISTING	(1) FRIG	–					< 15'–0"
	B3	–	–	–	–	–	–	–					< 15'–0"
	B4	**100°**	**294'**	**LTE 600/700 N600 GSM/UMTS 1900**	**(1) COMMSCOPE FFHH–65C–R3**	**NEW**	**(1) AHLOA**	(1) COMMSCOPE TWIN STYLE 3C–TMAT1921B78–21A (E15Z01P33)					< 15'–0"
	B5	100°	294'	LTE 1900	(1) ANDREW TMBXX–6517–A2M	EXISTING	(1) FHFB	–					< 15'–0"
GAMMA	G1	220°	287'	LTE 2100	(1) ANDREW TMBXX–6517–A2M	EXISTING	(1) FRIG	–					< 15'–0"
	G2	**220°**	**287'**	**LTE 600/700 N600 GSM/UMTS 1900**	**(1) COMMSCOPE FFHH–65C–R3**	**NEW**	**(1) AHLOA**	(1) COMMSCOPE TWIN STYLE 3C–TMAT1921B78–21A (E15Z01P33)					< 15'–0"
	G3	220°	287'	LTE 1900	(1) ANDREW TMBXX–6517–A2M	EXISTING	(1) FHFB	–					< 15'–0"

(*) SHARED WITH ALL SECTORS

IMPORTANT NOTE: PLEASE REFER TO LATEST RFDS SHEET FOR NSN CONFIGURATION. GC TO CAP ALL UNUSED PORTS.



RF JUMPER CONNECTION DETAIL | NOT TO SCALE | 1

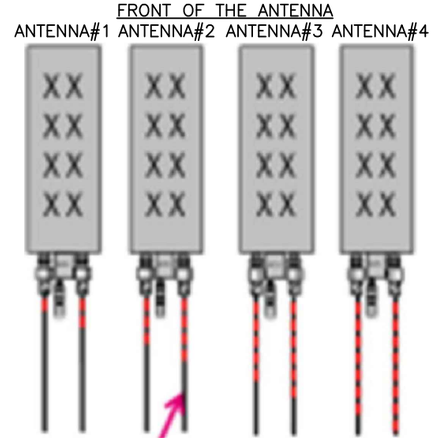


RF JUMPER MOUNTING DETAIL | NOT TO SCALE | 2

COAX COLOR CODING
- ANTENNAS WILL BE LABELED (BACK OF ANTENNA VIEW) RIGHT TO LEFT 1–X PORTS
- COAX/JUMPER LINES WILL BE IDENTIFIED BY SECTOR COLOR AND BY NUMBER OF BANDS AROUND THE COAX/JUMPER

SECTOR A	RED
SECTOR B	GREEN
SECTOR C	BLUE
SECTOR D	YELLOW
SECTOR E	WHITE
SECTOR F	PURPLE
LMU	BROWN + SECTOR COLOR BANDS (1 & 2)
FIBER ID	GRAY
UNUSED COAX	PINK
MICROWAVE	ORANGE
DWE T-1'S + GPS DOWNLINK CABLE	ID W/LABEL MAKER

FRONT OF THE ANTENNA



EXAMPLE: COAX WITH FOUR BANDS OF RED TAPE WILL REPRESENT ALPHA SECTOR AND THE 4TH PORT OF ANTENNA

ANTENNA AND COAXIAL CABLE SCHEDULE

1. ALL ANTENNAS SHALL BE FURNISHED WITH DOWNTILT BRACKETS. CONTRACTOR SHALL COORDINATE REQUIRED MECHANICAL DOWNTILT FOR EACH ANTENNA WITH RF ENGINEER. ANTENNA DOWNTILT SHALL BE SET AND VERIFIED BY A SMART LEVEL.
2. CONTRACTOR SHALL INSTALL COLOR CODE RINGS ON EACH OF THE HYBRID CABLES AND JUMPER CABLES WITH UV RESISTANT TAPE. ALL CABLE SHALL BE MARKED AT TOP AND BOTTOM WITH 2" COLOR TAPE OR STENCIL TAG. COLOR TAPE MAY BE OBTAINED FROM GRAYBAR ELECTRONICS

TAGGING COLOR AND NOTES | NOT TO SCALE | 3

PLANS PREPARED FOR:

T-Mobile

T-MOBILE WEST LLC
18400 EAST 22ND AVENUE
AURORA, CO 80011

PLANS PREPARED BY:

INFINIGY ENGINEERING, PLLC
1490 W. 121st AVE., SUITE 101
WESTMINSTER, COLORADO 80234
JOB NUMBER 317–701

MLA PARTNER:

AMERICAN TOWER CORPORATION

ENGINEERING LICENSE:

COLORADO LICENSED
CHRISTOPHER J. WARREN
47849
5/3/19
PROFESSIONAL ENGINEER

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	05/03/19	CTL	0

SITE NAME: BLACK FOREST CO

T-MOBILE SITE #: DN03014A

ATC SITE #: 88791

SITE ADDRESS: 14775 BLACK FOREST ROAD COLORADO SPRINGS, CO 80461

SHEET DESCRIPTION: ANTENNA & CABLE SCHEDULE

SHEET NUMBER: A-3A

FFHH-65C-R3

8-port sector antenna, 4x 617-806 and 4x 1695–2360 MHz, 65° HPBW, 3x RET, 600 MHz-Ready Antenna Technology

Dimensions

Length	2437.0 mm | 95.9 in
Width	640.0 mm | 25.2 in
Depth	235.0 mm | 9.3 in
Net Weight, without mounting kit	57.9 kg | 127.6 lb

General Specifications

Operating Frequency Band	1695 – 2360 MHz | 617 – 806 MHz
Antenna Type	Sector
Band	Multiband
Performance Note	Outdoor usage
Total Input Power, maximum	900 W @ 50 °C

ANTENNA (COMMSCOPE - FFHH-65C-R3) NOT TO SCALE 1

AIRSCALE DUAL RRH 4T4R B12/71 240W AHLOA	
SUPPORTED FREQUENCY BANDS	3GPP BAND 12/71
FREQUENCIES	BAND 12 ADJUSTED: RX 698 – 715 MHZ, TX 728 – 745 MHZ BAND 71: RX 663 MHZ – 698 MHZ, TX 617 MHZ – 652 MHZ
NUMBER OF TX/RX PATHS/PIPES	4 PIPES; 2T2R, 2T4R, 4T4R FOR BOTH BANDS
INSTANTANEOUS BANDWIDTH IBW	16 MHZ FOR B12 AND 35MHZ FOR B71 1 MHZ BELOW B12 NB IOT FUTURE USE
OCCUPIED BANDWIDTH OBW	52 MHZ TOTAL ACROSS BANDS
OUTPUT POWER	60W PER TX SHARED BETWEEN BANDS
SUPPLY VOLTAGE/RANGE	DC-48 V / -36 V TO -60 V
TYPICAL POWER CONSUMPTION	664W [ETSI BUSY HOUR LOAD AT 4TX@60W (BOTH BANDS ACTIVE)]
	395W [ETSI BUSY HOUR LOAD AT 4TX@30W (ONE BAND ACTIVE)]
ANTENNA PORTS	4 PORTS; 4.3-10+
OPTICAL PORTS	2x CPRI 9.8 Gbps
ALD CONTROL INTERFACES	AISG3.0 FROM ANT1,2,3,4 & RET (DC ON ANT1 & ANT3)
OTHER INTERFACES	EXTERNAL ALARM MDR-26 SERIAL CONNECTOR (4 INPUTS, 1 OUTPUT) DC CIRCULAR POWER CONNECTOR
PHYSICAL	560MM/22.04INCHESx308MM/12.126INCHESx189MM/7.44INCHES, 38KG/ 83.7 LBS WITHOUT COVER AND BRACKETS
OPERATING TEMPERATURE RANGE	-40°C TO 55°C (WITH NO SOLAR LOAD)
SURGE PROTECTION	CLASS II 5A
INSTALLATION OPTIONS	VERTICAL & HORIZONTAL BOOK MOUNT, POLE & WALL MOUNT

RRH (AIRSCALE - AHLOA 4T4R B12/71 240W) NOT TO SCALE 2

NOT USED NOT TO SCALE 3

NOT USED NOT TO SCALE 4

PLANS PREPARED FOR:

T-Mobile

T-MOBILE WEST LLC
18400 EAST 22ND AVENUE
AURORA, CO 80011

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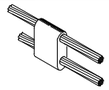
SHEET DESCRIPTION: NEW EQUIPMENT SPECIFICATION

SHEET NUMBER: A-4

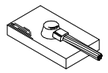
CADWELD CONNECTIONS

OR APPROVED EQUAL



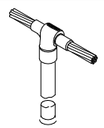
PARALLEL HORIZONTAL CONDUCTORS

PARALLEL THROUGH CONNECTION OF HORIZONTAL CABLE TYPE PT



HORIZONTAL STEEL SURFACE

TO FLAT STEEL SURFACE OR HORIZONTAL PIPE TYPE HS



THROUGH CABLE TO GROUND ROD

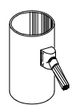
THROUGH CABLE TO TOP OF GROUND ROD TYPE GT

VERTICAL STEEL SURFACE

CABLE DOWN AT 45° TO VERTICAL STEEL SURFACE INCLUDING PIPE TYPE VS

HORIZONTAL SPLICE

SPLICE OF HORIZONTAL CABLES

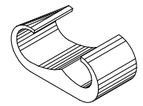


VERTICAL PIPE

CABLE DOWN AT 45° TO RANGE OF VERTICAL PIPES TYPE VS

BURNDY CONNECTIONS

OR APPROVED EQUAL

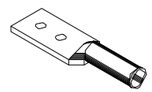


"C" CONNECTOR

HYPRESS TYPE YGHC

BOND JUMPER

FIELD FABRICATED GREEN STRANDED INSULATED TYPE 2-YA-2



COPPER LUGS

TWO HOLE - LONG BARREL LENGTH TYPE YA-2

CADWELD DETAILS

GROUNDING DETAILS:

1. UNDERGROUND AND OVERHEAD UTILITY LENGTHS TO BE DETERMINED FROM SITE PLAN.
2. SEE ELECTRICAL SPECIFICATIONS SECTION 16000 FOR ALL ELECTRICAL AND GROUNDING INSTALLATION REQUIREMENTS.
3. FOR ORIENTATION OF SITE LAYOUT SEE SITE PLAN, DRAWING.
4. UDA CABINET FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR.
5. GROUND KITS PROVIDED BY OWNER SHALL BE RETROFITTED TO ACCOMMODATE 2 HOLE LUG CONNECTION AND APPROPRIATE LENGTH.
6. CONTRACTOR RESPONSIBLE TO PROVIDE OWNER CERTIFICATION OF RESISTIVITY TESTING.
7. GROUND RODS TO BE INSTALLED AT 10' CENTERS.
8. ALL GROUND LEADS TO BE SLEEVED IN 3/4"ø SCHEDULE 40 PVC CONDUIT AND SEALED W/ SILICON.
9. GROUND BARS SUPPLIED BY OWNER AND INSTALLED BY CONTRACTOR.
10. ALL BENDS IN GROUNDING SYSTEM MUST BE SMOOTH AND WELL ROUNDED AND MAINTAIN BENDING RADIUS.
11. SEE SITE PLAN FOR COAXIAL ROUTING THIS SHEET IS INTENDED FOR GROUNDING CLARITY ONLY AND IS SCHEMATIC IN DETAIL.
12. GROUND KITS SHALL BE INSTALLED BETWEEN 8"-18" OF ALL CONNECTORS.
13. TOWER FOUNDATION DESIGN BY OWNER, INSTALLED BY CONTRACTOR.
14. ADDITIONAL GROUND KITS TO BE PLACED AT 100' WHEN ANTENNA CENTERLINE IS 200' OR ABOVE.
15. ALL CONDUITS TO BE SEALED W/ SILICONE TO PROVIDE A WATER TIGHT SEAL.

KEY NOTES:

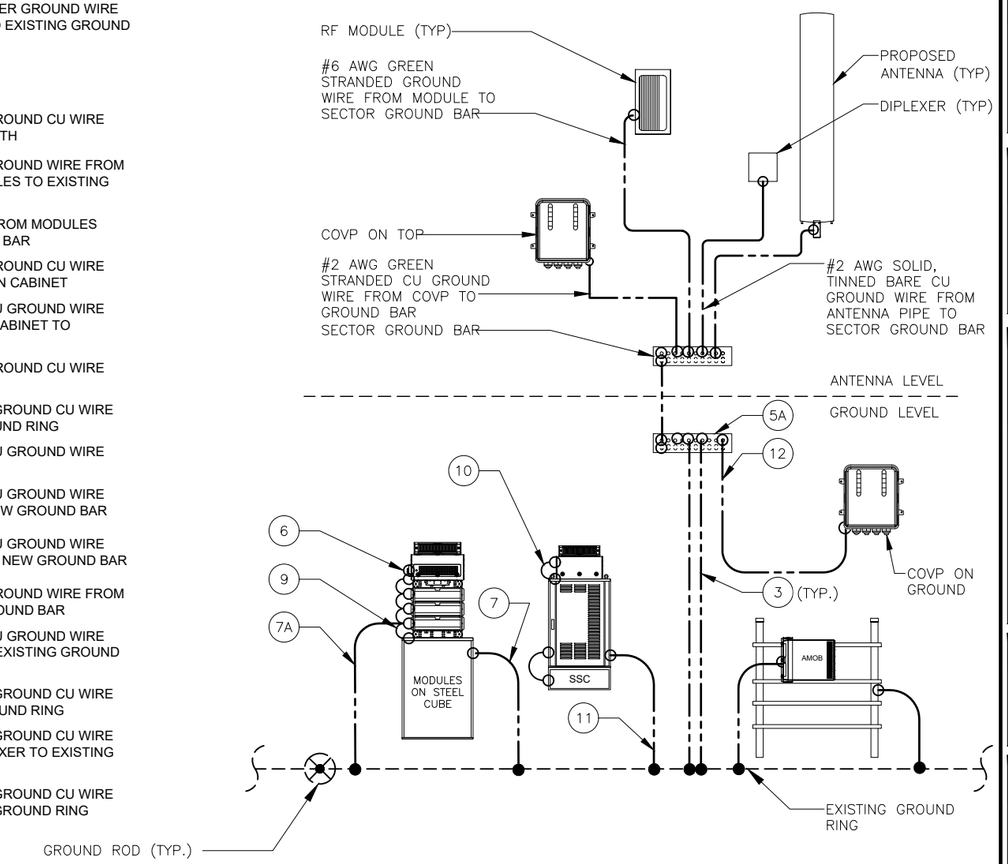
1. #2 SOLID, TINNED BARE COPPER GROUND WIRE FROM ICE BRIDGE TO ICE BRIDGE POST.
2. #2 SOLID, TINNED BARE COPPER GROUND WIRE, BOND ICE BRIDGE POST W/ VS TYPE CADWELD. (1 PER POST REQUIRED).
3. #2 SOLID, TINNED BARE COPPER GROUND WIRE FROM GROUND BAR TO EXISTING GROUND RING (2 REQUIRED).
4. #2 SOLID, TINNED BARE COPPER GROUND WIRE FROM NEW H-FRAME POST TO EXISTING GROUND RING
5. NEW GROUND BAR
5A. EXISTING GROUND BAR
6. #6 AWG GREEN STRANDED GROUND CU WIRE FROM NEW MODULES TO PLINTH
7. #2 AWG GREEN STRANDED GROUND WIRE FROM STEEL CUBE/PLINTH W/MODULES TO EXISTING GROUND
7A. #2 AWG BAR GROUND WIRE FROM MODULES PLINTH TO EXISTING GROUND BAR
8. #6 AWG GREEN STRANDED GROUND CU WIRE FROM MODULES TO PLINTH ON CABINET
9. #2 AWG GREEN STRANDED CU GROUND WIRE FROM MODULE'S PLINTH ON CABINET TO EXISTING GROUND RING
10. #6 AWG GREEN STRANDED GROUND CU WIRE FROM SSC TO SSC PLINTH
11. #2 AWG SOLID TINNED BARE GROUND CU WIRE FROM SSC TO EXISTING GROUND RING
12. #2 AWG GREEN STRANDED CU GROUND WIRE FROM COVP TO GROUND BAR
13. #2 AWG GREEN STRANDED CU GROUND WIRE FROM NEW ALARM BOX TO NEW GROUND BAR
14. #6 AWG GREEN STRANDED CU GROUND WIRE FROM NEW HYBRID CABLE TO NEW GROUND BAR
15. #2 AWG GREEN STRANDED GROUND WIRE FROM NEW RF MODULE TO NEW GROUND BAR
16. #2 AWG GREEN STRANDED CU GROUND WIRE FROM NEW GROUND BAR TO EXISTING GROUND RING/ROD
17. #2 AWG SOLID TINNED BARE GROUND CU WIRE FROM FCOA CABINET TO GROUND RING
18. #6 AWG SOLID TINNED BARE GROUND CU WIRE FROM NEW DIPLEXER/ TRIPLEXER TO EXISTING GROUND BAR
19. #2 AWG SOLID TINNED BARE GROUND CU WIRE FROM BATTERY CABINET TO GROUND RING

SYMBOLS LEGEND:

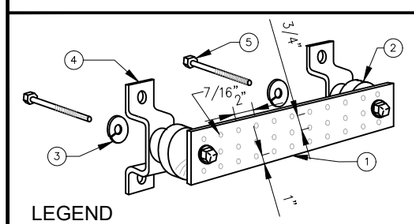
GROUND BAR	
EXOTHERMIC WELD CONNECTION	●
MECHANICAL CONNECTION	○
BOND DIRECTLY TO TOWER	

NOTE:

1. EXISTING GROUNDING NOT SHOWN IN THIS DIAGRAM. GC TO VERIFY EXISTING EQUIPMENT GROUNDING IN FIELD
2. GC TO V.I.F. AND INSTALL ANY MISSING T-MOBILE GROUND BAR ON SITE



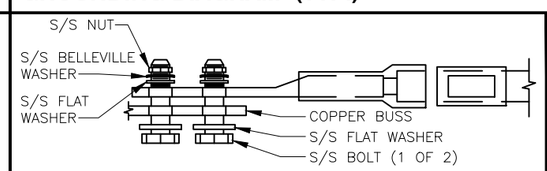
GROUNDING DIAGRAM (TYP.) NOT TO SCALE 1



LEGEND

1- GROUND BUSS BAR, 1/4"X 4"X 24", CONFIRM w/T-MOBILE PROJECT MANAGER THE APPROVED BUSS MFR.HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
2- INSULATORS, CONFIRM THE APPROVED BUSS MFR. w/T-MOBILE
3- 5/8" LOCKWASHERS, CONFIRM w/T-MOBILE THE APPROVED BUSS MFR. (NEWTON INSTRUMENT CO. CAT. NO. 3015-8 OR EQUIVALENT)
4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR APPROVED EQUIVALENT (CONFIRM w/T-MOBILE THE APPROVED BUSS MFR.)
5- 5/8-11 X 1" H.H.C.S. BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1 OR APPROVED EQUIVALENT

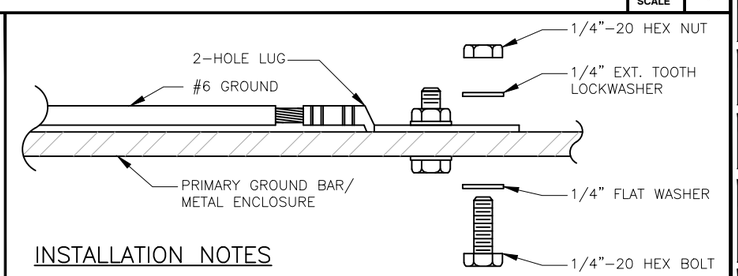
GROUND BAR CONNECTIONS DETAIL (TYP.) NOT TO SCALE 2



NOTES:

1. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING BELLEVILLES. COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON TOOTH WASHER BETWEEN LUG AND STEEL. COAT ALL SURFACES WITH KOPR-SHEILD.

GROUND BAR DETAIL (TYP.) NOT TO SCALE 3



INSTALLATION NOTES

1. SELECT BOLT LENGTH TO PROVIDE A MINIMUM OF 2 EXPOSED THREADS
2. BURNISH MOUNTING SURFACE TO REMOVE PAINT IN THE AREA OF LUG CONTACT
3. APPLY ANTI-OXIDANT COMPOUND TO MATING SURFACE OF LUG AND WIPE CLEAN EXCESS COMPOUND
4. USE SOLID COPPER WIRE AND MECHANICAL 2-HOLE LUG FOR ALL EXTERIOR GROUNDING

MECH. GROUND CONNECTION (TYP.) NOT TO SCALE 4

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ATC SITE #: 88791

SITE ADDRESS: 14775 BLACK FOREST ROAD COLORADO SPRINGS, CO 80461

SHEET DESCRIPTION: PROPOSED SITE GROUNDING DIAGRAM

SHEET NUMBER: EG-1

GENERAL NOTES:

1. OWNER FURNISHED MATERIALS, T–MOBILE "THE COMPANY" WILL PROVIDE AND THE CONTRACTOR WILL INSTALL:
   - A. BTS EQUIPMENT FRAME (PLATFORM) AND ICEBRIDGE SHELTER (GROUND BUILD/CO–LOCATE ONLY)
   - B. AC/TELCO INTERFACE BOX(PPC)
   - C. ICE BRIDGE (CABLE TRAY WITH COVER) (GROUND BUILD/CO–LOCATE ONLY, GC TO FURNISH AND INSTALL FOR ROOFTOP INSTALLATION)
   - D. TOWERS, MONOPOLE
   - E. TOWER LIGHTING
   - F. GENERATORS & LIQUID PROPANE TANK
   - G. ANTENNA STANDARD BRACKETS, FRAMES, AND PIPES FOR MOUNTING.
   - H. ANTENNAS (INSTALLED BY OTHERS)
   - I. TRANSMISSION LINE
   - J. TRANSMISSION LINE JUMPERS
   - K. TRANSMISSION LINE CONNECTORS WITH WEATHERPROOFING KITS
   - L. TRANSMISSION LINE GROUND KITS
   - M. HANGERS
   - N. HOISTING GRIPS
   - O. BTS EQUIPMENT
2. CONTRACTOR TO FURNISH AND INSTALL THE FOLLOWING:
   THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL OTHER MATERIALS FOR THE COMPLETE INSTALLATION OF THE SITE INCLUDING, BUT NOT LIMITED TO, SUCH MATERIALS AS FENCING, STRUCTURAL STEEL SUPPORTING SUB–FRAME FOR PLATFORM, ROOFING LABOR AND MATERIALS, GROUNDING RINGS, GROUNDING WIRES, COPPER–CLAD OR XIT CHEMICAL GROUND ROD(S), BUSS BARS, TRANSFORMERS AND DISCONNECT SWITCHES WHERE APPLICABLE, TEMPORARY ELECTRICAL POWER, CONDUIT, LANDSCAPING COMPOUND STONE, CRANES, CORE DRILLING, SLEEPERS AND RUBBER MATTING, REBAR, CONCRETE CAISSONS, PADS AND/OR AUGER MOUNTS, MISCELLANEOUS FASTENERS, CABLE TRAYS, NON–STANDARD ANTENNA FRAMES AND ALL OTHER MATERIAL AND LABOR REQUIRED TO COMPLETE THE JOB ACCORDING TO THE DRAWINGS AND SPECIFICATIONS. IT IS THE POSITION OF T–MOBILE TO APPLY FOR PERMITTING AND CONTRACTOR RESPONSIBLE FOR PICKUP AND PAYMENT OF REQUIRED PERMITS.
3. T–MOBILE FURNISHED EQUIPMENT SHALL BE PICKED–UP AT THE T–MOBILE WAREHOUSE, NO LATER THAN 48HR AFTER BEING NOTIFIED INSURED, STORED, UNCRATED, PROTECTED AND INSTALLED BY THE CONTRACTOR WITH ALL APPURTENANCES REQUIRED TO PLACE THE EQUIPMENT IN OPERATION, READY FOR USE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EQUIPMENT AFTER PICKING UP.
4. ALL EQUIPMENT FURNISHED AND WORK PERFORMED UNDER THE CONTRACT DOCUMENTS SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS OR WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE, UNLESS NOTED OTHERWISE. ANY FAILURE OF EQUIPMENT OR WORK DUE TO DEFECTS IN MATERIALS OR WORKMANSHIP SHALL BE CORRECTED BY THE CONTRACTOR AT NO COST TO THE OWNER.
5. ALL WORK, MATERIAL, AND EQUIPMENT SHALL COMPLY WITH ALL REQUIREMENTS OF THE LATEST EDITIONS AND INTERIM AMENDMENTS OF THE NATIONAL ELECTRICAL CODE (NEC). NATIONAL ELECTRICAL SAFETY CODE, OSHA, AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND ORDINANCES. ALL ELECTRICAL EQUIPMENT PROVIDED UNDER THIS CONTRACT SHALL BE NEW (EXCEPT WHERE OTHERWISE NOTED) AND SHALL COMPLY WITH THE REQUIREMENTS OF THE UNDERWRITERS' LABORATORIES (U.L.) AND BEAR THE U.L. LABEL.
6. T–MOBILE OR THEIR ARCHITECT/ENGINEER RESERVES THE RIGHT TO REJECT ANY EQUIPMENT OR MATERIALS WHICH, IN THEIR OPINION ARE NOT IN COMPLIANCE WITH THE CONTRACT DOCUMENTS, EITHER BEFORE OR AFTER INSTALLATION AND THE EQUIPMENT SHALL BE REPLACED WITH EQUIPMENT CONFORMING TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS BY THE CONTRACTOR AT NO COST TO THE OWNER OR THEIR ARCHITECT/ENGINEER.
7. THE CONTRACTOR SHALL SUPPORT, BRACE AND SECURE EXISTING STRUCTURE AS REQUIRED. CONTRACTOR IS SOLELY RESPONSIBLE FOR THE PROTECTION OF ANY EXISTING STRUCTURES DURING CONSTRUCTION. FIELD VERIFY ALL EXISTING DIMENSIONS WHICH AFFECT THE NEW CONSTRUCTION.
8. THE CONTRACTOR SHALL NOT ALLOW OR CAUSE ANY OF THE WORK TO BE COVERED UP OR ENCLOSED UNTIL IT HAS BEEN INSPECTED BY THE GOVERNING AUTHORITIES. ANY WORK THAT IS ENCLOSED OR COVERED UP BEFORE SUCH INSPECTION AND TEST SHALL BE UNCOVERED AT THE CONTRACTOR'S EXPENSE; AFTER IT HAS BEEN INSPECTED, THE CONTRACTOR SHALL RESTORE THE WORK TO ITS ORIGINAL CONDITION AT THEIR OWN EXPENSE.
9. ALL EXISTING UTILITIES, FACILITIES, CONDITIONS, AND THEIR DIMENSIONS SHOWN ON PLANS HAVE BEEN PLOTTED FROM AVAILABLE RECORDS. THE ARCHITECT/ENGINEER AND OWNER (T–MOBILE) ASSUME NO RESPONSIBILITY WHATEVER AS TO THE SFOFICIENCY OR ACCURACY OF THE INFORMATION SHOWN ON THE PLANS OR THE MANNER OF THEIR REMOVAL OR ADJUSTMENT. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL SAID UTILITIES AND FACILITIES PRIOR TO START OF CONSTRUCTION. CONTRACTOR SHALL ALSO OBTAIN FROM EACH UTILITY COMPANY DETAILED INFORMATION RELATIVE TO WORKING SCHEDULES AND METHODS OF REMOVING OR ADJUSTING AFFECTED UTILITIES.

GENERAL NOTES (CONT'D):

10. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES BOTH HORIZONTALLY AND VERTICALLY PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES OR DOUBTS AS TO THE INTERPRETATION OF PLANS SHOULD BE IMMEDIATELY REPORTED TO THE PROJECT MANAGER FOR RESOLUTION AND INSTRUCTION, AND NO FURTHER WORK SHALL BE PERFORMED UNTIL DISCREPANCY IS CHECKED AND CORRECTED BY THE ARCHITECT/ENGINEER. FAILURE TO SECURE SUCH INSTRUCTION MEANS CONTRACTOR WILL HAVE WORKED AT THEIR OWN RISK AND EXPENSE.
11. CONTRACTORS SHALL CLEAN ENTIRE SITE AFTER EACH DAY OF CONSTRUCTION SUCH THAT NO PAPERS, TRASH, DEBRIS, WEEDS, BRUSH, OR ANY OTHER DEPOSITS REMAIN. ALL MATERIALS COLLECTED DURING CLEANING OPERATIONS SHALL BE PROPERLY DISPOSED OF OFF–SITE BY THE CONTRACTOR.
12. ALL SITE WORK SHALL BE CAREFULLY COORDINATED BY THE CONTRACTOR WITH LOCAL GAS, ELECTRIC, TELEPHONE, AND ANY OTHER UTILITY COMPANIES HAVING JURISDICTION OVER THIS LOCATION.
13. DURING CONSTRUCTION, THE CONTRACTOR SHALL AT ALL TIMES MAINTAIN THE UTILITIES OF THE BUILDING/SITE WITHOUT INTERRUPTION. SHOULD IT BE NECESSARY TO INTERRUPT ANY SERVICE OR UTILITY, THE CONTRACTOR SHALL SECURE PERMISSION IN WRITING FROM THE BUILDING/PROPERTY OWNER FOR SUCH INTERRUPTION, AT LEAST 72 HOURS IN ADVANCE. ANY INTERRUPTION SHALL BE MADE WITH A MINIMUM AMOUNT OF INCONVENIENCE TO THE BUILDING/PROPERTY OWNER AND ANY SUCH SHUTDOWN TIME SHALL BE COORDINATED WITH THE BUILDING/PROPERTY OWNER.
14. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION.
15. CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS BUILT DRAWINGS TO T–MOBILE'S PROJECT ENGINEER.
16. GC WILL NOT START THE CONSTRUCTION UNTIL AFTER THEY RECEIVE THE PRE CON PACKAGE AND HAVE A PRE CON WALK WITH THE PROJECT MANAGER.

DIVISION 2 - SITE WORK:

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE PROJECT MANAGER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT LIMITED TO:
   - A. FALL PROTECTION
   - B. CONFINED SPACE
   - C. ELECTRICAL SAFETY
   - D. TRENCHING AND EXCAVATION
2. REMOVE FROM SITE/OWNER'S PROPERTY ALL WASTE MATERIALS, UNUSED EXCAVATED MATERIAL INCLUDING MATERIAL CLASSIFIED UNSATISFACTORY, CONTAMINATED OR DANGEROUS TRASH AND DEBRIS, AND DISPOSE OF IN A LEGAL MANNER.
3. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF ENGINEERING.
4. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE BUILDING OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, FERTILIZED, SEEDED, AND COVERED WITH MULCH
5. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, AS REQUIRED DURING CONSTRUCTION.

   CONTRACTOR IS RESPONSIBLE FOR LAYOUT AND CONSTRUCTION STAKING. CONTRACTOR SHALL ESTABLISH GRADE AND LINE STAKES PRIOR TO CONSTRUCTION.

   INFINIGY DOES NOT GUARANTEE OR WARRANT THAT THE AFOREMENTIONED EASEMENTS ARE SUFFICIENT FOR CONSTRUCTION TRAFFIC. GC SHALL CONSULT WITH A T–MOBILE REPRESENTATIVE AND LANDLORD WITH EXACT LOGISTICS TO FACILITATE CONTRACTIBILITY OF THE SITE AND DELIVERY OF CRITICAL MATERIALS SUCH AS THE TOWER, STEEL, CONCRETE AND CRANES TO THE PROPOSED LEASE AREA. GC SHALL RESTORE SITE TO ORIGINAL CONDITIONS AND REPLACE ANY AND ALL DISTURBED TREES OR LANDSCAPING.

   INFINIGY IS NOT RESPONSIBLE FOR THE MAINTENANCE AND/OR OPERATIONAL FEASIBILITY. SCOPE OF WORK FOR THESE PLANS DOES NOT INVOLVE VALUE ENGINEERING AS WELL AS MAINTAINABILITY OPERATIONS OF THE SITE, ACCESS OR UTILITIES.

DIVISION 3 - CONCRETE:

1. MINIMUM ALLOWABLE CONCRETE COMPRESSIVE STRENGTH SHALL BE 4000 PSI AT 28 DAYS WHEN TESTED IN ACCORDANCE WITH THE AMERICAN SOCIETY FOR TESTING AND MATERIALS METHODS STANDARDS ASTM C172, ASTM C31 AND ASTM C39 UNLESS OTHERWISE NOTED.

DIVISION 3 - CONCRETE CONTINUED:

2. CONCRETE FOR ALL FOUNDATIONS: 540 LBS PER CUBIC YARD OF CONCRETE MINIMUM CEMENT CONTENT FOR 1–INCH MAXIMUM SIZE AGGREGATE, SLUMP RANGE 3 INCHES TO 5 INCHES, TOTAL AIR CONTENT 4 PERCENT TO 7 PERCENT BY VOLUME. AIR ENTRAINING ADMIXTURE REQUIRED TO CONTROL TOTAL AIR CONTENT, WATER REDUCING ADMIXTURE PERMITTED TO OBTAIN SLUMP OVER 3–INCHES.
3. ALL CONCRETE CONSTRUCTION SHALL MEET THE REQUIREMENTS OF THE LATEST EDITION OF THE AMERICAN CONCRETE INSTITUTE (ACI 318) BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE AND (ACI 301) STANDARD SPECIFICATION FOR STRUCTURAL CONCRETE.
4. REBARS SHALL BE ASTM A–615 DEFORMED TYPE WITH MINIMUM YIELD STRENGTH OF 60,000 PSI (40,000 PSI GRADE MAY BE USED FOR TIES & STIRRUPS).

   WELDED WIRE FABRIC SHALL CONFORM TO ASTM A–185.
5. DETAILING SHALL BE IN ACCORDANCE WITH MANUAL OF STANDARD PRACTICE OF DETAILING REINFORCED CONCRETE STRUCTURES (ACI STD–315 LATEST EDITION).
6. CHAMFER ALL EXPOSED EDGES OF CONCRETE 3/4".UNLESS OTHERWISE NOTED.
7. REINFORCING STEEL SHALL BE ACCURATELY PLACED AND ADEQUATELY SECURED IN POSITION. LOCATION OF REINFORCEMENT SHALL BE INDICATED ON THE DRAWINGS. THE FOLLOWING MINIMUM COVER (INCHES) FOR REINFORCEMENT SHALL BE PROVIDED, EXCEPT AS NOTED ON DRAWINGS.

   MINIMUM COVER (INCHES)
   CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH ... 3"
   EXPOSED TO EARTH OR WEATHER:
   #6 THROUGH #18 ... 2"
   #5 BAR AND SMALLER ... 1–1/2"
8. TESTS
   CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY THE ENGINEER AS THE WORK PROGRESSES. FAILURE TO DETECT ANY DEFECTIVE WORK OR MATERIAL SHALL NOT IN ANY WAY PREVENT LATER REJECTION WHEN SUCH DEFECT IS DISCOVERED NOR SHALL IT OBLIGATE THE ENGINEER FOR FINAL ACCEPTANCE.
   - A. FIVE CONCRETE TEST CYLINDERS SHALL BE TAKEN OF THE TOWER PIER FOUNDATION. TWO SHALL BE TESTED @ THREE DAYS, TWO @ TWENTY–EIGHT DAYS. THE FIFTH CYLINDER SHALL BE KEPT SEPARATELY, IF REQUIRED TO BE USED IN THE FUTURE.
   - B. ONE ADDITIONAL TEST CYLINDER SHALL BE TAKEN DURING COLD WEATHER AND CURED ON SITE UNDER SAME CONDITIONS AS CONCRETE IT REPRESENTS.
   - C. ONE SLUMP TEST SHALL BE TAKEN FOR EACH SET OF TEST CYLINDERS TAKEN.
9. PLACING CONCRETE
   - A. THE ENGINEER SHALL BE NOTIFIED NOT LESS THAT 24 HOURS IN ADVANCE OF CONCRETE PLACEMENT, UNLESS INSPECTION IS WAIVED IN EACH CASE, PLACING OF CONCRETE SHALL BE PERFORMED ONLY IN THE PRESENCE OF THE ENGINEER. CONCRETE SHALL NOT BE PLACED UNTIL ALL FORMWORK, EMBEDDED PARTS, STEEL REINFORCEMENT, FOUNDATION SURFACES AND JOINTS INVOLVED IN THE PLACING HAVE BEEN APPROVED, AND UNTIL FACILITIES ACCEPTABLE TO THE T–MOBILE REPRESENTATIVE HAVE BEEN PROVIDED AND MADE READY FOR ACCOMPLISHMENT OF THE WORK AS SPECIFIED. CONCRETE MAY NOT BE ORDERED FOR PLACEMENT UNTIL ALL ITEMS HAVE BEEN APPROVED AND T–MOBILE HAS PERFORMED A FINAL INSPECTION AND GIVEN APPROVAL TO START PLACEMENT IN WRITING.
   - B. PLACEMENT OF CONCRETE SHALL BE IN ACCORDANCE WITH ACI 301.
10. PROTECTION
    - A. IMMEDIATELY AFTER PLACEMENT, THE CONTRACTOR SHALL PROTECT THE CONCRETE FROM PREMATURE DRYING, EXCESSIVELY HOT OR COLD TEMPERATURES, AND MECHANICAL INJURY. FINISHED WORK SHALL BE PROTECTED.
    - B. CONCRETE SHALL BE MAINTAINED WITH MINIMAL MOISTURE LOSS AT RELATIVELY CONSTANT TEMPERATURE FOR A PERIOD NECESSARY FOR HYDRATION OF CEMENT AND HARDENING OF CONCRETE.
    - C. ALL CONCRETE SHALL BE WATER CURED BY CONTINUOUS (NOT PERIODIC) FINE MIST SPRAYING OR SPRINKLING ALL EXPOSED SURFACES. WATER SHALL BE CLEAN AND FREE FROM ACID, ALKALI, SALTS, OIL SEDIMENT, AND ORGANIC MATTER. SUCCESSFUL CURING SHALL BE OBTAINED BY USE OF AN AMPLE WATER SUPPLY UNDER PRESSURE IN PIPES, WITH ALL NECESSARY APPLIANCES OF SPRINKLERS, AND SPRAYING DEVICES.

ELECTRICAL NOTES:

1. ELECTRICAL DESIGN SHALL BE PERFORMED BY ELECTRICAL CONTRACTOR. STRUCTURAL DESIGN SHALL BE PERFORMED BY GENERAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL ENSURE THAT ALL WORK COMPLIES WITH ALL APPLICABLE LOCAL AND STATE CODES AND NATIONAL ELECTRICAL CODE.

2. ALL SUGGESTED ELECTRICAL ELEMENTS (SUCH AS BREAKER SIZES, WIRE SIZES, CONDUITS SIZES ARE FOR ZONING PURPOSES ONLY. IT IS THE RESPONSIBILITY TO OF THE ELECTRICAL CONTRACTOR TO CONFIRM COMPLIANCE WITH LOCAL ELECTRICAL CODES AND PASS ALL APPLICABLE AND NECESSARY INSPECTIONS. IN SOME EVENTS, IT MAY BE NECESSARY TO PERFORM AN ELECTRICAL LOAD STUDY TO VERIFY THE CAPACITY OF THE EXISTING SERVICE. THIS IS NOT THE RESPONSIBILITY OF INFINIGY. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

3. CONTRACTOR SHALL FIELD LOCATE ALL BELOW GRADE GROUND LINES AND UTILITY LINES PRIOR TO CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR RELOCATION OF ALL UTILITIES AND GROUND LINES THAT MAY BECOME DISTURBED OR CONFLICTING IN THE COURSE OF CONSTRUCTION.

DIVISION 5 - STRUCTURAL STEEL:

1. DETAIL, FABRICATE AND ERECT STRUCTURAL STEEL IN ACCORDANCE WITH THE LATEST AISC MANUAL OF STEEL CONSTRUCTION (ASD), AWS D1.1, AND THE BASIC BUILDING CODE. STRUCTURAL STEEL SHALL BE AS FOLLOWS:
   - A. ASTM A36, GRADE 36; ROLLED STEEL, RODS, PLATES, U–BOLTS AND ANCHOR BOLTS.
   - B. ASTM A325 BOLTS, BEARING TYPE
   - C. ALL STEEL SHALL BE HOT–DIP GALVANIZED IN ACCORDANCE WITH ASTM A123.
2. THE CONTRACTOR SHALL PROVIDE ADEQUATE SHORING AND/OR BRACING WHERE REQUIRED DURING CONSTRUCTION UNTIL ALL CONNECTIONS ARE COMPLETE.
3. ANY FIELD CHANGES OR SUBSTITUTIONS SHALL HAVE PRIOR APPROVAL FROM THE ENGINEER, AND T– MOBILE PROJECT MANAGER IN WRITING.
4. TIGHTEN HIGH STRENGTH BOLTS TO A SNUG TIGHT CONDITION WHERE ALL PLIES IN A JOINT ARE IN FIRM CONTACT BY EITHER:
   - A. A FEW IMPACTS OF A IMPACT WRENCH
   - B. THE FULL EFFORT OF A PERSON USING A SPUD WRENCH.
5. WELDING
   - A. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS. CERTIFICATION DOCUMENTS SHALL BE MADE AVAILABLE FOR ENGINEER'S AND/OR OWNER'S REVIEW IF REQUESTED.
   - B. WELDING ELECTRODES FOR MANUAL SHIELDED METAL ARC WELDING SHALL CONFORM TO ASTM A–233, E70 SERIES. BARE ELECTRODES AND GRANULAR FLUX USED IN THE SUBMERGED ARC PROCESS SHALL CONFORM TO AISC SPECIFICATIONS.
   - C. FIELD WELDING SHALL BE DONE AS PER AWSD1.1 REQUIREMENTS VISUAL INSPECTION IS ACCEPTABLE.
6. PROTECTION
   - A. UPON COMPLETION OF ERECTION INSPECT ALL GALVANIZED STEEL AND PAINT ANY FIELD CUTS, WELDS, OR GALVANIZED BREAKS WITH ZINC BASED PAINT. COLOR TO MATCH THE GALVANIZING PROCESS.

DIVISION 13 - SPECIAL CONSTRUCTION ANTENNA INSTALLATION

1. WORK INCLUDED:
   - A. ANTENNAS AND COAXIAL CABLES ARE FURNISHED BY T–MOBILE UNDER A SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUB–CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONNEL AND
   - B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND T–MOBILE SPECIFICATIONS.
   - C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.
   - D. INSTALL FURNISHED GALVANIZED STEEL OR ALUMINUM WAVEGUIDE AND PROVIDE PRINTOUT OF THAT TEST. PROPERTY.
   - E. CONTRACTOR SHALL PROVIDE FOUR (4) SETS OF SWEEP TESTS USING ANRITZU –PACKARD 8713B RF SCALAR NETWORK ANALYZER. SUBMIT FREQUENCY DOMAIN REFLECTOMETER(FDR) TESTS RESULTS TO THE PROJECT MANAGER. SWEEP TESTS SHALL BE AS PER ATTACHED RFS "MINIMUM FIELD TESTING RECOMMENDED FOR ANTENNA AND HELIAX COAXIAL CABLE SYSTEMS" DATED 10/5/93. TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING SERVICE AND BE BOUND AND SUBMITTED WITHIN ONE WEEK OF WORK COMPLETION.
   - F. INSTALL COAXIAL CABLES AND TERMINATING BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS. TERMINATE ALL COAXIAL CABLE THREE (3) FEET IN EXCESS OF ENTRY PORT LOCATION UNLESS OTHERWISE STATED.
   - G. ANTENNA AND COAXIAL CABLE GROUNDING:
     1. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH RFS CONNECTOR/SPLICE WEATHERPROOFING KIT #221213 OR EQUAL.
     2. ALL COAXIAL CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE (NOT WITHIN BENDS).

PLANS PREPARED FOR:

T-MOBILE WEST LLC
18400 EAST 22ND AVENUE
AURORA, CO 80011

PLANS PREPARED BY:

INFINIGY ENGINEERING, PLLC
1490 W. 121st AVE., SUITE 101
WESTMINSTER, COLORADO 80234
JOB NUMBER 317–701

MLA PARTNER:

AMERICAN TOWER CORPORATION

ENGINEERING LICENSE:

COLORADO LICENSED
CHRISTOPHER J. WARREN
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5/3/19
PROFESSIONAL ENGINEER

DRAWING NOTICE:

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	05/03/19	CTL	0

SITE NAME:
BLACK FOREST CO

T-MOBILE SITE #:
DN03014A

ATC SITE #:
88791

SITE ADDRESS:
14775 BLACK FOREST ROAD
COLORADO SPRINGS, CO 80461

SHEET DESCRIPTION:
GENERAL NOTES & SPECIFICATIONS

SHEET NUMBER:
SP-1