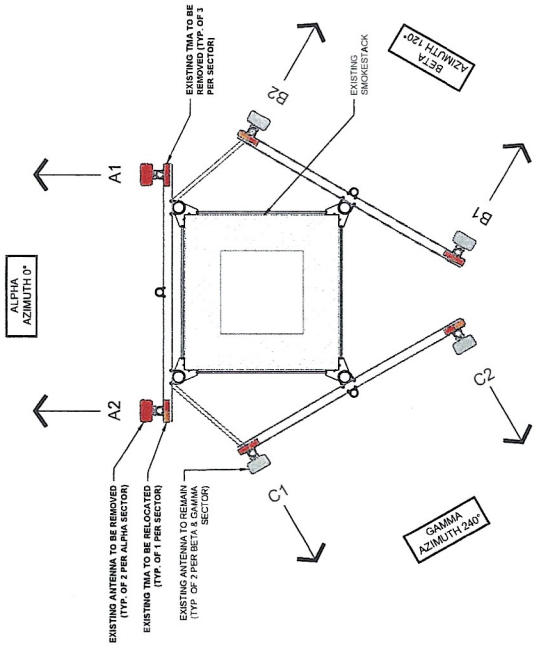


LEGEND

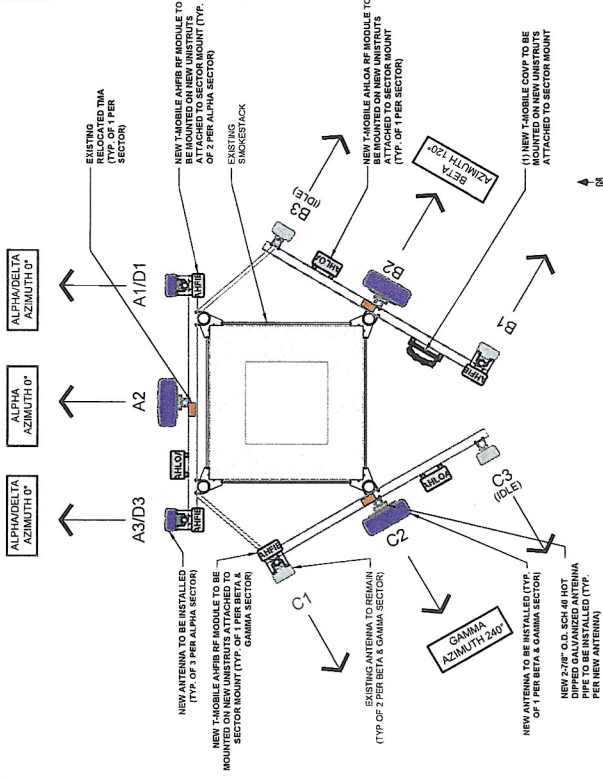
- EXISTING TMA TO BE REMOVED (TYP. OF 2 PER ALPHA SECTOR)
- EXISTING TMA TO BE RELOCATED (TYP. OF 1 PER SECTOR)
- EXISTING ANTENNA TO BE REMOVED
- EXISTING ANTENNA TO REMAIN



LEGEND

- RELOCATED TMA
- EXISTING ANTENNA
- NEW ANTENNA

NOTE: FOR ALL T-MOBILE EQUIPMENT, ANTENNAS, FRAMES, CABLE TRAYS AND CONDUITS, TMA SHALL BE RELOCATED TO MATCH THE ADJACENT MASONRY FROM GROUND TO MATCH THE ADJACENT MASONRY



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ROSEMONT, IL 60018
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LICENSE # 252301-D-04
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NORWOOD, IL 60452
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MAIN: (847) 981-0801

DRAWN BY: J.C.
CHECKED BY: GMS

THADDEUS A. PACYNAK
8109
LICENSED ARCHITECT
STATE OF ILLINOIS

CH42418A
CPS WENTWORTH SCHOOL
6950 S SANGAMON STREET
CHICAGO, IL 60621

EXISTING & PROPOSED
ANTENNA PLANS

A-2B 10-31-18
D/RE

NEW AND EXISTING ANTENNA AND CABLE SCHEDULE

SECTOR	POS.	AZIMUTH CENTER	RAD CENTER	TECHNOLOGY	M. TILT	E. TILT	ANTENNA	STATUS	RRU TYPE	COVP	CABLE STATUS	HCS FACTORY LENGTH	JUMPER LENGTH
ALPHA/ DELTA	A3/D3	0°	85°-0"	LTE AWS/PCS	T.B.D.	2°	(1) NEW COMMSCOPE - HBXX-3817B1-A2M	(1) ANDREW - TMBXXX-6517-A2M TO BE REPLACED	(1) NEW AHFIB				≤ 15'-0"
	A2	0°	85°-0"	LTE700/LTE600/GSM UMTS PCS (N600)	T.B.D.	2°/1/2°/2°	(1) NEW COMMSCOPE - FFHH-65C-R3	NEW	(1) NEW AHLOA				≤ 15'-0"
	A1/D1	0°	85°-0"	LTE AWS/PCS	T.B.D.	2°	(1) NEW COMMSCOPE - HBXX-3817B1-A2M	(1) ANDREW - TMBXXX-6517-A2M TO BE REPLACED	(1) NEW AHFIB				≤ 15'-0"
BETA	B3	120°	85°-0"	LTE AWS/PCS	T.B.D.	2°	(1) EXISTING COMMSCOPE - TMBXX-6517-A2M	RE-USE EXISTING	(1) NEW AHFIB				≤ 15'-0"
	B2	120°	85°-0"	LTE700/LTE600/GSM UMTS PCS (N600)	T.B.D.	2°/1/2°/2°	(1) NEW COMMSCOPE - FFHH-65C-R3	NEW	(1) NEW AHLOA	(1) NEW COVP	(1) NEW HIGH CAP HYBRID CABLE TO BE INSTALLED. EXISTING COAX CABLES TO REMAIN	150'	≤ 15'-0"
	B1	120°	85°-0"	IDLE	T.B.D.	0°	(1) EXISTING COMMSCOPE - TMBXX-6517-A2M	RE-USE EXISTING					≤ 15'-0"
GAMMA	C3	240°	85°-0"	LTE AWS/PCS	T.B.D.	2°	(1) EXISTING COMMSCOPE - TMBXX-6517-A2M	RE-USE EXISTING	(1) NEW AHFIB				≤ 15'-0"
	C2	240°	85°-0"	LTE700/LTE600/GSM UMTS PCS (N600)	T.B.D.	2°/1/2°/2°	(1) NEW COMMSCOPE - FFHH-65C-R3	NEW	(1) NEW AHLOA				≤ 15'-0"
	C1	240°	85°-0"	IDLE	T.B.D.	0°	(1) EXISTING COMMSCOPE - TMBXX-6517-A2M	RE-USE EXISTING					≤ 15'-0"

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

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LICENSE # 0332011-03A
CONCORDIA WIRELESS, INC.
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CAROL STREAM, IL 60188
UNIT 101
MAIN: (973) 981-0801

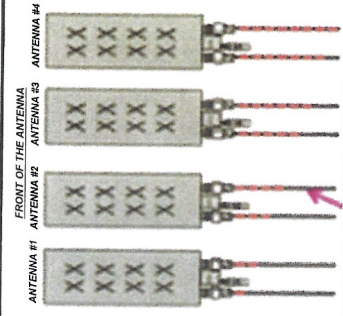
DRAWN BY: JC
CHECKED BY: DMS
DESIGNED BY: DMS

THADDEUS A. PACYNIAK
8109P
LICENSED ELECTRICAL ARCHITECT

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CPS WENTWORTH SCHOOL
6950 S SANGAMON STREET
CHICAGO, IL 60621

ANTENNA
& CABLE SCHEDULE

A-3



FRONT OF THE ANTENNA
ANTENNA #1 ANTENNA #2 ANTENNA #3 ANTENNA #4

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

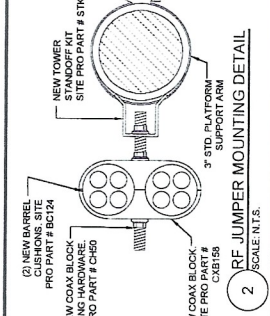
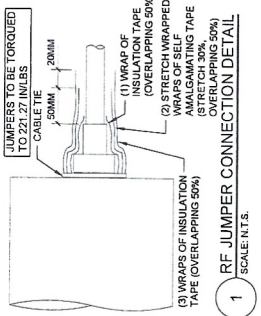
COAX COLOR CODING: Labeled back of antenna view) RIGHT TO LEFT 1-4 PORTS. COAX JUMPER LINES WILL BE IDENTIFIED BY SECTOR COLOR AND BY NUMBER OF BANDS AROUND THE COAX JUMPER

SECTOR A	RED
SECTOR B	GREEN
SECTOR C	BLUE
SECTOR D	YELLOW
SECTOR E	WHITE
SECTOR F	BROWN
LMU	BROWN
FIBER ID	GRAY
UNUSED COAX	PINK
MICROWAVE	ORANGE
DWE T-1'S + GPS	ORANGE
DOWNLINK CABLE	ID LABEL MAKER

ANTENNA AND COAXIAL CABLE SCHEDULE

- ALL ANTENNAS SHALL BE FURNISHED WITH DOWNWILT BRACKETS. EACH ANTENNA WITH RF ANTENNA DOWNWILT SHALL BE SET AND VERIFIED BY A SMART LEVEL.
- CONTRACTOR SHALL INSTALL COAX CABLES ON EACH OF THE HYBRID CABLES AND JUMPER CABLES WITH UV RESISTANT TAPE. ALL CABLE SHALL BE MARKED WITH "Z" COLOR TAPE OR STENCIL TAG. COLOR TAPE MAY BE OBTAINED FROM GRAYBAR ELECTRONICS.

3 TAGGING COLOR AND NOTES
SCALE: N.T.S.



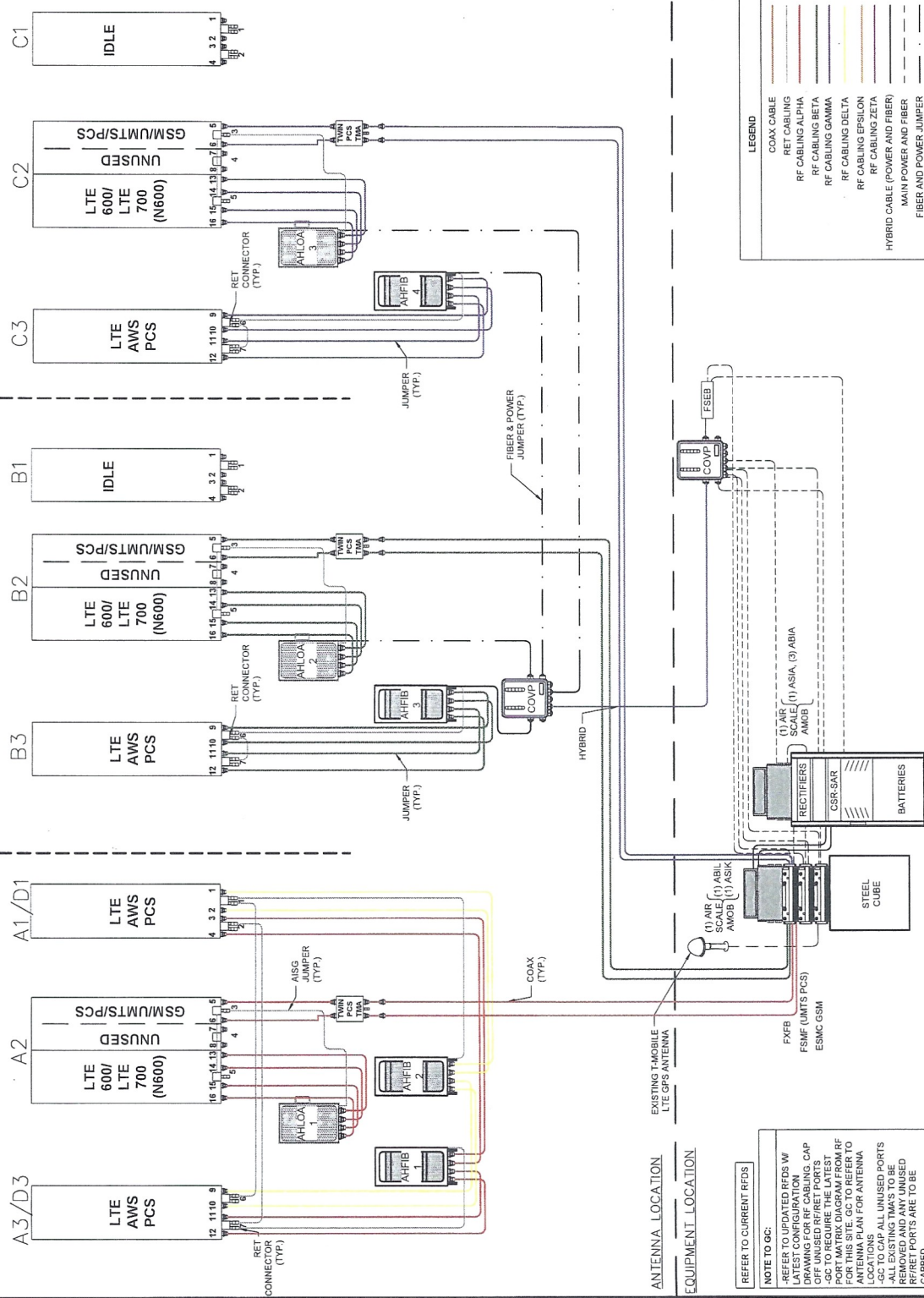
1 RF JUMPER CONNECTION DETAIL
SCALE: N.T.S.

2 RF JUMPER MOUNTING DETAIL
SCALE: N.T.S.

ALPHA/DELTA SECTOR

BETA SECTOR

GAMMA SECTOR



LEGEND

COAX CABLE
RET CABLING
RF CABLING ALPHA
RF CABLING BETA
RF CABLING GAMMA
RF CABLING DELTA
RF CABLING EPSILON
RF CABLING ZETA
HYBRID CABLE (POWER AND FIBER)
MAIN POWER AND FIBER
FIBER AND POWER JUMPER

NOTE TO GC:

- REFER TO UPDATED RFDS W/ LATEST CONFIGURATION
- OFF UNUSED RET/RET PORTS
- GC TO REQUIRE THE LATEST PORT MATRIX DIAGRAM FROM RF FOR THIS SITE. GC TO REFER TO LOCATIONS FOR ANTENNA
- GC TO CAP ALL UNUSED PORTS
- ALL EXISTING TMA'S TO BE CAPPED
- ALL EXISTING AND UNUSED RET/RET PORTS ARE TO BE CAPPED

ANTENNA LOCATION

EQUIPMENT LOCATION

SYSTEM CONNECTION DIAGRAM

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 T-MOBILE
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 TELKOM SERVICES
 LCC, TELKOM SERVICES, LLC
 10700 W. HEGGINS RD, SUITE 240
 ADDS 5
 ADDS 3
 ADDS 4
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 A PROFESSIONAL DESIGN FIRM
 LICENSE #0020110 USA
 85 RANNEY ROAD
 UNIT 101
 CAROL STREAM, IL 60188
 MAIN: (847) 981-0801

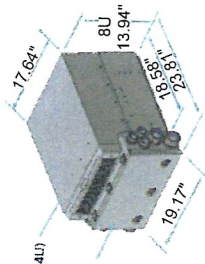
DRAWN BY: JC
 CHECKED BY: GMB
 CHECKED BY: GMB

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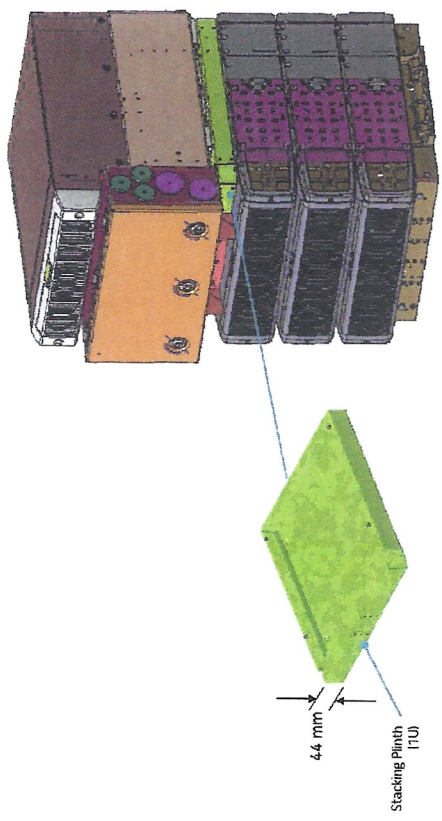
RFDS DIAGRAM

A-3A



HEX Assembly (~4U)
PDU and Heaters (-1U)
ASIA-ABIA(-3U)

HEIGHT	8U (54MM / 13.94 INCH)
WIDTH (FRONT COVER)	487MM / 19.17 INCH
WIDTH (CABINET)	448MM / 17.64 INCH (FITS INTO 19 INCH RACK)
DEPTH	487MM / 19.17 INCH (WITHOUT CONDUIT PLUGS OR FITTINGS)
WEIGHTS	TOTAL 695MM / 23.81 INCH (472MM / 18.58 INCH FROM RACK MOUNTING SURFACE) 23 KG / 50.71 LBS AMOB ENCLOSURE 3 KG / 6.61 LBS ASIA (CORE MODULE) 3 KG / 6.61 LBS ABIA (CORE MODULE) 32 KG / 70.55 LBS 1/2 CAPACITY (1 CORE + 6 EXPANSION) 41 KG / 90.39 LBS FULL CAPACITY (2 CORE + 6 EXPANSION)
INGRESS PROTECTION	IP55
OPERATING TEMPERATURE	-40°C UP TO +55°C (WITHOUT SOLAR RADIATION)
INSTALLATION TEMPERATURE	20°C +55°C
AIRFLOW DIRECTION	BACK TO FRONT AIR-FLOW DIRECTION SUPPORTED FOR HORIZONTAL (FOOA, FPOA, FPOB, FPOC) STRAGS FRONT TO BACK AIR-FLOW DIRECTION SUPPORTED FOR VERTICAL (WALL AND POLE MOUNTING CASE)
CLEARANCES FOR COOLING	40 MM MINIMUM ON THE BACK AND FRONT SIDE
COLD START	-2H FROM -40°C TO 5°C OPTIONAL 2ND HEATER CAN BE ADDED TO MEET NAM REQUIREMENT. COLD START FROM -40°C TO 5°C IN 1 HOUR INSTEAD OF 2 HOURS
NOMINAL SUPPLY VOLTAGE INPUT VOLTAGE RANGE	100-240 V AC EXTENDED SERVICE VOLTAGE RANGE SUPPORTED: 38VDC...80VDC FLOATING
MASS CAPACITY	SUPPORT MAX. 18KG INSIDE
POWER CONSUMPTION	TYPICAL MAX. 265W (ALL FANS AT HIGHEST SPEED) COLD START ~600W (HEATER ON 50W + FANS AT LOW SPEED)
CONDUIT CABLE ENTRY	2X1.5" x 1" ON EACH LEFT AND RIGHT SIDE



AIRSCALE SUBRACK OUTDOOR AMOB

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CHECKED BY: GMS

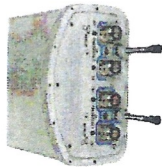


CH42418A
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NEW EQUIPMENT
SPECIFICATIONS

A-4

HBXX-3817TB1-VTM | HBXX-3817TB1-A2M
 4-port multibeam antenna, 4x 1710-2180 MHz, 2x 38° HPBW, RET compatible



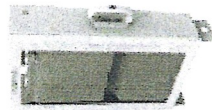
General Specifications

Operating Frequency Band	1710 - 2180 MHz
Antenna Type	Multibeam
Band	Single Band
Performance Note	Outdoor usage
Dimensions	
Length	1390.0 mm 54.7 in
Width	301.0 mm 11.9 in
Depth	181.0 mm 7.1 in
Net Weight, without mounting kit	13.6 kg 30.0 lb

NEW ANTENNA (COMMSCOPE- HBXX-3817TB1-VTM | HBXX-3817TB1-A2M)

AHFIB-DUAL BAND

- 4T4R B25+B66 RADIO
- OUTPUT POWER 4X40W PER BAND
- 1BW
- B66 90MHz (OBW 40 MHz)
- B25 65MHz (OBW 40 MHz)
- 26 X 6 X 12 IN (H X W X D)
- 66 LBS
- 2 X 9.8 GBPS CPRI FIBER
- IP65



NOKIA 5G NR2100/1900 5G MID-BAND RADIOS (AHFIB)

FFHH-65C-R3

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

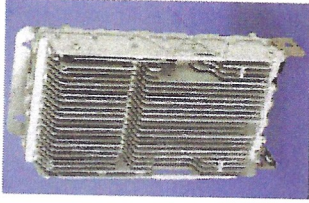
General Specifications

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
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



NEW ANTENNA (COMMSCOPE- FFHH-65C-R3)

AIRSCALE DUAL RRH 4T4R B1271 240W AHLOA	
SUPPORTED FREQUENCY BANDS	3GPP BAND 1271
FREQUENCIES	BAND 12 ADJUSTED RX 688 - 715 MHz, TX 728 - 745 MHz BAND 17 1710 MHz - 688 MHz, TX 671 MHz - 652 MHz
NUMBER OF TMR PATHS/PAPERS	4 PAPERS, 2TMR, 2T4R, 4T4R FOR BOTH BANDS
INSTANTANEOUS BANDWIDTH BW	16 MHz FOR B12 AND 35MHz FOR B17
OCCUPIED BANDWIDTH OBW	1 MHz BELOW B12, B17 FOR FUTURE USE
OUTPUT POWER	50 MHz TOTAL ACROSS BANDS
SUPPLY VOLTAGE/RANGE	DC-48 V / -35 V TO -60 V
TYPICAL POWER CONSUMPTION	66W (ETB) BUSY HOUR LOAD AT 4T4R60W (BOTH BANDS ACTIVE)
ANTENNA PORTS	35W (ETB) BUSY HOUR LOAD AT 4T4R60W (ONE BAND ACTIVE)
OPTICAL PORTS	4 PORTS, 1.3-10+
ALD CONTROL INTERFACES	2x CPRI 8 Gbps
OTHER INTERFACES	ASG3.0 FROM ANT1, 2,3,4 & RET DC ON ANT1 & ANT3) EXTERNAL ALARM NOK-36 SERIAL CONNECTOR (4 INPUTS, 1 OUTPUT) DC CIRCULAR POWER CONNECTOR
PHYSICAL	500MMX225MMX185MMX72.2MM (W X H X D X MOUNTING BRACKET) 380G (8.7 LBS) WITHOUT COVER AND BRACKETS -40 C TO 55°C (WITH NO SQUAR LOAD)
OPERATING TEMPERATURE RANGE	CLASS I IFA
SURGE PROTECTION	VERTICAL & HORIZONTAL BOOK MOUNT, POLE & WALL MOUNT
INSTALLATION OPTIONS	



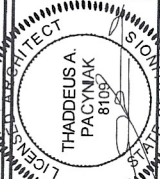
AIRSCALE DUAL RRH 4T4R
 B1271 240W AHLOA

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 T-MOBILE
 1400 OPLIS PLACE
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 PHONE: (773) 444-5400

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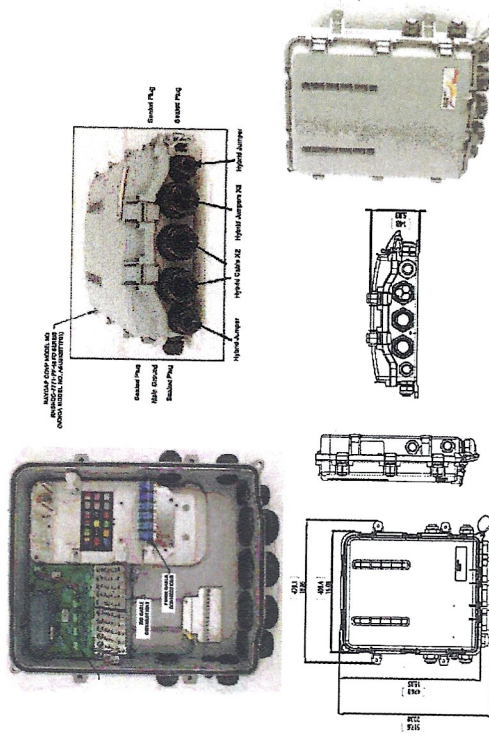
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 CHECKED BY: GMS



CH42418A
 CPS WENTWORTH SCHOOL
 6950 S SANGAMON STREET
 CHICAGO, IL 60621

NEW EQUIPMENT
 SPECIFICATIONS

A-4A



RAYCAP COVP MODEL NO. RNSNDC-7771-PF-48 FD SERIES- (NOKIA MODEL NO. ASU83381TP01)

Mobile
 T. MOBILE
 1400 DUPES PLACE
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 CHICAGO, IL 60658
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ONCORDIA WIRELESS, INC.
 A PROFESSIONAL DESIGN FIRM
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 98 PANDY ROAD
 CAROL STREAM, IL 60188
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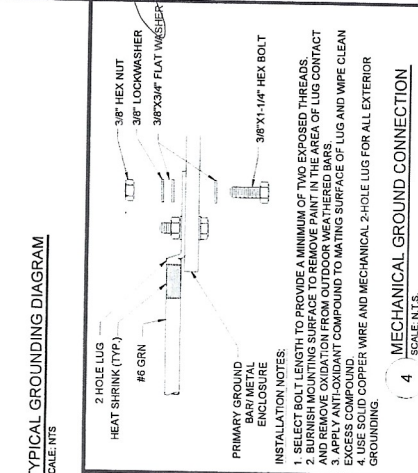
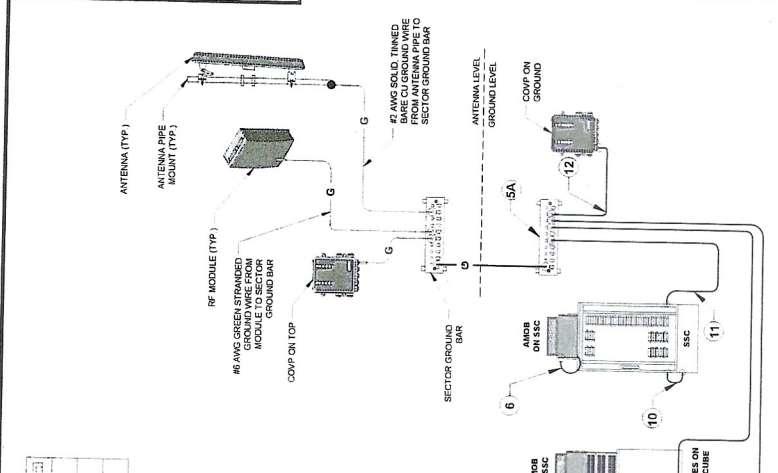
DRAWN BY: J.C. CHECKED BY: GMS
 CHECKED BY: [Signature] PT. GMS

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**PROPOSED SITE
 GROUNDING DIAGRAM**

EG-1

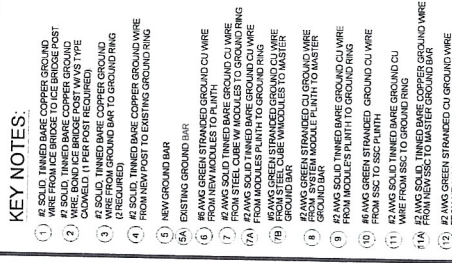
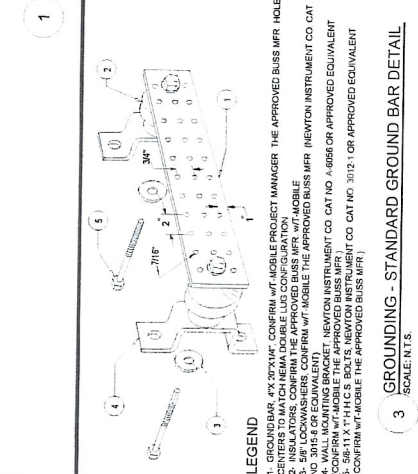


SYMBOLS LEGEND:

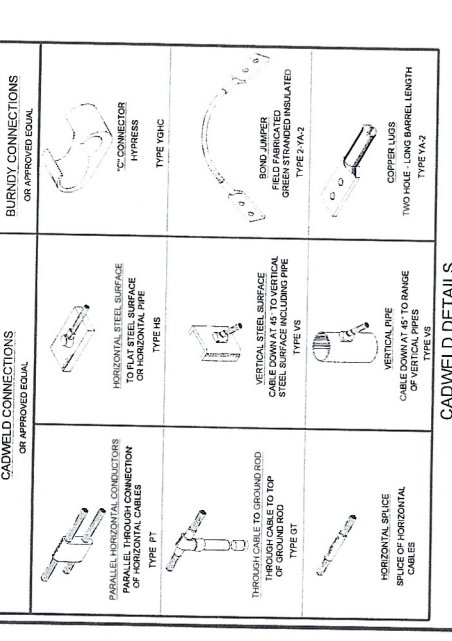
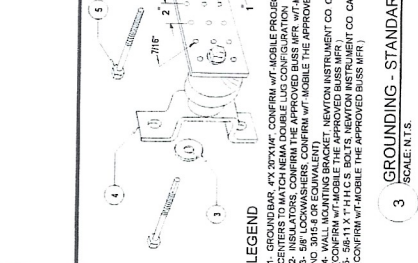
GROUND BAR	EXOTHERMIC WELD CONNECTION
MECHANICAL CONNECTION	BOND DIRECTLY TO TOWER

NOTE:
 1. EXISTING GROUNDING NOT SHOWN IN THIS DIAGRAM. GO TO VERIFY EXISTING EQUIPMENT GROUNDING IN FIELD.
 2. VARIABLE GROUNDING BARS ON SITE.

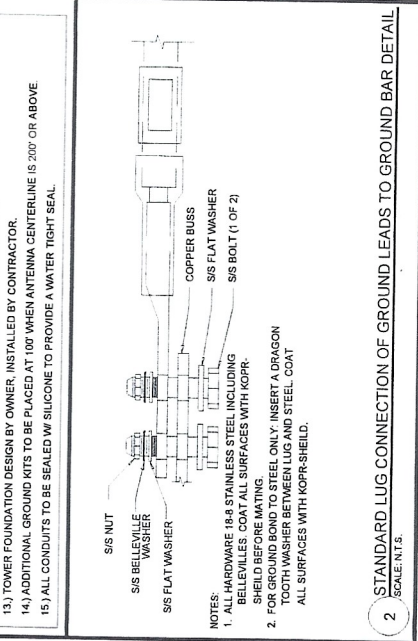
- KEY NOTES:**
- #2 SOLID TINNED BARE COPPER GROUND WIRE FROM ICE BRIDGE TO ICE BRIDGE POST
 - WIRE BOND ICE BRIDGE POST WITH W/PE COATED W/ 1 PER POST REQUIRED
 - #2 SOLID TINNED BARE COPPER GROUND WIRE FROM ICE BRIDGE POST TO GROUND RING (REQUIRED) BOND PART TO GROUND RING FROM NEW POST TO EXISTING GROUND RING
 - #2 SOLID TINNED BARE COPPER GROUND WIRE FROM NEW POST TO EXISTING GROUND RING
 - NEW GROUND BAR
 - #6 AWG GREEN STRANDED GROUND WIRE FROM NEW MODULES TO PLINTH
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM STEEL CABLE MODULES TO GROUND BAR FROM MODULES PLINTH TO GROUND RING
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM STEEL CABLE MODULES TO MASTER GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM SYSTEM MODULE PLINTH TO MASTER GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM MODULES PLINTH TO GROUND WIRE FROM SSC TO SSC PLINTH
 - #2 AWG SOLID TINNED BARE GROUND WIRE FROM SSC TO GROUND RING
 - #2 AWG SOLID TINNED BARE GROUND WIRE FROM SSC TO GROUND RING
 - #2 AWG GREEN STRANDED GROUND WIRE FROM NEW COMP TO GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM NEW ALARM BOX TO GROUND BAR
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM NEW HYBRID CABLE TO GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM NEW GROUND WIRE FROM NEW GROUND BAR
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM NEW GROUND BAR TO EXISTING GROUND RINGBAR
 - #6 AWG SOLID TINNED BARE CU GROUND WIRE FROM FROM BATTERY CABINET TO EXISTING GROUND BAR
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM BATTERY CABINET TO GROUND RING



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



- KEY NOTES:**
- #2 SOLID TINNED BARE COPPER GROUND WIRE FROM ICE BRIDGE TO ICE BRIDGE POST
 - WIRE BOND ICE BRIDGE POST WITH W/PE COATED W/ 1 PER POST REQUIRED
 - #2 SOLID TINNED BARE COPPER GROUND WIRE FROM ICE BRIDGE POST TO GROUND RING (REQUIRED) BOND PART TO GROUND RING FROM NEW POST TO EXISTING GROUND RING
 - #2 SOLID TINNED BARE COPPER GROUND WIRE FROM NEW POST TO EXISTING GROUND RING
 - NEW GROUND BAR
 - #6 AWG GREEN STRANDED GROUND WIRE FROM NEW MODULES TO PLINTH
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM STEEL CABLE MODULES TO GROUND BAR FROM MODULES PLINTH TO GROUND RING
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM STEEL CABLE MODULES TO MASTER GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM SYSTEM MODULE PLINTH TO MASTER GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM MODULES PLINTH TO GROUND WIRE FROM SSC TO SSC PLINTH
 - #2 AWG SOLID TINNED BARE GROUND WIRE FROM SSC TO GROUND RING
 - #2 AWG SOLID TINNED BARE GROUND WIRE FROM SSC TO GROUND RING
 - #2 AWG GREEN STRANDED GROUND WIRE FROM NEW COMP TO GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM NEW ALARM BOX TO GROUND BAR
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM NEW HYBRID CABLE TO GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM NEW GROUND WIRE FROM NEW GROUND BAR
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM NEW GROUND BAR TO EXISTING GROUND RINGBAR
 - #6 AWG SOLID TINNED BARE CU GROUND WIRE FROM FROM BATTERY CABINET TO EXISTING GROUND BAR
 - #2 AWG SOLID TINNED BARE CU GROUND 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. GO TO VERIFY EXISTING EQUIPMENT GROUNDING IN FIELD.
 2. VARIABLE GROUNDING BARS ON SITE.

- KEY NOTES:**
- #2 SOLID TINNED BARE COPPER GROUND WIRE FROM ICE BRIDGE TO ICE BRIDGE POST
 - WIRE BOND ICE BRIDGE POST WITH W/PE COATED W/ 1 PER POST REQUIRED
 - #2 SOLID TINNED BARE COPPER GROUND WIRE FROM ICE BRIDGE POST TO GROUND RING (REQUIRED) BOND PART TO GROUND RING FROM NEW POST TO EXISTING GROUND RING
 - #2 SOLID TINNED BARE COPPER GROUND WIRE FROM NEW POST TO EXISTING GROUND RING
 - NEW GROUND BAR
 - #6 AWG GREEN STRANDED GROUND WIRE FROM NEW MODULES TO PLINTH
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM STEEL CABLE MODULES TO GROUND BAR FROM MODULES PLINTH TO GROUND RING
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM STEEL CABLE MODULES TO MASTER GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM SYSTEM MODULE PLINTH TO MASTER GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM MODULES PLINTH TO GROUND WIRE FROM SSC TO SSC PLINTH
 - #2 AWG SOLID TINNED BARE GROUND WIRE FROM SSC TO GROUND RING
 - #2 AWG SOLID TINNED BARE GROUND WIRE FROM SSC TO GROUND RING
 - #2 AWG GREEN STRANDED GROUND WIRE FROM NEW COMP TO GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM NEW ALARM BOX TO GROUND BAR
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM NEW HYBRID CABLE TO GROUND BAR
 - #2 AWG GREEN STRANDED GROUND WIRE FROM NEW GROUND WIRE FROM NEW GROUND BAR
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM NEW GROUND BAR TO EXISTING GROUND RINGBAR
 - #6 AWG SOLID TINNED BARE CU GROUND WIRE FROM FROM BATTERY CABINET TO EXISTING GROUND BAR
 - #2 AWG SOLID TINNED BARE CU GROUND WIRE FROM BATTERY CABINET TO GROUND RING



GENERAL NOTES:

1. OWNERS FURNISH MATERIALS. T-MOBILE THE COMPANY WILL PROVIDE AND THE CONTRACTOR WILL INSTALL.
2. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES BOTH HORIZONTALLY AND VERTICALLY PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES OR OMISSIONS SHOULD BE REPORTED TO THE PROJECT MANAGER FOR RESOLUTION. NO PLANTER WORK SHALL BE PERFORMED UNTIL DISCREPANCY IS CHECKED AND CORRECTED BY THE ARCHITECT/ENGINEER. FAILURE TO SECURE SUCH INFORMATION BEFORE CONSTRUCTION WILL BE WORKED AT THE OWNER'S RISK AND EXPENSE.
3. CONTRACTOR SHALL SUBMIT ALL UTILITY CONSTRUCTION SUCH THAT NO PAPER, TRASH, DEBRIS, WEEDS, BRUSH, OR OTHER UTILITIES SHALL BE REMOVED OR DESTROYED. ALL MATERIALS COLLECTED DURING OPERATIONS SHALL BE PROPERLY DISPOSED OF OFF-SITE BY THE CONTRACTOR.
4. ALL SITE WORK SHALL BE CAREFULLY COORDINATED BY THE CONTRACTOR WITH LOCAL GAS, ELECTRIC, TELEPHONE, AND ANY OTHER UTILITY COMPANIES (NANUK JURISDICTION OVER THIS LOCATION).
5. DURING CONSTRUCTION, THE CONTRACTOR SHALL AT ALL TIMES MAINTAIN UTILITIES OF THE BUILDINGSITE WITHOUT INTERRUPTION. SHOULD IT BE NECESSARY TO INTERRUPT ANY SERVICE OR UTILITY, THE CONTRACTOR SHALL SUBMIT A WRITTEN NOTICE TO THE BUILDING PROPERTY OWNER FOR BUILDING PROPERTY OWNER AND ANY SUCH SHUTDOWN TIME SHALL BE COORDINATED WITH THE BUILDING PROPERTY OWNER.
6. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION.
7. CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS-BUILT DIMENSIONS TO T-MOBILE'S PROJECT ENGINEER.

DIVISION 2 - SITE WORK

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION TO IDENTIFY ALL UTILITIES, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE PROPER EXECUTION OF THE WORK. SHALL AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE PROJECT MANAGER. EXCELLENCE CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING AROUND OR NEAR UTILITIES. THE CONTRACTOR SHALL PROVIDE SURETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE, BUT NOT LIMITED TO:
 - A. FALL PROTECTION
 - B. CONFINED SPACE
 - C. TRENCHING AND EXCAVATION
 - D. TRENCHING AND EXCAVATION
2. REMOVE OR DESTROY ALL WASTE MATERIALS, UNLIMBED EXCAVATED MATERIAL, INCLUDING MATERIALS, TRASH, AND DEBRIS, AND DISPOSE OF IN A LEGAL MANNER.
3. ALL EXISTING INACTIVE SPASER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLACED 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 CAPPED BY THE BUILDING OR OTHERWISE DISCONTINUED SHALL BE GRADDED TO A UNIFORM SLOPE BETWEEN, REEDED, AND COVERED WITH MULCH.
5. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, AS REQUIRED DURING CONSTRUCTION.

DIVISION 3 - CONCRETE

1. MINIMUM ALLOWABLE CONCRETE COMPRESSIVE STRENGTH SHALL BE 4000 PSI AT 28 DAYS WHEN TESTED IN ACCORDANCE WITH THE STANDARD TESTING AND METHODS STANDARDS ASTM C119, ASTM C109 AND ASTM C158 USING COMPRESSIVE METHOD.
2. CONCRETE FOR ALL FOUNDATIONS 360 LBS PER CUBIC YARD OF CONCRETE SHALL BE PLACED IN A CONTAINER FOR 1400 MINIMUM SIZE AGGREGATE SLUMP RANGES. AIR ENTRAINMENT AGGREGATE REQUIRED TO CONTROL TOTAL AIR CONTENT. WATER REDUCING ADMIXTURE PERMITTED TO USE IN SLUMP OVER 3.0'SHIES.
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. REBAR SHALL BE ASTM A615 DEFORMED TYRE WITH MINIMUM YIELD STRENGTH OF 60,000 PSI (60,000 PSI GRADE MAY BE USED FOR TIES & STIRRUPS).
5. DETAILING SHALL BE IN ACCORDANCE WITH MINIMUM OF STANDARD PRACTICE OF DETAILING REINFORCED CONCRETE STRUCTURES (ACI 318 LATEST EDITION).
6. CHAMFER ALL EXPOSED EDGES OF CONCRETE 3" UNLESS OTHERWISE NOTED 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 WEATHER: 2"
 - CAST AGAINST FORMWORK: 1 1/2"
 - # 3 BAR AND SMALLER: 1 1/2"
7. 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 DETECTED. NON-SHAFT TO OBTAIN THE ENGINEER'S FINAL ACCEPTANCE.
8. TWO SHALL BE TESTED FOR CYLINDERS FOR THE TOWER RIB FOUNDATION. THE CYLINDERS SHALL BE KEPT SEPARATELY, IF REQUIRED TO BE USED IN THE FUTURE.
9. ONE ADDITIONAL TEST CYLINDER SHALL BE TAKEN FROM EACH CYLINDER AND CURED ON SITE UNDER SAME CONDITIONS AS CONCRETE REPRESENTS.
10. ONE SLUMP TEST SHALL BE TAKEN FOR EACH SET OF TEST CYLINDERS TAKEN.
11. PLACING CONCRETE
 - A. CONCRETE SHALL BE NOTED NOT LESS THAN 24 HOURS IN ADVANCE OF CONCRETE PLACEMENT. UNLESS OTHERWISE NOTED ON DRAWINGS OF CONCRETE SHALL NOT BE PLACED UNTIL ALL FORMWORK, EMBEDDED PARTS, STEEL, AND JOINTS HAVE BEEN PROVED, AND ALL SURFACES AND JOINTS INVOLVED IN THE PLACING HAVE REPRESENTATIVE HAVE BEEN PROVIDED AND MADE READY FOR PLACEMENT UNTIL ALL THE WORK AS SPECIFIED, CONCRETE MAY NOT BE ORDERED FOR PLACEMENT UNTIL ALL WORK IS APPROVED TO START. CONCRETE SHALL BE PLACED IN THE MANNER AND ORDER APPROVED TO START.
 - B. PLACEMENT OF CONCRETE SHALL BE IN ACCORDANCE WITH ACI 301.
12. PROTECTION
 - A. IMMEDIATELY AFTER PLACEMENT, THE CONTRACTOR SHALL PROTECT THE CONCRETE FROM PREMATURE DRYING, EXCESSIVE 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 WATER SPRAYING SURFACES. WATER SHALL BE CLEAN AND FREE FROM ACID, OIL, SALTS, OIL, OR OTHER CONTAMINANTS. WATER SUPPLY UNDER PRESSURE IN PIPES, WITH ALL NECESSARY APPLIANCES OF SPRINKLERS, AND SPRAYING DEVICES.
13. ELECTRICAL NOTES:
 - 1. ELECTRICAL DESIGN SHALL BE PERFORMED BY ELECTRICAL CONTRACTOR. STRUCTURAL DESIGN SHALL BE PERFORMED BY STRUCTURAL CONTRACTOR. CONTRACTOR SHALL ASSURE THAT ALL WORK COMPLETES WITH ALL APPLICABLE LOCAL AND STATE CODES AND NATIONAL ELECTRICAL CODE.
 - 2. ALL SUGGESTED ELECTRICAL ELEMENTS SUCH AS BREAKER SIZES, WIRE SIZES, CONDUIT SIZES TO CONFIRM COMPLIANCE WITH LOCAL ELECTRICAL CODES AND THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOR THE ELECTRICAL LOAD STUDY. IN SOME EVENTS, IT MAY BE NECESSARY TO PERFORM AN ELECTRICAL LOAD STUDY TO DETERMINE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
 - 3. CONTRACTOR SHALL FIELD LOCATE ALL BELOW GRADE GROUND LINES AND UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR RELOCATION OF ALL UTILITIES AND GROUND LINES THAT MAY BE OBTAINED BY CONDUCTING WORK DURING THE COURSE OF CONSTRUCTION.

DIVISION 5 - STRUCTURAL STEEL

1. DETAIL, FABRICATE AND ERECT STRUCTURAL STEEL IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR STRUCTURAL STEEL IN ACCORDANCE WITH THE BASIC BUILDING CODE. STRUCTURAL STEEL SHALL BE AS FOLLOWS:
 - A. ASTM A588 GRADE 50 BOLDED STEEL, RIGOR PAGES.
 - B. ASTM A572 GRADE 50, BEARING TYPE.
 - C. ALL STEEL SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A173 REQUIREMENTS. GALVANIZING SHALL BE PERFORMED BY AN INDEPENDENT TESTING SERVICE AND BE EVIDENCED DURING CONSTRUCTION UNTIL ALL CONNECTIONS ARE COMPLETE.
 - D. ANY FIELD CHANGES OR SUBSTITUTIONS SHALL HAVE PRIOR APPROVAL FROM THE ARCHITECT/ENGINEER AND T-MOBILE PROJECT MANAGER IN WRITING.
 - E. ALL STEEL SHALL BE STRIPPED TO A SMOOTH FINISH.
 - F. A REMAINS OF AN ANCHOR.
 - G. THE FULL EFFORT OF A PERSON USING A SPREAD WRENCH.
 - H. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS. CERTIFICATION DOCUMENTS SHALL BE MADE AVAILABLE FOR ENGINEERS AND/OR OWNERS REVIEW UPON REQUEST.
 - I. WELDING ELECTRODES FOR MANUAL, SHIELDED METAL ARC WELDS SHALL BE E6010 FOR ASTM A572, E7018 FOR E8010. SHIELDED METAL ARC AND SHALLOW FLUX WELDS FOR ASTM A588 AND PROCESS SHALL CONFORM TO AISE SPECIFICATIONS.
 - J. COLD CHAMFERING SHALL BE DONE AS PER AWS D1.1 REQUIREMENTS. VISUAL INSPECTION IS ACCEPTABLE.
 - K. UPON COMPLETION OF ERECTION INSPECT ALL GALVANIZED STEEL AND PAINT ANY FIELD CUTS, WELDS, OR GALVANIZED BEAMS WITH ZINC BASED PAINT. COLOR TO MATCH THE GALVANIZING PROCESS.
2. 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 AND PROVIDE THE NECESSARY COORDINATION AND SITE ACCESS. ERECTION SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONNEL AND ANTENNAS AS INDICATED ON DRAWINGS AND T-MOBILE SPECIFICATIONS.
 - B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS AND PROVIDE PRINTOUT OF THAT TEST.
 - C. CONTRACTOR SHALL PROVIDE FOUR (4) SETS OF SWEEP TESTS USING ARBITZUL PACKARD FT138 RF SCALAR NETWORK ANALYZER. SUBMIT FREQUENCY COMPARISON REPORTS TO THE PROJECT MANAGER. SWEEP TESTS SHALL BE PERFORMED BY AN INDEPENDENT TESTING SERVICE AND BE EVIDENCED FOR ANTENNA AND HELIX COAXIAL CABLE SYSTEMS UNLESS OTHERWISE NOTED AND SUBMITTED WITHIN ONE WEEK OF WORK COMPLETION.
 - D. INSTALL COAXIAL CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS AND TERMINATIONS. WEATHERPROOF ALL COAXIAL CABLES. COAXIAL CONNECTORS REQUIREMENTS TERMINATE ALL COAXIAL CABLE THREE (3) FEET IN SEEPS OF ENTRY POINT LOCATION UNLESS OTHERWISE STATED.
 - E. ANTENNAS AND COAXIAL CABLE ENDINGS
 - 1. ALL ANTENNAS AND COAXIAL CABLES ENDINGS SHALL BE KEPT UNDER COVER UNTIL THEY ARE TO BE WEATHER SEALED WITH THE CONNECTOR/SLAVE WEATHERPROOFING KIT #272131 OR EQUAL.
 - 2. ALL COAXIAL CABLE ENDINGS SHALL BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE (NOT WITHIN 8" OF BEND).

DIVISION 13 - SPECIAL CONSTRUCTION

1. WORK INCLUDED
 - A. ANTENNAS AND COAXIAL CABLES ARE FURNISHED BY T-MOBILE UNDER A SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION AND PROVIDE THE NECESSARY COORDINATION AND SITE ACCESS. ERECTION SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONNEL AND ANTENNAS AS INDICATED ON DRAWINGS AND T-MOBILE SPECIFICATIONS.
 - B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS AND PROVIDE PRINTOUT OF THAT TEST.
 - C. CONTRACTOR SHALL PROVIDE FOUR (4) SETS OF SWEEP TESTS USING ARBITZUL PACKARD FT138 RF SCALAR NETWORK ANALYZER. SUBMIT FREQUENCY COMPARISON REPORTS TO THE PROJECT MANAGER. SWEEP TESTS SHALL BE PERFORMED BY AN INDEPENDENT TESTING SERVICE AND BE EVIDENCED FOR ANTENNA AND HELIX COAXIAL CABLE SYSTEMS UNLESS OTHERWISE NOTED AND SUBMITTED WITHIN ONE WEEK OF WORK COMPLETION.
 - D. INSTALL COAXIAL CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS AND TERMINATIONS. WEATHERPROOF ALL COAXIAL CABLES. COAXIAL CONNECTORS REQUIREMENTS TERMINATE ALL COAXIAL CABLE THREE (3) FEET IN SEEPS OF ENTRY POINT LOCATION UNLESS OTHERWISE STATED.
 - E. ANTENNAS AND COAXIAL CABLE ENDINGS
 - 1. ALL ANTENNAS AND COAXIAL CABLES ENDINGS SHALL BE KEPT UNDER COVER UNTIL THEY ARE TO BE WEATHER SEALED WITH THE CONNECTOR/SLAVE WEATHERPROOFING KIT #272131 OR EQUAL.
 - 2. ALL COAXIAL CABLE ENDINGS SHALL BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE (NOT WITHIN 8" OF BEND).

GENERAL NOTES (CONT'D)

16. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES BOTH HORIZONTALLY AND VERTICALLY PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES OR OMISSIONS SHOULD BE REPORTED TO THE PROJECT MANAGER FOR RESOLUTION. NO PLANTER WORK SHALL BE PERFORMED UNTIL DISCREPANCY IS CHECKED AND CORRECTED BY THE ARCHITECT/ENGINEER. FAILURE TO SECURE SUCH INFORMATION BEFORE CONSTRUCTION WILL BE WORKED AT THE OWNER'S RISK AND EXPENSE.
17. CONTRACTOR SHALL SUBMIT ALL UTILITY CONSTRUCTION SUCH THAT NO PAPER, TRASH, DEBRIS, WEEDS, BRUSH, OR OTHER UTILITIES SHALL BE REMOVED OR DESTROYED. ALL MATERIALS COLLECTED DURING OPERATIONS SHALL BE PROPERLY DISPOSED OF OFF-SITE BY THE CONTRACTOR.
18. ALL SITE WORK SHALL BE CAREFULLY COORDINATED BY THE CONTRACTOR WITH LOCAL GAS, ELECTRIC, TELEPHONE, AND ANY OTHER UTILITY COMPANIES (NANUK JURISDICTION OVER THIS LOCATION).
19. DURING CONSTRUCTION, THE CONTRACTOR SHALL AT ALL TIMES MAINTAIN UTILITIES OF THE BUILDINGSITE WITHOUT INTERRUPTION. SHOULD IT BE NECESSARY TO INTERRUPT ANY SERVICE OR UTILITY, THE CONTRACTOR SHALL SUBMIT A WRITTEN NOTICE TO THE BUILDING PROPERTY OWNER FOR BUILDING PROPERTY OWNER AND ANY SUCH SHUTDOWN TIME SHALL BE COORDINATED WITH THE BUILDING PROPERTY OWNER.
20. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION.
21. CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS-BUILT DIMENSIONS TO T-MOBILE'S PROJECT ENGINEER.

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GENERAL NOTES & SPECIFICATIONS

SP-1

EXHIBIT "B"

PAYMENTS

TERM	ANNUAL LICENSE PAYMENTS
1 December 1, 2019 – November 30, 2020 December 1, 2020 – November 30, 2021 December 1, 2021 – November 30, 2022 December 1, 2022 – November 30, 2023 December 1, 2023 – November 30, 2024	48,000.00 49,440.00 50,923.00 52,451.00 54,025.00
2 December 1, 2024 – November 30, 2025 December 1, 2025 – November 30, 2026 December 1, 2026 – November 30, 2027 December 1, 2027 – November 30, 2028 December 1, 2028 – November 30, 2029	55,645.00 57,315.00 59,034.00 60,805.00 62,629.00
3 December 1, 2029 – November 30, 2030 December 1, 2030 – November 30, 2031 December 1, 2031 – November 30, 2032 December 1, 2032 – November 30, 2033 December 1, 2033 – November 30, 2034	64,508.00 66,443.00 68,437.00 70,490.00 72,604.00
4 December 1, 2034 – November 30, 2035 December 1, 2035 – November 30, 2036 December 1, 2036 – November 30, 2037 December 1, 2037 – November 30, 2038 December 1, 2038 – November 30, 2039	74,782.00 77,026.00 79,337.00 81,717.00 84,168.00