



APPLICANT SITE NAME:  
US 50 & LEE SUMMIT

APPLICANT SITE NUMBER:  
A5C0198A

DRAWING DESCRIPTION:  
FINAL CD

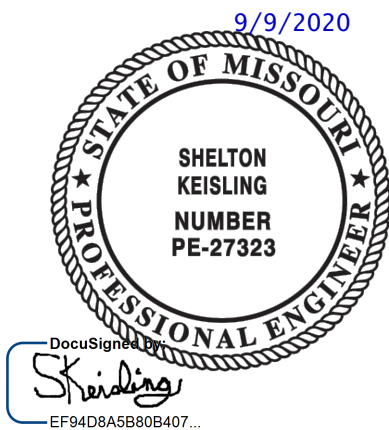
APPROVAL SIGNATURE BLOCK  
The following parties have reviewed these documents:

Site Acquisition Specialist:	Approved: <input type="checkbox"/> Rejected: <input type="checkbox"/>	Date:
RF Engineer:	Approved: <input type="checkbox"/> Rejected: <input type="checkbox"/>	Date:
Construction Manager:	Approved: <input type="checkbox"/> Rejected: <input type="checkbox"/>	Date:
Operations:	Approved: <input type="checkbox"/> Rejected: <input type="checkbox"/>	Date:
Project Manager:	Approved: <input type="checkbox"/> Rejected: <input type="checkbox"/>	Date:

APPLICANT SITE NUMBER:  
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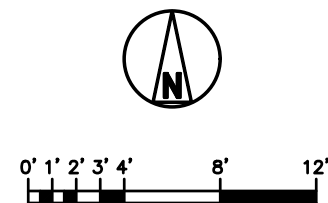
PROJECT:  
ANCHOR

DRAWING DESCRIPTION:  
FINAL CD



ENGINEERING LICENSE:			
STATE OF <u>MISSOURI</u>			
STATE CERTIFICATE OF AUTHORIZATION # EF-2791			
ENGINEER:	PE#:	DISCIPLINE:	
KMV KEVIN M. VANMAELE	21561	CIVIL	C
REJ ROBERT E. JENSEN	28974	CIVIL	
SDK SHELTON D. KEISLING	E-27323	ELECTRICAL	E
TMS TERRANCE M. SUPER	E-18521	ELECTRICAL	

[illegible]



1

ENGINEERING LICENSE:		
STATE OF <u>MISSOURI</u>		
STATE CERTIFICATE OF AUTHORIZATION # EF-2791		
ENGINEER:	PE#:	DISCIPLINE:
KMV KEVIN M. VANMAELE	21561	C
REJ ROBERT E. JENSEN	28974	C
SDK SHELTON D. KEISLING	E-27323	E
TMS TERRANCE M. SUPER	E-18521	E

PLANS PREPARED FOR: \_\_\_\_\_



PLANS PREPARED BY: \_\_\_\_\_



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SUBMITTALS:				
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ISSUED FOR REVIEW	08/21/20	AEA	A	
ISSUED FOR CONSTRUCTION	09/09/20	HEE	0	

APPLICANT SITE NAME: \_\_\_\_\_

US 50 &amp; LEE SUMMIT

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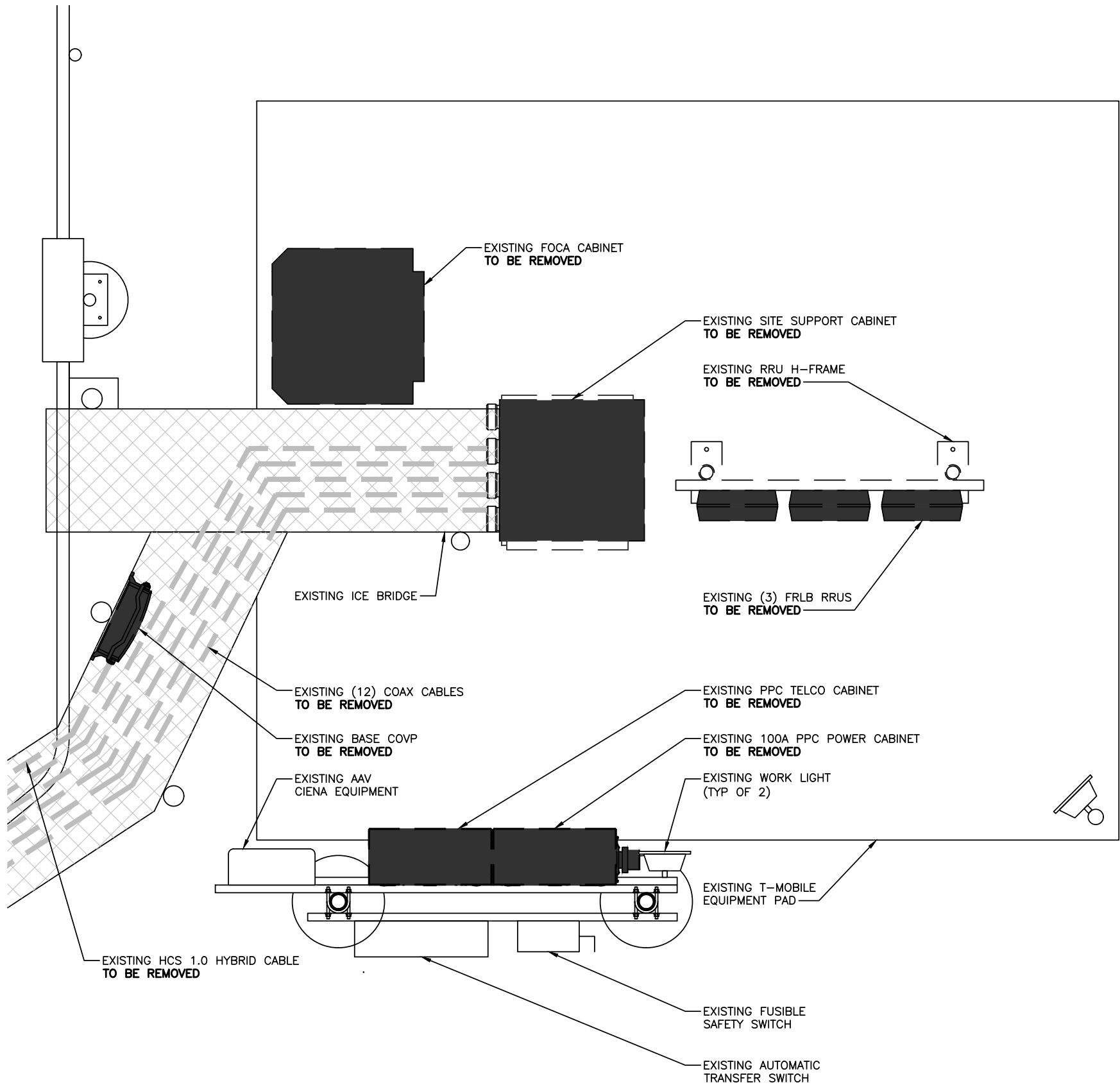
A5C0198A

SITE ADDRESS:  
900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION: SHEET #:

## OVERALL SITE PLAN

A-1.0



EXISTING T-MOBILE EQUIPMENT LAYOUT

STAMP: 9/9/2020

DocuSign Envelope ID: 9E40868B-37DB-448B-8C68-D63207DBC5BF

Kevin VanMaele

ENGINEERING LICENSE:  
STATE OF MISSOURI  
STATE CERTIFICATE OF AUTHORIZATION # EF-2791  
ENGINEER: KEVIN M. VANMAELE 21561 CIVIL  
REJ. ROBERT E. JENSEN 28974 CIVIL  
SDK SHELTON D. KEISLING E-27323 ELECTRICAL  
TMS TERRANCE M. SUPER E-16521 ELECTRICAL

PLANS PREPARED FOR:

PLANS PREPARED BY:

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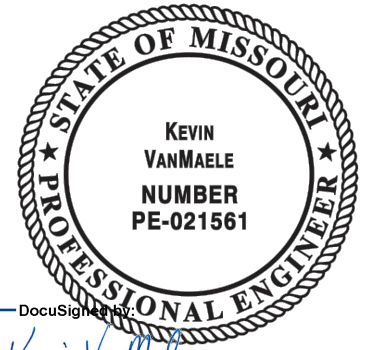
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EXISTING T-MOBILE EQUIPMENT LAYOUT

SHEET #:  
A-1.1



- STAMP:-

9/9/2020



DocuSigned by:

ENGINEERING LICENSE: -

STATE CERTIFICATE OF AUTHORIZATION #EF-2791

ENGINEER: PE#: DISCIPLINE:

KMV	KEVIN M. VANMAELE	21561	CIVIL
REJ	ROBERT E. JENSEN	28974	CIVIL

REU	ROBERT E. JENSEN	E-20371	CIVIL
SDK	SHELTON D. KEISLING	E-27323	ELECTRICAL

TMS TERRANCE M. SUPER E-18521 ELECTRICAL

PLANS PREPARED FOR: —



PLANS PREPARED BY: —



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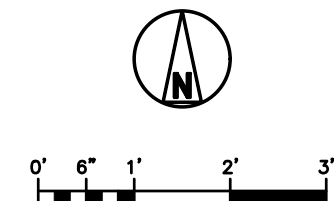
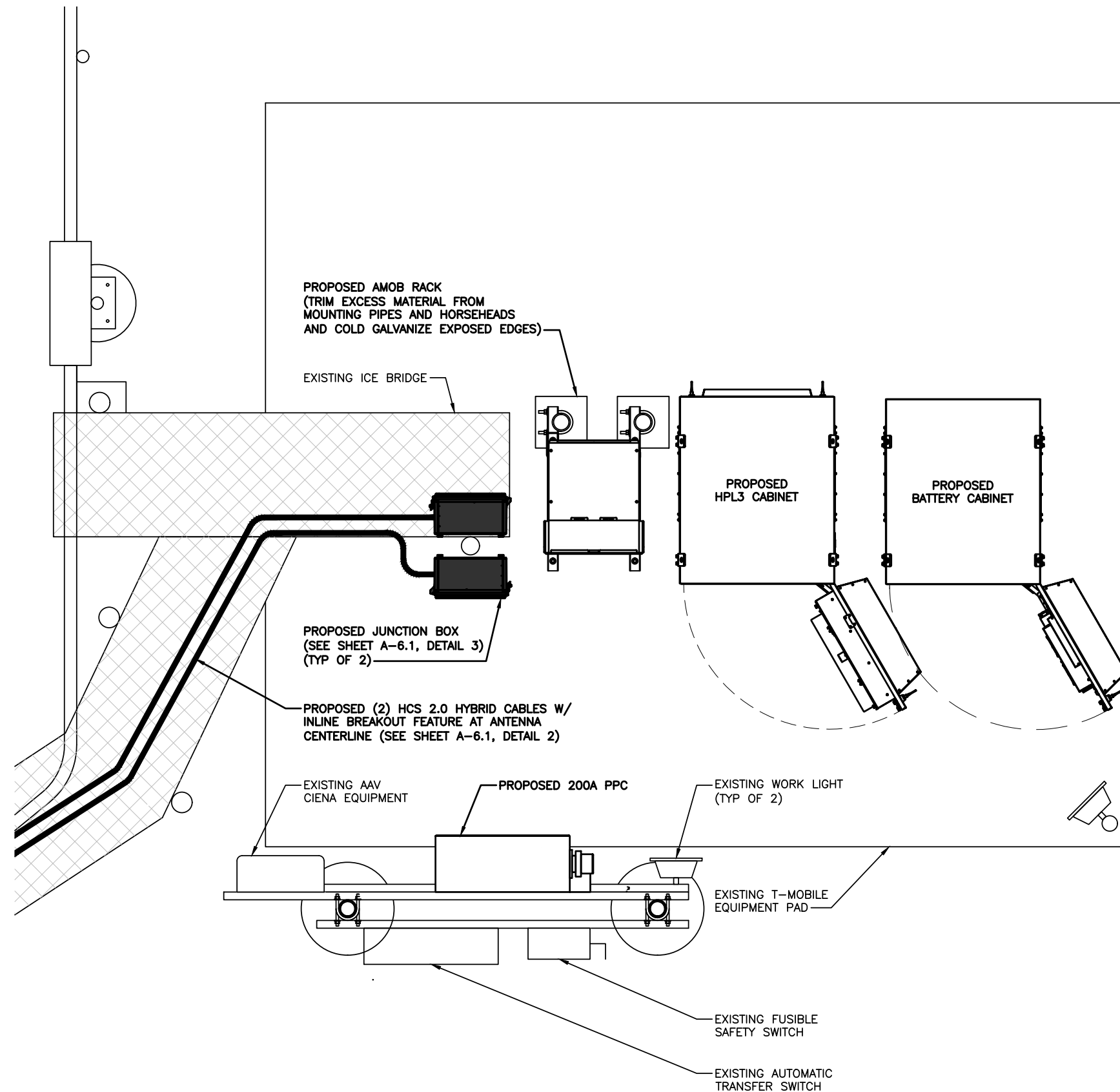
900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

**SHEET DESCRIPTION:** —

## FINAL T-MOBILE EQUIPMENT LAYOUT

**SHEET #:** \_\_\_\_\_

A-1.2



STRUCTURE INFORMATION IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. STRUCTURAL INTEGRITY OF SUPPORTING STRUCTURE, ANTENNA MOUNTS, AND FOUNDATION SHALL BE VERIFIED AS ACCEPTABLE BY ENGINEER CERTIFIED STRUCTURAL ANALYSIS, UTILIZING THE LOADING REPRESENTED WITHIN THESE DRAWINGS PRIOR TO THE EXECUTION OF EQUIPMENT CHANGES CONTAINED IN THESE DRAWINGS. CONTRACTOR SHALL OBTAIN ALL STRUCTURAL REPORTS AND FOLLOW ALL RECOMMENDATIONS.

EQUIPMENT LEGEND:

- EXISTING TO REMAIN
- EXISTING TO BE REPLACED
- EXISTING TO BE RELOCATED
- RESERVED

EQUIPMENT KEYED NOTES:

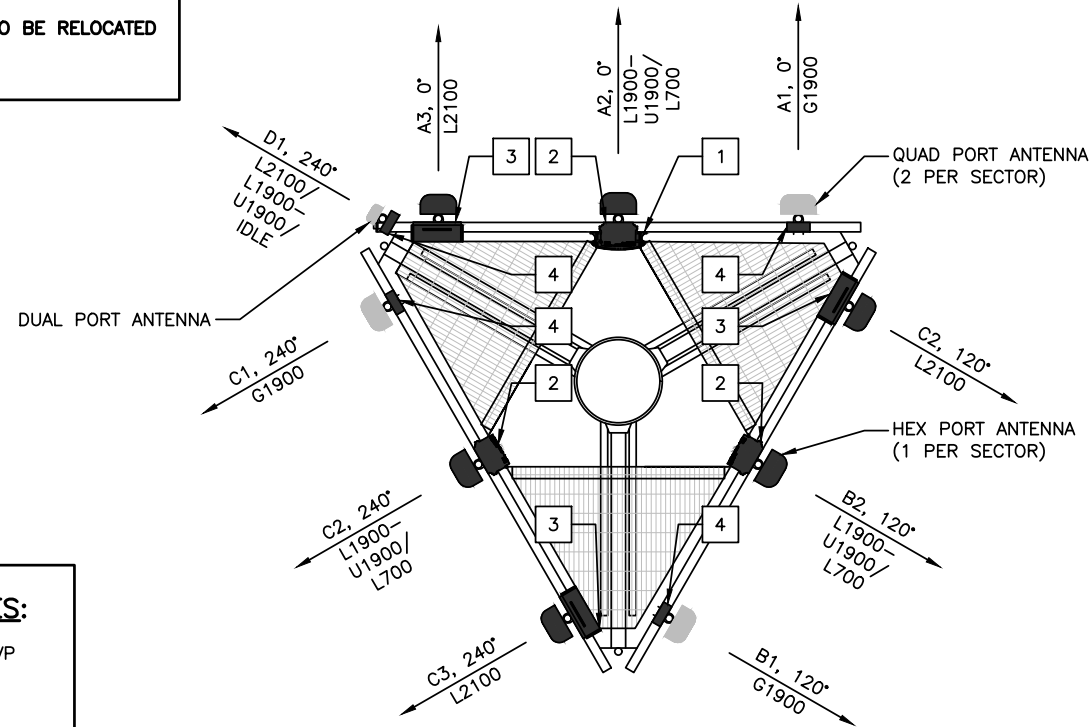
- 1 SECTOR COVP
- 2 FHFB RRU
- 3 FRIG RRU
- 4 TWIN PCS TMA

EQUIPMENT LEGEND:

- EXISTING
- PROPOSED
- RELOCATED

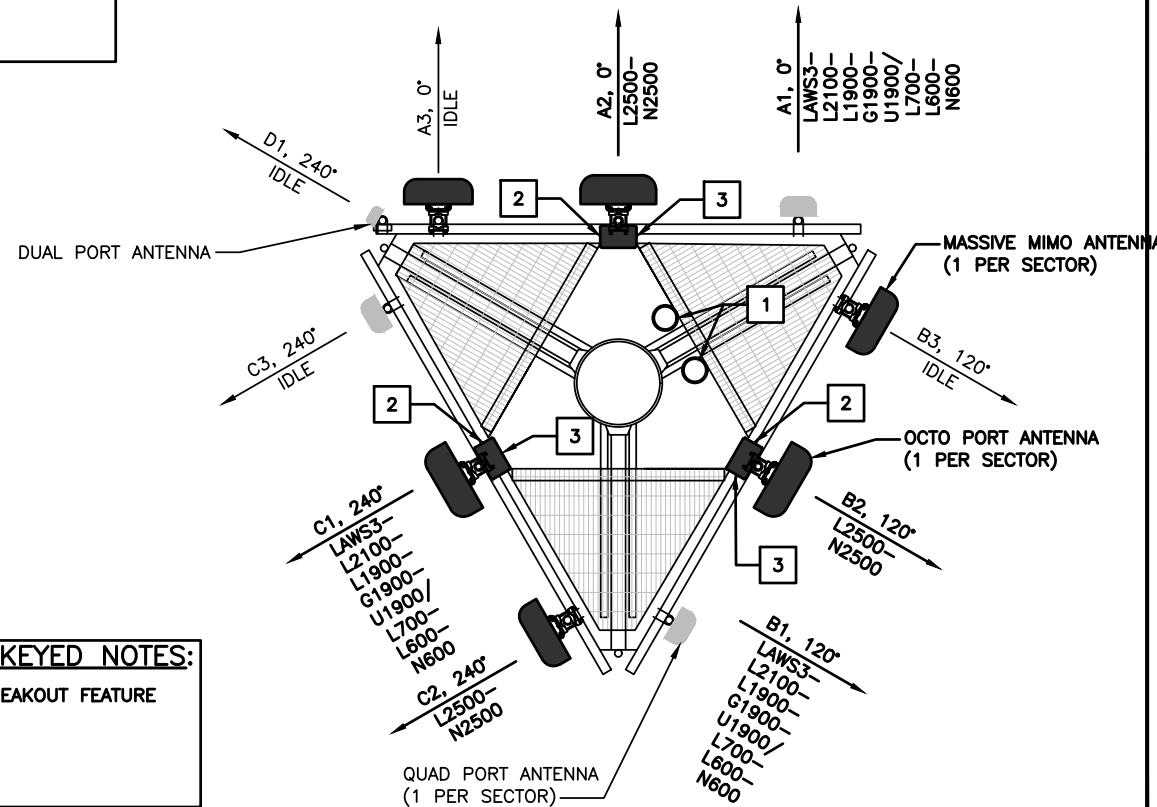
EQUIPMENT KEYED NOTES:

- 1 HCS 2.0 BREAKOUT FEATURE
- 2 AHLOA RRU
- 3 AHFIG RRU



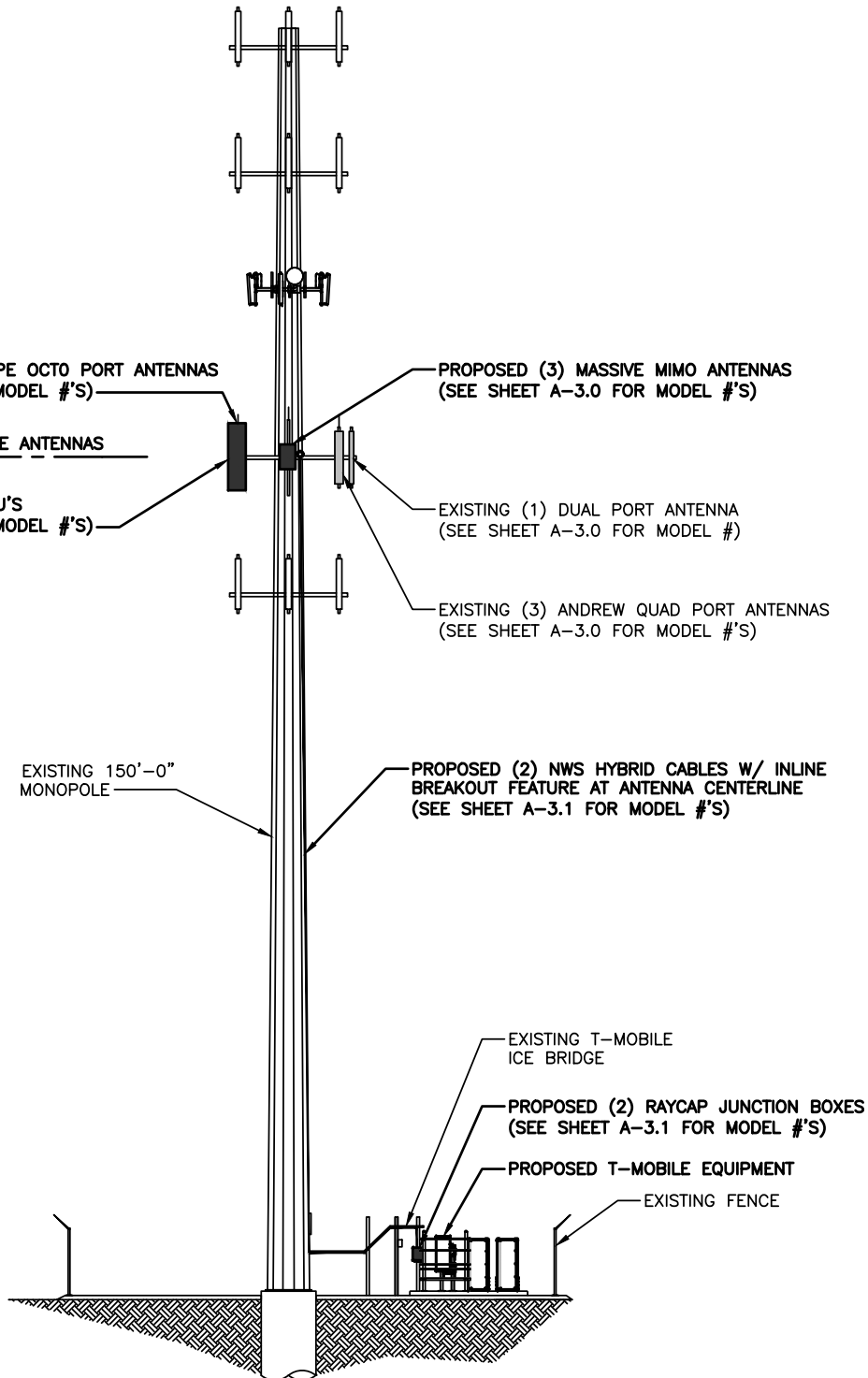
EXISTING ANTENNA PLAN

1



PROPOSED ANTENNA PLAN

2



TOWER ELEVATION

3

STAMP: 9/9/2020

STATE OF MISSOURI  
KEVIN VANMAELE  
NUMBER PE-021561  
PROFESSIONAL ENGINEER

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REJ ROBERT E. JENSEN 28974 CIVIL E  
SDK SHELTON D. KEISLING E-27323 ELECTRICAL  
TMS TERRANCE M. SUPER E-16521 ELECTRICAL

PLANS PREPARED FOR:  
T-Mobile

PLANS PREPARED BY:  
SSC

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LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION:  
TOWER ELEVATION & ANTENNA PLANS

SHEET #:  
A-2.0

ANTENNA KEY														
STATUS	ANTENNA NUMBER	COLOR CODE (SEE NOTE 3)	BEAM WIDTH	ANTENNA VENDOR	MODEL #	AZIMUTH	ELECTRICAL DOWNTILT	MECHANICAL DOWNTILT	ANTENNA @ AGL	TECH	COAXIAL FEEDER		HYBRID FEEDER	
											(QTY) SIZE	COLOR CODE	QUANTITY	COLOR CODE
PROPOSED	A3 L2500– N2500	RED 1/P	65°	NOKIA	AEHC	0°	TBD	0°	99’–0”	L2500 N2500	–	–	(1) HCS 2.0 HYBRID CABLE	GRAY 2
PROPOSED	A2 LAWS3– L2100– L1900– G1900– U1900/ L700– L600– N600	R 4/YB+GB+BW+RW	65°	COMMSCOPE	FFHH–65C–R3	0°	TBD	0°	99’–0”	LAWS3 L2100 L1900 G1900 U1900	–	–	(1) HCS 2.0 HYBRID CABLE	GRAY 1
		R 3/YB+GB+BW+RW									–	–		
		R 2/YB+GB+BW+RW									–	–		
		R 1/YB+GB+BW+RW									–	–		
		RED 4/RB+W								L700 L600 N600	–	–		
		RED 3/RB+W									–	–		
		RED 2/RB+W									–	–		
		RED 1/RB+W									–	–		
EXISTING	A1 IDLE	–	65°	ANDREW	TMBXX–6517–A2M	0°	TBD	0°	99’–0”	IDLE	–	–	–	–
		–									–	–	–	
		–									–	–	–	
		–									–	–	–	
PROPOSED	B3 L2500– N2500	YELLOW 1/P	65°	NOKIA	AEHC	120°	TBD	0°	99’–0”	L2500 N2500	–	–	SHARED WITH A2	GRAY 2
PROPOSED	B2 LAWS3– L2100– L1900– G1900– U1900/ L700– L600– N600	Y 4/YB+GB+BW+RW	65°	COMMSCOPE	FFHH–65C–R3	120°	TBD	0°	99’–0”	LAWS3 L2100 L1900 G1900 U1900	–	–	SHARED WITH A1	GRAY 1
		Y 3/YB+GB+BW+RW									–	–		
		Y 2/YB+GB+BW+RW									–	–		
		Y 1/YB+GB+BW+RW									–	–		
		YELLOW 4/RB+W								L700 L600 N600	–	–		
		YELLOW 3/RB+W									–	–		
		YELLOW 2/RB+W									–	–		
		YELLOW 1/RB+W									–	–		
EXISTING	B1 IDLE	–	65°	ANDREW	TMBXX–6517–A2M	120°	TBD	0°	99’–0”	IDLE	–	–	–	–
		–									–	–	–	
		–									–	–	–	
		–									–	–	–	
PROPOSED	C3 L2500– N2500	BLUE 1/P	65°	NOKIA	AEHC	240°	TBD	0°	99’–0”	L2500 N2500	–	–	SHARED WITH A2	GRAY 2
PROPOSED	C2 LAWS3– L2100– L1900– G1900– U1900/ L700– L600– N600	B 4/YB+GB+BW+RW	65°	COMMSCOPE	FFHH–65C–R3	240°	TBD	0°	99’–0”	LAWS3 L2100 L1900 G1900 U1900	–	–	SHARED WITH A1	GRAY 1
		B 3/YB+GB+BW+RW									–	–		
		B 2/YB+GB+BW+RW									–	–		
		B 1/YB+GB+BW+RW									–	–		
		BLUE 4/RB+W								L700 L600 N600	–	–		
		BLUE 3/RB+W									–	–		
		BLUE 2/RB+W									–	–		
		BLUE 1/RB+W									–	–		
EXISTING	C1 IDLE	–	65°	ANDREW	TMBXX–6517–A2M	240°	TBD	0°	99’–0”	IDLE	–	–	–	–
		–									–	–	–	
		–									–	–	–	
		–									–	–	–	
EXISTING	D1 IDLE	–	65°	ANDREW	TMBX–6517–A1M	0°	TBD	0°	99’–0”	IDLE	–	–	–	–
		–									–	–	–	
										FEEDLINES TO BE REMOVED	(4) 7/8” (4) 7/8” (4) 7/8”	RED YELLOW BLUE		

ANTENNA NOTES:  
SEE SHEET A–3.1 FOR ANTENNA NOTES.

STAMP:

9/9/2020

STATE OF MISSOURI

KEVIN VANMAELE

NUMBER PE-021561

PROFESSIONAL ENGINEER

DocuSign Envelope ID: 9E40868B-37DB-448B-8C68-D63207DBC5BF

KEVIN VANMAELE

ENGINEERING LICENSE:

STATE OF MISSOURI

STATE CERTIFICATE OF AUTHORIZATION # EF-2791

ENGINEER: KMV KEVIN M. VANMAELE 21561 CIVIL C  
REJ ROBERT E. JENSEN 28974 CIVIL C

SDK SHELTON D. KEISLING E-27323 ELECTRICAL E  
TMS TERRANCE M. SUPER E-16621 ELECTRICAL E

PLANS PREPARED FOR:

T-Mobile

PLANS PREPARED BY:

SSC

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US 50 & LEE SUMMIT

APPLICANT SITE NUMBER:

A5C0198A

SITE ADDRESS:

900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION:

ANTENNA CONFIGURATION KEY

SHEET #:

A-3.0

EQUIPMENT KEY – EQUIPMENT PAD						
LOCATION	VENDOR	EQUIPMENT	MODEL NO.	TECH	QTY.	STATUS
HPL3 CABINET	NOKIA	SYSTEM MODULE	AMIA	L2500 LAWS3 L2100 L1900 L700 L600	1	PROPOSED
		COMMON MODULE	ASIB	L2500	1	PROPOSED
		COMMON MODULE	ASIA	LAWS3 L2100 L1900 L700 L600	1	PROPOSED
		CAPACITY MODULE	ABIC	L2500	3	PROPOSED
		CAPACITY MODULE	ABIA	LAWS3 L2100 L1900	2	PROPOSED
		CAPACITY MODULE	ABIA	L700 L600	1	PROPOSED
HPL3 CABINET	NOKIA	SYSTEM MODULE	AMIA	N2500 N600	1	PROPOSED
		COMMON MODULE	ASIK	N2500 N600	1	PROPOSED
		COMMON MODULE	ASIK	N600	1	PROPOSED
		CAPACITY MODULE	ABIL	N600	1	PROPOSED
		CAPACITY MODULE	ABIL	N2500	3	PROPOSED
AMOB RACK	NOKIA	SYSTEM MODULE	FSMF	G1900 U1900	1	RELOCATED
MOUNTED TO UNISTRUT FRAME	RAYCAP	JUNCTION BOX	RTMDC-5634-RF-48	L2500 N2500	1	PROPOSED
MOUNTED TO UNISTRUT FRAME	RAYCAP	JUNCTION BOX	RTMDC-5634-RF-48	LAWS3 L2100 L1900 G1900 U1900 L700 L600 N600	1	PROPOSED


EQUIPMENT KEY – SECTOR						
LOCATION	VENDOR	EQUIPMENT	MODEL NO.	TECH	QTY.	STATUS
1 PER SECTOR	NOKIA	RRU	AHLOA	LAWS3 L2100 L1900 G1900 U1900	3	PROPOSED
1 PER SECTOR	NOKIA	RRU	AHFIG	L700 L600 N600	3	PROPOSED

EQUIPMENT KEY – FEEDLINES						
LOCATION	VENDOR	EQUIPMENT	MODEL NO.	QTY.	LENGTH	STATUS
MULTI SECTOR	NOKIA	HYBRID CABLE	FD21206–48S55–150	2	150’–0”	PROPOSED

**ANTENNA NOTES:**

- |  |   |  |   |
|--|---|--|---|
| <p>1. ANTENNA CONTRACTOR SHALL INSURE THAT ALL ANTENNA MOUNTING PIPES ARE PLUMB.</p> <p>2. FEEDLINE LENGTHS INDICATED ARE APPROXIMATE.</p> <p>3. ANTENNA COAXIAL FEEDERS &amp; ANTENNA JUMPERS SHALL BE COLOR CODED PER T-MOBILE REQUIREMENTS. THE FOLLOWING CHECKER STRIPE SHALL BE ADDED TO EACH ANTENNA FEEDLINE &amp; ANTENNA JUMPER.</p> <p>L2500/N2500 - PURPLE STRIPE</p> <p>L600/N600 - WHITE STRIPE</p> <p>L700 - RED-BLACK CHECKER STRIPE</p> <p>L1900 - GREEN-BLACK CHECKER STRIPE</p> <p>L2100/LAWS3 - YELLOW-BLACK CHECKER STRIPE</p> <p>U1900 - RED-WHITE CHECKER STRIPE</p> <p>U2100 - GREEN-WHITE CHECKER STRIPE</p> <p>G1900 - BLACK-WHITE CHECKER STRIPE</p> | <p>4. IN ADDITION TO THE COLOR CODE THE FOLLOWING ANTENNA SECTOR COLOR STRIPE SHALL BE ADDED TO EACH ANTENNA SECTOR FEEDLINE &amp; JUMPER.</p> <p>ALPHA - RED STRIPE</p> <p>BETA - YELLOW STRIPE</p> <p>GAMMA - BLUE STRIPE</p> <p>DELTA - GREEN STRIPE</p> <p>EPSILON - WHITE STRIPE</p> <p>ZETA - PURPLE STRIPE</p> <p>HYBRID - GRAY STRIPE</p> <p>5. MULTI PORT ANTENNAS: TERMINATE UNUSED ANTENNA PORTS WITH CONNECTOR CAP &amp; WEATHERPROOF THOROUGHLY. JUMPERS FROM TMA'S MUST TERMINATE TO OPPOSITE POLARIZATIONS IN EACH SECTOR.</p> | <p>6. CONTRACTOR MUST FOLLOW ALL MANUFACTURERS' RECOMMENDATIONS REGARDING THE INSTALLATION OF FEEDLINES, CONNECTORS, AND ANTENNAS.</p> <p>7. MINIMUM BEND RADIUS:</p> <p>LDF4-50A (1/2" HARD LINE) = 5"</p> <p>FSJ4-50B (1/2" SUPER FLEX) = 1 1/4"</p> <p>AVA5-50A (7/8" HARD LINE) = 10"</p> <p>AVA7-50A (1-5/8" HARD LINE) = 1'-3"</p> <p>LDF7-50A (1-5/8" HARD LINE) = 1'-8"</p> <p>LOW-CAP HYBRID CABLE = 1'-3"</p> <p>MID-CAP HYBRID CABLE = 1'-3"</p> <p>HIGH-CAP HYBRID CABLE = 1'-7"</p> | <p>8. SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO T-MOBILE.</p> <p>9. WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE.</p> <p>10. ANTENNA CONTRACTOR SHALL PERFORM A "TAPE DROP" MEASUREMENT TO CONFIRM/ VALIDATE ANTENNA CENTERLINE (ACL) HEIGHT. CONTRACTOR SHALL SUBMIT A COMPLETED HEIGHT VERIFICATION FORM TO THE CONSTRUCTION MANAGER.</p> |
|--|---|--|---|

STAMP: 9/9/2020



**KEVIN  
VANMAELE  
NUMBER  
PE-021561**

STATE OF MISSOURI  
PROFESSIONAL ENGINEER


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TMS TERRANCE M. SUPER	E-18521	ELECTRICAL	E

PLANS PREPARED FOR:

**T** · · Mobile

PLANS PREPARED BY:



The logo for the Southern States Company (SSC) is located in the top right corner of the page. It features a stylized recycling symbol composed of three triangles (two blue, one orange) arranged in a circular pattern, with the letters "SSC" in blue below it.

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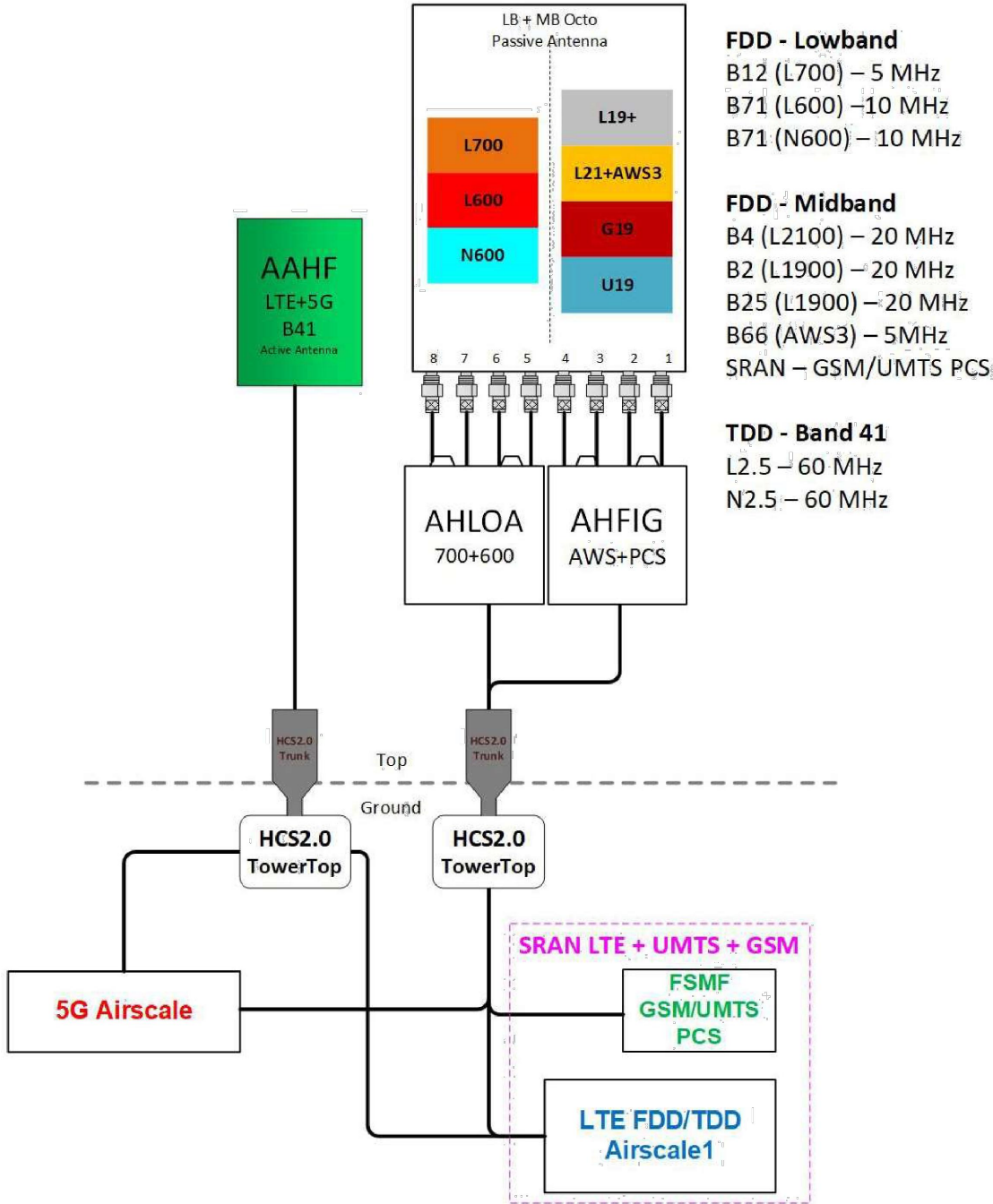
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SHEET DESCRIPTION:	SHEET #:
EQUIPMENT CONFIGURATION KEYS	A-3.1



Configuration 56791X\_SR

\* For 5G and LTE Airscale BB dimensioning refer to Fiber Port matrices.  
(Alpha, Beta & Gamma)



RAN Scope of Work:

- Anchor Upgrade: L700, L1900, L2100, U1900 & GSM currently on air
- Install (3) AHLOAs
- Install (3) AHFIGs
- Install (3) Nokia AAFH. Reserve rights for a future swap to Nokia AEHC
- Remove the existing TMAs
- Retain (3) Andrew - TMBXX-6517-A2M antennas and keep the 4th sector idle
- Remove the existing Low Cap hybrid cable and COVPs
- Install (2) HCS 2.0 Hybrid Trunk with breakout feature
- Install (2) HCS 2.0 COVP at the BTS. Raycap RTMDC-5634-PF-48

**NOTE:**  
DETAIL PROVIDED BY APPLICANT & REPRODUCED ON THIS SHEET AS REQUESTED BY APPLICANT.

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ENGINEER: KMV KEVIN M. VANMAELE 21561 CIVIL C  
REJ ROBERT E. JENSEN 28974 CIVIL C  
SDK SHELTON D. KEISLING E-27323 ELECTRICAL E  
TMS TERRANCE M. SUPER E-16521 ELECTRICAL E

PLANS PREPARED FOR: T-Mobile

PLANS PREPARED BY: SSC

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SUBMITTALS: 

DESCRIPTION	DATE	BY	REV
ISSUED FOR REVIEW	08/21/20	AEA	A
ISSUED FOR CONSTRUCTION	09/09/20	HEE	0

APPLICANT SITE NAME: US 50 & LEE SUMMIT

APPLICANT SITE NUMBER: A5C0198A

SITE ADDRESS: 900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION: NSN CONFIGURATION DIAGRAM

SHEET #: A-4.0

LINETYPE LEGEND:

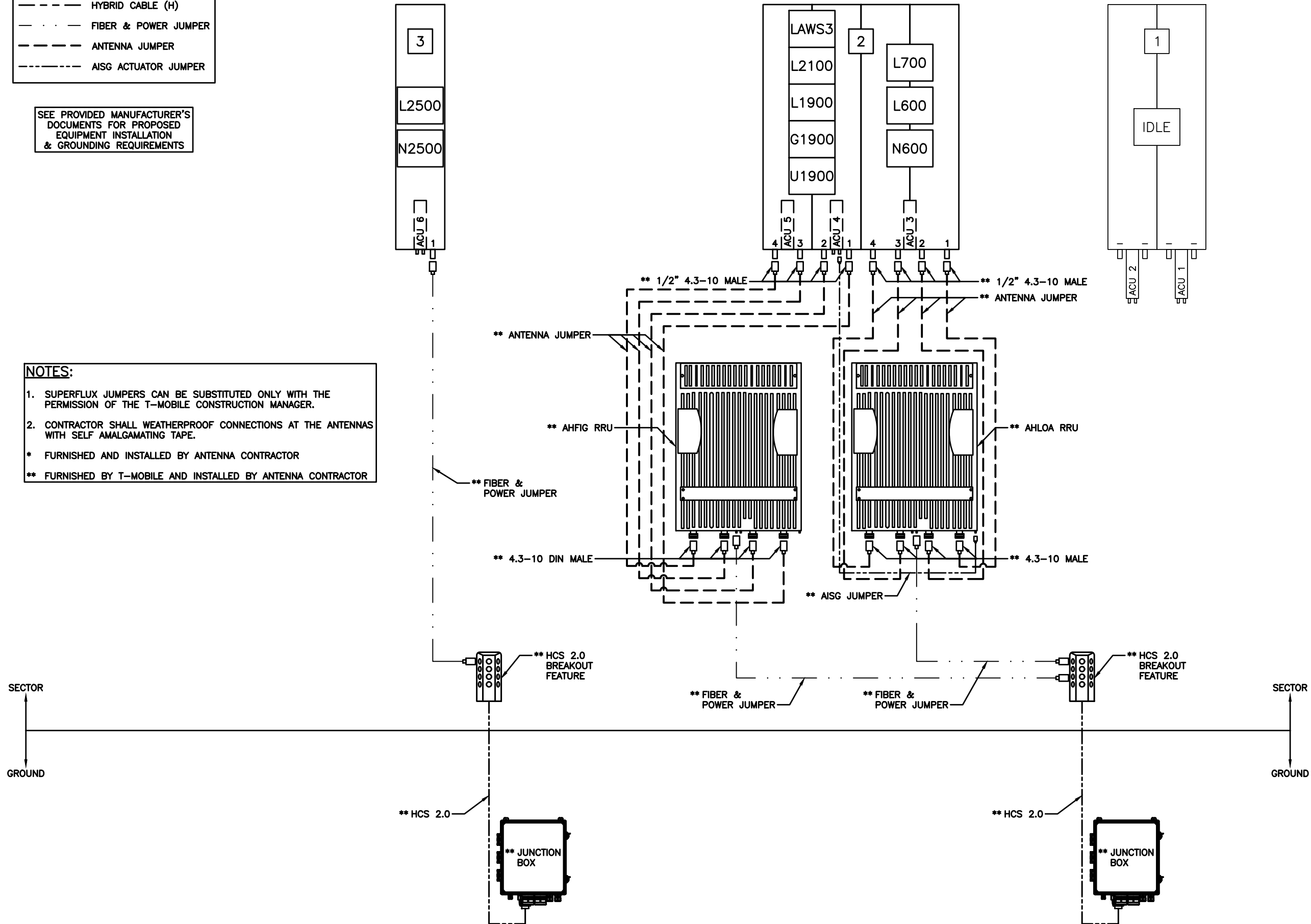
- COAX (C)
- HYBRID CABLE (H)
- FIBER & POWER JUMPER
- ANTENNA JUMPER
- AISG ACTUATOR JUMPER

SEE PROVIDED MANUFACTURER'S DOCUMENTS FOR PROPOSED EQUIPMENT INSTALLATION & GROUNDING REQUIREMENTS

NOTES:

- SUPERFLUX JUMPERS CAN BE SUBSTITUTED ONLY WITH THE PERMISSION OF THE T-MOBILE CONSTRUCTION MANAGER.
  - CONTRACTOR SHALL WEATHERPROOF CONNECTIONS AT THE ANTENNAS WITH SELF AMALGAMATING TAPE.
- \* FURNISHED AND INSTALLED BY ANTENNA CONTRACTOR
- \*\* FURNISHED BY T-MOBILE AND INSTALLED BY ANTENNA CONTRACTOR

TYPICAL SECTOR:  
(VIEW FROM BACK OF ANTENNA)



STAMP: 9/9/2020

STATE OF MISSOURI

KEVIN VANMAELE

NUMBER PE-021561

DocuSign Envelope ID: 9E40868B-37DB-448B-8C68-D63207DBC5BF

ENGINEERING LICENSE:

STATE OF MISSOURI

STATE CERTIFICATE OF AUTHORIZATION # EF-2791

ENGINEER: PE#: DISCIPLINE:

KMV KEVIN M. VANMAELE 21561 CIVIL C

REJ ROBERT E. JENSEN 28974 CIVIL E

SDK SHELTON D. KEISLING E-27323 ELECTRICAL

TMS TERRANCE M. SUPER E-16521 ELECTRICAL

PLANS PREPARED FOR:

T-Mobile

PLANS PREPARED BY:

SSC

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US 50 & LEE SUMMIT

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A5C0198A

SITE ADDRESS:

900 SW BLUE PARKWAY

LEE'S SUMMIT, MISSOURI

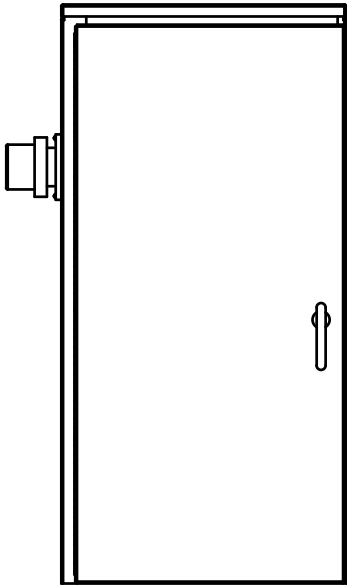
64063

SHEET DESCRIPTION:

ANTENNA ONE-LINE DIAGRAM

SHEET #:

A-5.0



POWER PROTECTION CABINET

200A POWER TRANSFER CABINET WITHOUT TELCO  
(NOT TO SCALE)



LOAD CENTER

POWER PROTECTION CABINET SPECIFICATIONS	
GENERAL	
CONSTRUCTION	SINGLE LAYER ALUMINUM ENCLOSURE, TYPE 3R
DIMENSIONS (WxHxD)	20"x40"x10"
WEIGHT	≈75lbs (WITHOUT PACKAGING)
FINISH	POLYESTER POWDER PAINT
DOOR LATCH	3-POINT LATCHING, PAD LOCKABLE
SAFETY	UL50 (CABINET) UL891 DEAD FRONT SWITCHBOARD LISTED SUITABLE FOR USE AS SERVICE EQUIPMENT (N-G BONDING KIT INCLUDED)
ENVIRONMENT	
OPERATING TEMPERATURE	-40°F TO 115°F (-40°C TO +46°C)
HUMIDITY (RELATIVE)	95%, NON-CONDENSING (MAX)
PROTECTION CLASS	TYPE 3R
AC SECTION	
VOLTAGE	120/240 1φ (3-WIRE + GROUND)
CURRENT	200A
AIC RATING	UTILITY 65,000 AMPS
OTHER FEATURES	GENERATOR INTERFACE: GENERATOR PLUG SERVICE DISCONNECT: SQUARE D 200A MANUAL TRANSFER SWITCH LOAD CENTER: SQUARE D 200A, QO SERIES, 24 POSITIONS SURGE PROTECTION DEVICE (SPD) – 1 EA. AC DATA 2080 SQUARE D 30A, 2P BREAKER FOR SPD GROUND BAR SILKSCREENED DEAD-FRONT CAPTIVE DEAD-FRONT FASTENERS

STAMP: 9/9/2020

DocuSign Envelope ID: 9E40868B-37DB-448B-8C68-D63207DBC5BF

Kevin VanMaele

ENGINEERING LICENSE:			
STATE OF MISSOURI			
STATE CERTIFICATE OF AUTHORIZATION # EF-2791			
ENGINEER:	PE#:	DISCIPLINE:	
KMV KEVIN M. VANMAELE	21561	CIVIL	
REJ ROBERT E. JENSEN	28974	CIVIL	
SDK SHELTON D. KEISLING	E-27323	ELECTRICAL	
TMS TERRANCE M. SUPER	E-16621	ELECTRICAL	



PLANS PREPARED FOR:

PLANS PREPARED BY:

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ISSUED FOR CONSTRUCTION			09/09/20	HEE	0

APPLICANT SITE NAME:  
US 50 & LEE SUMMIT

APPLICANT SITE NUMBER:  
A5C0198A

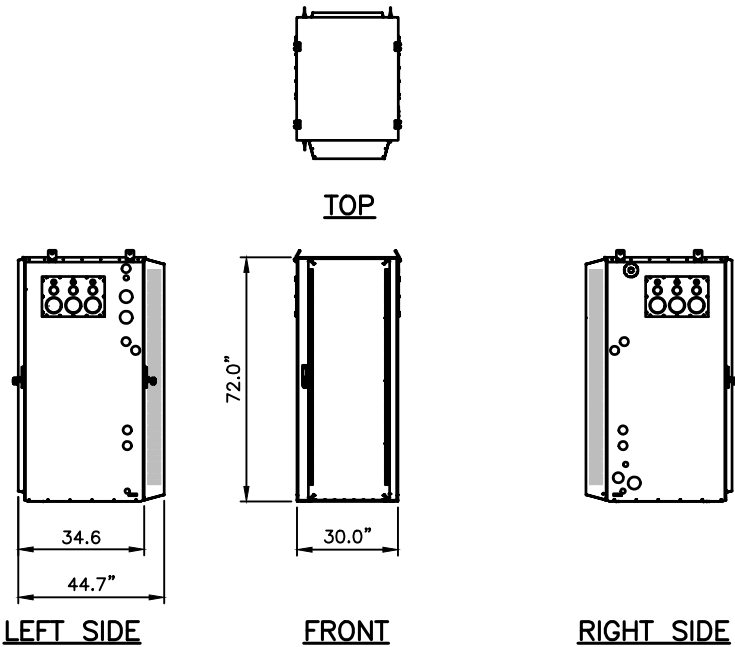
SITE ADDRESS:  
900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION: EQUIPMENT DETAILS (1 OF 3)	SHEET #: A-6.0
--	-------------------

PPC DETAIL

1

NOTE:  
DELTA SB3 BATTERY CABINET IS PERMITTED  
IN LIEU OF DELTA LB3 BATTERY CABINET.

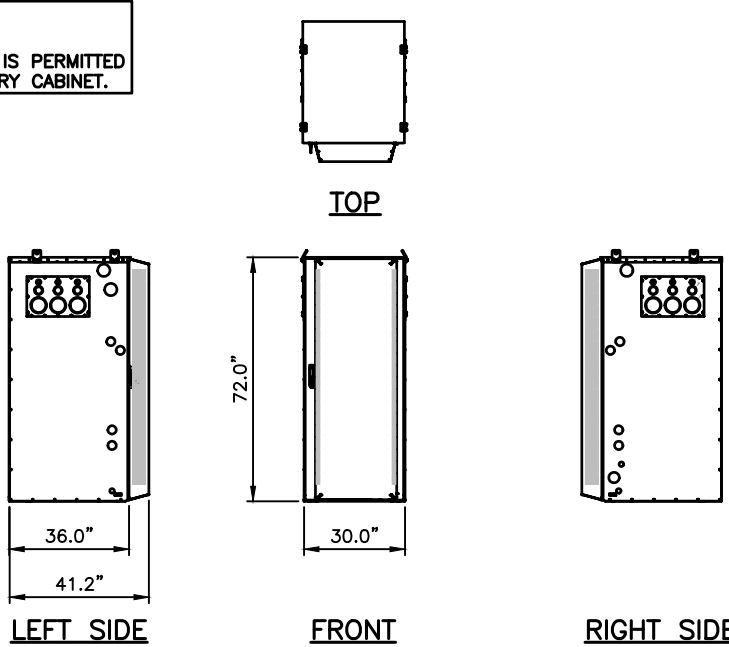


SPECIFICATIONS:	
VENDOR	DELTA
MODEL #:	ESOA600-HCU01
DIMENSIONS (HxWxD):	72.0" x 30.0" x 34.6"
DEPTH WITH DOOR:	44.7"
EMPTY WEIGHT:	~595 lbs
MAX WEIGHT:	1100 lbs

HPL3 CABINET DETAIL

3

SPECIFICATIONS:	
VENDOR	DELTA
MODEL #:	ESOF015-ECV04
DIMENSIONS (HxWxD):	72.0" x 30.0" x 36.0"
DEPTH WITH DOOR:	41.2"
WEIGHT:	SEE CHART

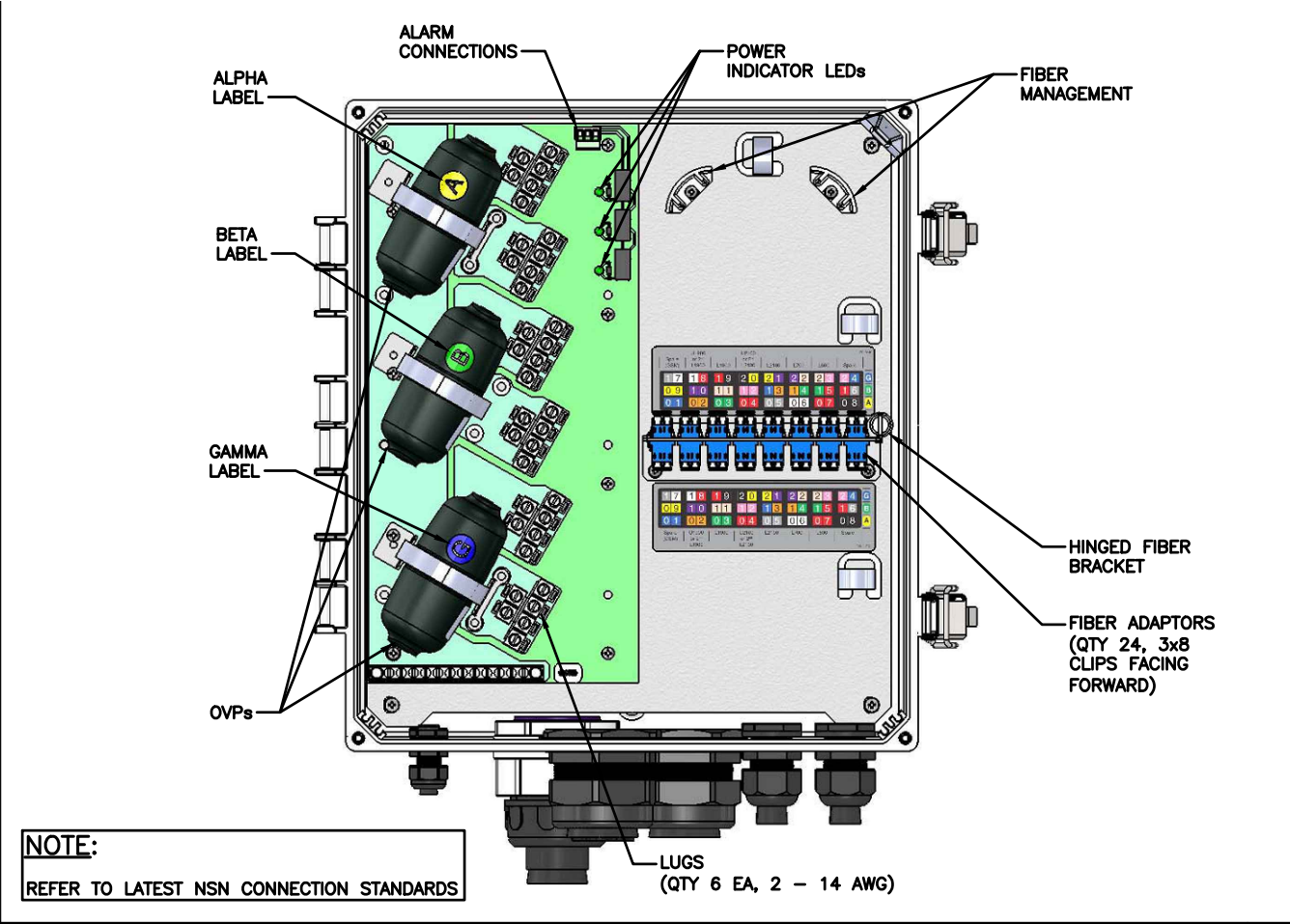


LB3 WEIGHT CHART		
EQUIPMENT	QUANTITY	WEIGHT (lbs)
CABINET	1	462
NSB 190FT BATTERIES	16	1,968
	TOTAL	2,430

LB3 CABINET DETAIL

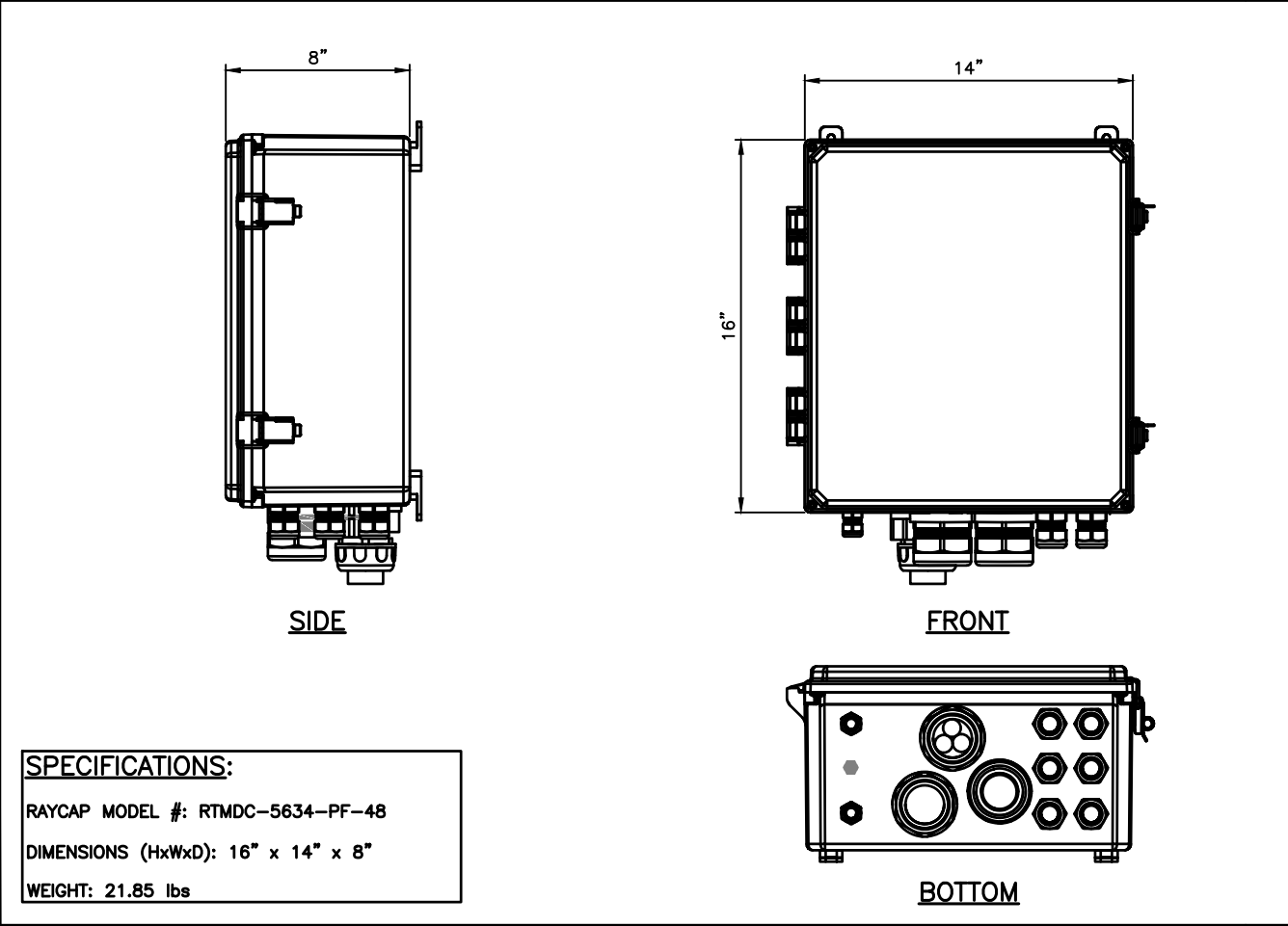
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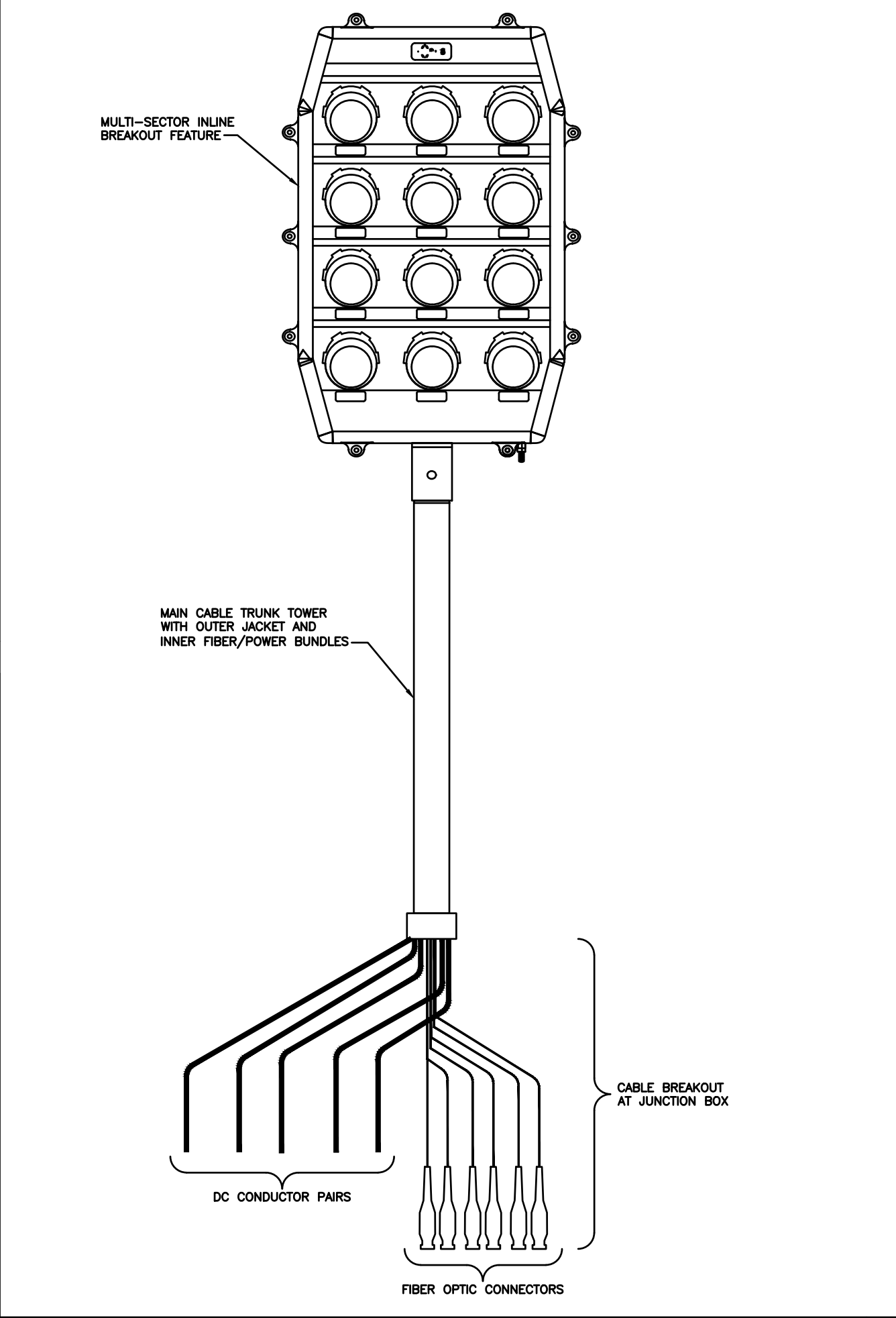
JUNCTION BOX WIRING DETAIL

1



JUNCTION BOX DETAIL

3



FEEDLINE DETAIL

2

STAMP: 9/9/2020

STATE OF MISSOURI  
KEVIN VANMAELE  
NUMBER PE-021561  
PROFESSIONAL ENGINEER

DocuSign Envelope ID: 9E40868B-37DB-448B-8C68-D63207DBC5BF

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T-Mobile

PLANS PREPARED BY:  
SSC

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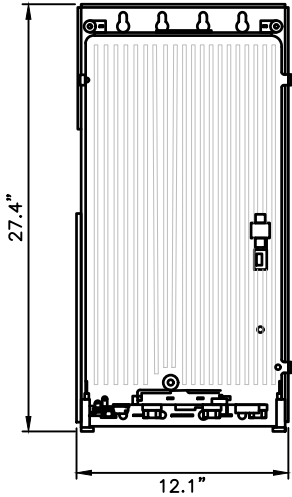
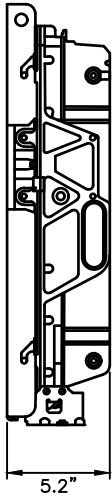
APPLICANT SITE NUMBER:  
A5C0198A

SITE ADDRESS:  
900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION:  
EQUIPMENT  
DETAILS  
(2 OF 3)

SHEET #:  
A-6.1



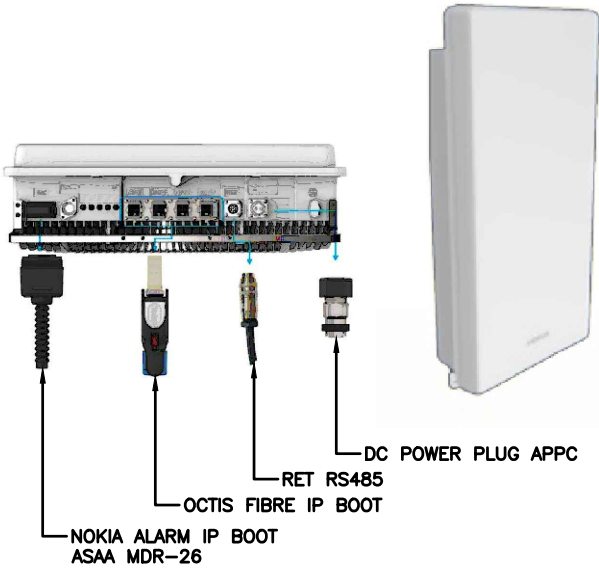


**SPECIFICATIONS:**

VENDOR: NOKIA  
MODEL #: AHFIG RRU  
DIMENSIONS (HxWxD): 27.4" x 12.1" x 5.2"  
WEIGHT: 79.3 lbs  
CONNECTORS: (4) 4.3-10 FEMALE

AHFIG RRU DETAIL

1

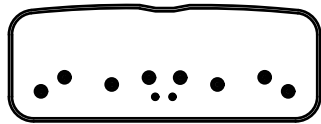


**SPECIFICATIONS:**

VENDOR: NOKIA  
MODEL #: AEHC  
DIMENSIONS (HxWxD): 38.19" x 21.26" x 8.07"  
WEIGHT: 103.6 lbs  
CONNECTORS: SEE ABOVE

MASSIVE MIMO ANTENNA DETAIL

2

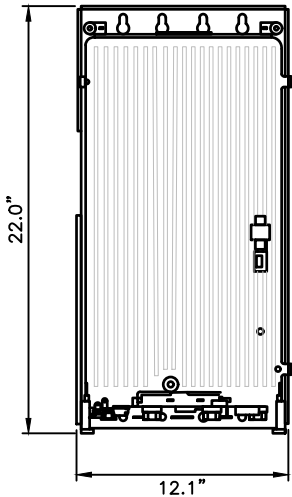
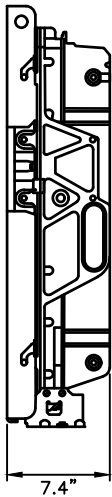


**SPECIFICATIONS:**

VENDOR: COMMSCOPE  
MODEL #: FFHH-65C-R3  
DIMENSIONS (HxWxD): 95.9" x 25.2" x 9.3"  
WEIGHT: 127.6 lbs  
CONNECTORS: (8) 4.3-10 FEMALE

OCTO PORT ANTENNA DETAIL

3

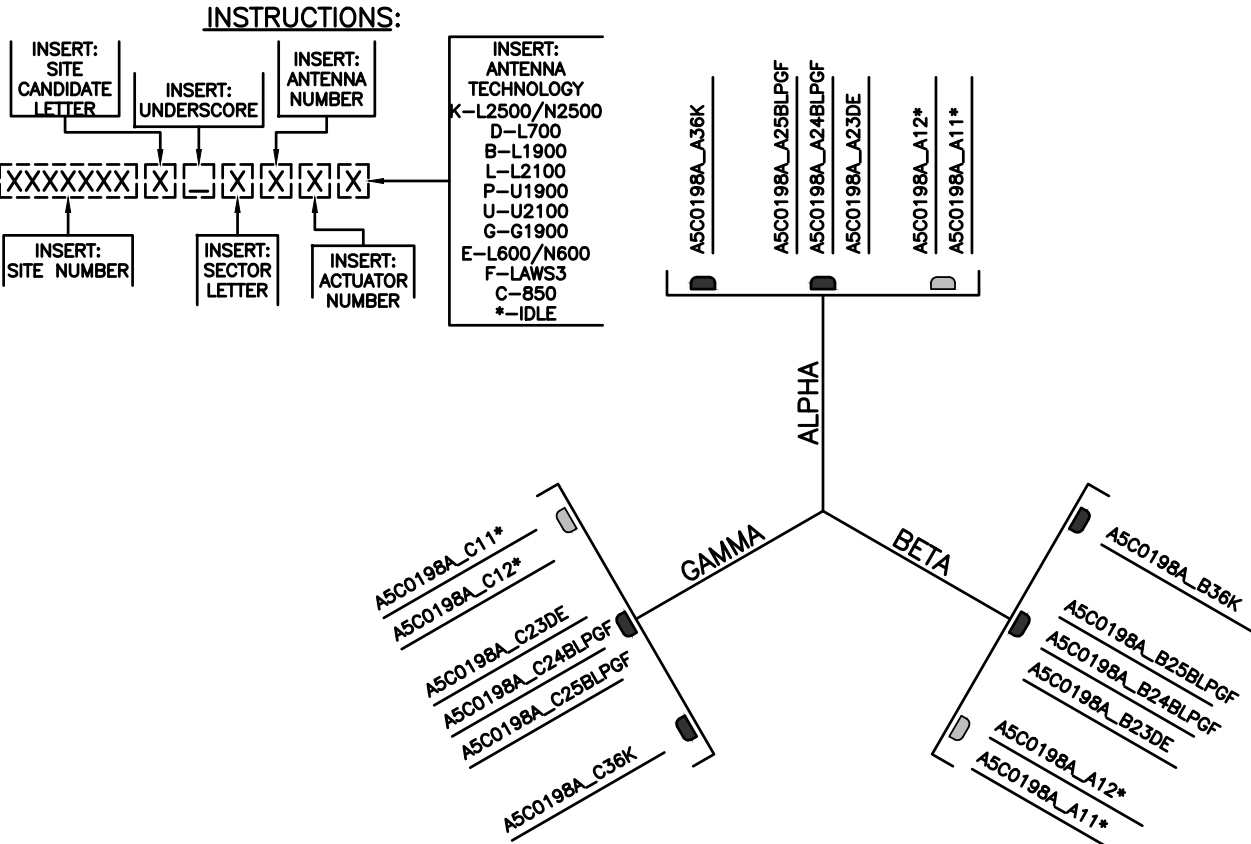


**SPECIFICATIONS:**

VENDOR: NOKIA  
MODEL #: AHLOA RRU  
DIMENSIONS (HxWxD): 22.0" x 12.1" x 7.4"  
WEIGHT: 83.8 lbs  
CONNECTORS: (4) 4.3-10 FEMALE

AHLOA RRU DETAIL

5



**BASE STATION ID:**  
(TO BE USED FOR "BASE STATION ID" DATA FIELD IN THE TMO UPGRADE APPLICATION SOFTWARE)

RET ACTUATOR NAMING CONVENTION

4

STAMP: 9/9/2020

STATE OF MISSOURI

KEVIN VANMAELE  
NUMBER PE-021561  
PROFESSIONAL ENGINEER

DocuSign Envelope ID: 9E40868B-37DB-448B-8C68-D63207DBC5BF

ENGINEERING LICENSE:

STATE OF MISSOURI

STATE CERTIFICATE OF AUTHORIZATION # EF-2791

ENGINEER: KMV KEVIN M. VANMAELE 21561 CIVIL  
REJ ROBERT E. JENSEN 28974 CIVIL

SDK SHELTON D. KEISLING E-27323 ELECTRICAL  
TMS TERRANCE M. SUPER E-16521 ELECTRICAL

PLANS PREPARED FOR:

T-Mobile

PLANS PREPARED BY:

SSC

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ISSUED FOR CONSTRUCTION	09/09/20	HEE	0

APPLICANT SITE NAME:

US 50 & LEE SUMMIT

APPLICANT SITE NUMBER:

A5C0198A

SITE ADDRESS:

900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION:

EQUIPMENT DETAILS  
(3 OF 3)

SHEET #:

A-6.2

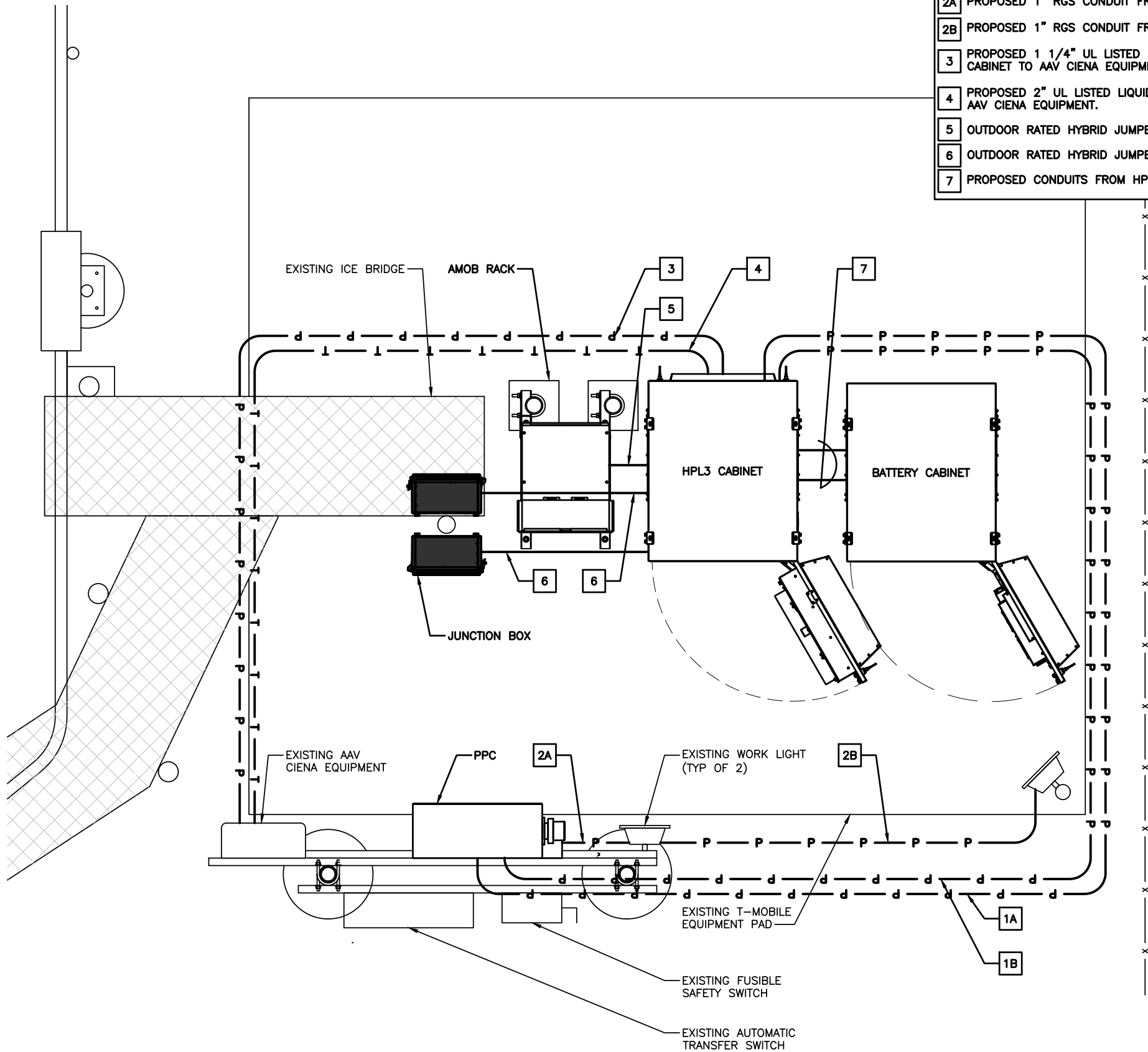
CONTRACTOR ALERT:

THIS SITE HAS EXISTING 100A SERVICE.

T-MOBILE CONSTRUCTION MANAGER TO COORDINATE WITH LOCAL POWER COMPANY AND GENERAL CONTRACTOR TO DESIGN, PROCURE, AND INSTALL ALL REQUIRED MATERIAL TO UPGRADE TO A 200A SERVICE.

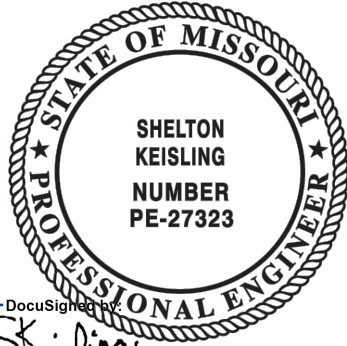
KEYED NOTES:

- 1A PROPOSED 2" UL LISTED LIQUIDTIGHT FLEXIBLE METAL CONDUIT FOR POWER FROM PPC TO HPL3 CABINET.
- 1B PROPOSED 1 1/4" UL LISTED LIQUIDTIGHT FLEXIBLE METAL CONDUIT FOR POWER FROM PPC TO HPL3 CABINET.
- 2A PROPOSED 1" RGS CONDUIT FROM GFCI RECEPTACLE/SWITCH TO OVERHEAD WORK LIGHT.
- 2B PROPOSED 1" RGS CONDUIT FROM OVERHEAD WORK LIGHT TO OVERHEAD WORK LIGHT.
- 3 PROPOSED 1 1/4" UL LISTED LIQUIDTIGHT FLEXIBLE METAL CONDUIT FROM HPL3 CABINET TO AAV CIENA EQUIPMENT.
- 4 PROPOSED 2" UL LISTED LIQUIDTIGHT FLEXIBLE METAL CONDUIT FROM HPL3 CABINET TO AAV CIENA EQUIPMENT.
- 5 OUTDOOR RATED HYBRID JUMPERS FROM HPL3 TO SYSTEM MODULE.
- 6 OUTDOOR RATED HYBRID JUMPERS FROM HPL3 CABINET TO JUNCTION BOX.
- 7 PROPOSED CONDUITS FROM HPL3 CABINET TO BATTERY CABINET.



STAMP:

9/9/2020



ENGINEERING LICENSE:

STATE OF MISSOURI  
STATE CERTIFICATE OF AUTHORIZATION # EF-2791  
ENGINEER: PE#: DISCIPLINE:  
KMY KEVIN M. VANMAELE 21561 CIVIL C  
REJ ROBERT E. JENSEN 28974 CIVIL E  
SDK SHELTON D. KEISLING E-27323 ELECTRICAL  
TMS TERRANCE M. SUPER E-16521 ELECTRICAL

PLANS PREPARED FOR:



PLANS PREPARED BY:



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A5C0198A

SITE ADDRESS:

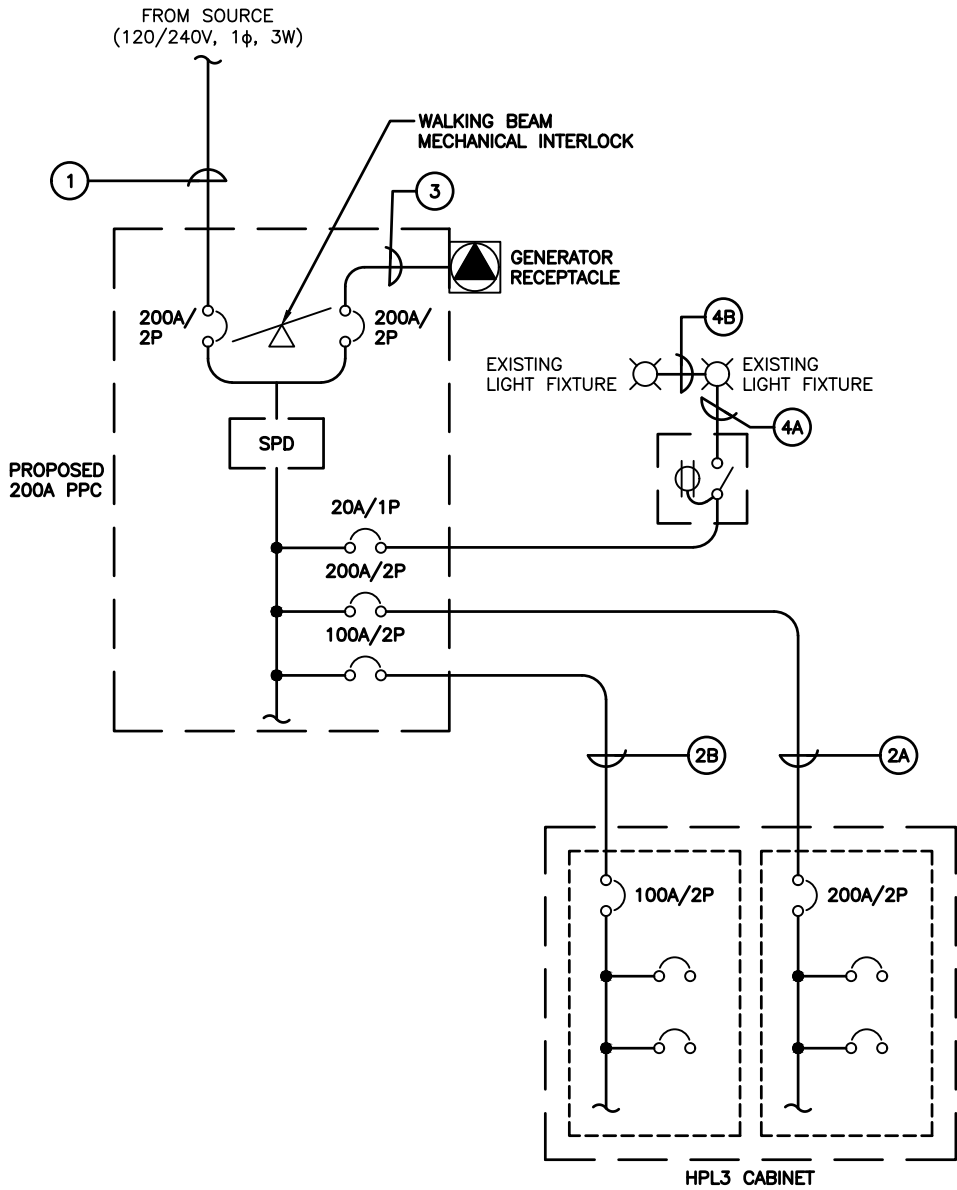
900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION:

UTILITY PLAN

SHEET #:

E-1.0



NO.	FROM	TO	CONFIGURATION	FUNCTION
①	SOURCE	PPC	POWER UPGRADE DESIGN BY OTHERS	
②A	PPC	HPL3 CABINET	2#3/0, 1#3N, 1#3/0G, 2"C	POWER FEEDER TO HPL3 CABINET PANELBOARD
②B	PPC	HPL3 CABINET	2#3, 1#3N, 1#3G, 1 1/4"C	POWER FEEDER TO HPL3 CABINET PANELBOARD
③	GENERATOR RECEPTACLE	PPC	BY PPC MANUFACTURER	EMERGENCY POWER FEEDER TO PPC
④A	RECEPTACLE/ SWITCH	LIGHT FIXTURE	2#12, 1#12G, 1"C	POWER TO LIGHT FIXTURES
④B	LIGHT FIXTURE	LIGHT FIXTURE	2#12, 1#12G, 1"C	POWER TO LIGHT FIXTURES

STAMP:

9/9/2020

STATE OF MISSOURI

SHELTON KEISLING

NUMBER PE-27323

PROFESSIONAL ENGINEER

DocuSigned by:

Skiesling

PE-27323-2020-09

ENGINEERING LICENSE:

STATE OF MISSOURI

STATE CERTIFICATE OF AUTHORIZATION # EF-2791

ENGINEER: PE#: DISCIPLINE:

KMV KEVIN M. VANMAELE 21561 CIVIL C

REJ ROBERT E. JENSEN 28974 CIVIL C

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PLANS PREPARED FOR:

T-Mobile

PLANS PREPARED BY:

SSC

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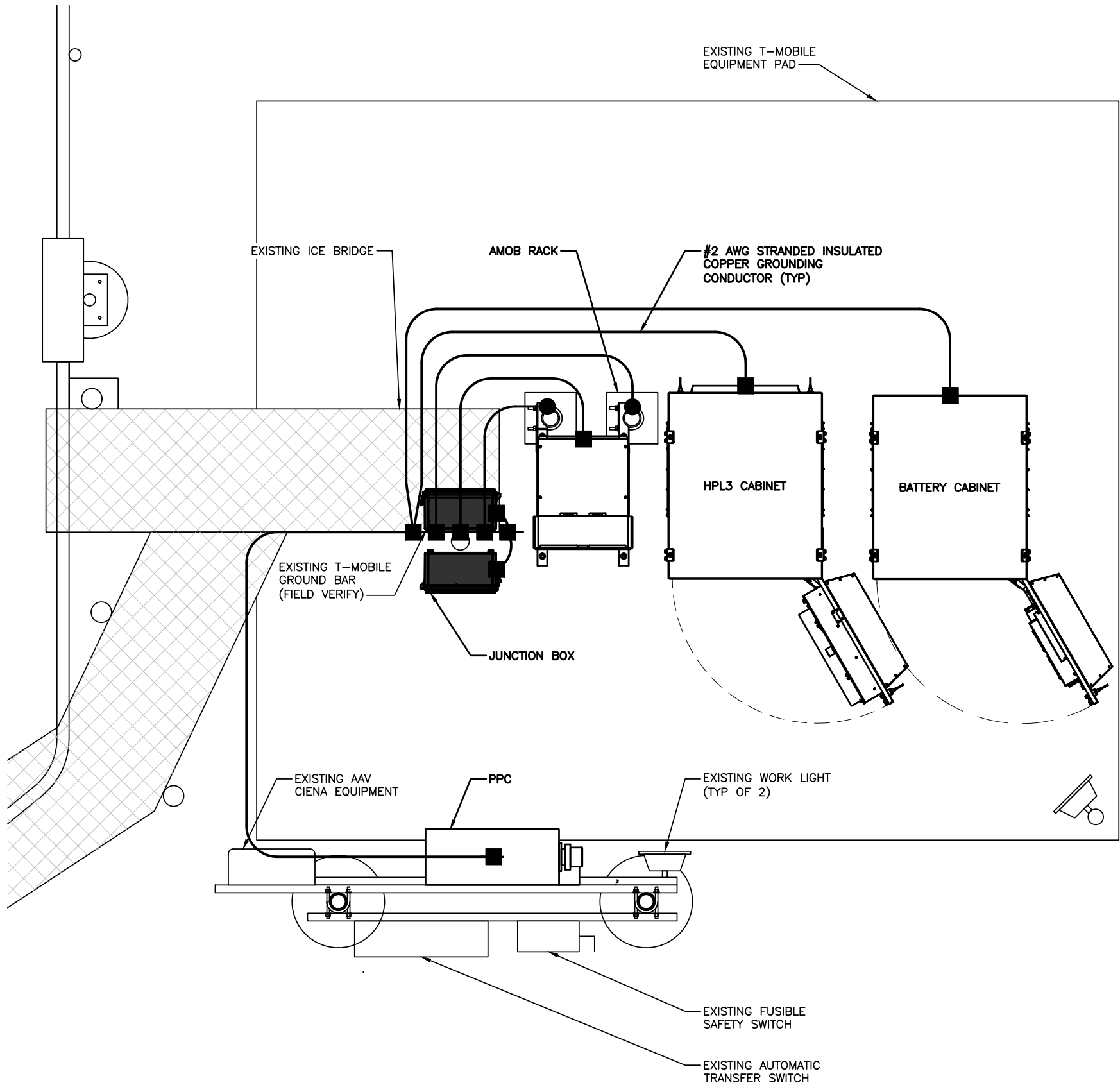
900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION:

ELECTRICAL ONE-LINE DIAGRAM

SHEET #:

E-2.0



GROUNDING SYMOBL LEGEND:

- GROUNDING CONDUCTOR (ABOVE GRADE)
- - - GROUNDING CONDUCTOR (BELOW GRADE)
- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION

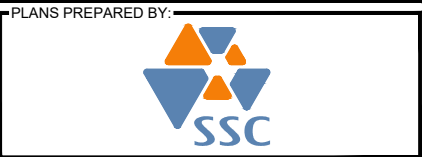
STAMP: 9/9/2020

**STATE OF MISSOURI**  
SHELTON KEISLING  
NUMBER PE-27323  
PROFESSIONAL ENGINEER

DocuSigned by: *Skiesling*

ENGINEERING LICENSE:

STATE OF MISSOURI			
STATE CERTIFICATE OF AUTHORIZATION # EF-2791			
ENGINEER:	PE#:	DISCIPLINE:	
KMV KEVIN M. VANMAELE	21561	CIVIL	C
REJ ROBERT E. JENSEN	28974	CIVIL	C
SDK SHELTON D. KEISLING	E-27323	ELECTRICAL	E
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LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION:	SHEET #:
GROUNDING PLAN	G-1.0



GENERAL REQUIREMENTS

PART 1: GENERAL

1.1 INTENT:

- A. THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE DONE AND THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION. PLANS ARE NOT TO BE SCALED.
- B. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY, HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF SHOWN, INDICATED OR SPECIFIED IN BOTH.
- C. THE INTENTION OF DOCUMENTS IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.
- D. CONFLICTS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING MATERIALS OR DOING ANY WORK. NO COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCES BETWEEN ACTUAL DIMENSIONS AND THOSE ON THE DOCUMENTS. ANY DISCREPANCY SHALL BE REPORTED TO THE OWNER OR THEIR AGENT FOR CONSIDERATION.

1.2 LICENSING REQUIREMENTS:

- A. THE CONTRACTOR IS RESPONSIBLE FOR PROCUREMENT AND MAINTAINING ALL APPLICABLE LICENSES AND BONDS.

1.3 STORAGE:

- A. ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION THAT DOES NOT OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

1.4 CLEAN UP:

- A. THE CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH AT ALL TIMES.

1.5 QUALITY ASSURANCE:

- A. ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.

PART 2: PRODUCTS – NOT APPLICABLE TO THIS SECTION

PART 3: EXECUTION – NOT APPLICABLE TO THIS SECTION

END OF SECTION

COMMUNICATIONS/ANTENNA'S

PART 1: GENERAL

1.1 WORK INCLUDED:

- A. ANTENNA AND FEEDLINE CABLES ARE FURNISHED BY OWNER UNDER SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONNEL AND PROPERTY FROM HAZARDOUS EXPOSURE TO OVERHEAD DANGER.
- B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND OWNER SPECIFICATIONS.
- C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.
- D. INSTALL FURNISHED GALVANIZED STEEL WAVEGUIDE LADDER AS INDICATED ON DRAWINGS.
- E. THE CONTRACTOR SHALL PROVIDE FREQUENCY DOMAIN REFLECTOMETER (FDR) TEST RESULTS TO THE CONSTRUCTION MANAGER AND OWNER WITHIN ONE WEEK OF COMPLETION.
- F. INSTALL FEEDLINE CABLES AND TERMINATORS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS. TERMINATE ALL FEEDLINE CABLE THREE (3) FEET IN EXCESS OF ENTRY PORT LOCATION UNLESS OTHERWISE STATED.
- G. ANTENNA AND FEEDLINE CABLE GROUNDING:
  - 1. ALL FEEDLINE CABLE GROUNDING CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREW CONNECTOR/SPLICE WEATHERPROOFING KITS OR APPROVED EQUAL.
  - 2. ALL FEEDLINE CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF FEEDLINE CABLE (NOT WITHIN BENDS)

1.2 RELATED WORK:

- A. FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:
  - 1. FLASHING OF OPENING INTO OUTSIDE WALLS.
  - 2. SEAL AND CAULK ALL OPENINGS.
  - 3. PAINTING.
  - 4. CUTTING AND PATCHING.

1.3 REQUIREMENTS OF REGULATOR AGENCIES:

- A. FURNISH UL LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE, INSTALL IN CONFORMANCE WITH UL STANDARDS WHERE APPLICABLE.
- B. INSTALL ANTENNA, ANTENNA CABLES, AND GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, AND ANY SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:
  - 1. TIA-222 (TELECOMMUNICATIONS INDUSTRY ASSOCIATION) – STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.
  - 2. FAA (FEDERAL AVIATION ADMINISTRATION ADVISORY) – CIRCULAR AC 70/7460-1K, OBSTRUCTION MARKING AND LIGHTING.
  - 3. FCC (FEDERAL COMMUNICATIONS COMMISSION) – RULES AND REGULATIONS OBSTRUCTION MARKING AND LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES AND HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.
  - 4. AISC (AMERICAN INSTITUTE OF STEEL CONSTRUCTION) – SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS.
  - 5. NEC (NATIONAL ELECTRICAL CODE) – FOR TOWER LIGHTING KITS.
  - 6. UL (UNDERWRITERS LABORATORIES) – APPROVED ELECTRICAL PRODUCTS.
  - 7. IN ALL CASES, THE FAA RULES AND THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.
  - 8. LIFE SAFETY CODE NFPA, LATEST EDITION.

PART 2: PRODUCTS – NOT APPLICABLE TO THIS SECTION

PART 3: EXECUTION – NOT APPLICABLE TO THIS SECTION

END OF SECTION

STAMP:

9/9/2020

STATE OF MISSOURI

KEVIN VANMAELE

PROFESSIONAL ENGINEER

NUMBER PE-021561

DocuSign Envelope ID: 81DD922818E14182

ENGINEERING LICENSE:

STATE OF MISSOURI

STATE CERTIFICATE OF AUTHORIZATION # EF-2791

ENGINEER:

PE#:

DISCIPLINE:

KMV KEVIN M. VANMAELE 21561 CIVIL C

REJ ROBERT E. JENSEN 28974 CIVIL C

SDK SHELTON D. KEISLING E-27323 ELECTRICAL E

TMS TERRANCE M. SUPER E-16521 ELECTRICAL E

PLANS PREPARED FOR:

T-Mobile

PLANS PREPARED BY:

SSC

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US 50 & LEE SUMMIT

APPLICANT SITE NUMBER:

A5C0198A

SITE ADDRESS:

900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION:

SHEET #:

SPECIFICATIONS  
(1 OF 3)

SP-1.0

ELECTRICAL

PART 1: GENERAL

1.1 GENERAL CONDITIONS:

- A. THE CONTRACTOR SHALL INSPECT THE SITE WHERE THIS WORK IS TO BE PERFORMED AND FULLY FAMILIARIZE HIMSELF WITH ALL CONDITIONS RELATED TO THIS PROJECT.
- B. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND LICENSES AND SHALL MAKE ALL DEPOSITS AND PAY ALL FEES REQUIRED FOR THE PERFORMANCE OF WORK UNDER THIS SECTION.
- C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWINGS SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES:

- A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

1.3 REFERENCES:

- A. THE PUBLICATIONS LISTED BELOW FORM PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS NOTED OTHERWISE. EXCEPT AS MODIFIED BY THE REQUIREMENTS SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISIONS OF THESE PUBLICATIONS.
  - 1. NEC (NATIONAL ELECTRICAL CODE)
  - 2. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
  - 3. IEEE (INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS)
  - 4. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
  - 5. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
  - 6. NEMA (NATIONAL ELECTRICAL MANUFACTURER’S ASSOCIATION)
  - 7. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
  - 8. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
  - 9. UL (UNDERWRITERS LABORATORIES, INC.)

1.4 SCOPE OF WORK:

- A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL AND ASSOCIATED SERVICES REQUIRED TO COMPLETELY CONSTRUCT AND LEAVE READY FOR OPERATION SYSTEMS AS SHOWN ON THE DRAWINGS AND HEREIN DESCRIBED.
- B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.
- C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.
- D. THE CONTRACTOR SHALL FURNISH TO THE OWNER, CERTIFICATES OF FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

PART 2: PRODUCTS

2.1 GENERAL:

- A. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE NEW, FREE FROM DEFECTS AND OF THE BEST QUALITY NORMALLY USED FOR THE PURPOSE IN GOOD COMMERCIAL PRACTICE.
- B. ALL MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.
- C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE.
- D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING RATING EQUAL TO OR GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT.

2.2 MATERIALS AND EQUIPMENT:

- A. CONDUIT:
  - 1. RIGID GALVANIZED STEEL CONDUIT (RGS) SHALL BE HOT–DIP GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
  - 2. FLEXIBLE METAL CONDUIT SHALL BE GALVANIZED, ZINC–COATED STEEL, PVC COATED FOR OUTDOOR APPLICATIONS.
  - 3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION TYPE AND WATERTIGHT.
  - 4. NON–METALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC, HEAVY–WALL RIGID WITH SOLVENT–CEMENT–TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.
- B. WIRE AND CABLE:
  - 1. WIRE AND CABLE SHALL BE FLAME–RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN, 600 VOLT, SIZES AS INDICATED, #12 AWG MINIMUM.
  - 2. #10 AWG AND SMALLER CONDUCTORS SHALL BE SOLID AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
  - 3. SOLDERLESS, PRESSURE–TYPE CONNECTORS CONSTRUCTED OF HIGH–STRENGTH, NON–CORRODIBLE, TIN–PLATED COPPER DESIGNED TO FURNISH HIGH–PULLOUT STRENGTH AND HIGH CONDUCTIVITY JOINTS SHALL BE USED.
  - 4. SUPPORT GRIPS SHALL BE SINGLE WEAVE, CLOSED MESH, HIGH–GRADE, NON–MAGNETIC, TIN–COATED BRONZE CAPABLE OF SUPPORTING TEN TIMES THE CABLE DEAD WEIGHT, HUBBELL KELLEMS OR APPROVED EQUAL.
- C. DISCONNECT SWITCHES:
  - 1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD–FRONT, QUICK–MAKE, QUICK–BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCKED WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE D CLASS 3110 OR APPROVED EQUAL.
- D. SYSTEM GROUNDING:
  - 1. GROUNDING CONDUCTOR SHALL BE SOLID TINNED BARE COPPER, SIZE AS INDICATED, EXCEPT ABOVE GROUND GROUNDING CONDUCTORS SHALL BE STRANDED INSULATED.
  - 2. GROUND BUSSES SHALL BE GALVANIZED STEEL BARS OF RECTANGULAR CROSS SECTION.
  - 3. CONNECTORS SHALL BE HIGH–CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO–HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS.
  - 4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
  - 5. GROUND RODS SHALL BE COPPER–CLAD STEEL WITH HIGH–STRENGTH STEEL CORE AND ELECTROLYTIC–GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 3/4" x 10'–0".
- E. OTHER MATERIALS:
  - 1. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.

STAMP:

9/9/2020

STATE OF MISSOURI

PROFESSIONAL ENGINEER

SHELTON KEISLING

NUMBER PE-27323

DocuSigned by:  
Skeling

EF0420615B002B107

ENGINEERING LICENSE:

STATE OF MISSOURI

STATE CERTIFICATE OF AUTHORIZATION # EF-2791

ENGINEER: PE#: DISCIPLINE:

KMV KEVIN M. VANMAELE 21561 CIVIL C

REJ ROBERT E. JENSEN 28974 CIVIL C

SDK SHELTON D. KEISLING E-27323 ELECTRICAL E

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900 SW BLUE PARKWAY  
LEE'S SUMMIT, MISSOURI  
64063

SHEET DESCRIPTION:

SPECIFICATIONS  
(2 OF 3)

SHEET #:

SP-2.0

PART 3: EXECUTION

3.1 GENERAL:

- A. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER’S RECOMMENDATIONS.
- B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

- A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE DONE BY EXPERIENCED MECHANICS OF THE PROPER TRADES.
- B. ALL ELECTRICAL EQUIPMENT FURNISHED SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.
- C. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

- A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER–FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

- A. CONDUIT:
1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS HEREIN SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4” NOMINAL SIZE SHALL BE USED.
2. PROVIDE RGS CONDUIT FOR ALL EXPOSED, EXTERIOR CONDUIT.
3. PROVIDE SCHEDULE 40 PVC OR RGS CONDUIT BELOW GRADE, 1” MINIMUM, UNLESS NOTED OTHERWISE. ALL 90 DEGREE BENDS TO ABOVE GRADE SHALL BE RGS. MINIMUM BURIAL DEPTH SHALL BE 24” CLEAR TO TOP OF CONDUIT, UNLESS NOTED OTHERWISE.
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION IS NOT DESIRABLE FOR REASONS OF EQUIPMENT MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUIDTIGHT, PVC COATED FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS.
5. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORTS TO ALLOW FOR EXPANSION AND CONTRACTION.
6. A RUN OF CONDUIT BETWEEN BOXES OR FITTINGS SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF FOUR QUARTER–BENDS INCLUDING THOSE BENDS LOCATED IMMEDIATELY AT THE BOX OR FITTING. THE RADIUS OF BENDS SHALL NEVER BE SHORTER THAN THAT OF THE CORRESPONDING TRADE ELBOW.
7. WHERE CONDUIT HAS TO BE CUT IN THE FIELD, IT SHALL BE CUT SQUARE WITH A PIPE CUTTER USING CUTTING KNIVES.
8. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF WIRE OR CABLE. CLEAR ALL BLOCKAGES AND REMOVE BURRS, DIRT, AND DEBRIS.
9. INSTALL PULL STRINGS IN ALL EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END WITH ITS DESTINATION.
10. PROVIDE INSULATED GROUNDING BUSHINGS FOR ALL CONDUITS STUBBED INTO EQUIPMENT ENCLOSURES OR STUBBED OUT FOR FUTURE USE BY OTHERS.
11. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
12. INSTALL 2” ORANGE DETECTABLE TAPE 12” ABOVE ALL UNDERGROUND CONDUIT AND WIRE.
13. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
- B. WIRE AND CABLE:
1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

DESCRIPTION	120/240V	208Y/120V	480Y/277V
PHASE A	BLACK	BLACK	BROWN
PHASE B	RED	RED	ORANGE
PHASE C		BLUE	YELLOW
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAYS WITH PRESSURE–TYPE CONNECTORS.
3. PULLING LUBRICANTS SHALL BE SOAPSTONE POWDER, POWDERED TALC, OR A COMMERCIAL PULLING COMPOUND. NO SOAP SUDS, SOAP FLAKES, OIL, OR GREASE SHALL BE USED, AS THESE MAY BE HARMFUL TO CABLE INSULATION. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CABLE TO AVOID SCORING THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES, EQUIPMENT, ETC. TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS, AND SHALL BE PROTECTED FROM MECHANICAL INJURY AND FROM MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS ARE PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR’S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUND AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEMS INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. 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 486A TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
5. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER’S INSTRUCTIONS.
6. ALL GROUND CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC–WELDED CONNECTIONS SHALL BE APPROVED BY THE CONSTRUCTION INSPECTOR BEFORE BEING PERMANENTLY CONCEALED.
7. APPLY CORROSION–RESISTANT FINISH TO FIELD CONNECTIONS, AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE COPPER–BASED “NO–OX” OR APPROVED EQUAL.
8. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS
9. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS OR GROUNDING LUG IN ENCLOSURE.
10. DIRECT BURIED GROUND CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 30” BELOW GRADE, UNLESS NOTED OTHERWISE.
11. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSULATED OR INSTALLED IN PVC CONDUIT.
12. INSTALL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER’S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
13. DRIVE GROUND RODS UNTIL TOPS ARE 30” BELOW FINAL GRADE.
14. GROUNDING CONDUCTOR TO EQUIPMENT GROUND LUGS:
- a. BOLTED TO EQUIPMENT HOUSING WITH STAINLESS STEEL BOLTS AND LOCK WASHERS.
- b. ALL EQUIPMENT TO BE GROUNDED SHALL BE FREE OF PAINT OR ANY OTHER MATERIAL COVERING BARE METAL AT THE POINT OF CONNECTION.

3.5 ACCEPTANCE TESTING:

- A. PROVIDE PERSONNEL AND EQUIPMENT, MAKE REQUIRED TESTS, AND SUBMIT TEST REPORTS UPON COMPLETION OF TESTS.
- B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NONCOMPLYING ITEMS SHALL BE REMOVED FROM THE JOBSITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE OF SUCH NON–COMPLIANCE.

C. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE THEIR INSULATION TESTED AFTER INSTALLATION, BUT BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. INVESTIGATE ANY VALUES LESS THAN 50 MEGAOHMS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE WIRES AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUND TEST TO MEASURE GROUND RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3–POINT “FALL–OF–POTENTIAL” METHOD. PROVIDE PLOTTED TEST VALUES & LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

END OF SECTION

END OF SPECIFICATION

STAMP:

9/9/2020

STATE OF MISSOURI

SHELTON KEISLING

NUMBER PE-27323

PROFESSIONAL ENGINEER

DocuSigned by:  
*S. Keisling*

ENGINEERING LICENSE:

STATE OF MISSOURI

STATE CERTIFICATE OF AUTHORIZATION # EF-2791

ENGINEER: PE#: DISCIPLINE:

KMV KEVIN M. VANMAELE 21561 CIVIL C

REJ ROBERT E. JENSEN 28974 CIVIL CIVIL

SDK SHELTON D. KEISLING E-27323 ELECTRICAL E

TMS TERRANCE M. SUPER E-16621 ELECTRICAL

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