Agenda Item Executive Summary

AGENDA ITEM: T-Mobile License Agreement Amendment No. 2 at Schick Water Tower

BOARD OR COMMITTEE: Board

BUDGET IMPACT			
Amount	$ NA	**Budgeted**	$ NA
Fund: Water	**Corresponding Activity Measure: NA**		

EXECUTIVE SUMMARY

As you are aware, we have the Schick Rd. water tower scheduled to be painted this spring and as part of the painting, T-Mobile was required to move their equipment to a temporary pole. In our discussions with T-Mobile to temporarily relocate, they approached the Village to amend their license agreement with the Village. The agreement was due to expire in 2030. This amendment will extend the agreement up to two additional 5 year terms.

The Village Attorney and I have negotiated and reviewed this amendment with T-Mobile and believe this agreement is consistent with the existing agreements we currently have.

ATTACHMENTS (PLEASE LIST)

Memo, Resolution, Agreement

RELATIONSHIP TO STRATEGIC PLAN GOAL

Strategic Plan Goal: NA

Short Term (1-3 Years): Routine ☐ Complex ☐

Long Term (3-5 Years): Routine ☐ Complex ☐

ACTION REQUESTED

☐ For Discussion Only
☒ Resolution
☐ Ordinance
☐ Motion

MOTION: I move to approve Resolution 2024-_____, a resolution approving the second amendment to the non-exclusive license agreement between the Village of Bartlett and T-Mobile Central LLC.

Staff: Dan Dinges, Director of Public Works Date: April 8, 2024

PUBLIC WORKS MEMO

DATE: April 8, 2024

TO: Paula Schumacher
Village Administrator

FROM: Dan Dinges, PE
Director of Public Works

SUBJECT: T-Mobile License Agreement Amendment No. 2 at Schick Water Tower

As you are aware, we have the Schick Rd. water tower scheduled to be painted this spring and as part of the painting, T-Mobile was required to move their equipment to a temporary pole. In our discussions with T-Mobile to temporarily relocate, they approached the Village to amend their license agreement with the Village. The agreement was due to expire in 2030. This amendment will extend the agreement up to two additional 5 year terms.

The Village Attorney and I have negotiated and reviewed this amendment with T-Mobile and believe this agreement is consistent with the existing agreements we currently have.

MOTION:

I MOVE TO APPROVE RESOLUTION 2024-____, A RESOLUTION APPROVING THE SECOND AMENDMENT TO THE NON-EXCLUSIVE LICENSE AGREEMENT BETWEEN THE VILLAGE OF BARTLETT AND T-MOBILE CENTRAL LLC.

RESOLUTION 2024 - _____

A RESOLUTION APPROVING THE SECOND AMENDMENT TO THE NON-EXCLUSIVE LICENSE AGREEMENT BETWEEN THE VILLAGE OF BARTLETT AND T-MOBILE CENTRAL LLC

BE IT RESOLVED by the President and Board of Trustees of the Village of Bartlett, Cook, DuPage and Kane Counties, Illinois, pursuant to its home rule authority, as follows:

SECTION ONE: APPROVAL. The Second Amendment to the Non-Exclusive License Agreement between the Village of Bartlett and T-Mobile Central, LLC (the "Second Amendment"), a copy of which is appended hereto and expressly incorporated herein by this reference, is hereby approved.

SECTION TWO: AUTHORIZATION. The Village President is hereby authorized and directed to sign the Second Amendment on behalf of the Village of Bartlett.

SECTION THREE: SEVERABILITY. The various provisions of this Resolution are to be considered as severable, and of any part or portion of this Resolution shall be held invalid by any Court of competent jurisdiction, such decision shall not affect the validity of the remaining provisions of this Resolution.

SECTION FOUR: REPEAL OF PRIOR RESOLUTIONS. All prior Ordinances and Resolutions in conflict or inconsistent herewith are hereby expressly repealed only to the extent of such conflict or inconsistency.

SECTION FIVE: EFFECTIVE DATE. This Resolution shall be in full force and effect upon passage and approval.

ROLL CALL VOTE:

AYES:

NAYS:

ABSENT:

PASSED:

APPROVED:

_____
Kevin Wallace, Village President

ATTEST:

_____
Lorna Giless, Village Clerk

CERTIFICATION

I, the undersigned, do hereby certify that I am the Village Clerk of the Village of Bartlett, Cook, DuPage and Kane Counties, Illinois, and that the foregoing is a true, complete and exact copy of Resolution 2024 - _____ enacted on April 16, 2024, and approved on April 16, 2024, as the same appears from the official records of the Village of Bartlett.

_____
Lorna Giless, Village Clerk

Site #: CH74338A
Site Name: Bartlett WT Schick Rd.

SECOND AMENDMENT TO NON-EXCLUSIVE LICENSE AGREEMENT

THIS SECOND AMENDMENT TO NON-EXCLUSIVE LICENSE AGREEMENT ("Second Amendment") is made effective as of the latter signature date hereof (the "Effective Date") by and between Village of Bartlett, an Illinois home rule municipal corporation (the "Village" or "Licensor") and T-Mobile Central LLC, a Delaware limited liability company, ("Licensee") (Collectively the "Parties").

Recitals

WHEREAS, Licensor and Licensee entered into a NON-EXCLUSIVE LICENSE AGREEMENT, dated August 17, 2010, as amended by that certain FIRST AMENDMENT TO NON-EXCLUSIVE LICENSE AGREEMENT, dated May 7, 2019 (collectively, the "Agreement") for the licensed premises (the "Premises") located at 26 W 011 Schick Road, Bartlett, IL (the "Water Tower Property"); and

WHEREAS, Licensor and Licensee desire to further amend the Agreement;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. Exhibit C "Engineering Plans" to the Agreement is hereby removed and replaced with the "Engineering Plans" set forth as Exhibit-C-1 of this Second Amendment.

2. Upon the expiration of the Third Renewal Term, Licensee shall have the right to renew the Agreement for two (2) additional Renewal Terms of 5 years each, respectively herein referred to as (the "Fourth Renewal Term") and (the "Fifth Renewal Term"), each of which shall renew automatically unless Licensee provides at least thirty (30) days prior written notice before the expiration of the then current term that Licensee does not wish to exercise such Renewal Term.

3. The license fee for the Fourth Renewal Term (years 21-25) will be $4,386.00 per month.

4. The license fee for the Fifth Renewal Term (years 26-30) will be $4,912.00 per month.

5. Paragraph 27 of the Agreement is hereby deleted in its entirety and replaced with the following:

> 27. Notwithstanding any other provision to the contrary herein, in the event the Village determines that it is in its best interests to raze the Tower, to re-paint the Tower, or otherwise perform repairs or maintenance work on the Tower, the Village shall give Licensee 180 days prior written notice to T-Mobile of its intention to raze the Tower or perform such other painting or maintenance work, in which event T-

Mobile shall remove its property from the Tower and the Village shall permit T-Mobile the use of temporary cellular facilities including a cellular-on-wheels facility, direct-bury monopole, ballast tower or similar installation at T-Mobile's sole cost and expense, during the time it takes for the Village to complete the painting, repair or maintenance work to the Tower, upon the Water Tower Property if feasible; otherwise, at a location for such temporary facility that is reasonably acceptable to T-Mobile, and subject to the approval of the Village Engineer and the Director of Public Works. Within ninety (90) days after notice from the Village of completion of said painting, repair or maintenance work, T-Mobile may remount and reconnect the Antennas that were temporarily removed from the Tower in the same location, all at T-Mobile's sole cost, except that during the time of such temporary relocation no monthly license fee shall be due from T-Mobile.

6. **Effect.** Except as amended by this Second Amendment, all other terms, provisions and conditions of the Agreement remain in full force and effect.

7. **Conflict/Capitalized Terms.** Landlord and Tenant hereby acknowledge and agree that in the event of a conflict between the terms and provisions of this Second Amendment and those contained in the Agreement, the terms and provisions of this Second Amendment shall control. Except as otherwise defined or expressly provided in this Second Amendment, all capitalized terms used in this Second Amendment shall have the meanings or definitions ascribed to them in the Agreement. To the extent of any inconsistency in or conflict between the meaning, definition, or usage of any capitalized terms in this Second Amendment and the meaning, definition, or usage of any such capitalized terms or similar or analogous terms in the Agreement, the meaning, definition, or usage of any such capitalized terms in this Second Amendment shall control. Except as explicitly amended by this Second Amendment, the terms of the Agreement remain in full force and effect.

8. **Counterparts.** This Second Amendment may be executed in multiple counterparts, each of which so executed and delivered, shall be deemed an original and all of which, when taken together, shall constitute one and the same instrument.

[SIGNATURE PAGE FOLLOWS]

Site #: CH74338A
Site Name: Bartlett WT Schick Rd.

Licensor:

Village of Bartlett

Signature: _____

Print Name: _____

Title: _____

Date: _____

Licensee:

T-Mobile Central LLC

Signature: DocuSigned by: Mike Blasutti E2530D5D0838418... _____

Print Name: Mike Blasutti _____

Title: Director, Engineering & Ops _____

Date: 4/4/2024 _____

DS AM DS GM DS JP

TMO Legal Digitally signed by TMO Legal Date: 2024.03.20 08:59:21 -04'00'

DS ESL-L

TMO Signatory Level: L06
NLG-93871

Site #: CH74338A
Site Name: Bartlett WT Schick Rd.

Exhibit C-1

Attached

REVIEWED BY:

PROPERTY OWNER OR REP:	RF:
ZONING:	NETWORK:
CONSTRUCTION:	CONTRACTOR:
OPERATIONS:	SITE ACQUISITION:

SCOPE OF WORK

GROUND SCOPE OF WORK:

1. REMOVAL OF T-MOBILE ANTENNAS, RRUs, HYBRID & COAX CABLES, AND LOW-PROFILE PLATFORM ON TEMPORARY TOWER. DISMANTLING OF TEMPORARY TOWER. RESTORATION OF TEMPORARY TOWER SITE TO ITS FORMER CONDITION.
2. RELOCATION OF ALPHA & BETA OVPs TO EXISTING UNISTRUT CORRAL. INSTALLATION OF LONG PULL BOX BELOW OVPs.
3. INSTALLATION OF (3) HCS 2.0 TRUNK CABLES FROM OVPs TO (3) WT BREAKOUT BOXES. TRUNK CABLES TO FOLLOW ROUTE OF FORMER COAX CABLES INSIDE WT BASE CONE, SHAFT AND ACCESS TUBE.

TOWER SCOPE OF WORK:

1. INSTALLATION OF NEW (3) COMMSCOPE FFHH-65B-R3 OCTO ANTENNAS.
2. INSTALLATION/RELOCATION OF EXISTING (3) AEHC MASSIVE MIMO ANTENNAS, (3) AAFIA MASSIVE MIMO ANTENNAS, (3) AHFIG RRUs, (3) AHLOA RRUs AND (3) HCS 2.0 CABLE BREAKOUT BOXES/PENDANTS ON NEW 30'ø RAILING AT WT ROOF.
3. INSTALLATION OF HYBRID JUMPER CABLES FROM PENDANTS TO AEHC ANTENNAS, AAFIA ANTENNAS, AND SECTOR RRUs.
4. INSTALLATION OF RF JUMPER CABLES FROM SECTOR RRUs TO OCTO ANTENNAS.
5. INSTALLATION OF NEW GROUNDING SYSTEM FOR T-MOBILE EQUIPMENT ON TOP OF WATER TANK.

T-Mobile®

PROJECT:	**EQUIPMENT UPGRADE**
SITE ID:	**CH74338A**
SITE NAME:	**BARTLETT WT - SCHICK ROAD**
SITE TYPE:	**WATER TANK**
PLAN:	**5G AND LTE AIRSCALE**
SITE ADDRESS:	**401 E. SCHICK ROAD, BARTLETT, IL 60103**

SITE COORDINATES:

GEOGRAPHIC COORDINATES (NAD 83)

LATITUDE: N 41° 57' 05.3"
LONGITUDE: W 88° 09' 54.0"

SITE DIRECTIONS

FROM T-MOBILE OFFICE:

- GET ON I-88 W
- TAKE I-355 N TO US-20 W/W LAKE ST IN ADDISON. TAKE EXIT 31 FROM I-355 N
- FOLLOW US-20 W/W LAKE ST AND W SCHICK RD TO YOUR DESTINATION IN HANOVER PARK

SCAN OR CODE FOR LINK TO SITE LOCATION MAP

SHEET INDEX

SHEET NO:	SHEET TITLE	REV. NO:
T-1	TITLE SHEET	0
A-1	OVERALL SITE PLAN	0
A-1A	DEMOLITION PLAN	0
A-2	DETAILED SITE PLAN	0
A-3	ELEVATION	0
A-4	ANTENNA & RRU LAYOUT	0
A-5	ANTENNA & CABLE SCHEDULE	0
A-6	ANTENNA & EQUIPMENT INFORMATION	0
A-7	EQUIPMENT INFORMATION	0
A-8	OVP MOUNTING DETAIL, CABLE INFORMATION	0
A-9	ANTENNA & EQUIPMENT SCHEMATIC DIAGRAM	0
WT-1	ANTENNA & RRU MOUNTING DETAILS	0
WT-2	CABLE SUPPORT & MISCELLANEOUS DETAILS	0
E-1	ELECTRICAL NOTES, CABLE ROUTING PLAN	0
E-2	GROUNDING NOTES, GROUNDING PLANS	0
E-3	GROUNDING DETAILS	0
N-1	NOTES	0
N-2	NOTES	0

SITE LOCATION

PROJECT SUMMARY

APPLICABLE CODES

- INTERNATIONAL BUILDING CODE, LATEST EDITION
- NATIONAL ELECTRICAL CODE, LATEST EDITION

APPLICANT

T-MOBILE L.L.C.
1400 OPUS PLACE, SUITE 700
DOWNERS GROVE, IL 60515
PHONE:
FAX:

CONSTRUCTION CONTACT: CHRISTOPHER LYTLE
PHONE NO.:

OPERATIONAL CONTACT:
PHONE NO.:

UTILITIES

POWER:

TELEPHONE:

UNDERGROUND SERVICE ALERT
CALL TOLL FREE
1-800-892-0123
THREE WORKING DAYS BEFORE YOU DIG

CONTRACTOR

PROFESSIONAL LICENSE

I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ENGINEER UNDER THE LAWS OF THE STATE OF ILLINOIS

LICENSED STRUCTURAL ENGINEER
RICHARD A. PETERSON
81-3446
STATE OF ILLINOIS

SIGNATURE:

SIGNED: 2/23/24 EXPIRES: 11/30/24

NOTES FOR CONTRACTOR

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

EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED IN FIELD. IF SIGNIFICANT DEVIATIONS OR DETERIORATION ARE ENCOUNTERED AT THE TIME OF CONSTRUCTION, A REPAIR PERMIT WILL BE OBTAINED AND CONTRACTOR SHALL NOTIFY STRUCTURAL ENGINEER IMMEDIATELY.

HANDICAP ACCESS REQUIREMENTS

SITE IS UNOCCUPIED AND NOT FOR HUMAN HABITATION. HANDICAP ACCESS NOT REQUIRED.

NOTES

THE DRAWINGS ARE FULL ON 11"x17" SHEET SIZE AND ARE NOT REDUCED IN SIZE U.N.O.

THESE PLANS HAVE BEEN PREPARED FOR THE PURPOSE OF DESIGN AND DETAILING OF ANY AND ALL CIVIL AND ELECTRICAL ENGINEERING ASPECT OF THIS PROJECT.

T-Mobile
1400 OPUS PLACE, SUITE 700
DOWNERS GROVE, IL 60515
PHONE:
FAX:

KCS CORPORATION
(D/B/A KCS ENGINEERS)
ILLINOIS DESIGN FIRM REGISTRATION NO. 184.007139
1125 REMINGTON RD., SCHAUMBURG, IL 60173
PHONE: 847-490-8200; FAX: 847-490-8225
www.kcscorp.com

LICENSED PROFESSIONAL ENGINEER
SEEMESH M. SETHI
0062-051290
STATE OF ILLINOIS

SIGNATURES:

DATE: 2/23/24 EXPIRES: 11/30/25

REV.	DESCRIPTION	DATE
0	ISSUED FOR PERMIT	2/23/24
B	ISSUED FOR REVIEW	2/1/24
A	ISSUED FOR REVIEW	1/24/24

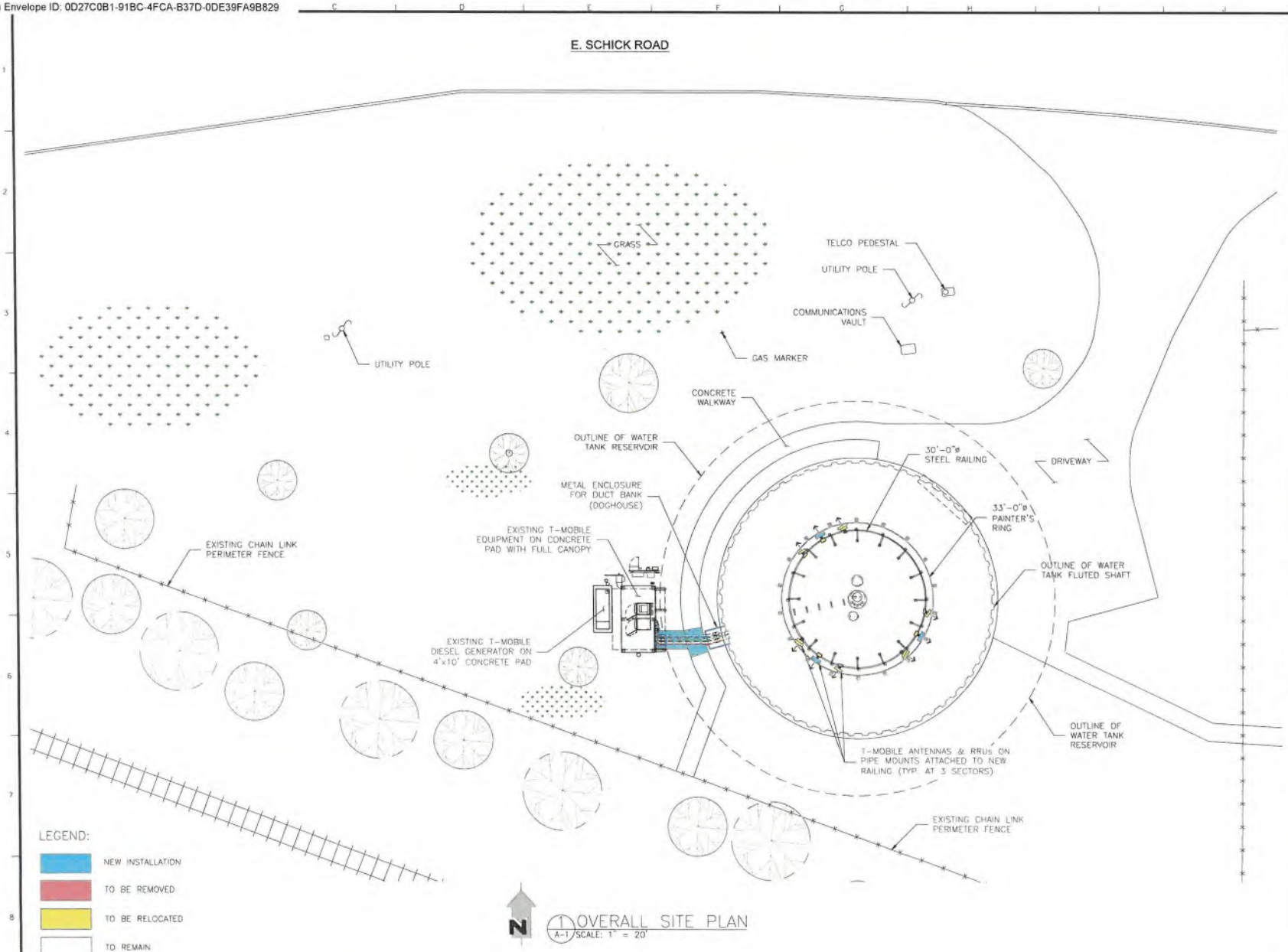
CH74338A
BARTLETT WT SCHICK ROAD

401 E. SCHICK ROAD, BARTLETT, IL 60103

Drawing Title: TITLE SHEET

Project Number | Drawn by: | Date
Client Project Number | Checked by: | Date
Scale | Approved for MC | Date
Drawing Number: T-1

TMO Signatory Level: L06
NLC 03871



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CH74338A
BARTLETT WT SCHICK ROAD
401 E. SCHICK ROAD, BARTLETT, IL 60103

Drawing Title
OVERALL SITE PLAN

Project Number | Drawn by: PA
Date
Client Project Number | Checked by:
Date
Scale | Approved by: MS
Date
Drawing Number
A-1

TMO Signatory Level: L06
NLG 93871

LEGEND:

- NEW INSTALLATION
- TO BE REMOVED
- TO BE RELOCATED
- TO REMAIN

E. SCHICK ROAD

GRASS

TELCO PEDESTAL

UTILITY POLE

COMMUNICATIONS VAULT

GAS MARKER

CONCRETE WALKWAY

DRIVEWAY

OUTLINE OF EXISTING 25'x25' ENCLOSURE FOR 100' STEEL MONOPOLE WITH BALLAST FOUNDATION (TO BE REMOVED)

EXISTING T-MOBILE ANTENNAS & RRUs (TO BE RELOCATED/ REMOVED) ON LOW-PROFILE PLATFORM (TO BE REMOVED)

OUTLINE OF WATER TANK FLUTED SHAFT

10'-0"

±10'-0"

EXISTING STEEL RAILING ON WT ROOF, TYP. AT 3 SECTORS (TO BE REMOVED)

EXISTING T-MOBILE DIESEL GENERATOR ON 4'x10' CONCRETE PAD

EXISTING T-MOBILE EQUIPMENT ON CONCRETE PAD WITH FULL CANOPY

EXISTING DUCT BANK

RAILROAD TRACKS

OUTLINE OF WATER TANK RESERVOIR

EXISTING CHAIN LINK PERIMETER FENCE

N

1 OVERALL SITE DEMOLITION PLAN
A-1A/SCALE: 1" = 20'

OUTLINE OF WATER TANK RESERVOIR

WATER TOWER SHAFT

CONCRETE WALKWAY

PPC

ELECT METER

GAS METER

RAC24

ICE BRIDGE POST (3 TOTAL)

CANOPY POST (4 TOTAL)

EXISTING ALPHA & BETA OVPs (TO BE RELOCATED) ON MOUNTING POLE (TO BE REMOVED)

DIESEL GENERATOR

±14'-5" (CONCRETE PAD)

SSC-HPL3

EXISTING DUCT BANK (CONDUIT STUB-UPS)

BBU-LB3

EXISTING OVP C MOUNTED TO EXIST. UNISTRUT CORRAL

GROUNDING TEST WELL

±7'-6" (CONCRETE PAD)

EXISTING CONCRETE SLAB SECTIONS (TO BE REMOVED & REPOURED)

EXISTING TREE

(3) HCS 2.0 TRUNK CABLES ON PVC SLEEPERS WITH GRATING COVER FROM EXISTING OVPs TO TEMPORARY TOWER BREAKOUT BOXES/PENDANTS (ALL TO BE REMOVED)

N

2 DETAILED SITE DEMOLITION PLAN
A-1A/SCALE: 3/16" = 1'-0"

NOTE:

1. T-MOBILE GENERAL CONTRACTOR SHALL RESTORE SITE TO ITS ORIGINAL CONDITION.
2. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING FENCE, SITE GRADING, CURB AND LANDSCAPING IF IT OCCURS.

T-Mobile
1400 OPUS PLACE, SUITE 700
DOWNERS GROVE, IL 60515
PHONE:
FAX:

KCS CORPORATION
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0062-051290
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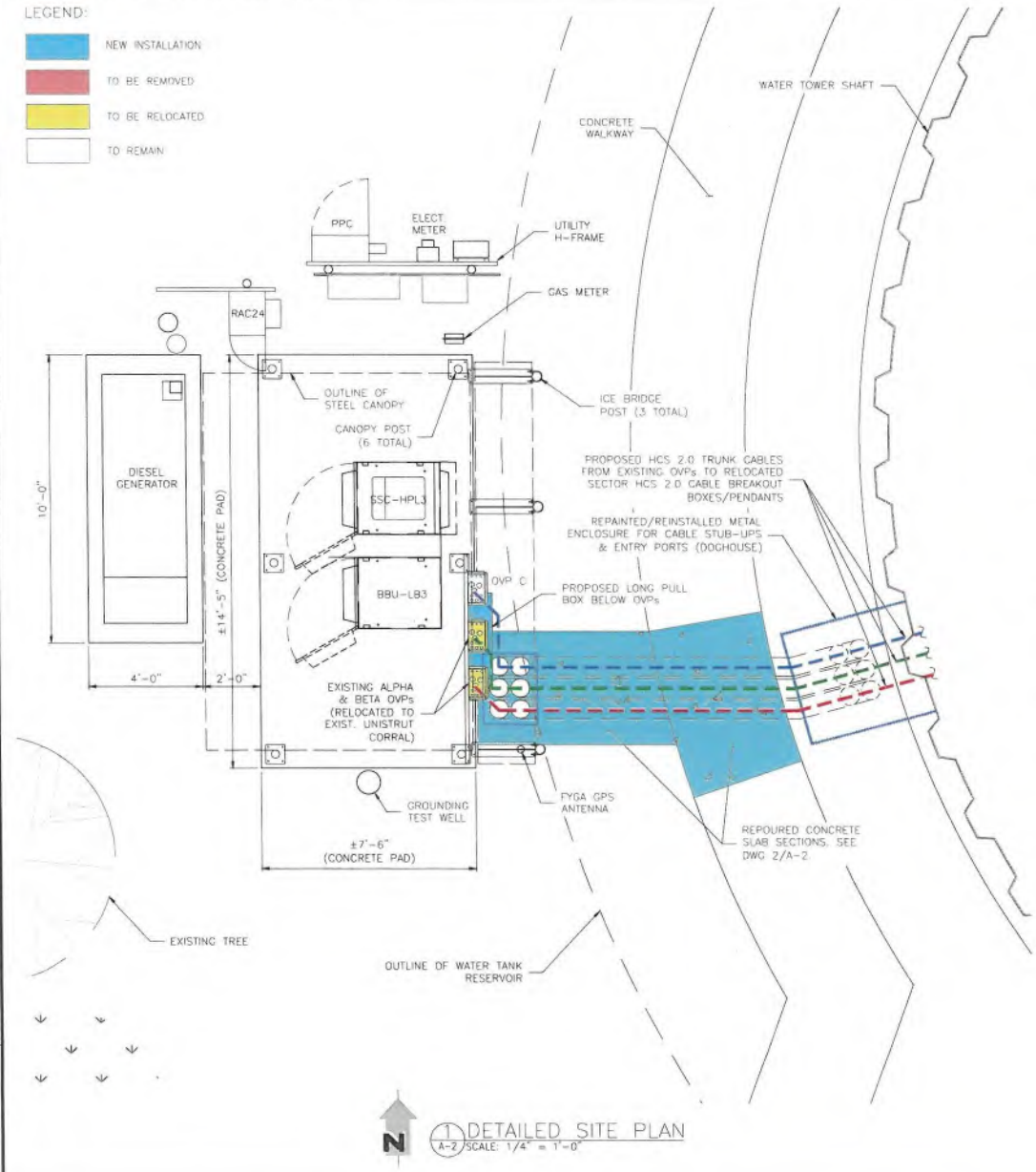
BARTLETT WT SCHICK ROAD
401 E. SCHICK ROAD, BARTLETT, IL 60103

DEMOLITION PLAN

A-1A

TMO Signatory Level: L06
NLG 92871



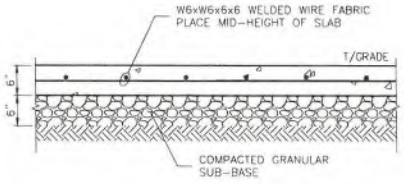
1 DETAILED SITE PLAN
A-2 SCALE: 1/4" = 1'-0"

EQUIPMENT INSTALLATION NOTES:

1. AT THE END OF THE PROJECT THE FOLLOWING EQUIPMENT WILL BE INSTALLED INSIDE THE SSC-HPL3 CABINET: (3) AMIAs, (2) ASIAs, (1) ASIB, (2) ASILs, (5) ABIAs, (3) ABILs, (3) ABICs, (1) ABIO, (1) FSEB, (1) FSMF, BREAKERS AND CSR IXRE V2 (GEN2), (3) RAYCAP POWERPLUS VOLTAGE BOOSTER WITH 2 MODULES WITH EXTRA AMPLIFIER MODULE.
2. CONTRACTOR TO ENSURE THE FANS ON THE FSMF MODULE ARE THOROUGHLY CLEANED AND FLIPPED PRIOR TO INSTALLING IN THE NEW SSC-HPL3 CABINET TO ALLOW PROPER COOLING OF THE MODULES.
3. FSEB TO BE RELOCATED WITH FLAT MOUNTING BRACKET TO INSIDE THE SSC-HPL3 CABINET.
4. DURING PRE-CONSTRUCTION SCOPE WALK, GC SHALL FIELD MEASURE AND DETERMINE REQUIRED HCS 2.0 CABLE LENGTHS TO EACH SECTOR.
5. PROVIDE LENGTHS BACK TO T-MOBILE TO ENSURE IT IS CAPTURED ON THE RFDS AND T-MOBILE BOM.
6. SSC USED BATTERIES WITH CONNECTION HARDWARE TO BE RELOCATED INSIDE NEW BBU RACK.
7. GC TO INSURE ALL CONDUITS NO LONGER BEING USED ARE DECOMMISSIONED AND HOLES ARE PROPERLY SEALED AND WEATHERPROOFED.
8. GPS CABLE SHALL RE REROUTED THROUGH THE TROUGH OR OVP AND THE 2" FIBER CONDUIT TO THE SSC RACK.
9. GC SHALL ENSURE THE OVPs ARE INSTALLED AND WIRED PER MANUFACTURER SPECIFICATION. HCS 2.0 SHALL BE EQUIPPED WITH (3) SETS OF 2#2 AWG (BLUE AND BLACK INSULATED) EACH PROTECTED BY A 100A DC BREAKER (3 TOTAL 100A BREAKERS). IF TOWER J-BOX REQUIRES VOLTAGE BOOSTER, THE CIRCUITS WILL BE FED FROM VOLTAGE BOOSTER OUTPUT TERMINALS.

PENETRATION PIPES/DUCT BANK SEAL NOTES:

1. ALL UNUSED PENETRATION PIPES NEED TO BE SEALED WITH SOLID RUBBER BOOTS.
2. GC WILL INSTALL RUBBER BOOT ASSEMBLIES ON UNUSED PIPE STUB-UPS AT CONCRETE PAD DUCT BANKS AND AT BOTH ENDS OF CABLE ENTRY PORTS.
3. T-MOBILE PENETRATION PIPES IN THE FLUTED COLUMN NEED TO BE SEALED WITH RUBBER BOOT ASSEMBLIES AND/OR WEATHER RESISTANT CAULK TO A DEPTH OF 2" ON THE EXTERIOR AND DRY INTERIOR ENDS. SPRAY FOAM, BUTYL, AND TAPE ARE NOT ACCEPTABLE ALTERNATIVES.



2 CONCRETE SLAB DETAIL
A-2 SCALE: 1/2" = 1'-0"

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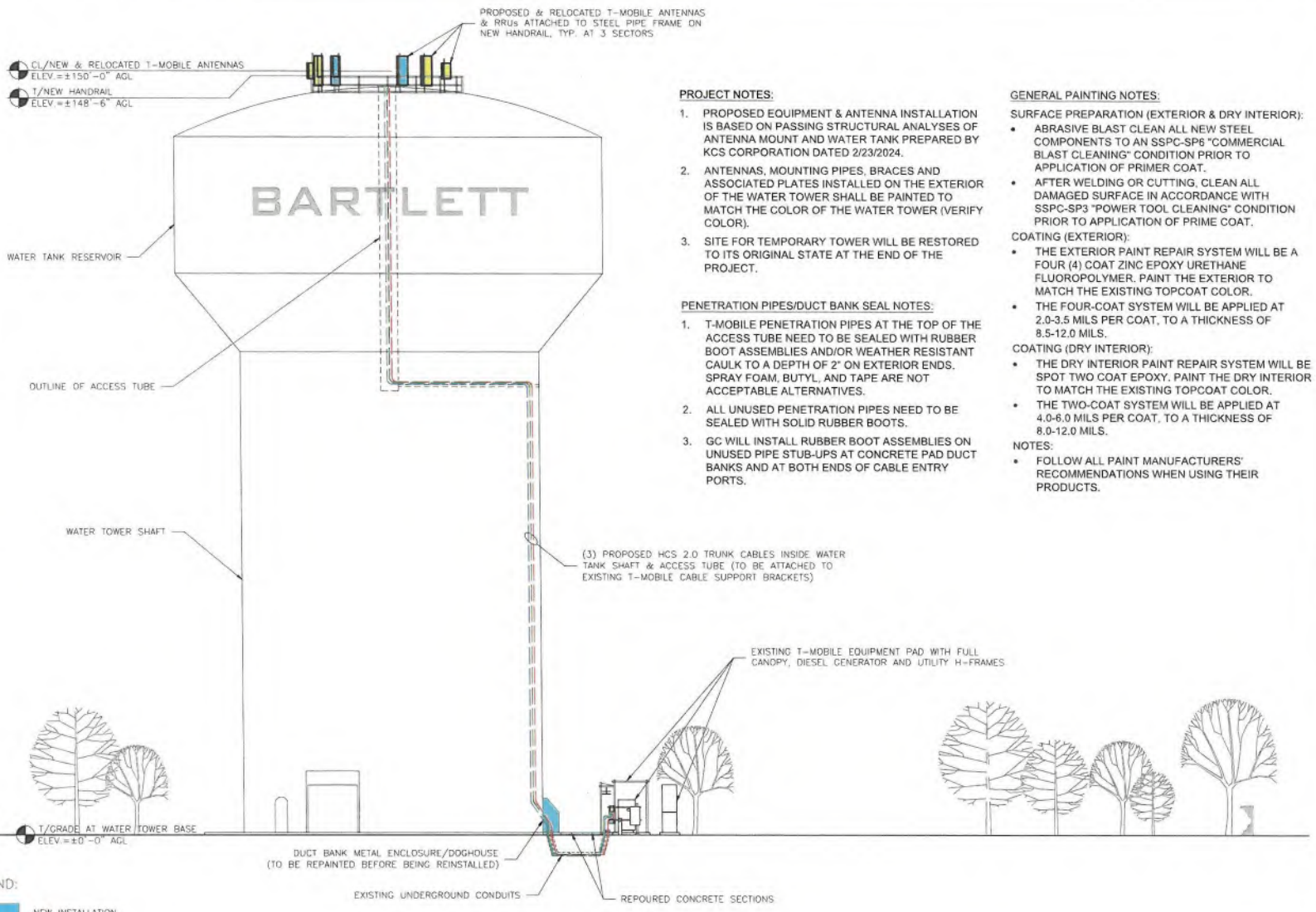
BARTLETT WT SCHICK ROAD
401 E. SCHICK ROAD, BARTLETT, IL 60103

DETAILED SITE PLAN

A-2

TMO Signatory Level: L06
NLC 93871



1 NORTH ELEVATION (FACING SOUTH)
A-3 SCALE: 1" = 20'

PROJECT NOTES:

1. PROPOSED EQUIPMENT & ANTENNA INSTALLATION IS BASED ON PASSING STRUCTURAL ANALYSES OF ANTENNA MOUNT AND WATER TANK PREPARED BY KCS CORPORATION DATED 2/23/2024.
2. ANTENNAS, MOUNTING PIPES, BRACES AND ASSOCIATED PLATES INSTALLED ON THE EXTERIOR OF THE WATER TOWER SHALL BE PAINTED TO MATCH THE COLOR OF THE WATER TOWER (VERIFY COLOR).
3. SITE FOR TEMPORARY TOWER WILL BE RESTORED TO ITS ORIGINAL STATE AT THE END OF THE PROJECT.

PENETRATION PIPES/DUCT BANK SEAL NOTES:

1. T-MOBILE PENETRATION PIPES AT THE TOP OF THE ACCESS TUBE NEED TO BE SEALED WITH RUBBER BOOT ASSEMBLIES AND/OR WEATHER RESISTANT CAULK TO A DEPTH OF 2" ON EXTERIOR ENDS. SPRAY FOAM, BUTYL, AND TAPE ARE NOT ACCEPTABLE ALTERNATIVES.
2. ALL UNUSED PENETRATION PIPES NEED TO BE SEALED WITH SOLID RUBBER BOOTS.
3. GC WILL INSTALL RUBBER BOOT ASSEMBLIES ON UNUSED PIPE STUB-UPS AT CONCRETE PAD DUCT BANKS AND AT BOTH ENDS OF CABLE ENTRY PORTS.

GENERAL PAINTING NOTES:

SURFACE PREPARATION (EXTERIOR & DRY INTERIOR):

- ABRASIVE BLAST CLEAN ALL NEW STEEL COMPONENTS TO AN SSPC-SP6 "COMMERCIAL BLAST CLEANING" CONDITION PRIOR TO APPLICATION OF PRIMER COAT.
- AFTER WELDING OR CUTTING, CLEAN ALL DAMAGED SURFACE IN ACCORDANCE WITH SSPC-SP3 "POWER TOOL CLEANING" CONDITION PRIOR TO APPLICATION OF PRIME COAT.

COATING (EXTERIOR):

- THE EXTERIOR PAINT REPAIR SYSTEM WILL BE A FOUR (4) COAT ZINC EPOXY URETHANE FLUOROPOLYMER. PAINT THE EXTERIOR TO MATCH THE EXISTING TOPCOAT COLOR.
- THE FOUR-COAT SYSTEM WILL BE APPLIED AT 2.0-3.5 MILS PER COAT, TO A THICKNESS OF 8.5-12.0 MILS.

COATING (DRY INTERIOR):

- THE DRY INTERIOR PAINT REPAIR SYSTEM WILL BE SPOT TWO COAT EPOXY. PAINT THE DRY INTERIOR TO MATCH THE EXISTING TOPCOAT COLOR.
- THE TWO-COAT SYSTEM WILL BE APPLIED AT 4.0-6.0 MILS PER COAT, TO A THICKNESS OF 8.0-12.0 MILS.

NOTES:

- FOLLOW ALL PAINT MANUFACTURERS' RECOMMENDATIONS WHEN USING THEIR PRODUCTS.

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PHONE:
FAX:

KCS CORPORATION
CONSULTING ENGINEERS
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LICENSED STRUCTURAL ENGINEER
RICHARD A. PETERSON
81-3446
STATE OF ILLINOIS

SIGNATURES:
DATE: 2/23/24 EXPIRES: 11/30/24

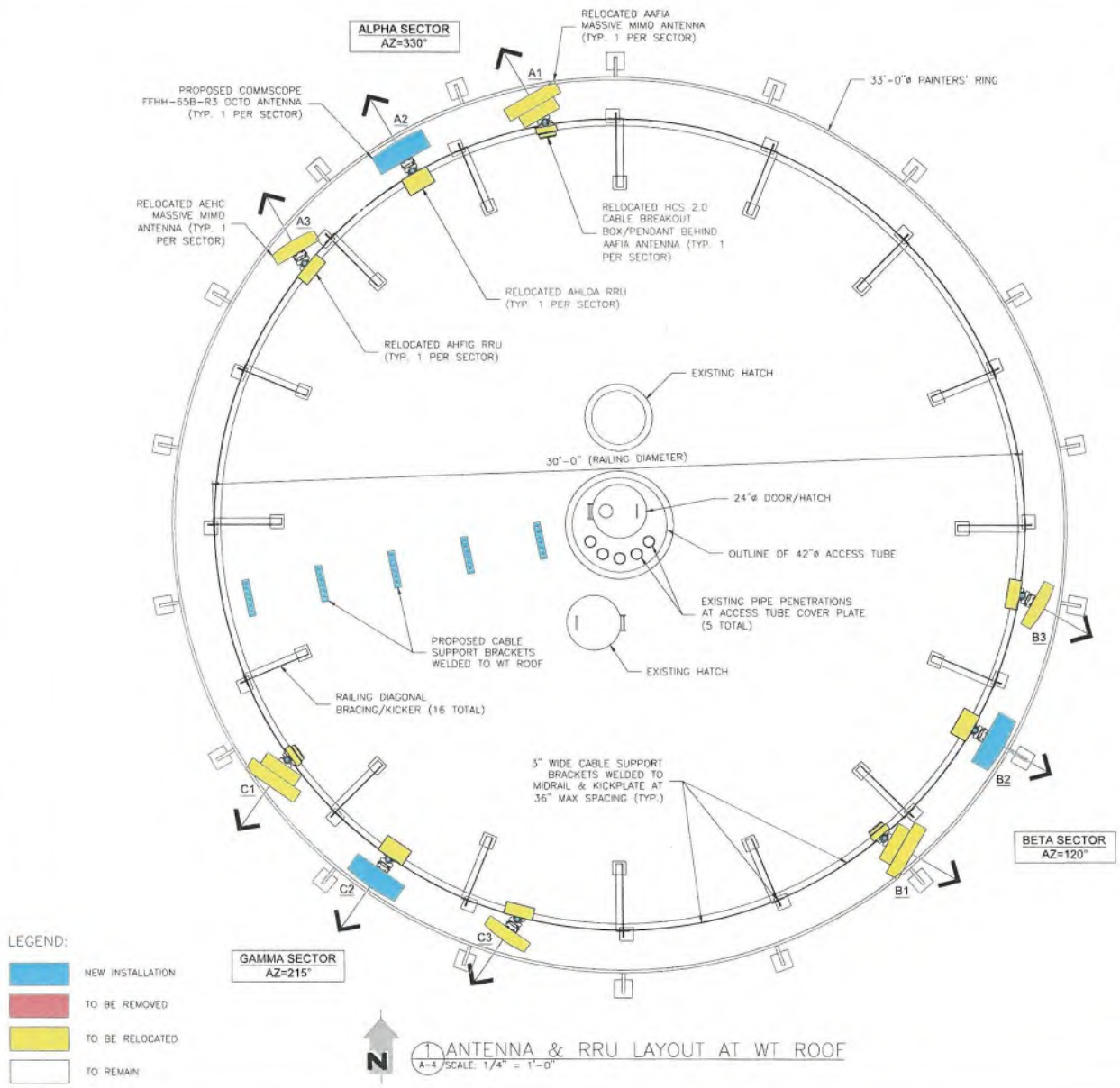
REV.	DESCRIPTION	DATE
D	ISSUED FOR PERMIT	2/23/24
B	ISSUED FOR REVIEW	2/1/24
A	ISSUED FOR REVIEW	1/24/24

CH74338A
BARTLETT WT SCHICK ROAD
401 E. SCHICK ROAD, BARTLETT, IL 60103

Drawing Title:
ELEVATION

Project Number:
Drawn by:
Date:
Client Project Number:
Checked by:
Date:
Date:
Approved for MS
Date:
Drawing Number:
A-3

TMO Signatory Level: L06
NLG-92871



1 ANTENNA & RRU LAYOUT AT WT ROOF
A-4 SCALE: 1/4" = 1'-0"

PROJECT NOTES:

1. PROPOSED EQUIPMENT & ANTENNA INSTALLATION IS BASED ON PASSING STRUCTURAL ANALYSES OF ANTENNA MOUNT AND WATER TANK PREPARED BY KCS CORPORATION DATED 2/23/2024.
2. ANTENNAS, MOUNTING PIPES, BRACES AND ASSOCIATED PLATES INSTALLED ON THE EXTERIOR OF THE WATER TOWER SHALL BE PAINTED TO MATCH THE COLOR OF THE WATER TOWER (VERIFY COLOR).
3. ANY NEW ANGLE ADAPTERS OR PIPE CLAMPS THAT MIGHT BE ADDED NEED TO BE ATTACHED WITH RUBBER STRIPS TO PREVENT METAL ON METAL CONTACT.

PENETRATION PIPES/DUCT BANK SEAL NOTES:

1. T-MOBILE PENETRATION PIPES AT THE TOP OF THE ACCESS TUBE NEED TO BE SEALED WITH RUBBER BOOT ASSEMBLIES AND/OR WEATHER RESISTANT CAULK TO A DEPTH OF 2" ON EXTERIOR ENDS. SPRAY FOAM, BUTYL, AND TAPE ARE NOT ACCEPTABLE ALTERNATIVES.
2. ALL UNUSED PENETRATION PIPES NEED TO BE SEALED WITH SOLID RUBBER BOOTS.

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BARTLETT WT SCHICK ROAD
401 E. SCHICK ROAD, BARTLETT, IL 60103

Drawing Title:
ANTENNA & RRU LAYOUT & MOUNTING DETAILS

Project Number:
Client Project Number:
Scale:
Drawing Number:
A-4

TMO Signatory Level: L06
NLC 03871

ANTENNA & CABLE SCHEDULE

SECTOR	1						2						3					
SECTOR NAME	ALPHA						BETA						GAMMA					
ANTENNA	A1	A2				A3	B1	B2				B3	C1	C2				C3
MODEL #	AAFIA (ACTIVE ANTENNA-MASSIVE MIMO)	COMMSCOPE FFHH-65B-R3 (OCTO)				AEHC (ACTIVE ANTENNA-MASSIVE MIMO)	AAFIA (ACTIVE ANTENNA-MASSIVE MIMO)	COMMSCOPE FFHH-65B-R3 (OCTO)				AEHC (ACTIVE ANTENNA-MASSIVE MIMO)	AAFIA (ACTIVE ANTENNA-MASSIVE MIMO)	COMMSCOPE FFHH-65B-R3 (OCTO)				AEHC (ACTIVE ANTENNA-MASSIVE MIMO)
AZIMUTH	330°						120°						215°					
RAD CENTER	±150.0'						±150.0'						±150.0'					
MECH. DOWNTILT	0	0				0	0	0				0	0	0				0
PORTS	P1	P2	P3	P4	P5	P6	P1	P2	P3	P4	P5	P6	P1	P2	P3	P4	P5	P6
ACTIVE TECHNOLOGY	L1900 L2100	L700 L600 N600	L700 L600 N600	N1900 L1900 G1900	N1900 L1900 G1900	L2500 N2500	L1900 L2100	L700 L600 N600	L700 L600 N600	N1900 L1900 G1900	N1900 L1900 G1900	L2500 N2500	L1900 L2100	L700 L600 N600	L700 L600 N600	N1900 L1900 G1900	N1900 L1900 G1900	L2500 N2500
DARK TECHNOLOGY				N2100	N2100					N2100	N2100					N2100	N2100	
DECOMMISSIONED TECHNOLOGY				U1900	U1900					U1900	U1900					U1900	U1900	
ELEC. DOWNTILT	2	2	2	2	2		2	2	2	2	2		2	2	2	2	2	
RRU TYPE		(1) AHLOA		(1) AHFIG				(1) AHLOA		(1) AHFIG				(1) AHLOA		(1) AHFIG		
CABLES																		
HYBRID TRUNK TYPE FROM EQUPMENT OVP TO ANTENNA SECTOR BREAKOUT BOX/PENDANT	**HCS 2.0 TRUNK 1 (N)**						**HCS 2.0 TRUNK 2 (N)**						**HCS 2.0 TRUNK 3 (N)**					
HCS TRUNK ESTIMATED LENGTH	(N) (1) 253.0'						(N) (1) 263.0'						(N) (1) 239.0'					
TRUNK CABLE FACTORY LENGTH	**(N) (1) 300.0'**						**(N) (1) 325.0'**						**(N) (1) 300.0'**					
HYBRID JUMPER TYPE FROM SECTOR BREAKOUT BOX TO SECTOR RRUs & AEHC ANTENNAS	**HCS 2.0 HYBRID JUMPER (N)**	**HCS 2.0 HYBRID JUMPER (N)**		**HCS 2.0 HYBRID JUMPER (N)**		**HCS 2.0 HYBRID JUMPER (N)**	**HCS 2.0 HYBRID JUMPER (N)**	**HCS 2.0 HYBRID JUMPER (N)**		**HCS 2.0 HYBRID JUMPER (N)**		**HCS 2.0 HYBRID JUMPER (N)**	**HCS 2.0 HYBRID JUMPER (N)**	**HCS 2.0 HYBRID JUMPER (N)**		**HCS 2.0 HYBRID JUMPER (N)**		**HCS 2.0 HYBRID JUMPER (N)**
HYBRID FIBER JUMPER LENGTH	**(N) (1) 15'-0"**	**(N) (1) 15'-0"**		**(N) (1) 30'-0"**		**(N) (1) 30'-0"**	**(N) (1) 15'-0"**	**(N) (1) 15'-0"**		**(N) (1) 30'-0"**		**(N) (1) 30'-0"**	**(N) (1) 15'-0"**	**(N) (1) 15'-0"**		**(N) (1) 30'-0"**		**(N) (1) 30'-0"**
RF JUMPER TYPE FROM RRU TO ANTENNA		**1/2" Ø COAX (N)**		**1/2" Ø COAX (N)**				**1/2" Ø COAX (N)**		**1/2" Ø COAX (N)**				**1/2" Ø COAX (N)**		**1/2" Ø COAX (N)**		
RF JUMPER LENGTH		**(N) (2) 6'-0"**	**(N) (2) 6'-0"**	**(N) (2) 14'-0"**	**(N) (2) 14'-0"**			**(N) (2) 6'-0"**	**(N) (2) 6'-0"**	**(N) (2) 14'-0"**	**(N) (2) 14'-0"**			**(N) (2) 6'-0"**	**(N) (2) 6'-0"**	**(N) (2) 14'-0"**	**(N) (2) 14'-0"**	

NOTE: T-MOBILE GC WILL CALL OUT HCS 2.0 LENGTHS REQUIRED TO EACH SECTOR ON SCOPE WALK; GET ON RFDS; GET MATERIALS ON ORDER THROUGH T-MOBILE BILL OF MATERIALS (BOM); AND CONFIRM PRIOR TO START OF CONSTRUCTION.

LEGEND: (N) - PROPOSED CABLE
(E) - EXISTING CABLE

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	
SECTOR B	
SECTOR C	
SECTOR D	YELLOW
SECTOR E	WHITE
SECTOR F	
LMU	
FIBER ID	GREY
UNUSED COAX	
MICROWAVE	ORANGE
SWR T-1's +GPS DOWNLINK CABLE	ID W/ LABEL MAKER

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.
2. CONTRACTOR SHALL INSTALL COLOR CODE RINGS ON EACH OF THE HYBRID CABLES AND JUMPERS CABLES WITH UV RESISTANT TAPE. ALL CABLES SHALL BE MARKED AT TOP AND BOTTOM WITH 2" COLOR TAPE OR STENCIL TAG. COLOR TAPE MAY BE OBTAINED FROM GRAYBAR ELECTRONICS.

FRONT OF THE ANTENNA

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

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SIGNATURES:
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401 E. SCHICK ROAD, BARTLETT, IL 60103

Drawing Title: ANTENNA & CABLE SCHEDULE

Project Number | Drawn by: | Date
Client Project Number | Checked by: | Date
Scale | Approved by: | Date
Drawing Number: A-5

TMO Signatory Level: L06
NLC 03871

PROPOSED:

COMMSCOPE

FFHH-65B-R3
8-port sector antenna, 4x617-806 and 4x1695-2360 MHz, 65° HPBW, 3Xret, 600 MHz-Ready

Port Configuration

Dimensions and Weight

Property	Value
Height	1830.0 mm (72.0 in.)
Width	640.0 mm (25.2 in.)
Depth	235.0 mm (9.3 in.)
Net Weight	46 kg (101.41 lbs.) without mounting kit

1 OCTO ANTENNA SPECIFICATIONS
SCALE: N.T.S.

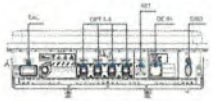
EXISTING/RELOCATED:

NOKIA

AEHC
Airscale MAA 64T64R 192AE n41 240W

There are no RF ports on the AEHC since it is an integrated radio within the antenna.

AEHC Interfaces
The ports of the AEHC are shown below:



Dimensions and Weight

Property	Value
Height	970 mm (38.2 in.) with front covers
Width	545 mm (21.5 in.) with front covers
Depth	150 mm (5.9 in.) with front covers
Net Weight	49 kg (108.0 lbs.) without mounting brackets

2 AEHC–MASSIVE MIMO ANTENNA SPECS
SCALE: N.T.S.

EXISTING/RELOCATED:

NOKIA

AAFIA

AirScale MAA 16T16R B25/66 200W

Dual band massive MIMO, 5G New Radio ready, integrated antenna system

Dimensions and Weight

Property	Value
Height	1840 mm (72.44 in.)
Width	650 mm (25.59 in.)
Depth	300mm (11.81 in.)
Weight	124 kg (273.37 lbs.)

3 AAFIA–MASSIVE MIMO ANTENNA SPECS
SCALE: N.T.S.

EXISTING/RELOCATED:

NOKIA

AHFIG
AirScale Dual RRH 4T4R B25/B66 Module

AHFIG Interface
The ports of the AHFIG are shown below:

Dimensions and Weight

Property	Value
Height	Core RRH: 695 mm (27.4 in.) With upper and lower mounting brackets: 730 mm (28.7 in.)
Width	Core RRH: 308 mm (12.1 in.) With mounting cover: 327mm (12.9 in.)
Depth	Core RRH: 131 mm (5.2 in.) With mounting cover: 142 mm (5.6 in.)
Net Weight	Core RRH: 32 kg (70.5 lbs.)

4 AHFIG SPECIFICATIONS
SCALE: N.T.S.

EXISTING/RELOCATED:

NOKIA

AHLOA
AirScale Dual RRH 4T4R B12/71 240W

AHLOA Interface

Dimensions and Weight

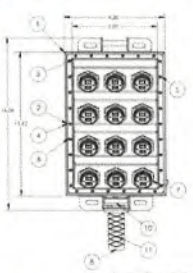
Property	Value
Height	560 mm (22.05 in.)
Width	308 mm (12.13 in.)
Depth	189 mm (7.44 in.)
Net Weight	38 kg (83.78 lbs.) without covers or brackets

5 AHLOA SPECIFICATIONS
SCALE: N.T.S.

EXISTING/RELOCATED:

ALLIANCE CORPORATION

HYBRID CABLE HI-CAP BREAKOUT BOX



Dimensions and Weight

Property	Value
Height	407.9 mm (16.06 in.)
Width	236.2 mm (9.3 in.)
Depth	146.8 mm (5.78 in.)
Net Weight	1.63 kg (3.59 lbs.)

6 BREAKOUT BOX SPECIFICATIONS
SCALE: N.T.S.

T··Mobile·

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A	ISSUED FOR REVIEW	1/24/24

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BARTLETT WT SCHICK ROAD

401 E. SCHICK ROAD, BARTLETT, IL 60103

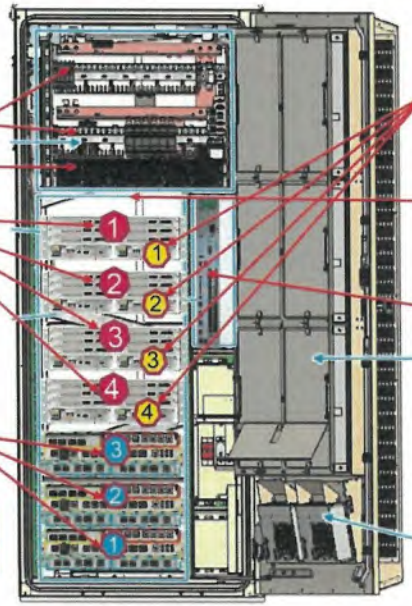
Drawing Title
ANTENNA & EQUIPMENT INFORMATION

Project Number	Drawn by: PA
Client Project Number	Checked by:
Scale	Approved by (all)
Drawing Number	Date

A-6

TMO Signatory Level: L06
NLG-03871

EXISTING:



1 SSC–HPL3 CABINET LAYOUT
SCALE: N.T.S.

EXISTING:

Nokia AirScale SM Indoor Technical Datasheet

Capacity Multi-RAT capable platform	Per Capacity plug-in unit in LTE16A: 8 LTE cells (FDD)
Minimum configuration	1 Common PIU (transport and control), 1 Capacity PIU (baseband processing)
Maximum configuration	2 Common PIU , 6 Capacity PIU
Installation options	19 inch standard rack, pole and wall (with mounting plinth), inside Outdoor Enclosure

Dimensions	(3U) H 128 mm x W 447 mm x D 400 mm H 5.04" x W 17.60" x D 15.75"
Installation Depth	400mm + cooling air space 50mm
Weight	Minimum (Common PIU + Capacity PIU): 10.1kg 22.27 LBS. Maximum (2 Common PIU + 6 Capacity PIU): 23.5kg 51.81 LBS.
Ingress protection	IP20
Operational Temperature Range	-5°C to 55°C

Supply Voltage / Voltage Range	Nominal: -48V DC / -40.5V to -57V
Power consumption	1 Common PIU & 1 Capacity PIU: typ 210W 1 Common PIU & 3 Capacity PIU: typ 420W 2 Common PIU & 6 Capacity PIU: typ 840W


Minimum configuration (1x BTS)


Minimum configuration (2x BTS, 1 BTS per half subrack)


Maximum AirScale SM Indoor configuration (FL16A: 1 BTS per half subrack)

NOKIA

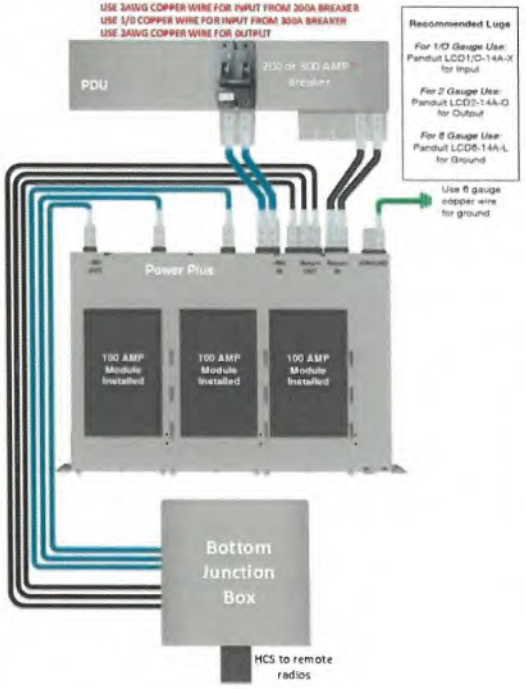
2 DETAIL–AMIA
SCALE: N.T.S.

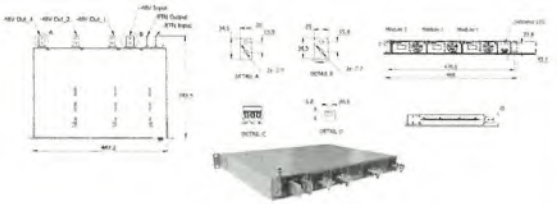
EXISTING:

NOTES:

VOLTAGE BOOSTER WILL BE CONFIGURED FOR SINGLE MODE OPERATION.

GC TO INSTALL (1) 200A DC BREAKER WITH (2) SETS OF 2/#2 AWG TO FEED THE VOLTAGE BOOSTER. PROVIDE TWO TO ONE TERMINAL ADAPTER AS REQUIRED FOR CIRCUIT BREAKER WIRING.





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BARTLETT WT SCHICK ROAD

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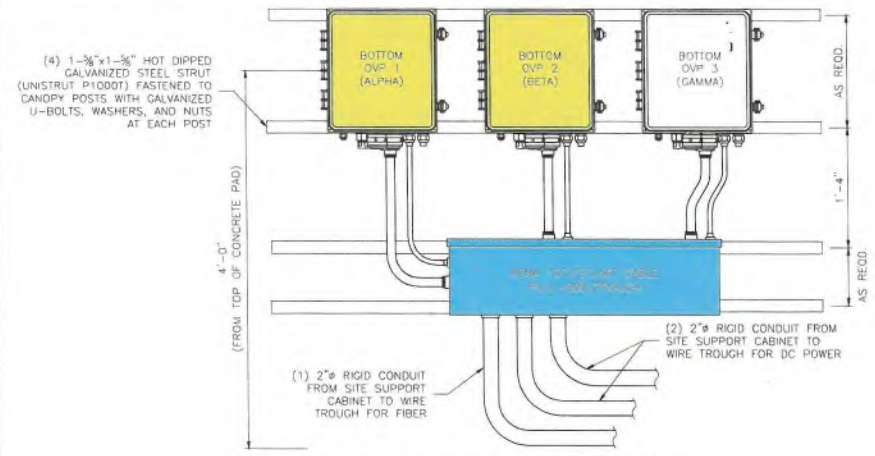
EQUIPMENT INFORMATION

A-7

TMO Signatory Level: L06
NLG 93871



1 DETAIL – BOTTOM OVP MOUNTING
SCALE: N.T.S.

PROPOSED:

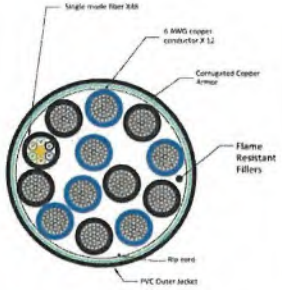
HybridConnect

NWS-HCS2-HC4-XXX

HCS 2.0 Trunk HiCap 12 RRU 12X4AWG

General Specifications	
Nominal OD	1.790 in (45.21 mm)
Cable Weight	2480 lb/mft (3690 kg/km)
Jacket Color	Black
Minimum Bend Radius: Installed	16.25"
DC Cable Specifications	
DC Pairs	6
DC Conductor Size	4 AWG
DC Resistance: Maximum	0.264 Ohms / 1000 ft.
Breakout Length: End 1	31 in (775 mm)
Breakout Length: End 2	Molded Enclosure

Product Ordering		
Part Number	Description	T-Mobile SKU
NWS-HCS2-HC4-250	HCS 2.0 Trunk HiCap 12 RRU 12x4AWG 250 FT	TBD
NWS-HCS2-HC4-275	HCS 2.0 Trunk HiCap 12 RRU 12x4AWG 275 FT	TBD
NWS-HCS2-HC4-300	HCS 2.0 Trunk HiCap 12 RRU 12x4AWG 300 FT	TBD
NWS-HCS2-HC4-325	HCS 2.0 Trunk HiCap 12 RRU 12x4AWG 325 FT	TBD
NWS-HCS2-HC4-350	HCS 2.0 Trunk HiCap 12 RRU 12x4AWG 350 FT	TBD
NWS-HCS2-HC4-375	HCS 2.0 Trunk HiCap 12 RRU 12x4AWG 375 FT	TBD
NWS-HCS2-HC4-400	HCS 2.0 Trunk HiCap 12 RRU 12x4AWG 400 FT	TBD
NWS-HCS2-HC4-425	HCS 2.0 Trunk HiCap 12 RRU 12x4AWG 425 FT	TBD
NWS-HCS2-HC4-450	HCS 2.0 Trunk HiCap 12 RRU 12x4AWG 450 FT	TBD



2 TRUNK CABLE INFORMATION
SCALE: N.T.S.

PROPOSED:

COMMSCOPE®

HFT410-ASNOK2-150

HELIAX® FiberFeed®

Hybrid Cable Assembly, HQLC

End 1: 4 fibers terminated DLC for Nokia RRU with flush cut power cord(red/black conductors).
End 2: 4 fibers terminated LC and 4X10 AWG conductors terminated at hybrid trunk connector. 15 ft

Dimensions

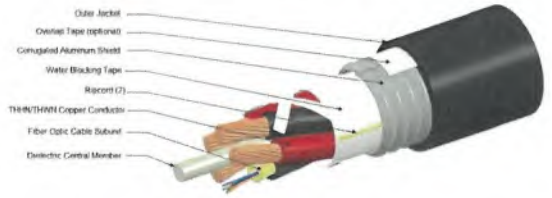
Property	Value
Cord Length	4.57m (14.993 ft)
Diameter Over Jacket	18.31mm (0.721 in)
Center Conductor Gauge	10 AWG
Minimum Bend Radius	221mm (8.701 in)

COMMSCOPE®

HTC-4SM-410-APVA

HELIAX® FiberFeed®

Hybrid Cable, UL Type TC-OF-ER



Properties

Description	Value
Buffer Tube/Subunit Diameter	3.556 mm (0.14 in)
Diameter Over Jacket	18.288 mm (0.72 in)
Center Conductor Gauge	10 AWG
Minimum Bend Radius, multiple bends loaded	365.76 mm (14.4 in)
Minimum Bend Radius, multiple bends loaded	220.98 mm (8.7 in)
Minimum Bend Radius, multiple bends loaded	127 mm (5 in)
Cable weight	456.122kg/km (306.5/kft)

3 HYBRID JUMPER CABLE INFORMATION
SCALE: N.T.S.

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BARTLETT WT SCHICK ROAD

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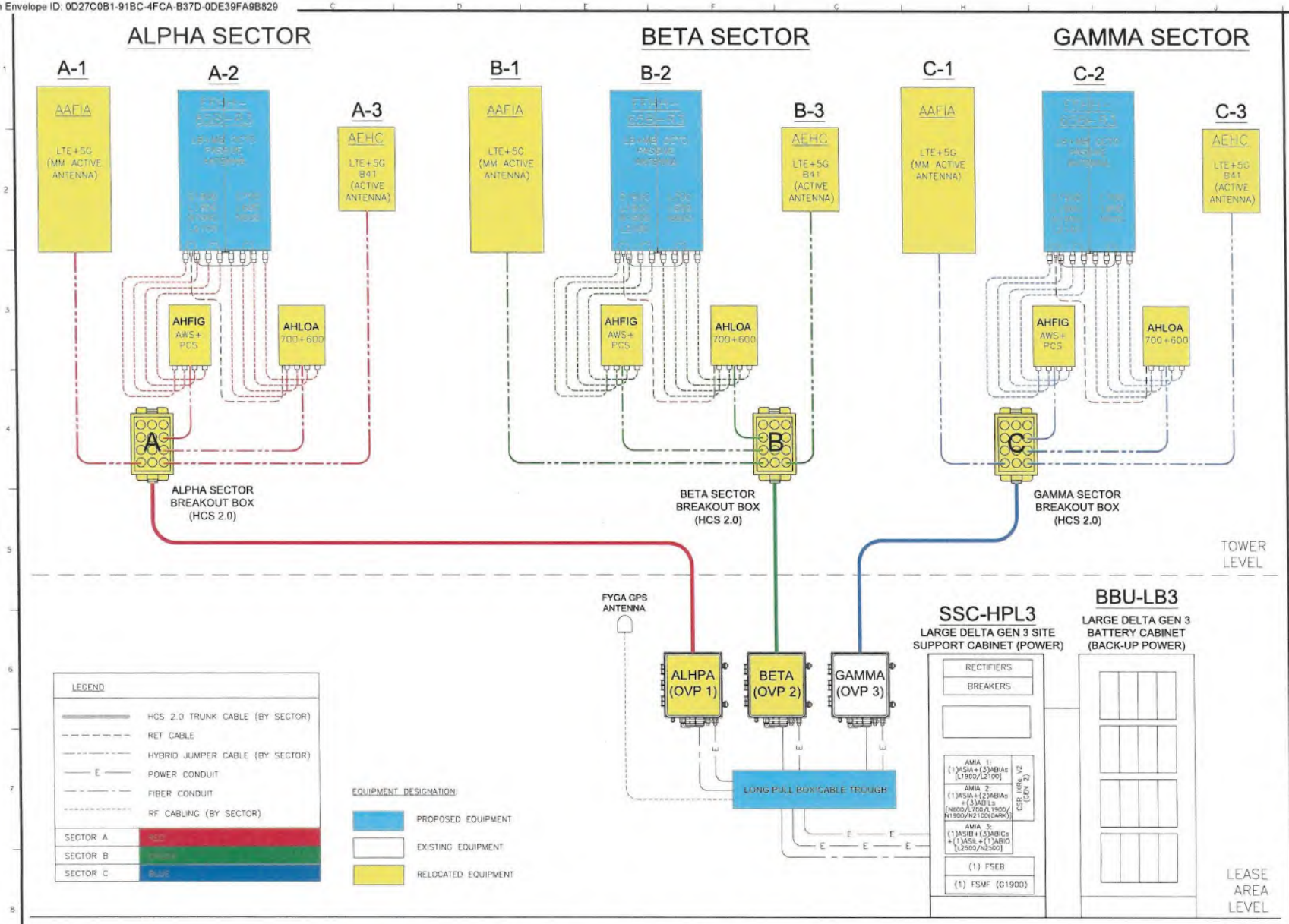
OVP MOUNTING DETAIL, CABLE INFORMATION

A-8

TNO Signatory Level: L06
NLG 02871



1 ANTENNA AND EQUIPMENT SCHEMATIC
SCALE: N.T.S.

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DOWNERS GROVE, IL 60515
PHONE:
FAX:

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SIGNATURES:
DATE: 2/23/24 EXPIRES: 11/30/25

REV.	DESCRIPTION	DATE
D	ISSUED FOR PERMIT	2/23/24
B	ISSUED FOR REVIEW	2/1/24
A	ISSUED FOR REVIEW	1/24/24

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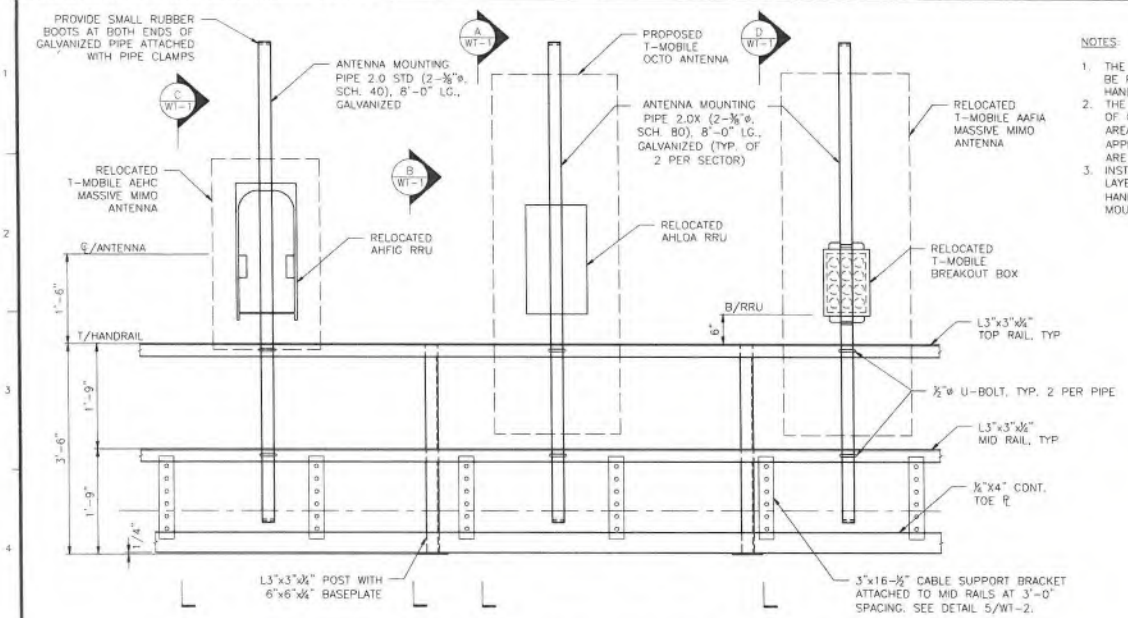
401 E. SCHICK ROAD, BARTLETT, IL 60103

ANTENNA & EQUIPMENT SCHEMATIC

A-9

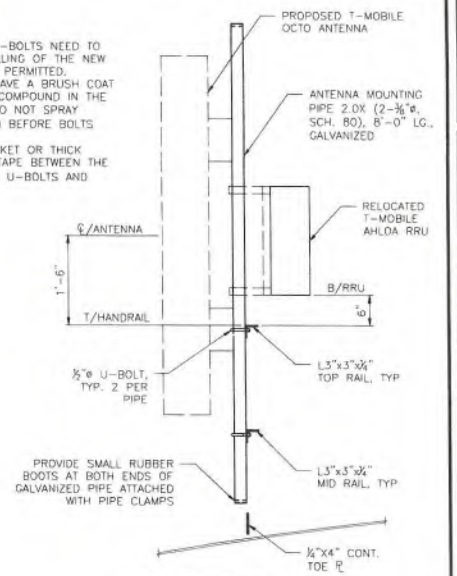
TMO Signatory Level: L06
NLG 93871



1 WT-1 HANDRAIL & ANTENNA/RRU MOUNT DETAIL
SCALE: 1/4" = 1'-0"

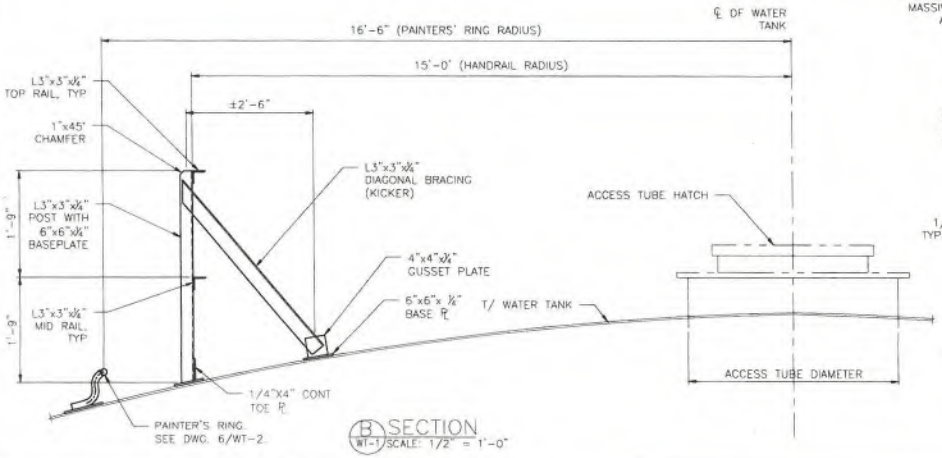
NOTES:

1. THE HOLES FOR THE U-BOLTS NEED TO BE PUNCHED OUT. DRILLING OF THE NEW HANDRAIL WILL NOT BE PERMITTED.
2. THE HOLES NEED TO HAVE A BRUSH COAT OF COLD GALVANIZING COMPOUND IN THE AREAS DRILLED OUT (DO NOT SPRAY APPLY THE COLD GALV) BEFORE BOLTS ARE INSTALLED.
3. INSTALL A RUBBER GASKET OR THICK LAYER OF ELECTRICAL TAPE BETWEEN THE HANDRAIL AND THE ½"ø U-BOLTS AND MOUNTING PIPES.

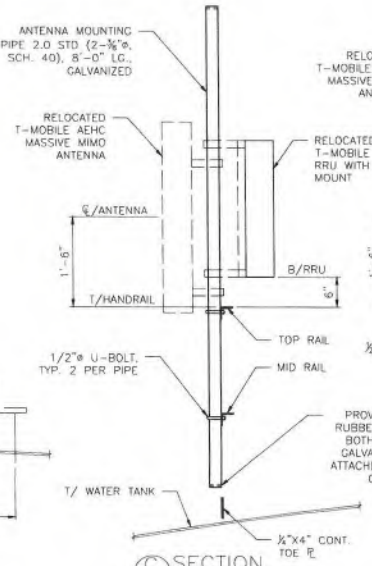


A WT-1 SECTION
SCALE: 1/2" = 1'-0"

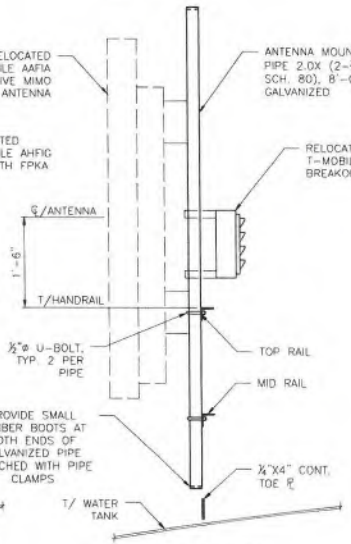
NOTE: HANDRAIL & PAINTER'S RING WILL BE INSTALLED BY THE VILLAGE OF BARLETT AS PART OF THE WATER TANK REPAINTING PROJECT.



B WT-1 SECTION
SCALE: 1/2" = 1'-0"



C WT-1 SECTION
SCALE: 1/2" = 1'-0"



D WT-1 SECTION
SCALE: 1/2" = 1'-0"

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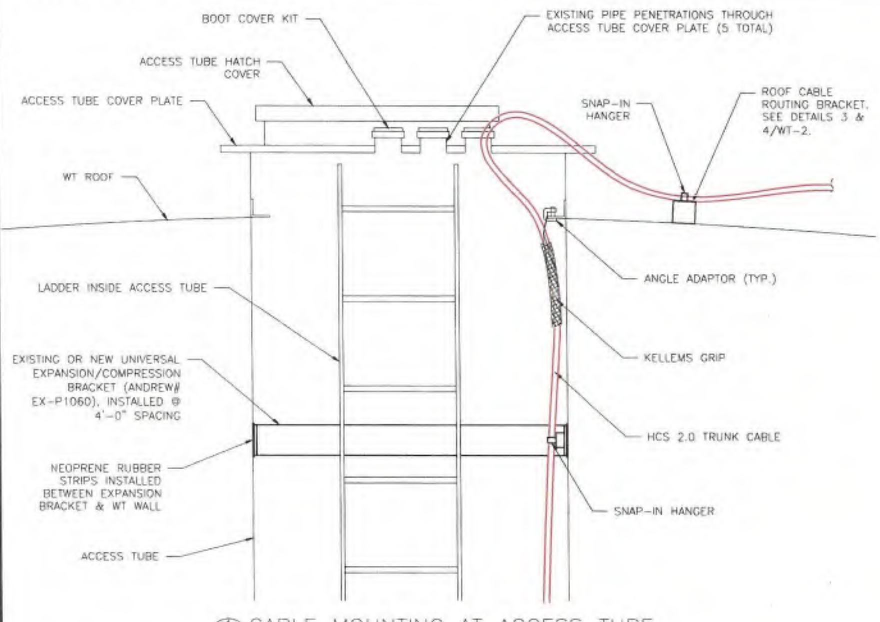
ANTENNA & RRU MOUNTING DETAILS

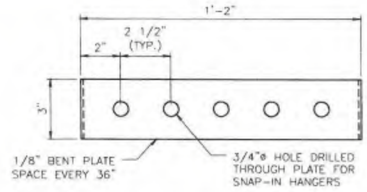
Project Number:	Drawn by: PA
Client Project Number:	Checked by:
Scale:	Approved by: MB
Drawing Number:	Date:

WT-1

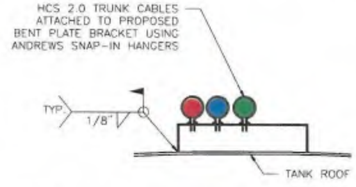
TMO Signatory Level: L06
NLG 93871



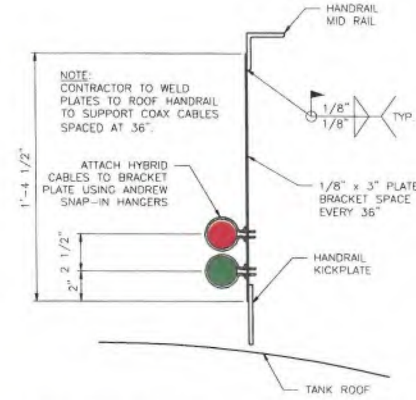
1 CABLE MOUNTING AT ACCESS TUBE
WT-2 SCALE: N.T.S.



3 COAX SUPPORT PLAN
WT-2 SCALE: 2" = 1'-0"



4 COAX SUPPORT SECTION
WT-2 SCALE: N.T.S.



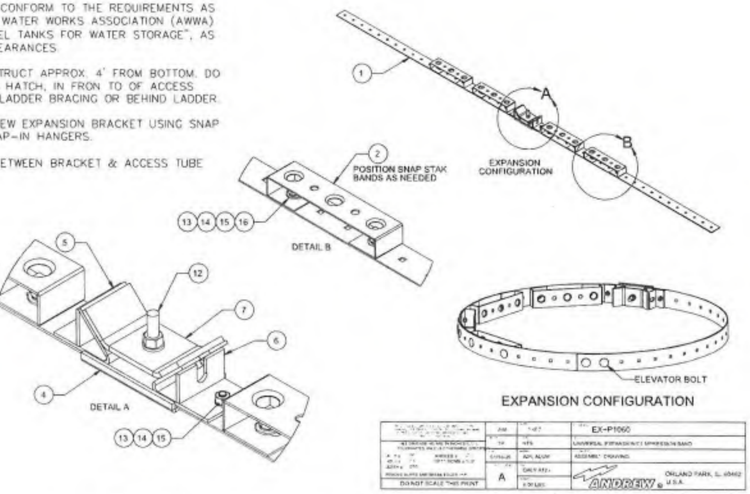
5 COAX ROUTING ON HANDRAIL
WT-2 SCALE: 1 1/2" = 1'-0"

NOTES:

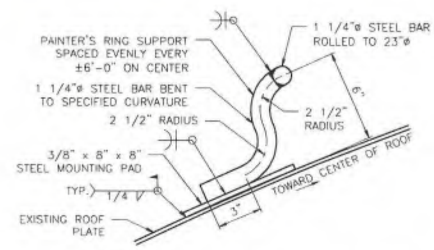
1. WORKING CLEARANCES SHALL CONFORM TO THE REQUIREMENTS AS SET FORTH IN THE AMERICAN WATER WORKS ASSOCIATION (AWWA) STANDARD FOR "WELDING STEEL TANKS FOR WATER STORAGE", AS WELL AS OSHA MANDATED CLEARANCES.
2. CONTRACTOR SHALL NOT OBSTRUCT APPROX. 4' FROM BOTTOM. DO NOT RUN COAX OVER ACCESS HATCH, IN FRON TO OF ACCESS LADDER, ON THE LADDER OR LADDER BRACING OR BEHIND LADDER.
3. ATTACH HYBRID CABLES TO NEW EXPANSION BRACKET USING SNAP STAK BANDS & ANDREWS SNAP-IN HANGERS.
4. INSTALL ⅛" THK. NEOPRENE BETWEEN BRACKET & ACCESS TUBE WALL.

EXPANSION CHART

DIA.	BAND LENGTH
30"	92"
32"	98"
34"	104"
36"	110"
38"	116"
40"	124"
42"	130"
44"	136"
46"	142"
48"	148"
50"	154"
52"	160"
54"	168"
56"	174"
58"	180"
60"	186"



2 DETAIL-EXPANSION BRACKET
WT-2 SCALE: N.T.S.



NOTE:
ALL WELDED CONNECTION POINTS FOR THE 1 1/4"ø ROLLED STEEL BAR MUST BE COMPLETED AT A STAND OFF ROOF SUPPORT.

6 PAINTER'S RING DETAIL
WT-2 SCALE: 1 1/2" = 1'-0"

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SIGNATURES: Richard A. Peterson
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Drawing Title
CABLE SUPPORT & MISCELLANEOUS DETAILS

Project Number:	Drawn by: / Date:
Client Project Number:	Checked by: / Date:
Scale:	Approved by: / Date:

Drawing Number
WT-2

TMO Signatory Level: L06
NLG-93871

ELECTRICAL NOTES:

THE GENERAL NOTES AND ACCOMPANYING DRAWINGS ARE TO INDICATE THE PROVISIONS AND REQUIREMENTS IN BY THE ELECTRICAL CONTRACTOR OF ALL LABOR, MATERIALS, AND EQUIPMENT REQUIRED TO INSTALL THE ELECTRICAL WORK COMPLETE IN CONNECTION WITH THIS SITE AND SHALL INCLUDE, BUT NOT LIMITED TO, THE FOLLOWING:

1. THE INSTALLATION, PROVISION, AND CONNECTION OF A GROUND ROD (ELECTRODE) SYSTEM AS INDICATED IN THE DRAWINGS.
2. THE INSTALLATION AND PROVISION OF AN ELECTRICAL SERVICE (OVERHEAD OR UNDERGROUND) AND ALL CONDUIT AND WIRE ASSOCIATED WITH IT AS INDICATED AND/OR REQUIRED ON PLANS.
3. THE INSTALLATION, PROVISION OF CONDUIT AND CONNECTIONS FOR LOCAL TELEPHONE SERVICE.
4. CONDUITS SHALL BE PVC SCHED. 40 UNLESS OTHERWISE NOTED.
5. ALL FISH LINE SHALL BE LEFT IN CONDUITS (PVC) FOR FUTURE USE.
6. THE CONTRACTOR SHALL FURNISH AND INSTALL ELECTRICAL SERVICE ENTRANCE CONDUCTORS, CONDUIT AND METER SOCKET AND MAKE THE NECESSARY CONNECTION TO THE SERVICE EQUIPMENT WITHIN THE BUILDING.

PRIOR TO THE SUBMISSION OF BIDS, THE ELECTRICAL CONTRACTOR SHALL VERIFY ALL DETAILS AND SCHEDULES ON THE DRAWINGS AND SPECIFICATIONS PROVIDED BY THE OWNER. FOR MEANING OF ABBREVIATIONS AND ADDITIONAL REQUIREMENTS AND INFORMATION, CHECK STRUCTURAL AND OTHER MECHANICAL AND ELECTRICAL DRAWINGS FOR SCALE, SPACE LIMITATIONS, BEAMS, DOOR SWINGS, WINDOWS, COORDINATION, AND ADDITIONAL INFORMATION, ETC. REPORT ANY DISCREPANCIES, CONFLICTS, ETC. TO THE OWNER BEFORE SUBMITTING BID.

UNLESS OTHERWISE NOTED, THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE NECESSARY MOTOR STARTERS, DISCONNECTS, CONTROLS, ETC. FOR ALL EQUIPMENT FURNISHED BY OTHER (FBO). ALL ASSOCIATED EQUIPMENT SHALL BE INSTALLED AND COMPLETELY WIRED BY THE ELECTRICAL CONTRACTOR IN ACCORDANCE WITH MANUFACTURER'S WIRE DIAGRAMS AND AS REQUIRED FOR A COMPLETE OPERATING INSTALLATION. ELECTRICAL CONTRACTOR SHALL VERIFY AND COORDINATE CHARACTERISTICS AND REQUIREMENTS OF (FBO) EQUIPMENT PRIOR TO ROUGH-IN OF CONDUIT AND WIRINGS TO AVOID CONFLICT.

CONTRACTOR RESPONSIBILITIES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND SECURING ALL REQUIRED PERMITS, LICENSES, INSPECTIONS, APPROVALS, AND PAYMENT OF ALL FEES.
2. THE INSTALLATION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE: STATE, LOCAL, AND NATIONAL CODES AS WELL AS THE LATEST ISSUE OF THE VARIOUS APPLICABLE STANDARD SPECIFICATIONS OF THE FOLLOWING RECOGNIZED AUTHORITIES:

   NEC – NATIONAL ELECTRIC CODE
   ANSI – AMERICAN NATIONAL STANDARD INSTITUTE
   IEEE – INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
   ASTM – AMERICAN SOCIETY FOR TESTING MATERIALS
   NEMA – NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
   UL – UNDERWRITERS LABORATORY, INC.

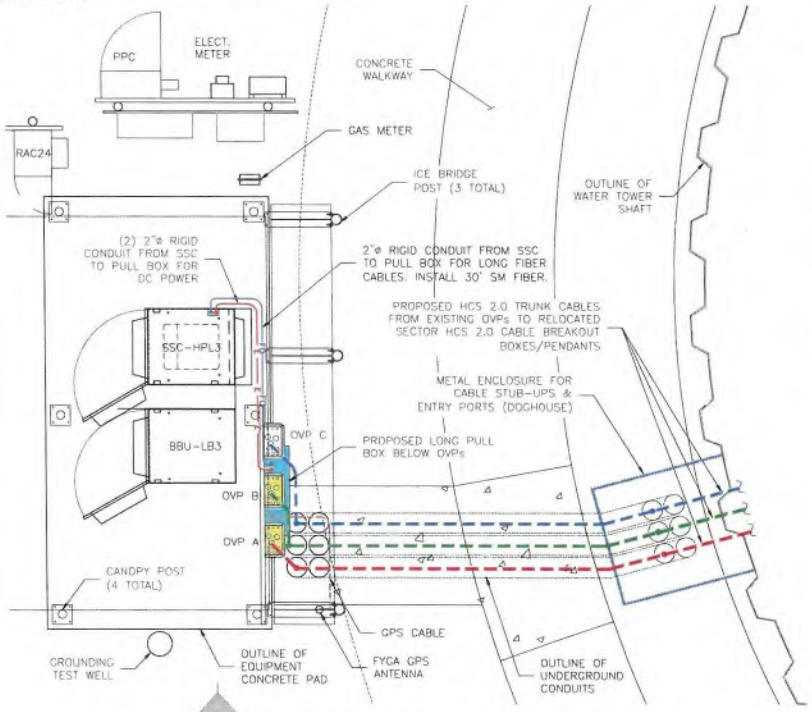
3. PRIOR TO COMMENCING WORK, THE ELECTRICAL CONTRACTOR SHALL CONFORM TO THE LOCAL UTILITY COMPANY'S REGULATIONS AND SHALL GET THE APPROVAL FROM THE SAME, BEFORE SUBMITTING HIS BID, TO DETERMINE FROM EACH UTILITY ADDITIONAL COSTS THEY MAY REQUIRE, AND SHALL BE INCLUDED IN HIS BID FOR CONTRACT.

UTILITIES GENERAL NOTES

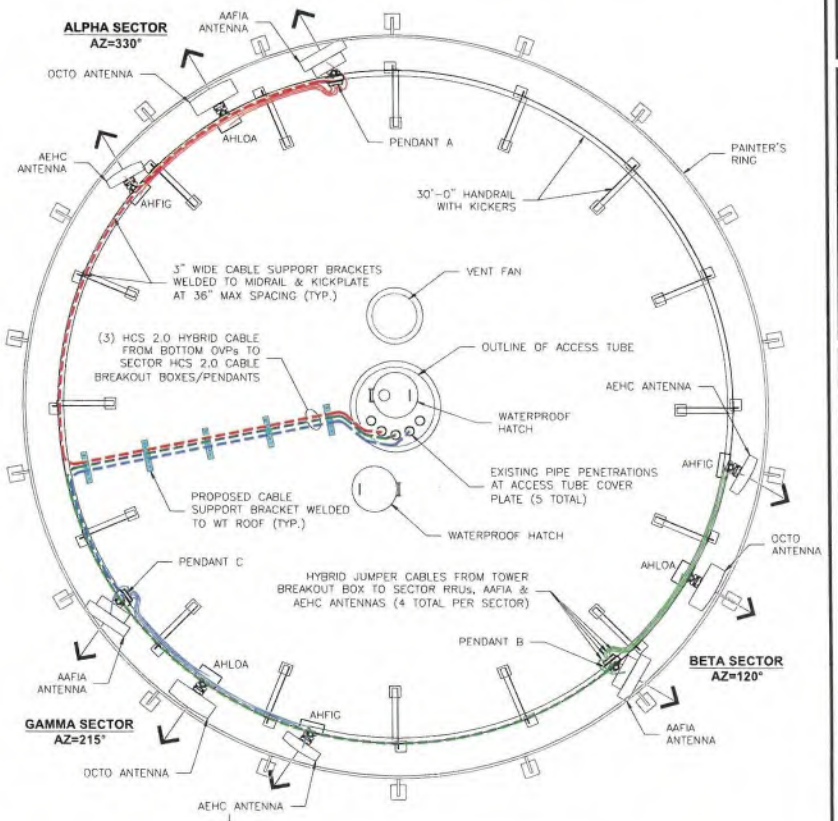
1. UTILITY POINTS OF SERVICE AND WORK/MATERIALS SHOWN ARE BASED ON PRELIMINARY INFORMATION ONLY, PROVIDED BY THE UTILITY COMPANIES AND ARE FOR BID PURPOSES ONLY.
2. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY FOR FINAL AND EXACT WORK/MATERIALS REQUIREMENTS AND CONSTRUCT TO UTILITY COMPANY PLANS AND SPECIFICATIONS ONLY. CONTRACTOR SHALL FURNISH AND INSTALL ALL CONDUIT, PULL WIRES, CABLES, PULL BOXES, CONCRETE ENCASEMENT OF CONDUIT (IF REQUIRED), TRANSFORMER PAD, BARRIERS, POLE RISERS, TRENCHING, BACKFILL.
3. PAY ALL UTILITY COMPANY FEES AND INCLUDE ALL REQUIREMENTS IN SCOPE OF WORK.

LEGEND

- FO — FIBER CONDUIT
- E — POWER CONDUIT
- G — ELECTRICAL GROUNDING CONDUIT
- ALPHA HCS 2.0 TRUNK CABLE
- BETA HCS 2.0 TRUNK CABLE
- GAMMA HCS 2.0 TRUNK CABLE
- ALPHA HYBRID JUMPER CABLES
- BETA HYBRID JUMPER CABLES
- GAMMA HYBRID JUMPER CABLES



1 LEASE AREA UTILITY PLAN
E-1 SCALE: 1/4" = 1'-0"



2 CABLE ROUTING AT WT ROOF
E-1 SCALE: 3/16" = 1'-0"

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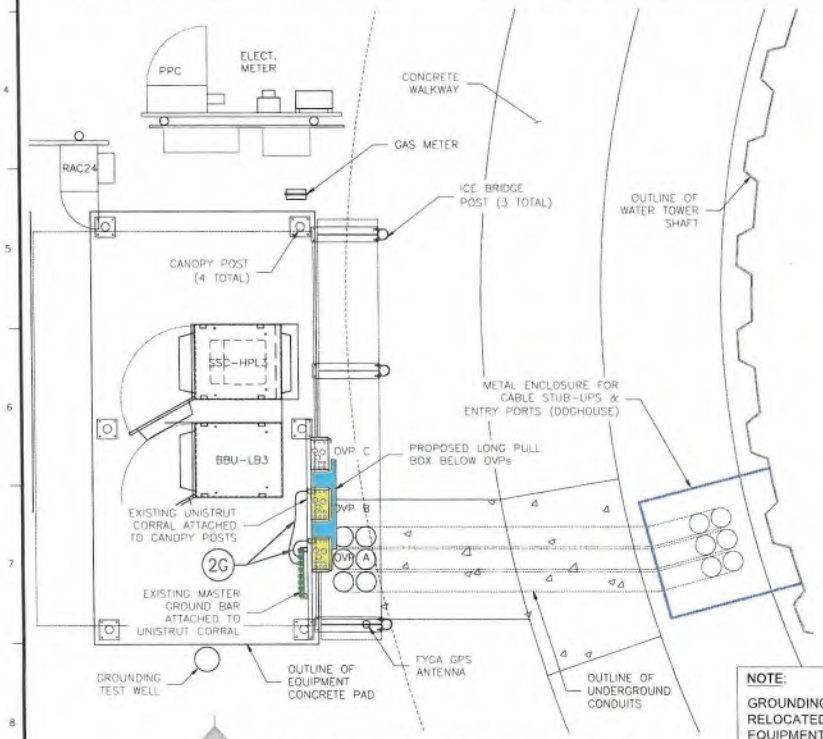
ELECTRICAL NOTES, UTILITY & CABLE ROUTING PLANS

E-1

TMO Signatory Level: L06
NLC 93871

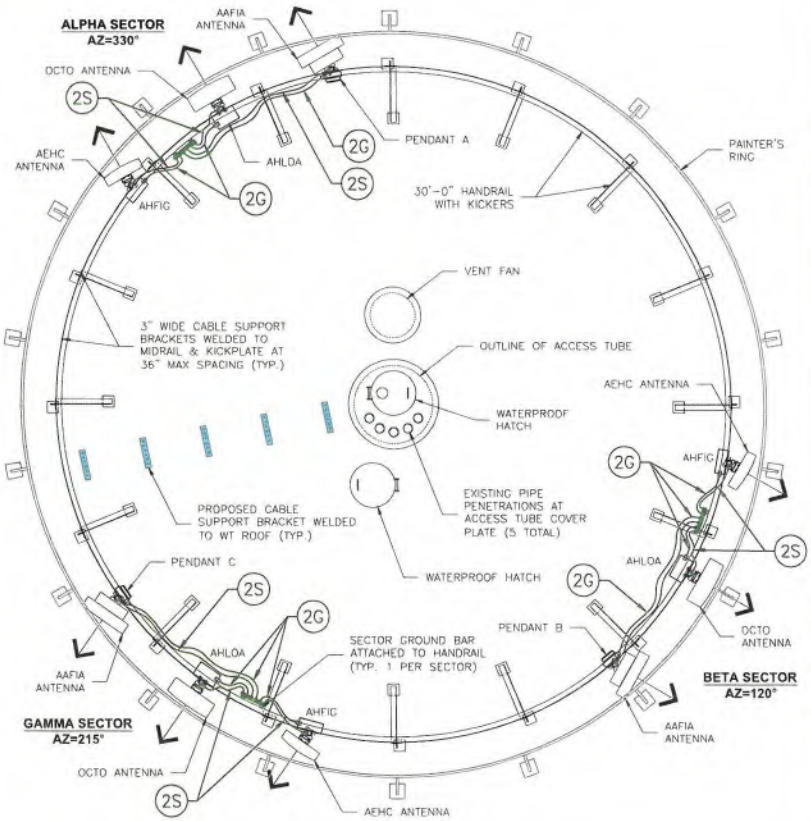
GROUNDING NOTES:

1. GROUNDING CONNECTIONS SHALL BE EXOTHERMIC TYPE ("CADWELD") TO ANTENNA MASTS, FENCE POSTS, MONOPOLE, AND THE GROUND RODS. REMAINING GROUNDING CONNECTIONS SHALL BE COMPRESSION FITTINGS.
2. GROUND CABLE SHIELDS AT BOTH ENDS WITH CABLE GROUNDING KITS.
3. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY.
4. CONTRACTOR TO PROVIDE GROUND WIRES, BARS AND CONNECTIONS AS SHOWN ON GROUNDING RISER DIAGRAM. CONTRACTOR SHALL TEST AND VERIFY THAT THE IMPEDANCE DOES NOT EXCEED 5 OHMS TO GROUND BY MEANS OF A 4 POINT BIDDLE-MEGGER TESTER. GROUNDING AND OTHER OPERATIONAL TESTING SHALL BE WITNESSED BY THE OWNER'S REPRESENTATIVE.
5. GROUNDING CONDUCTORS SHALL BE COPPER ONLY. ABOVE GROUND EITHER SOLID OR STRANDED CONDUCTORS ARE PERMITTED. IGR AND ALL EXTERNAL CONDUCTORS (W/ THE EXCEPTION FOR GROUND WIRE BETWEEN THE TOP AND THE BOTTOM OF THE ANTENNA TOWER) MUST BE BARE. EQUIPMENT GROUND LEADS IN CABLE TRAYS MUST BE GREEN INSULATED. BELOW GROUND BARE SOLID TINNED WIRE SHALL BE USED. ALL WIRES MUST BE #2 AWG MIN. WITH THE EXCEPTION OF GROUND WIRES FOR MISCELLANEOUS METALLIC OBJECTS IN THE EQUIPMENT SHELTER, WHERE #6 WIRES CAN BE USED.
6. THE GROUND ELECTRODE SYSTEM SHALL CONSIST OF DRIVEN GROUND RODS UNIFORMLY SPACED AROUND CELL SITE. THE GROUND RODS SHALL BE ⅝"x10'-0" COPPER CLAD STEEL. THE RODS SHALL BE INTERCONNECTED WITH #2 AWG BARE SOLID TINNED COPPER GROUND WIRE BURIED 42" BELOW THE SURFACE OF THE SOIL. MINIMUM DISTANCE BETWEEN GROUND RODS = 8', MAXIMUM = 16'.
7. METALS WITHIN 6' OF THE GROUND RING SHALL BE BONDED TO THE GROUND RING.
8. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER WHEN THE GROUNDING IS COMPLETE. THE CONSTRUCTION MANAGER SHALL INSPECT THE GROUNDING SYSTEM PRIOR TO BACKFILLING.
9. VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO ANY DIGGING.
10. GROUND CONDUCTOR BENDS SHALL NOT BE LESS THAN 8" RADIUS.
11. GROUND CONDUCTORS TO THE GROUND RING SHALL BE IN 3/4" "LIQUID-TITE" FLEX DUCT AND SEALED AT EXIT W/ SILICONE CAULK.
12. ANTENNA INSTALLATION CONTRACTOR TO PROVIDE & INSTALL TOP, RF BUSBARS & BUSBAR BELOW CENTERLINE.



1 LEASE AREA GROUNDING PLAN
E-2 SCALE: 1/4" = 1'-0"

NOTE:
GROUNDING PLAN IS FOR NEW/ RELOCATED EQUIPMENT. EXISTING EQUIPMENT TO RETAIN ORIGINAL GROUNDING CONNECTIONS.



2 GROUNDING PLAN AT WT ROOF
E-2 SCALE: 3/16" = 1'-0"

LEGEND	
	GROUND BAR
	CADWELD OR APPROVED CONNECTION
	SPARE GROUND LEAD
	MECHANICAL CONNECTION

KEY NOTES	
2G	#2 AWG GREEN STRANDED GROUND COPPER WIRE
2S	#2 AWG SOLID, TINNED BARE COPPER GROUND WIRE
6G	#6 AWG GREEN STRANDED GROUND COPPER WIRE

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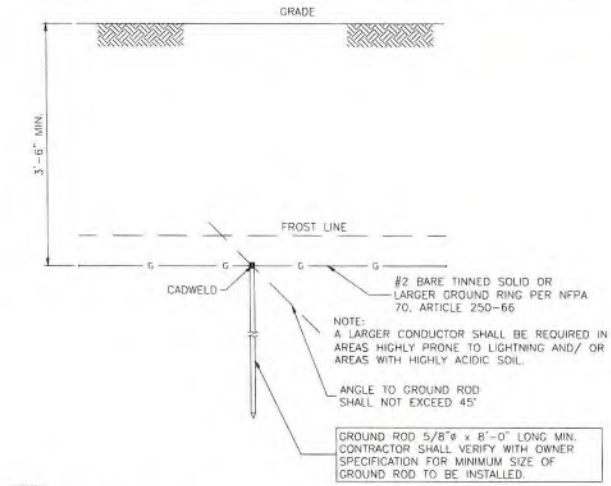
Drawing Title
GROUNDING NOTES, GROUNDING PLANS

Project Number:	Drawn by: PA
	Date:
Client Project Number:	Checked by:
	Date:
Scale:	Approved by: MS
	Date:
Drawing Number:	E-2

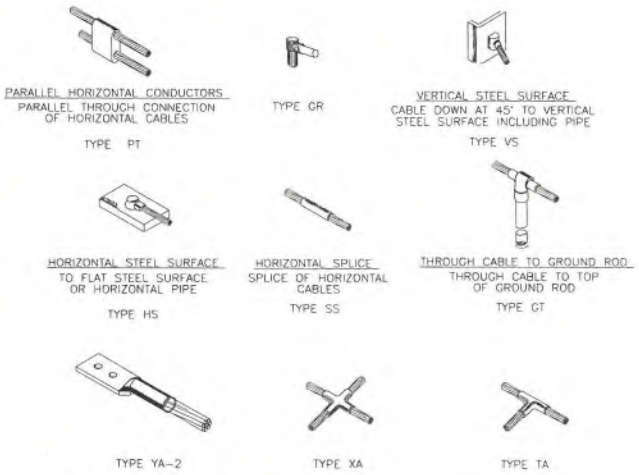
TNO Signatory Level: L06
NLG 02871



NOTES:

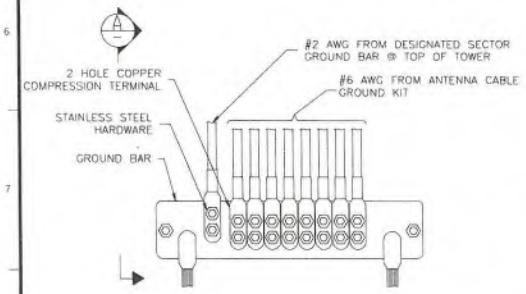
1. GROUND RODS MAY BE:
   - COPPER CLAD STEEL
   - SOLID COPPER
2. GROUND RODS SHALL HAVE A MAX. SPACING TWICE THE LENGTH OF ROD
3. SEE RESISTIVITY REPORT FOR VERIFICATION AS AVAILABLE
4. GROUND RODS INSTALLED WITHIN CLOSE PROXIMITY TO TOWER OR WHEN SOIL IS AT OR BELOW 2,000 OHM-CM, SHALL BE GALVANIZED TO PREVENT GALVANIC CORROSION OF TOWER (SEE ANSI/TIA-EIA-222-G)

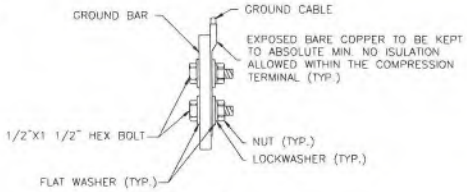
1 E-5 GROUNDING ROD (IF REQUIRED)
SCALE: N.T.S.



NOTE: CADWELD "TYPES" SHOWN ABOVE ARE EXAMPLES. CONSULT WITH PROJECT MANAGER FOR SPECIFIC TYPES OF CADWELDS TO BE USED FOR THIS PROJECT.

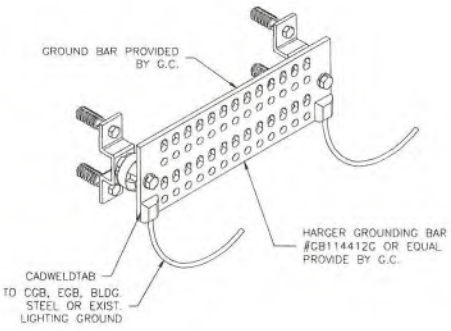
3 E-5 CADWELD TYPES
SCALE: N.T.S.





SECTION A-A

2 E-5 GROUNDING BAR CONNECTION
SCALE: N.T.S.



4 E-5 COLLECTOR GROUND BAR (CGB)
SCALE: N.T.S.

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B	ISSUED FOR REVIEW	2/1/24
A	ISSUED FOR REVIEW	1/24/24

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Drawing Title:
GROUNDING DETAILS

Project Number	Drawn by: PA
	Date
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	Date
None	Approved by (if)
	None

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E-3

TMO Signatory Level: L06
NLG 02871

DIVISION 1 – GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 INTENT

THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS ACCOMPANYING THEM DESCRIBE THE WORK TO BE DONE AND THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION.

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.

THE INTENTION OF THE DOCUMENTS IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.

THE PURPOSE OF THE SPECIFICATIONS IS TO INTERPRET THE INTENT OF THE DRAWINGS AND TO DESIGNATE THE METHOD OF THE PROCEDURE, TYPE AND QUALITY OF MATERIALS REQUIRED TO COMPLETE THE WORK.

MINOR DEVIATIONS FROM THE DESIGN LAYOUT ARE ANTICIPATED AND SHALL BE CONSIDERED AS PART OF THE WORK. NO CHANGES THAT ALTER THE CHARACTER OF THE WORK WILL BE MADE OR PERMITTED BY THE OWNER WITHOUT ISSUING A CHANGE ORDER.

1.2 CONFLICTS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO THE OWNER FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.

THE BIDDER, IF AWARDED THE CONTRACT, WILL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER OR THING CONCERNING WHICH SUCH BIDDER MIGHT HAVE FULLY INFORMED THEMSELVES PRIOR TO THE BIDDING.

NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED OR OF ANY OTHER RELEVANT MATTER CONCERNING THE WORK TO BE PERFORMED IN THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS GOVERNING THE WORK.

1.3 CONTRACTS AND WARRANTIES

CONTRACTOR IS RESPONSIBLE FOR APPLICATION AND PAYMENT OF CONTRACTOR LICENSES AND BONDS.

SEE MASTER CONSTRUCTION SERVICES AGREEMENT FOR ADD'L DETAILS.

1.4 STORAGE

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

1.5 CLEAN UP

THE CONTRACTORS SHALL AT ALL TIMES KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THEIR EMPLOYEES AT WORK AND AT THE COMPLETION OF THE WORK, THEY SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE BUILDING AREA, INCLUDING ALL THEIR TOOLS, SCAFFOLDING AND SURPLUS MATERIALS AND SHALL LEAVE THEIR WORK CLEAN AND READY FOR USE.

EXTERIOR: VISUALLY INSPECT EXTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER.

1. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
2. IF NECESSARY TO ACHIEVE A UNIFORM DEGREE OF CLEANLINESS, HOSE DOWN THE EXTERIOR OF THE STRUCTURE.

INTERIOR:

VISUALLY INSPECT INTERIOR SURFACE AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER FROM WALLS/FLOOR/CEILING.

1. REMOVE ALL TRACES OF SPLASHED MATERIAL FROM ADJACENT SURFACES.
2. REMOVE PAINT DROPPINGS, SPOTS, STAINS AND DIRT FROM FINISHED SURFACES.

1.6 CHANGE ORDER PROCEDURE

CHANGE ORDERS MAY BE INITIATED BY THE OWNER AND/OR THE CONTRACTOR INVOLVED. THE CONTRACTOR, UPON VERBAL REQUEST FROM THE OWNER SHALL PREPARE A WRITTEN PROPOSAL DESCRIBING THE CHANGE IN WORK OR MATERIALS AND ANY CHANGES IN THE CONTRACT AMOUNT AND PRESENT TO THE OWNER WITHIN 72 HRS FOR APPROVAL. SUBMIT REQUESTS FOR SUBSTITUTIONS IN THE FORM AND IN ACCORDANCE WITH PROCEDURES REQUIRED FOR CHANGE ORDER PROPOSALS. ANY CHANGES IN SCOPE OF WORK OR MATERIALS WHICH ARE PERFORMED BY THE CONTRACTOR WITHOUT A WRITTEN CHANGE ORDER AS DESCRIBED AND APPROVED BY THE OWNER SHALL PLACE FULL RESPONSIBILITY OF THESE ACTIONS ON THE CONTRACTOR.

1.7 RELATED DOCUMENTS AND COORDINATION

GENERAL NOTES, CIVIL, STRUCTURAL, ELECTRICAL AND ANTENNA DRAWINGS ARE INTERRELATED. IN PERFORMANCE OF THE WORK; THE CONTRACTOR MUST REFER TO ALL DRAWINGS. ALL COORDINATION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.8 SHOP DRAWINGS

A. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AS REQUIRED AND LISTED IN THESE SPECIFICATIONS TO THE OWNER FOR APPROVAL.

B. ALL SHOP DRAWINGS SHALL BE REVIEWED, CHECKED AND CORRECTED BY CONTRACTOR PRIOR TO SUBMITTAL TO THE OWNER.

1.9 PRODUCTS AND SUBSTITUTIONS

A. SUBMIT 3 COPIES OF EACH REQUEST FOR SUBSTITUTION. IN EACH REQUEST IDENTIFY THE PRODUCT OR FABRICATION OR INSTALLATION METHOD TO BE REPLACED BY THE SUBSTITUTION. INCLUDE RELATED SPECIFICATION SECTION AND DRAWING NUMBERS AND COMPLETE DOCUMENTATION SHOWING COMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS.

B. SUBMIT ALL NECESSARY PRODUCT DATA AND CUT SHEETS WHICH PROPERLY INDICATE AND DESCRIBE THE ITEMS, PRODUCTS AND MATERIALS BEING INSTALLED. THE CONTRACTOR SHALL, IF DEEMED NECESSARY BY THE OWNER SUBMIT ACTUAL SAMPLES TO THE OWNER FOR APPROVAL IN LIEU OF CUT SHEETS.

1.10 QUALITY ASSURANCE

ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS. THESE SHALL INCLUDE BUT NOT BE LIMITED TO THE LATEST VERSION OF THE FOLLOWING:

TIA–222–H
2018 INTERNATIONAL BUILDING CODE
2017 NATIONAL ELECTRICAL CODE
UNDERWRITER LABORATORIES APPROVED ELECTRICAL PRODUCTS
AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS (AISC)
LIFE SAFETY CODE NFPA – 101–2018

1.11 ADMINISTRATION

A. BEFORE THE COMMENCEMENT OF ANY WORK, THE CONTRACTOR WILL ASSIGN A PROJECT MANAGER WHO WILL ACT AS A SINGLE POINT OF CONTACT FOR ALL PERSONNEL INVOLVED IN THIS PROJECT. THIS PROJECT MANAGER WILL DEVELOP A MASTER SCHEDULE FOR THE PROJECT WHICH WILL BE SUBMITTED TO THE OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK.

B. SUBMIT A BAR TYPE PROGRESS CHART NOT MORE THAN 3 DAYS AFTER THE DATE ESTABLISHED FOR COMMENCEMENT OF THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR EACH MAJOR CATEGORY OR UNIT OF WORK TO BE PERFORMED AT SITE, PROPERLY SEQUENCED AND COORDINATED WITH OTHER ELEMENTS OF WORK AND SHOWING COMPLETION OF THE WORK SUFFICIENTLY IN ADVANCE OF THE DATE ESTABLISHED FOR SUBSTANTIAL COMPLETION OF THE WORK.

C. PRIOR TO COMMENCING CONSTRUCTION, THE OWNER SHALL SCHEDULE AN ON–SITE MEETING WITH ALL MAJOR PARTIES. THIS WOULD INCLUDE (THOUGH NOT LIMITED TO) THE OWNER, PROJECT MANAGER, CONTRACTOR, LAND OWNER REPRESENTATIVE, LOCAL TELEPHONE COMPANY, TOWER ERECTION FOREMAN (IF SUBCONTRACTED).

D. CONTRACTOR SHALL BE EQUIPPED WITH SOME MEANS OF CONSTANT COMMUNICATIONS, SUCH AS A MOBILE PHONE OR A BEEPER. THIS EQUIPMENT WILL NOT BE SUPPLIED BY THE OWNER, NOR WILL WIRELESS SERVICE BE ARRANGED.

E. DURING CONSTRUCTION, CONTRACTOR MUST ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS AT ALL TIMES. CONTRACTOR WILL COMPLY WITH ALL SAFETY REQUIREMENTS IN THEIR AGREEMENT.

F. PROVIDE WRITTEN DAILY UPDATES ON SITE PROGRESS TO THE OWNER.

G. COMPLETE INVENTORY OF CONSTRUCTION MATERIALS AND EQUIPMENT IS REQUIRED PRIOR TO START OF CONSTRUCTION.

H. NOTIFY THE OWNER / PROJECT MANAGER IN WRITING NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS, TOWER ERECTIONS, AND EQUIPMENT CABINET PLACEMENTS.

1.12 INSURANCE AND BONDS

A. CONTRACTOR SHALL AT THEIR OWN EXPENSE CARRY AND MAINTAIN FOR THE DURATION OF THE PROJECT ALL INSURANCE AS REQUIRED AND LISTED AND SHALL NOT COMMENCE WITH THEIR WORK UNTIL THEY HAVE PRESENTED AN ORIGINAL CERTIFICATE OF INSURANCE STATING ALL COVERAGES TO THE OWNER. REFER TO THE MASTER AGREEMENT FOR REQUIRED INSURANCE LIMITS.

B. THE OWNER SHALL BE NAMED AS AN ADDITIONAL INSURED ON ALL POLICIES.

C. CONTRACTOR MUST PROVIDE PROOF OF INSURANCE.

DIVISION 13 – SPECIAL CONSTRUCTION

13100 TOWER & ANTENNA INSTALLATION

PART 1 – GENERAL

1.1 WORK INCLUDED

A. INSTALL ANTENNAE AS INDICATED ON DRAWINGS AND OWNER SPECIFICATIONS.

B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

C. SUPPLY AND INSTALL ONE ISOLATED GROUND BAR AT EQUIPMENT CABINET.

D. SUPPLY AND INSTALL GROUNDING STRAP KITS WITH LONG BARREL COMPRESSION LUGS (SIM. TO ANDREW–223700TBD OR APPROVED EQUAL) ATOP TOWER BASE BEFORE ENTERING THE EQUIPMENT. GROUNDING STRAPS TO BE CONNECTED TO INSULATED GROUND BAR.

E. ASSIST OWNER TECHNICIANS IN PERFORMING SWEEP TEST OF INSTALLED COAX.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATION IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

1.3 APPLICABLE STANDARDS

A. EIA – ELECTRONIC INDUSTRIES ASSOCIATION EIA/TIA–222–H STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

B. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460–1H, OBSTRUCTION MARKING AND LIGHTING.

C. FCC – FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.

D. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS.

E. NATIONAL ELECTRICAL CODE, 2017– ON TOWER LIGHTING KITS.

F. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

G. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

H. LIFE SAFETY CODE NFPA – 101–2018.

DIVISION 16 – GENERAL ELECTRIC

GENERAL ELECTRICAL PROVISION

1. SUBMITTAL OF BID INDICATES CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT.
2. CONTRACTOR SHALL PERFORM ALL VERIFICATION OBSERVATION TEST, AND EXAMINATION WORK PRIOR TO THE ORDERING OF THE ELECTRICAL EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE ARCHITECT LISTING ALL MALFUNCTIONS, FAULTY EQUIPMENT AND DISCREPANCIES.
3. HEIGHTS SHALL BE VERIFIED WITH OWNER PRIOR TO INSTALLATION.
4. THESE PLANS ARE DIAGRAMMATIC ONLY, FOLLOW AS CLOSELY AS POSSIBLE.
5. ELECTRICAL SERVICE SHALL BE 120/240 VAC SINGLE PHASE 3 WIRE 200 AMP SERVICE.
6. EACH CONDUCTOR OF EVERY SYSTEM SHALL BE PERMANENTLY TAGGED IN EACH PANEL BOARD, PULL BOX, J–BOX, SWITCH BOX, ETC., IN COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ACT (O.S.H.A.).
7. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC., FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.
8. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. MATERIALS SHALL BE LISTED "U" WHERE SUBJECT TO SUCH APPROVAL. MATERIALS SHALL MEET WITH APPROVAL OF THE DIVISION OF INDUSTRIAL SAFETY AND ALL GOVERNING BODIES HAVING JURISDICTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA AND NBFU.
9. ALL CONDUIT INSTALLED SHALL BE SURFACE MOUNTED OR DIRECT BURIAL UNLESS OTHERWISE NOTED.
10. CONTRACTOR SHALL CARRY OUT THEIR WORK IN ACCORDANCE WITH ALL GOVERNING STATE,COUNTY AND LOCAL CODES AND O.S.H.A.
11. CONTRACTOR SHALL SECURE ALL NECESSARY BUILDING PERMITS AND PAY ALL REQUIRED FEES.
12. COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE BY OWNER. ANY WORK, MATERIAL OR EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE, UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.
13. ALL CONDUIT ONLY SHALL HAVE A PULL WIRE OR ROPE.
14. PROVIDE PROJECT MANAGER WITH ONE SET OF COMPLETE ELECTRICAL "AS INSTALLED" DRAWINGS AT THE COMPLETION OF THE JOB, SHOWING ACTUAL DIMENSIONS, ROUTINGS AND CIRCUITS.

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SIGNATURES:

DATE: 2/23/24 EXPIRES: 11/30/25

REV.	DESCRIPTION	DATE
0	ISSUED FOR PERMIT	2/23/24
B	ISSUED FOR REVIEW	2/1/24
A	ISSUED FOR REVIEW	1/24/24

CH74338A
BARTLETT WT SCHICK ROAD

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Drawing Title: NOTES

Project Number	Drawn by: FA
	Date:
Client Project Number	Checked by:
	Date:
Scale	Approved by: MS
	Date:

Drawing Number: N-1

TMO Signatory Level: L06
NLG 03871

15. ALL BROCHURES, OPERATING MANUALS, CATALOGS, SHOP DRAWINGS, ETC., SHALL BE TURNED OVER TO THE OWNER AT JOB COMPLETION.
16. USE T-TAP CONNECTIONS ON ALL MULTI- CIRCUITS WITH COMMON NEUTRAL CONDUCTOR FOR LIGHTING FIXTURES.
17. ALL CONDUCTORS SHALL BE COPPER.
18. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING SHORT CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AND A MINIMUM OF 10,000 A.I.C.
19. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY ALL APPLICABLE CODES.
20. PATCH, REPAIR AND PAINT ANY AREA THAT HAS BEEN DAMAGED IN THE COURSE OF THE ELECTRICAL WORK.
21. N/A
22. WIRE AND CABLE CONDUCTORS SHALL BE COPPER #12 AWG MINIMUM UNLESS SPECIFICALLY NOTED OTHERWISE ON DRAWINGS.
23. GROUNDING CONDUCTORS SHALL BE SOLID TINNED COPPER UNLESS OTHERWISE NOTED.
24. METER SOCKET AMPERES, VOLTAGE, NUMBER OF PHASES SHALL BE AS NOTED ON THE DRAWINGS, MANUFACTURED BY "SQUARE D COMPANY", OR APPROVED EQUAL.
25. ALL MATERIALS SHALL BE U.L. LISTED.
26. CONDUIT
    A. RIGID CONDUIT SHALL BE U.L. LABEL GALVANIZED ZINC COATED WITH ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS IN CONTACT WITH THE EARTH, UNDER PUBLIC ROADWAYS, IN MASONRY WALLS OR EXPOSED ON BUILDING EXTERIOR. RIGID CONDUIT IN CONTACT WITH EARTH SHALL BE 1/2 LAPPED WRAPPED WITH HUNTS WRAP PROCESS NO. 3
    B. ELECTRICAL METALLIC TUBING SHALL HAVE U.L. LABEL, FITTING SHALL BE GLAND RING COMPRESSION TYPE. EMT SHALL BE USED ONLY FOR INTERIOR RUNS.
    C. FLEXIBLE METALLIC CONDUIT SHALL HAVE U.L. LISTED LABEL AND MAY BE USED WHERE PERMITTED BY CODE. FITTINGS SHALL BE "JAKE" OR "SQUEEZE" TYPE, SEAL TIGHT FLEXIBLE CONDUIT. ALL CONDUIT SHALL HAVE FULL SIZE EQUIPMENT GROUND WIRE.
    D. N/A
    E. PARALLEL UNDERGROUND CONDUIT SHALL BE PVC SCHEDULE 40 (UNLESS NOTED OTHERWISE) AT A MINIMUM DEPTH OF 30" BELOW GRADE- STACKED UNDERGROUND CONDUIT SHALL BE PVC SCHEDULE 40 (UNLESS NOTED OTHERWISE) AT A MINIMUM DEPTH OF 24" BELOW GRADE.
    F. ABOVE GROUND CONDUIT SHALL BE P.V.C. SCHEDULE 80 (UNLESS NOTED OTHERWISE).
27. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PLASTIC LABELS.
28. COORDINATE THE ELECTRICAL SERVICE WITH THE UTILITY COMPANY, AND PROVIDE DAILY UPDATES TO PM UNTIL FINAL ELECTRICAL SERVICE IS EFFECTED.
29. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUND TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO PROJECT MANAGER. CLEAN PREMISES OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK IN A COMPLETE AND UNDAMAGED CONDITION.
30. CONTRACTOR TO COORDINATE WITH UTILITY COMPANY FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOKUP COSTS TO BE PAID BY CONTRACTOR.

GROUNDING STANDARDS

1. DEFINITIONS

AGB ANTENNA GROUND BAR

AWG AMERICAN WIRE GAUGE.

CAD WELDING:

AN EXOTHERMIC WELDING PROCESS WHICH CREATES POSITIVE CONTACT OF POSITIVE CONTACT OF GROUNDING CONDUCTORS

EMT ELECTRICAL METAL TUBING (LIGHT GAUGE METAL CONDUIT)

RGC RIGID GALVANIZED CONDUIT, SCH 40 OR HIGHER

PVC POLY VINYL CHLORIDE CONDUIT

MGB MASTER GROUND BAR

RFI RADIO FREQUENCY INTERFERENCE

THW LETTER TYPE DESIGNATION FOR CONDUCTOR INSULATION THAT IS A MOISTURE AND HEAT RESISTANT THERMOPLASTIC WITH A MAXIMUM OPERATING TEMPERATURE OF 75 DEGREES CELSIUS OR 167 DEGREES FAHRENHEIT.

T/I TENANT IMPROVEMENT

2. BACKGROUND

2.1. AREAS OF CONCERN: WHEN DESIGNING A GROUNDING SYSTEM FOR A MOBILE RADIO FACILITY THERE ARE FOUR INTERRELATED AREAS OF CONCERN. THE BASIC OBJECTIVE FOR EACH IS:

A. LIGHTNING PROTECTION – TO MAINTAIN ALL EQUIPMENT AT THE SAME POTENTIAL DURING A LIGHTNING IMPULSE.

B. RFI FOR NOISE INDUCTION CONTROL – TO ESTABLISH THE LOWEST POSSIBLE IMPEDANCE AMONG ALL EQUIPMENT.

C. ELECTROSTATIC CONTROL – TO REDUCE ELECTROSTATIC DISCHARGE PROBLEMS.

D. PERSONNEL SAFETY – TO MAINTAIN A MINIMUM VOLTAGE DIFFERENCE BETWEEN ANY TWO METALLIC OBJECTS WHICH PERSONNEL MIGHT CONTACT SIMULTANEOUSLY.

2.1. A/C GROUNDING:

IN THIS GROUNDING SYSTEM THE A/C SERVICE GROUND SHALL BE KEPT ISOLATED FROM THE EQUIPMENT FRAME WORK AND LIGHTNING PROTECTION GROUND SYSTEMS EXCEPT FOR ONE THIS WOULD TYPICALLY BE CONNECTING THE A/C SERVICE GROUND AT THE COMMERCIAL POWER RISER POLE DISCONNECT/METER BASE TO THE EXTERNAL GROUND RING. ALL GROUNDING CONNECTIONS INSIDE OF CABINETS SHALL BE SCRAPED TO BARE METAL AND COATED WITH NOALOX.

2.2. LIGHTNING CONSIDERATIONS:

LIGHTNING DAMAGE OCCURS FROM EITHER INDUCTION OR FROM AN ACTUAL DIRECT STRIKE TO THE BUILDING, USUALLY TAKEN THROUGH THE TOWER AND/OR ANTENNAS. STRIKES TO OTHER NEARBY OBJECTS INDUCE HIGH ENERGY INTO POWER OR TELEPHONE CABLES ENTERING THE BUILDING. THIS TYPE OF EFFECT HISTORICALLY CAUSES MOST OF THE DAMAGE TO THE BUILDING AND ITS CONTENTS.

3. STATION GROUNDING SYSTEM

3.1. MATERIALS.

A. #2 AWG, BARE SOLID TINNED COPPER WIRE, FOR ALL EXTERIOR CONDUCTORS AND TOWER GROUND BAR CONDUCTORS OR AS OTHERWISE SPECIFIED. GROUNDS TO THE LNAS SHALL BE NO. 6 STANDARD GREEN INSULATED JUMPERS. THE GROUND WIRE TO THE MGB SHALL BE GREEN JACKETED STRANDED #2 TINNED WIRE BURNDY CONNECTED TO THE BUSS BAR AND CONNECTED TO THE GROUND RING ON A GROUND ROD.

B. #2 AWG, INSULATED STRANDED COPPER CABLE IS ACCEPTABLE FOR INTERIOR GROUND BAR CONDUCTORS ON TENANT IMPROVEMENT SITES.

C. 5/8" øx 10' GROUND RODS OF SOLID COPPER, STAINLESS STEEL OR COPPER CLAD HIGH STRENGTH STEEL.

D. ABOVE GRADE CONNECTIONS SHALL BE BURNDY HYGROUND COMPRESSION. BELOW GRADE CONNECTIONS SHALL BE CAD WELD OR OTHER APPROVED EXOTHERMIC WELDING SYSTEM FOR BONDING AS SPECIFIED.

E. XIT OR ADVANCED GROUNDING ELECTRODE (AGE), ALL CHEMICAL GROUND RODS SHALL BE UL APPROVED.

F. SOLID COPPER PLATES OF MINIMUM 3'X3'X1/4" SIZE AS SPECIFIED.

G. NOALOX OR APPROVED EQUAL CONDUCTIVE MEDIUM MATERIAL SHALL BE USED IN ALL MECHANICAL CONNECTIONS.

H. #6 AWG STRANDED INSULATED (GREEN) FOR ALL INTERNAL EQUIPMENT GROUNDING.

I. MECHANICAL FASTENERS (I.E., DOUBLE LUGS, SPLIT BOLTS PARALLEL CONNECTORS) SHALL BE BRONZE, BRASS, COPPER OR STAINLESS STEEL AND HAVE NOALOX BETWEEN CONDUCTOR AND CONNECTION.

J. BOLTS, NUTS AND SCREWS USED TO FASTEN MECHANICAL CONNECTORS SHALL BE STAINLESS STEEL WITH STAR TYPE STAINLESS STEEL LOCK WASHERS.

K. ALL LUG TUBE FASTENERS SHALL PROVIDE TWO HOLES TO ALLOW A DOUBLE BOLT CONNECTION.

3.2 MASTER GROUND BAR (MGB):

THE PURPOSE OF THE MASTER GROUND BAR IS TO GROUND THE BTS AND ANY OTHER METALLIC OBJECTS AROUND THE BTS. IF AN MGB IS NOT PROVIDED WITH THE BTS, THE MGB SHALL BE AS FOLLOWS:

THE MGB IS A COPPER BAR MEASURING 4"W X 24"L X 1/4" LOCATED AS CLOSE TO THE BTS AS POSSIBLE. THE MGB SHALL HAVE A MINIMUM NUMBER OF 28 EACH 3/8" HOLES. GROUND BAR SHALL BE SUPPORTED BY MOUNTING BRACKETS WITH INSULATOR STANDOFFS. (2) #2 TINNED SHALL BE MECHANICALLY ATTACHED ((2) HOLE COMPRESSION LUG 3/8" HOLES, 1" CENTER TO CENTER SPACING) TO THE MGB AND DOWN LEADS THEN TAKEN THROUGH CONDUIT TO THE GROUND RING. THIS CONDUCTOR SHALL BE KEPT SEPARATE AND ISOLATED UNTIL TERMINATING AT THE MAIN GROUNDING POINT, (I.E. EXTERIOR GROUND RING OR BUILDING STEEL).

3.3 ANTENNA GROUND BAR (AGB):

THE PURPOSE OF THE ANTENNA GROUND BAR IS PRIMARILY FOR LIGHTNING PROTECTION. COAXIAL CABLE IS USUALLY THE ONLY ITEM GROUNDED TO THIS BAR. HOWEVER IT IS ACCEPTABLE TO BOND EXTERIOR; CABLE TRAY, WAVE GUIDE PORTS AND CANTILEVERED WAVE GUIDE BRIDGES TO THE AGB.

THE AGB IS A COPPER BAR MEASURING 4"W X 24"L X 1/4" ON WHICH THE COAXIAL CABLE FROM THE ANTENNAS ARE PRIMARILY GROUNDED. THERE SHALL BE TWO AGBS, ONE LOCATED AT THE TOP OF THE TOWER AT THE START OF THE VERTICAL RUN OF COAX, THE OTHER AT THE BOTTOM OF THE VERTICAL RUN OF COAX BEFORE IT MAKES ITS BEND. (IF THE TOWER IS OVER 200 THERE SHALL BE A THIRD AGB LOCATED AT THE MIDDLE OF THE TOWER). THE AGB SHALL HAVE A MINIMUM OF 28 EACH 3/8" HOLES. GROUND BARS SHALL BE SUPPORTED BY MOUNTING BRACKETS WITH INSULATOR STANDOFFS. USE #2 AWG SOLID TINNED WIRE W/ 2-HOLE SHORT BARREL COMPRESSION LUGS 3/8" HOLES, 1" CENTER TO CENTER SPACING). THIS CONDUCTOR SHALL BE KEPT SEPARATE AND ISOLATED UNTIL TERMINATING AT THE MAIN GROUNDING POINT (I.E., EXTERIOR GROUND RING, OR BUILDING STEEL.)

3.4 SURGE ARRESTOR GROUND BAR: N/A

3.5 GROUND ROD AND GROUND RING PLACEMENT:

THE OUTSIDE GROUND RING SHALL BE PLACED AROUND THE BTS AT A DISTANCE OF TWO (2) FEET FROM THE BTS AT A DEPTH OF 3'-6" OR 6" BELOW THE FROST LINE, WHICHEVER IS DEEPER. RODS SHALL BE DRIVEN TO A DEPTH SUCH THAT THE TOP OF THE RODS IS AT THE LEVEL OF THE GROUND RING CONDUCTOR. THE RODS SHALL BE PLACED ALONG THE RING AT THE FOLLOWING LOCATIONS:

A. BELOW THE AREA OF THE INTERNAL MASTER GROUND BAR (MGB) FOR CONNECTION TO THE MGB.

B. NEAR THE CORNERS OF THE BTS.

C. AS REQUIRED TO ACHIEVE A MAXIMUM SPACING OF EIGHT (8) FEET BETWEEN GROUND RODS ALONG THE RING PERIMETER.

D. AS REQUIRED ALONG THE RING PERIMETER TO ACHIEVE 5 OHMS OR LESS RESISTANCE WHEN TESTED.

E. TWO RODS LOCATED ON OPPOSITE SIDES AT EACH TOWER LEG OR MONOPOLE.

F. ONE ROD LOCATED BENEATH EACH END OF THE WAVE GUIDE BRIDGE OR CABLE TRAY.

G. ONE ROD LOCATED ADJACENT TO THE STANDBY GENERATOR, AND IF SEPARATED BY MORE THAN EIGHT (8) FEET, ONE LOCATED ADJACENT TO THE FUEL TANK.

H. ONE ROD LOCATED AT THE BASE OF THE TOWER FOR THE AGB.

3.6 TOWER GROUNDING (IF REQUIRED):

ALL MONOPOLES SHALL HAVE TWO GROUND RODS (MINIMUM). ALL OTHER TOWERS SHALL HAVE TWO GROUND RODS PLACED AT THE BASE OF EACH TOWER LEG. EACH MONOPOLE OR TOWER LEG SHALL BE BONDED TO THE SYSTEM VIA TWO #2 BARE TINNED SOLID COPPER CONDUCTORS. BURNDY CONNECT THE CONDUCTORS TO ONLY STRUCTURAL BASE PLATES OR LUGS OR EARS AS MAY BE PROVIDED. NO BURNDY CONNECTIONS SHALL BE MADE TO THE VERTICAL WALLS OF THE STRUCTURE, NEVER GROUND TO HOLLOW LEG MEMBERS.

3.7 ANTENNA GROUNDING:

EACH ANTENNA COAXIAL CABLE SHALL TYPICALLY BE GROUNDED AT THREE POINTS USING A HARD-SHELL COAXIAL CABLE KIT FROM THE MANUFACTURER OF THE ANTENNA CABLE. A TYPICAL INSTALLATION SHALL BE AS FOLLOWS:

A. THE FIRST GROUND CONNECTION SHALL OCCUR AS CLOSE TO THE ANTENNA AS POSSIBLE, BELOW THE FIRST POINT THE COAX CABLE BEGINS TO RUN VERTICAL DOWN THE TOWER. THIS GROUND SHALL TERMINATE DIRECT TO THE TOP AGB. ON A T/I, GROUND TO THE AGB AT THE ANTENNA MOUNTS.

B. THE SECOND GROUND SHALL BE MADE AT THE BOTTOM OF THE VERTICAL RUN OF THE COAXIAL CABLE AS IT TURNS OUT AWAY FROM THE TOWER TOWARDS THE BTS. THIS GROUND SHALL BE TERMINATED AT THE GROUND BAR AT BASE OF TOWER. THE GROUND BAR SHALL HAVE TWO (2) LEADS OF #2 AWG BARE TINNED SOLID COPPER WIRE, AND SHALL TERMINATE AT THE TOWER GROUND RING. THESE SHALL BE ENCASED IN PVC PIPE.

C. THE THIRD GROUND SHALL BE MADE PRIOR TO COAX ENTRY INTO BTS. THE GROUND WIRE SHALL BE TERMINATED AT THE MASTER GROUND BAR SHALL MASTER GROUND BAR. HAVE TWO (2) LEADS OF #2 AWG BARE TINNED SOLID COPPER WIRE, AND SHALL TERMINATE AT THE TOWER GROUND RING. THESE SHALL BE ENCASED IN PVC PIPE.

3.13 GENERATOR RECEPTACLE GROUNDING:

THE GENERATOR RECEPTACLE (HUBBLE PLUG) SHALL BE GROUNDED TO THE EGR.

3.14 COAX BRIDGE / CABLE TRAY GROUNDING :

BOND THE COAX BRIDGE OR CABLE TRAY TO THE AGB WITH #2 SOLID TINNED GROUND WIRE. THESE CONNECTIONS SHALL BE DOUBLE LUG BOLTED / SCREWED MECHANICAL CONNECTIONS WITH STAR LOCK WASHERS AND NOALOX. ALL BRIDGE SPLICES SHALL HAVE JUMPERS OF #2 SOLID WITH COMPRESSION LUGS.

3.15 CAD WELD & BURNDY CONNECTION:

CAD WELDS (EXOTHERMIC WELDS) AND BURNDY CONNECTIONS SHALL BOND ALL UNDERGROUND AND DAMP LOCATION CONNECTIONS, SHELTER SKID GROUNDS, TOWER OR MONOPOLE GROUNDS, FENCING CORNER AND AND GATE POSTS, ANTENNA GROUND BARS, (AGB) SURGE ARRESTER GROUND BAR, AND THE MASTER GROUND BAR (MGB) MECHANICAL CONNECTIONS SHALL BE TYPICALLY USED TO BOND ALL INTERIOR EQUIPMENT, COAX CABLE BRIDGES AND COAXIAL CABLE GROUND KITS. ALL LUG TYPE MECHANICAL CONNECTORS TO THE MGB OR AGB SHALL BE TWO HOLE TYPE CONNECTED WITH STAINLESS STEEL BOLTS AND NUTS WITH STAINLESS STEEL LOCK WASHERS AND NOALOX ON EITHER SIDE OF THE BUSS BAR.

3.16 CHEMICAL GROUND RODS (IF REQUIRED):

CHEMICAL GROUND RODS SHALL NOT BE INSTALLED ON GROUND RING INSTALLATIONS WITH NORMAL SOIL. CHEMICAL GROUND RODS SHALL BE INSTALLED ONLY FOR SPECIAL DESIGN APPLICATIONS THAT REQUIRE SINGLE POINT GROUNDING DUE TO SPECIFIC SITE CONDITIONS.

3.17 TENANT IMPROVEMENT SITE GROUNDING:

N/A

3.18 LIMITS OF BEND RADIUS:

IT IS IMPORTANT THAT THE GROUNDING CONDUCTOR CONNECTING THE INSIDE AND OUTSIDE GROUND SYSTEMS BE AS STRAIGHT AS POSSIBLE, WITH NO TURN OR BEND SHORTER THAN ONE FOOT RADIUS WITH A THREE FOOT RADIUS PREFERRED. NO RIGHT ANGLE OR SHARP BENDS SHALL BE ALLOWED.

3.19 BONDING PREPARATION & FINISH:

ALL SURFACES REQUIRE PREPARATION PRIOR TO BONDING OF EITHER CAD WELD OR BURNDY FASTENERS. GALVANIZED SURFACES SHALL BE GROUND OR SANDED TO THE POINT OF EXPOSING THE STEEL SURFACE BELOW, PRIOR TO BONDING THE GROUND CONDUCTOR. FOR OTHER SURFACES INCLUDING COPPER BUSS BARS ALL PAINT, RUST TARNISH AND GREASE SHALL BE REMOVED PRIOR TO BONDING THE GROUND CONDUCTOR. CAD WELD TYPE BONDS SHALL BE FINISHED WITH THE APPLICATION OF COLD GALVANIZATION AND WHEN APPLICABLE, FINISH PAINTED WITH AN APPROPRIATE COLOR AS REQUIRED. MECHANICAL TYPE BONDS ON BUSS BARS SHALL BE FINISHED WITH THE APPLICATION OF NOALOX OR OTHER APPROVED CONDUCTIVE MEDIUM MATERIAL BETWEEN CONNECTOR AND BUSS BAR. MECHANICAL TYPE BONDS ON ALL OTHER SURFACES SHALL BE FINISHED WITH THE APPLICATION OF COLD GALVANIZATION AND OR THE APPROPRIATE PAINT TO MATCH AS REQUIRED.

3.20 TESTING:

THE OUTSIDE GROUND RING SHALL BE TESTED AFTER INSTALLATION BUT PRIOR TO BACKFILLING THE GROUND RING TRENCH. THE GROUND FIELD RESISTANCE SHALL MEASURE 5 OHMS OR LESS TO GROUND. ANY DIFFICULTY IN ACHIEVING THIS LEVEL OF RESISTANCE MUST BE BROUGHT TO THE ATTENTION OF THE PROJECT MANAGER. THE RESISTANCE TO GROUND SHALL BE MEASURED USING THE FALL OF POTENTIAL METHOD. TESTING SHALL BE PERFORMED BY AN OWNER PROVIDED INDEPENDENT TESTING LABORATORY FROM WHICH A WRITTEN REPORT SHALL BE PRODUCED FOR REVIEW BY THE PROJECT MANAGER.

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SIGNATURES: _____

DATE: 2/23/24 EXPIRES: 11/30/25

REV.	DESCRIPTION	DATE
0	ISSUED FOR PERMIT	2/23/24
B	ISSUED FOR REVIEW	2/1/24
A	ISSUED FOR REVIEW	1/24/24

CH74338A
BARTLETT WT SCHICK ROAD
401 E. SCHICK ROAD, BARTLETT, IL 60103

Drawing Title: NOTES

Project Number	Drawn by: PM
Client Project Number	Date:
Scale:	Checked by:
Drawing Number:	Date:
	Approved by: MS
	Date:

N-2