



TOWN OF JACKSON PLANNING & BUILDING DEPARTMENT

TRANSMITTAL MEMO

Town of Jackson

- ☒ Public Works/Engineering
- ☒ Building
- ☐ Title Company
- ☒ Town Attorney
- ☒ Police

Joint Town/County

- ☒ Parks and Recreation
- ☒ Pathways
- ☒ Joint Housing Dept

Teton County

- ☐ Planning Division

- ☐ Engineer
- ☐ Surveyor- Nelson
- ☐ Assessor
- ☐ Clerk and Recorder
- ☐ Road and Levee

State of Wyoming

- ☐ Teton Conservation
- ☐ WYDOT
- ☐ TC School District #1
- ☐ Game and Fish
- ☐ DEQ

Federal Agencies

- ☐ Army Corp of Engineers

Utility Providers

- ☐ Qwest
- ☐ Lower Valley Energy
- ☐ Bresnan Communications

Special Districts

- ☒ START
- ☒ Jackson Hole Fire/EMS
- ☐ Irrigation Company

Date: August 6, 2024 Item #: P24-118 Planner: Katelyn Page Phone: 307-733-0440 ext. 1302 Email: kpage@jacksonwy.gov Owner Town of Jackson PO Box 1687 Jackson, WY 83001 Applicant: AT&T Mobility Cathi Peterson / Smartlink 10 Church Cir. Annapolis, MD 21401	REQUESTS: The applicant is submitting a request for a Basic Use Permit to modify existing wireless communication facility located at 305 W. Snow King Ave., PIDN: 22-41-16-33-1-00-024 For questions, please call Katelyn Page at 307-733-0440, x1302 or email to the address shown below. Thank you.
Please respond by: August 27, 2024 (with Comments)	

RESPONSE: For Departments not using Trak-it, please send responses via email to:
planning@jacksonwy.gov



PLANNING PERMIT APPLICATION
Planning & Building Department

150 E Pearl Ave. | ph: (307) 733-0440
P.O. Box 1687 | www.townofjackson.com
Jackson, WY 83001

For Office Use Only

Fees Paid _____ Date & Time Received _____
Application #s _____

Please note: Applications received after 3 PM will be processed the next business day.

PROJECT.

Name/Description: JACKSON FAIRGROUNDS
Physical Address: 305 West Snow King Ave.
Lot, Subdivision: PT. SE1/4NE1/4, SEC. 33, TWP. 41, RNG. 116 (RODEO GROUNDS INCLUDES MATEOSKY PARK) PIDN: 22-41-16-33-1-00-024

PROPERTY OWNER.

Name: Town of Jackson/ Diamond Towers IV, LLC Phone: 307-733-3932 / 405-255-1561
Mailing Address: 210 Mountain Ave. Unit 5619 Springfield, NH ZIP: 07081
E-mail: tcurtis@diamondcomm.com

APPLICANT/AGENT.

Name: Cathi Peterson /Smartlink on behalf of AT&T Mobility Phone: 480-235-4174
Mailing Address: 10 Church Circle Annapolis, MD ZIP: 21401
E-mail: cathi.peterson@smartlinkgroup.com

DESIGNATED PRIMARY CONTACT.

_____ Property Owner ☒ Applicant/Agent

TYPE OF APPLICATION. Please check all that apply; review the type of application at www.townofjackson/200/Planning

Use Permit

☒ Basic Use
_____ Conditional Use
_____ Special Use

Relief from the LDRs

_____ Administrative Adjustment
_____ Variance
_____ Beneficial Use Determination
_____ Appeal of an Admin. Decision

Physical Development

_____ Sketch Plan
_____ Development Plan
_____ Design Review

Subdivision/Development Option

_____ Subdivision Plat
_____ Boundary Adjustment (replat)
_____ Boundary Adjustment (no plat)
_____ Development Option Plan

Interpretations

_____ Formal Interpretation
_____ Zoning Compliance Verification

Amendments to the LDRs

_____ LDR Text Amendment
_____ Map Amendment

Miscellaneous

_____ Other: _____
_____ Environmental Analysis

PRE-SUBMITTAL STEPS. To see if pre-submittal steps apply to you, go to www.townofjackson.com/200/Planning and select the relevant application type for requirements. Please submit all required pre-submittal steps with application.

Pre-application Conference #: _____ Environmental Analysis #: _____

Original Permit #: _____ Date of Neighborhood Meeting: _____

SUBMITTAL REQUIREMENTS. Please ensure all submittal requirements are included. The Planning Department will not hold or process incomplete applications. Partial or incomplete applications will be returned to the applicant. Go to www.townofjackson.com/200/Planning and select the relevant application type for submittal requirements.

Have you attached the following?

_____ **Application Fee.** Fees are cumulative. Go to www.townofjackson.com/200/Planning and select the relevant application type for the fees.

☒ **Notarized Letter of Authorization.** A notarized letter of consent from the landowner is required if the applicant is not the owner, or if an agent is applying on behalf of the landowner. Please see the Letter of Authorization template at <http://www.townofjackson.com/DocumentCenter/View/845/LetterOfAuthorization-PDF>.

_____ **Response to Submittal Requirements.** The submittal requirements can be found on the TOJ website for the specific application. If a pre-application conference is required, the submittal requirements will be provided to applicant at the conference. The submittal requirements are at www.townofjackson.com/200/Planning under the relevant application type.

Note: Information provided by the applicant or other review agencies during the planning process may identify other requirements that were not evident at the time of application submittal or a Pre-Application Conference, if held. Staff may request additional materials during review as needed to determine compliance with the LDRs.

Under penalty of perjury, I hereby certify that I have read this application and associated checklists and state that, to the best of my knowledge, all information submitted in this request is true and correct. I agree to comply with all county and state laws relating to the subject matter of this application, and hereby authorize representatives of Teton County to enter upon the above-mentioned property during normal business hours, after making a reasonable effort to contact the owner/applicant prior to entering.

Cathi Peterson
Signature of Property Owner or Authorized Applicant/Agent

Cathi Peterson
Name Printed

6/24/2024

Date

Real Estate Specialist II

Title



Town of Jackson
150 E Pearl Avenue
PO Box 1687, Jackson, WY 83001
P: (307)733-3932 F: (307)739-0919
www.jacksonwy.gov

Date:

LETTER OF AUTHORIZATION

NAMING APPLICANT AS OWNER'S AGENT

PRINT full name of property owner as listed on the deed when it is an individual OR print full name and title of President or Principal Officer when the owner listed on the deed is a corporation or an entity other than an individual

Town of Jackson

Being duly sworn, deposes and says that Town of Jackson is the owner in fee of the premises located at:

Name of property owner as listed on deed

Address of Premises: 305 West Snow King Ave. Jackson, WY 83001

Legal Description: *attached

Please attach additional sheet for additional addresses and legal descriptions

And, that the person named as follows: Name of Applicant/agent: Cathi Peterson /Smartlink on behalf of AT&T

Mobility

Mailing address of Applicant/agent: 10 Church Circle Annapolis, MD 21401

Email address of Applicant/agent: cathi.peterson@smartlinkgroup.com

Phone Number of Applicant/agent: 480-235-4174

Is authorized to act as property owner's agent and be the applicant for the application(s) checked below for a permit to perform the work specified is this(these) application(s) at the premises listed above:

☐ Development/Subdivision Plat Permit Application ☒ Building Permit Application

☐ Public Right of Way Permit ☐ Grading and Erosion Control Permit ☐ Demolition Permit

☒ Other (describe) Basic Use Permit

Under penalty of perjury, the undersigned swears that the foregoing is true and, if signing on behalf of a corporation, partnership, limited liability company or other entity, the undersigned swears that this authorization is given with the appropriate approval of such entity, if required.

Property Owner Signature

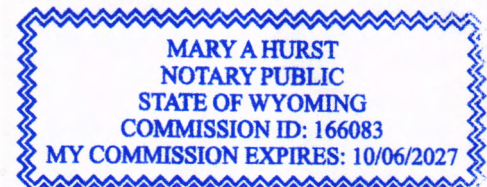
Title if signed by officer, partner or member of corporation, LLC (secretary or corporate owner) partnership or other non-individual Owner

STATE OF Wyoming)
) SS.
COUNTY OF Teton)

The foregoing instrument was acknowledged before me by Tyler Sinclair this 23rd day of July 2024. WITNESS my hand and official seal.

Mary A Hurst
Notary Public

My commission expires:
10/06/2027





Contracted to  AT&T Mobility

July 26, 2024

Town of Jackson Planning Department
150 E. Pearl Avenue
Jackson, WY 8300

RE: Proposed modifications of AT&T Wireless Communications Facility located in the Town of Jackson

Project Site Info: IDL04323 / Jackson Fairgrounds / 12781455

Site Address: **305 West Snow King Ave. Jackson, WY 83001**

Project: Nokia MM, WSUTH0037326, MRUTH066592

PROJECT NARRATIVE

I am writing to you on behalf of AT&T Wireless, which has an existing wireless communication facility located within your jurisdiction at the above address. Due to new technology, AT&T Wireless needs to modify the equipment at this existing site. The scope of work being proposed with this project includes the following details:

Tower: AT&T will remove (6) antennas and replace them with (6) smaller antennas mounted to the back of the larger antennas, remove (15) RRHs and replace them with (9) new RRHs on back-to-back mounts. Ground: AT&T will remove (1) Power Plant, (20) Batteries, (6) Rectifiers and (1) Converter Shelf and replace it with (1) Vertiv 7100 -48 Power Plant, (8) Converters/ converter kit, (16) 190AH Battery Strings, (1) Vertiv Indoor Battery Rack and (1) BBU. The engineer stamped construction drawings are enclosed for your review. Please note:

No changes to the heights of these structures.

No additional noise.

No changes to the existing electrical service already provided at these locations.

No additional Shelters/equipment sheds or platforms.

No expansion of the existing Compound

We are seeking the documented consent the Town of Jackson to proceed to make this change.

AT&T Wireless appreciates your assistance in the continuing operation of this wireless communication location. Thank you for your attention to this matter. Please call (480) 235-4174 if you have any questions.

Sincerely,



Cathi Peterson

Real Estate Specialist II

 480-235-4174

 cathi.peterson@smartlinkgroup.com

 10 Church Circle, Annapolis, MD 21401

 www.smartlinkgroup.com

AT&T Technology Upgrade Project: Jackson Fairgrounds
IDL04323 / 12781455
305 West Snow King Ave. Jackson, WY 83001

6/24/2024

Town of Jackson
Planning and Building Department
150 E Pearl Avenue
Jackson, WY 83001

VIA Electronic Deliver

RE: Request for Minor Modification to Existing Wireless Facility - Section 6409/47 CFR § 1.6100 (“6409”)
Site Address: 305 West Snow King Ave. Jackson, WY 83001
Prior Case No.: P22-147
AT&T Project No.: IDL04323 / 12781455 / Nokia MM WSUTH0037326, MRUTH066592

Dear Town of Jackson Planning and Building Department:

On behalf of New Cingular Wireless PCS, LLC (“**AT&T**”) we are pleased to submit this request to modify AT&T’s existing wireless communication site at the location referenced above, as an Eligible Facilities Request for a minor modification under Section 6409 and Federal Communications Commission (“FCC”) rules. This request is being made pursuant to Section 6409 of the federal Middle Class Tax Relief and Job Creation Act of 2012, 47 U.S.C 1455(a) and complies with all regulations set forth therein.

Scope of Work

AT&T proposes the following minor modifications to this site. (Please note: all work will be performed wholly within the existing premises and utility easements. This site is free of any concealment elements and the project otherwise complies with the site’s prior conditions of approval. The proposed dates during which the work will take place is forecasted for 12/1/2024 – 12/21/2024. Additionally, compliance with all non-discretionary structural, electrical, energy, building, and safety codes will be observed.

<u>Component</u>	<u>Federal Section 6409 Limits</u>	<u>AT&T’s Proposed Modification</u>
Increase height of tower	10% or 20 feet as measured from the top of the highest existing antennas to the bottom of the proposed new antennas, whichever is greater	No increase in height
Antennas extending horizontally from edge of tower	20 feet or less	Antennas extend 0 feet horizontally from edge of tower
Additional equipment cabinets	4 or fewer (does not include separately mounted radios and other pieces of equipment)	0 additional equipment cabinets

Concealment Elements

The existing wireless facility is a monopole structure. The proposed minor modification will continue to effectively stealth the wireless facility by remaining in place and mimicking the existing installation.

FCC Shot Clock for Section 6409 Minor Modifications

AT&T requests approval of the following applications, as well as any other authorizations necessary, for its proposed minor modification under Section 6409:

- Basic Use Permit

The FCC requires that all authorizations related to 6409 applications be completed within 60 days after filing.

Based on a filing date of 6/24/2024, the projected shot-clock deadline for a decision is 8/24/2024. Our goal is to work with you to obtain approval of this minor modification earlier than the deadline. We will respond promptly to any requests for information you may have for our application. Please let us know how we can work with you to expedite the approval process. We look forward to working with you on this important project, which will significantly improve wireless telecommunication services in your community without requiring an additional site. Should you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

Cathi Peterson
Real Estate Specialist II
Smartlink-on behalf of AT&T Mobility

PROJECT DESCRIPTION

AT&T WIRELESS PROPOSES TO MODIFY AN EXISTING WIRELESS INSTALLATION. THE SCOPE WILL CONSIST OF THE FOLLOWING:

MONOPOLE WORK:

- REMOVE (6) ANTENNAS
- REMOVE (15) REMOTE RADIO HEADS (RRHS)
- INSTALL (3) NNH4-65C-R6-UPM/AIR6419 B77D ANTENNAS
- INSTALL (3) NNH4-65C-R6-UPM/AIR6419 B77G ANTENNAS
- INSTALL (3) REMOTE RADIO UNITS (RRUs)
- INSTALL (9) BACK TO BACK RRU MOUNTS

GROUND WORK:

- REMOVE (1) ALPHA TECHNOLOGIES POWER PLANT
- REMOVE (20) BATTERIES
- REMOVE (6) RECTIFIERS
- REMOVE (1) CONVERTER SHELF
- INSTALL (1) VERTIV 7100 -48V POWER PLANT
- INSTALL (8) CONVERTERS
- INSTALL (1) CONVERTER KIT
- INSTALL (16) 190AH BATTERY STRINGS
- INSTALL (1) VERTIV INDOOR BATTERY RACK
- INSTALL (1) GENERIC E\ \ \ BBU @ DRM

ENGINEERING

2021 INTERNATIONAL BUILDING CODE
2023 NATIONAL ELECTRICAL CODE (NFPA 70)
2021 INTERNATIONAL FIRE CODE
ANSI/TIA-222-H - 2017

SITE INFORMATION

PROPERTY OWNER:	DAMOND TOWER IV LLC
ADDRESS:	120 MOUNTAIN AVE SPRINGFIELD, NJ 07081
SITE ADDRESS:	305 WEST SNOW KING AVE JACKSON, WY 83001
FA:	12781455
MONOPOLE OWNER:	MONOPOLE-DAMOND TOWER IV LLC
CELL SITE RF MODIFICATIONS IMM #:	WSUTH0037571
COUNTY:	TETON
LATITUDE (NAD83):	43° 28' 23.33" N (43.4731388°)
LONGITUDE (NAD83):	110° 46' 05.54" W (-110.768194°)
GROUND ELEVATION:	6,205 AMSL
ZONING JURISDICTION:	TOWN OF JACKSON
ZONING DISTRICT:	P/SP
PARCEL NUMBER:	22-41-16-33-1-00-024
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	V-B
POWER COMPANY:	LOWER VALLEY ENERGY
TELEPHONE COMPANY:	SILVER STAR COMMUNICATIONS
SITE ACQUISITION MANAGER:	TAMARA SHIVELEY (801) 230-4877
CONSTRUCTION MANAGER:	JOHN VAUGHAN (303) 517-3652
RF ENGINEER:	DAVID BLACK (303) 217-1477

CONTACT INFORMATION

ENGINEER: GPD GROUP, PROFESSIONAL CORPORATION
520 SOUTH MAIN STREET, SUITE 2531
AKRON, OH 44311

CONTACT: CHAD BURTON

PHONE: (614) 859-1623

VICINITY MAP



© GOOGLE EARTH 2024

LOCAL MAP



© GOOGLE EARTH 2024

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE. NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

DRAWING INDEX

SHEET NO.	SHEET TITLE
T-1	TITLE SHEET
C-1	SITE PLAN
C-1.1	ENLARGED SITE PLAN
C-2	EQUIPMENT LAYOUTS
C-3	ELEVATIONS
C-4	ANTENNA SCHEDULE & LAYOUTS
C-5	EQUIPMENT DETAILS
C-6	EQUIPMENT DETAILS
E-1	ELECTRICAL AC ONE-LINE DIAGRAM
E-2	ELECTRICAL DC ONE-LINE DIAGRAM
G-1	GROUNDING ONE-LINE DIAGRAM
G-2	GROUNDING DETAILS
GN-1	LEGEND & ABBREVIATIONS
GN-2	GENERAL CONSTRUCTION NOTES
GN-3	GENERAL SITE WORK & DRAINAGE NOTES
GN-4	GENERAL CONCRETE WORK NOTES
GN-5	GENERAL STRUCTURAL STEEL NOTES
GN-6	GENERAL ELECTRICAL NOTES
GN-7	BATTERY SAFETY NOTES

11"x17" PLOT WILL BE HALF SCALE UNLESS OTHERWISE NOTED

CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.



CALL WYOMING ONE CALL
(800) 849-2476
CALL 3 WORKING DAYS
BEFORE YOU DIG!



188 INVERNESS DRIVE WEST
SUITE 400
ENGLEWOOD, CO 80112



BLACK & VEATCH
4600 SOUTH SYRACUSE STREET
SUITE 800
DENVER, COLORADO 80237



GPD GROUP
Professional Corporation

520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 Fax 330.572.2101

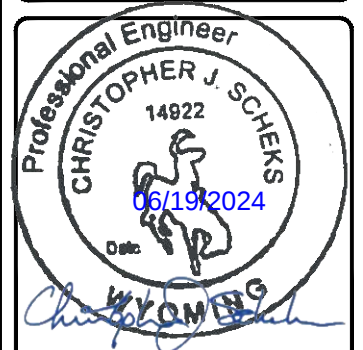
GPD JOB #: 2024723.02/143230.01

DRAWN BY: DRD

CHECKED BY:	MRL
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RFDS:	5894188
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A	05/17/24	ISSUED FOR REVIEW
REV	DATE	DESCRIPTION



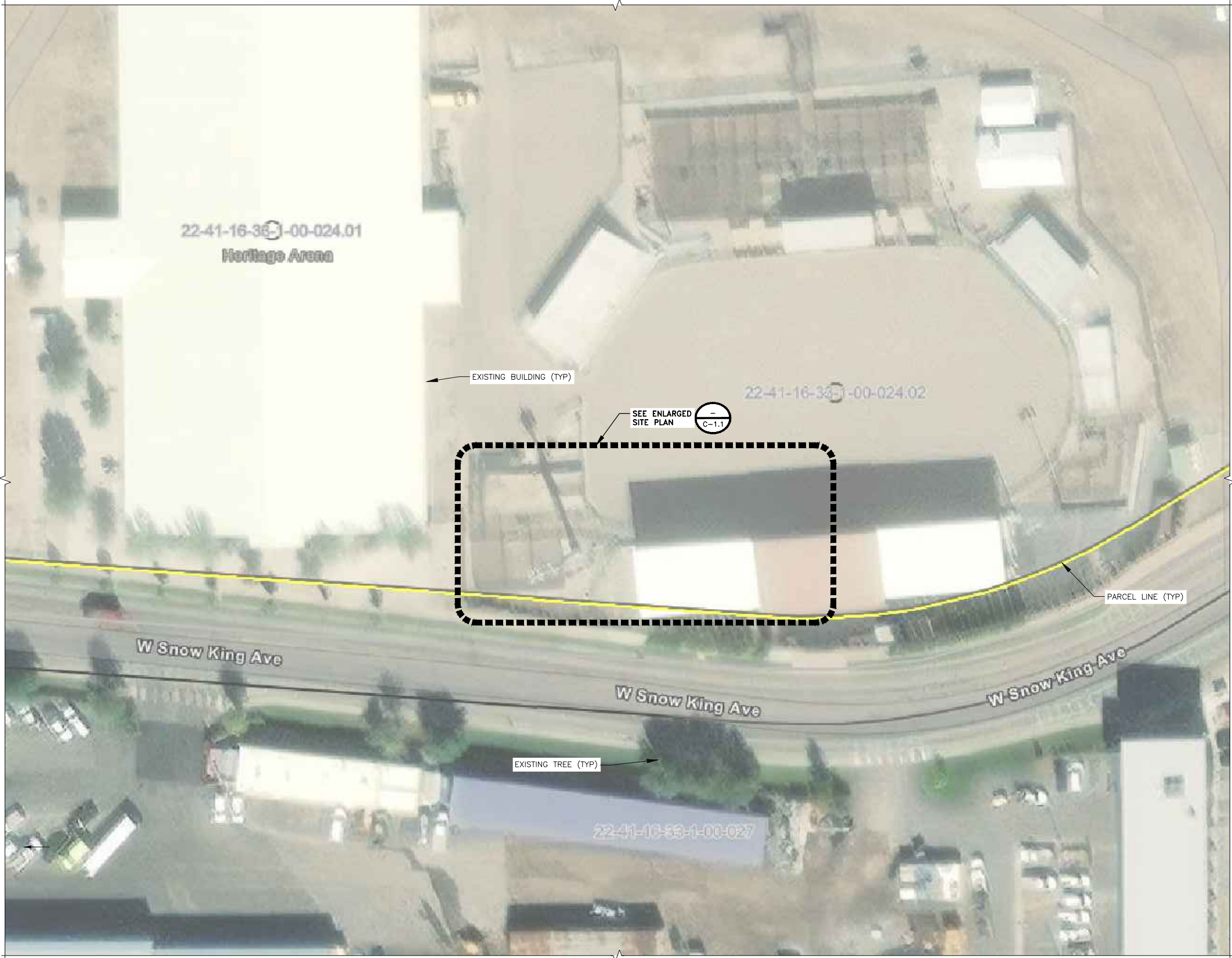
IT IS A VIOLATION OF LAW FOR ANY PERSON,
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TO ALTER THIS DOCUMENT.

JACKSON FAIRGROUNDS
IDL04323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
TITLE SHEET

SHEET NUMBER

T-1



NOTES

- 1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
- 2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.
- 3. SITE PLAN DISCLAIMER: THE EXISTING INFORMATION SHOWN IN THESE PLANS HAVE BEEN BASED ON EXISTING SITE INFORMATION PROVIDED BY OTHERS. THE GPD GROUP HAS NOT COMPLETED A SITE SURVEY AND THEREFORE MAKES NO CLAIMS AS TO THE ACCURACY OF INFORMATION DEPICTED ON THIS SHEET.



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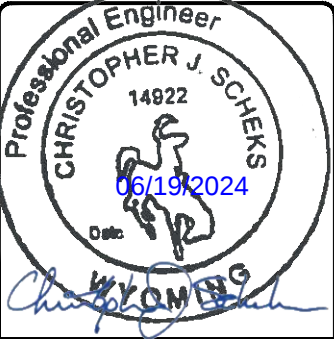
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JACKSON FAIRGROUNDS
IDLO4323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1



SITE PLAN

© GOOGLE EARTH 2024

32' 24'16" 8' 0" 32' 64'

1/32"=1'-0"

COAX & CABLE INFORMATION

- ALL EXISTING CABLES/COAX TO REMAIN UNLESS NOTED OTHERWISE
- (2) EXISTING 18-PAIR FIBER TRUNK
- (5) EXISTING #8 AWG DC POWER TRUNKS
- (3) EXISTING 2" INNERDUCT ROUTED WITHIN EXISTING MONOPOLE

NOTES

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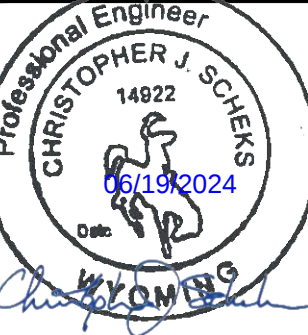
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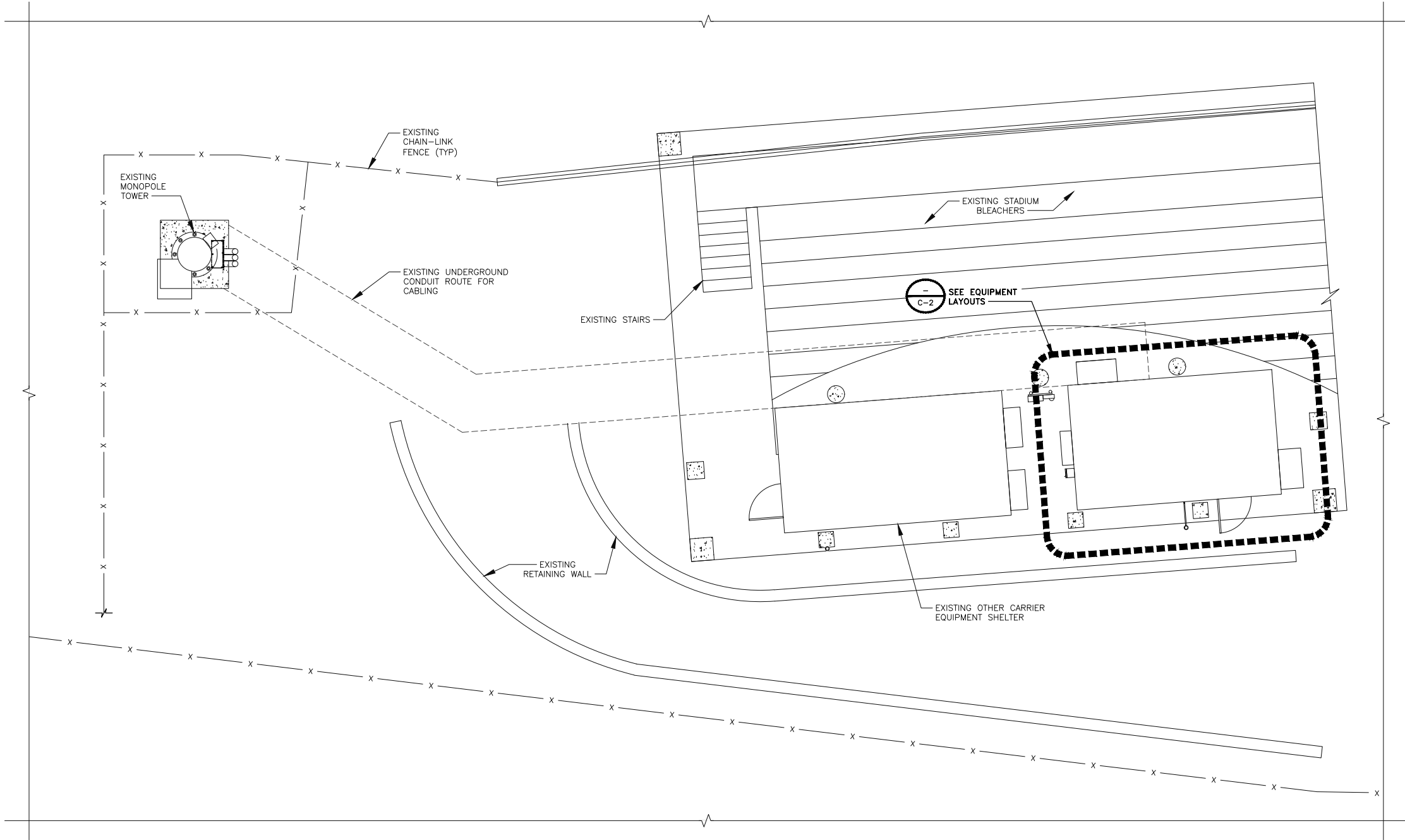


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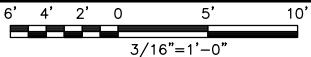
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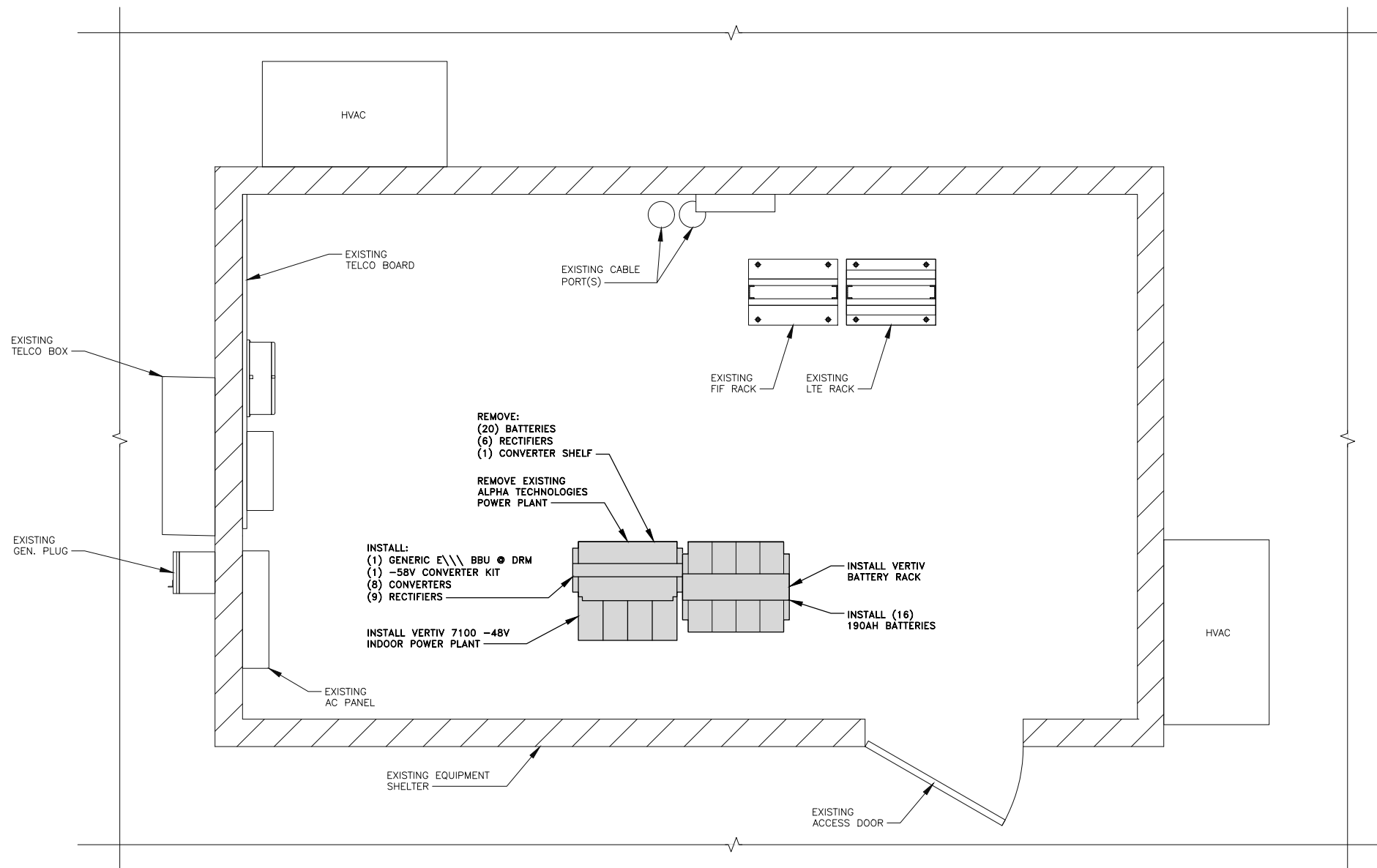
SHEET TITLE
ENLARGED SITE PLAN

SHEET NUMBER
C-1.1



ENLARGED SITE PLAN





NOTES

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3. IFC 1207 & IMC 502.4 CODE ANALYSIS & BATTERY COMPLIANCE INFORMATION SHOWN ON SHEET GN-7.
4. REFER TO BATTERY DATA CHART ON SHEET GN-7. IF BATTERY kWh CALCULATION REQUIRES ADHERENCE TO IFC 1207, AN ON-SITE BATTERY SPILL CLEAN-UP KIT SHALL BE PROVIDED ON SITE. ON-SITE BATTERY SPILL KIT SHALL BE CAPABLE OF NEUTRALIZING A SPILL OF ELECTROLYTE FROM THE LARGEST BATTERY OR VESSEL. CONTRACTOR SHALL CONFIRM THE LARGEST BATTERY ELECTROLYTE VOLUME (GALLONS) AND ENSURE THE KIT IS CAPABLE OF NEUTRALIZING THAT VOLUME, AT A MINIMUM.



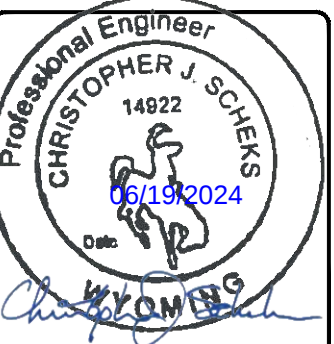
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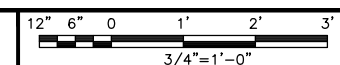
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IDLO4323
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JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
EQUIPMENT LAYOUTS

SHEET NUMBER

C-2

FINAL EQUIPMENT LAYOUT



1

NOTES

1. THIS DRAWING IS INTENDED TO DEPICT THE GENERAL LOCATION AND HEIGHT OF THE NEW EQUIPMENT ON THE EXISTING TOWER.

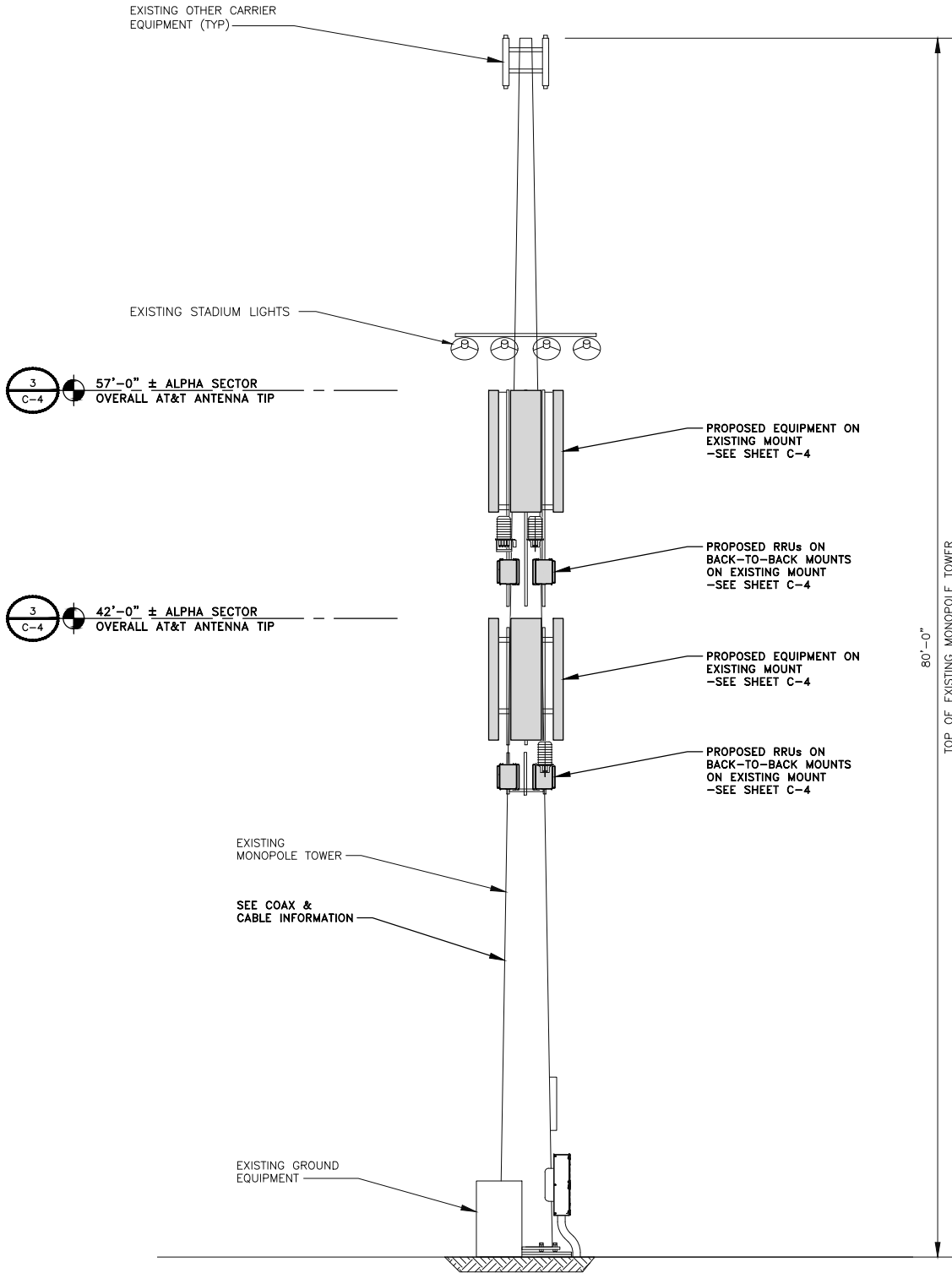
2. CONTRACTOR TO REFER TO THE TOWER STRUCTURAL ANALYSIS AND COORDINATE COAX LAYOUT WITH THE SITE CONSTRUCTION MANAGER,

MOUNT ANALYSIS:

REFER TO MOUNT ANALYSIS BY GPD GROUP PROFESSIONAL CORPORATION, DATED APRIL 23, 2024.

STRUCTURAL ANALYSIS PENDING:

THE STRUCTURE IS CURRENTLY BEING ANALYZED TO DETERMINE ITS STRUCTURAL CAPACITY TO CARRY THE PROPOSED EQUIPMENT. THESE DRAWINGS HAVE BEEN CREATED BASED ON THE ASSUMPTION THAT THE STRUCTURAL ANALYSIS WILL SHOW THAT THE STRUCTURE HAS SUFFICIENT CAPACITY TO SUPPORT THE PROPOSED LOADS. INSTALLATION OF THE PROPOSED EQUIPMENT SHALL NOT COMMENCE UNTIL AN APPROVED STRUCTURAL ANALYSIS HAS BEEN RECEIVED BY THE OWNER OR AT&T, & HAS BEEN REVIEWED BY BLACK & VEATCH.



- COAX & CABLE INFORMATION
- ALL EXISTING CABLES/COAX TO REMAIN UNLESS NOTED OTHERWISE
 - (2) EXISTING 18-PAIR FIBER TRUNK
 - (5) EXISTING #8 AWG DC POWER TRUNKS
 - (3) EXISTING 2" INNERDUCT ROUTED WITHIN EXISTING MONOPOLE

188 INVERNESS DRIVE WEST
SUITE 400
ENGLEWOOD, CO 80112

BLACK & VEATCH
4600 SOUTH SYRACUSE STREET
SUITE 800
DENVER, COLORADO 80237

GPD GROUP
Professional Corporation
520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 Fax 330.572.2101

GPD JOB #:

2024723.02/143230.01

DRAWN BY:

DRD

CHECKED BY:

MRL

RFDS:

5894188

0	06/19/24	FINALS
A	05/17/24	ISSUED FOR REVIEW
REV	DATE	DESCRIPTION

Professional Engineer

CHRISTOPHER J. SCHEKS

14822

06/19/2024

WYOMING

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JACKSON FAIRGROUNDS

IDL04323

305 WEST SNOW KING AVE

JACKSON, WY 83001

CELL SITE RF MODIFICATIONS

SHEET TITLE

ELEVATIONS

SHEET NUMBER

C-3

FINAL SOUTH ELEVATION

6' 4' 2' 0 5' 10'

3/16"=1'-0"

1

COAX & CABLE INFORMATION

- ALL EXISTING CABLES/COAX TO REMAIN UNLESS NOTED OTHERWISE
- (2) EXISTING 18-PAIR FIBER TRUNK
- (5) EXISTING #8 AWG DC POWER TRUNKS
- (3) EXISTING 2" INNERDUCT ROUTED WITHIN EXISTING MONOPOLE

SECTOR	TECH.		ANTENNA MODEL		AZIMUTH		ANTENNA TIP HEIGHT		RRH/RRU MODEL & RELATED EQUIPMENT	
	EXIST.	FINAL	EXIST.	FINAL	EXIST.	FINAL	EXIST.	FINAL	EXIST.	FINAL
A1	LTE	5G	*XXQLH-654L8H8-IVT	NNH4-65C-R6-UPM / AIR6419 B77G	15°	15°	57'-0"	57'-0"	*AHLBA RRH 4T4R B12/14/29 320W *B25 RRH4X30-4R *B66A RRH4X45-4R	INTEGRATED WITHIN: ERICSSON 6419G 4478 B14 4890 B25/B66
A2	LTE	5G	*RV4PX310-V2	NNH4-65C-R6-UPM / AIR6419 B77D	15°	15°	57'-0"	42'-0"	*RRH2X60-1900 *RRH4X25-WCS-4R	INTEGRATED WITHIN: ERICSSON 6419D 4415 B30
B1	LTE	5G	*XXQLH-654L8H8-IVT	NNH4-65C-R6-UPM / AIR6419 B77G	140°	140°	57'-0"	57'-0"	-	-
B2	LTE	5G	*RV4PX310-V2	NNH4-65C-R6-UPM / AIR6419 B77D	140°	140°	57'-0"	42'-0"	-	-
G1	LTE	5G	*XXQLH-654L8H8-IVT	NNH4-65C-R6-UPM / AIR6419 B77G	255°	255°	57'-0"	57'-0"	-	-
G2	LTE	5G	*RV4PX310-V2	NNH4-65C-R6-UPM / AIR6419 B77D	255°	255°	57'-0"	42'-0"	-	-

*TO BE REMOVED
**VERTICALLY STACKED CONFIGURATION (SEE ANTENNA PIPE MOUNT DETAIL 1/C-5)

ANTENNA SCHEDULE

NO SCALE

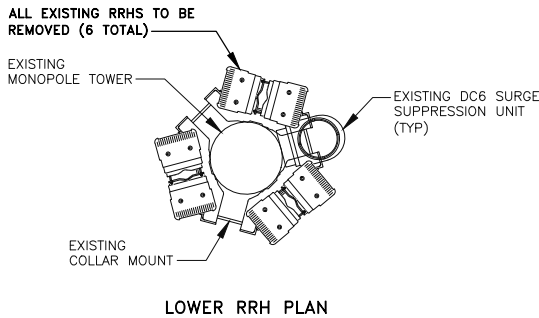
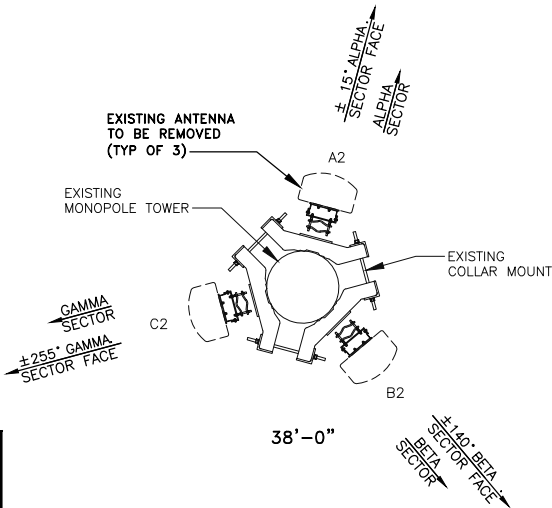
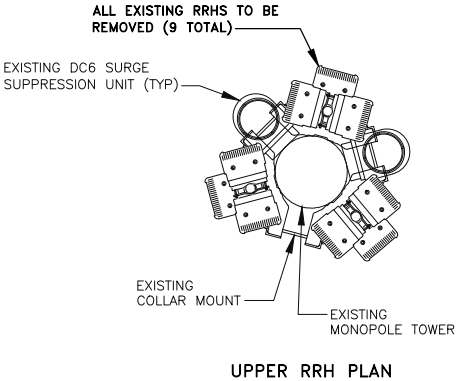
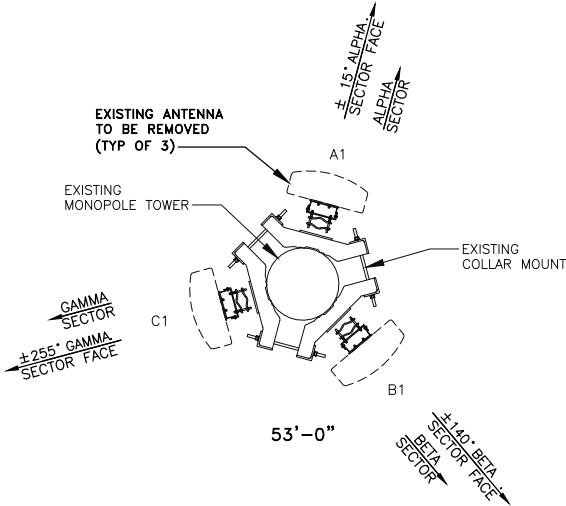
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NOTE

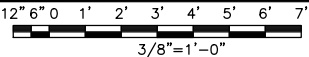
1. ALL EXISTING EQUIPMENT TO REMAIN UNLESS NOTED OTHERWISE.

NOTE

1. ALL NEW AND RELOCATED ANTENNA MOUNT PIPES TO BE REPLACED WITH 2-7/8" ANTENNA PIPES.
2. ANTENNA MOUNTING PIPE & CROSSOVER PLATE KITS FOR STACKED AIR6419 ANTENNAS SHALL BE REPLACED WITH NEW. SEE DETAIL 1, SHEET C-5.



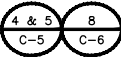
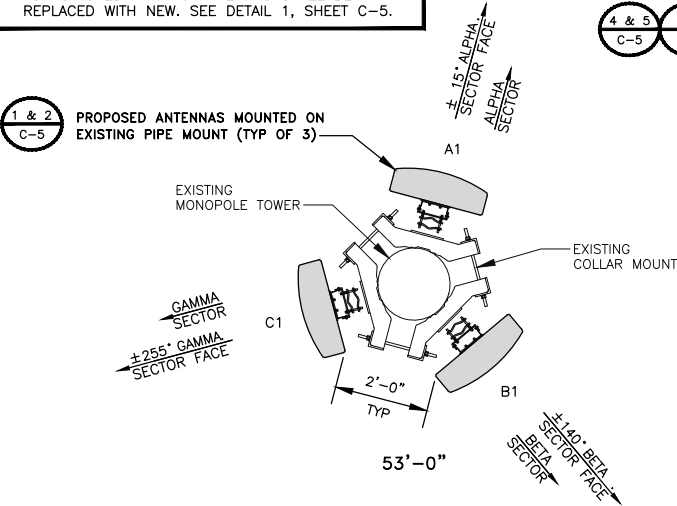
EXISTING ANTENNA LAYOUT



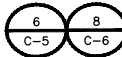
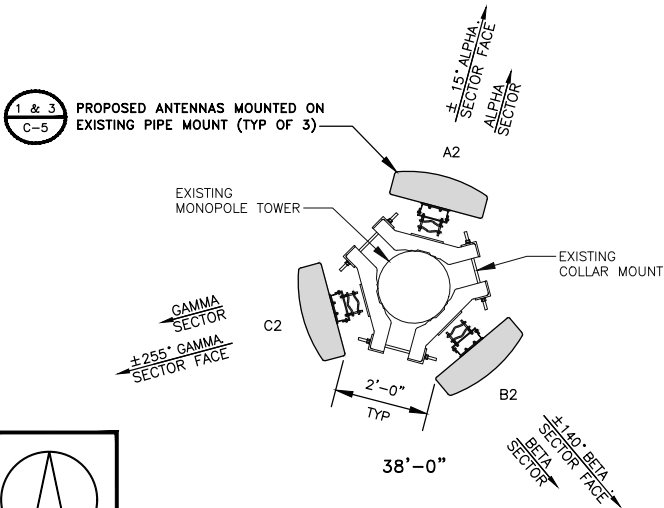
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NOTE

1. ALL NEW AND RELOCATED ANTENNA MOUNT PIPES TO BE REPLACED WITH 2-7/8" ANTENNA PIPES.
2. ANTENNA MOUNTING PIPE & CROSSOVER PLATE KITS FOR STACKED AIR6419 ANTENNAS SHALL BE REPLACED WITH NEW. SEE DETAIL 1, SHEET C-5.



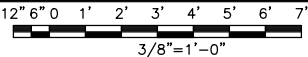
PROPOSED 4478 B14 RRU & 4890 B25/66 RRU MOUNTED ON PROPOSED BACK TO BACK MOUNT ON EXISTING PIPE (TYP OF 3)



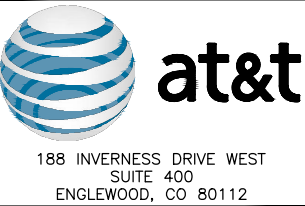
PROPOSED 4415 B30 RRU MOUNTED ON PROPOSED BACK TO BACK MOUNT ON EXISTING PIPE (TYP OF 3)



PROPOSED ANTENNA LAYOUT

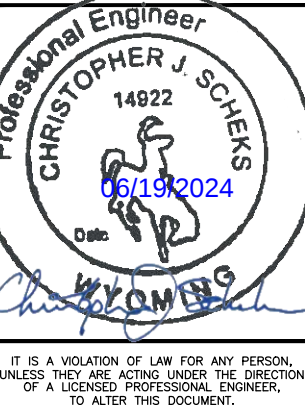


3



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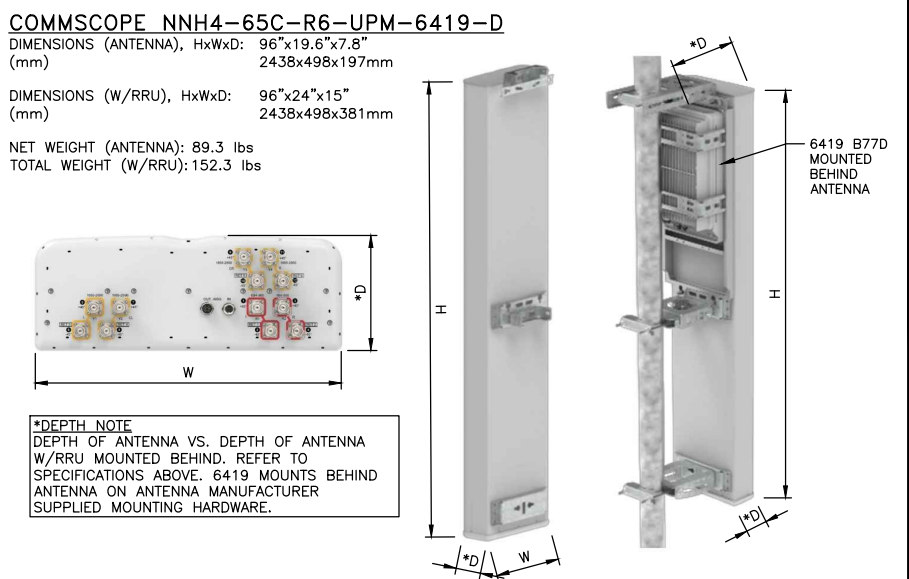
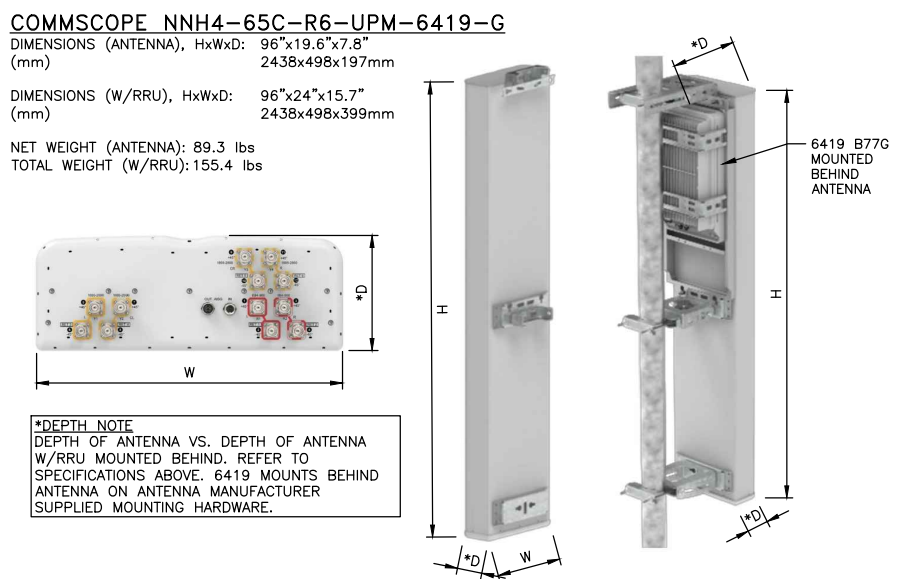
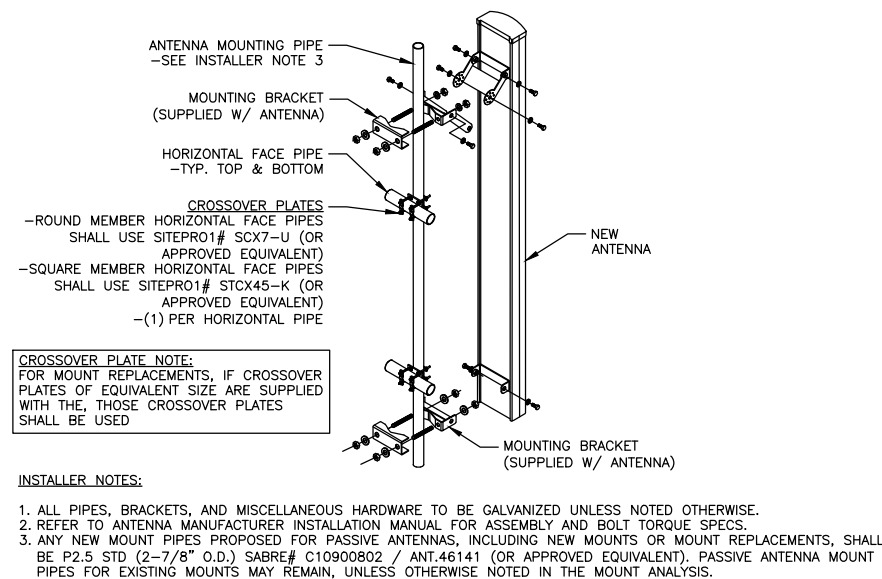
REV	DATE	DESCRIPTION
0	06/19/24	FINALS
A	05/17/24	ISSUED FOR REVIEW



JACKSON FAIRGROUNDS
IDLO4323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
ANTENNA SCHEDULE & LAYOUTS

SHEET NUMBER
C-4



at&t

188 INVERNESS DRIVE WEST
SUITE 400
ENGLEWOOD, CO 80112



BLACK & VEATCH
4600 SOUTH SYRACUSE STREET
SUITE 800
DENVER, COLORADO 80237

CPD JOB #:	2024723.02/143230.0
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REFERENCE
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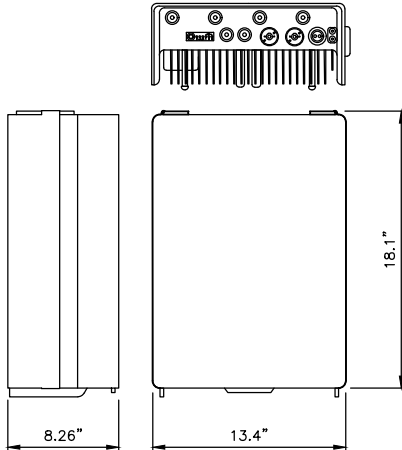
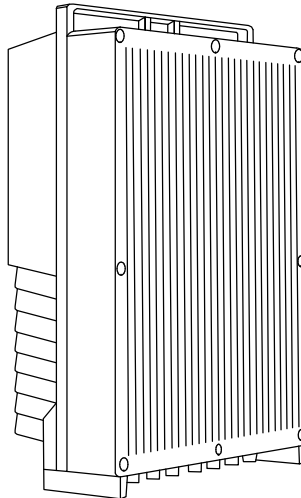
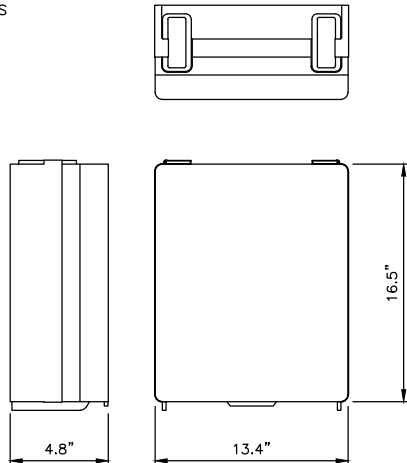
JACKSON FAIRGROUNDS
IDL04323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE

EQUIPMENT DETAILS

SHEET NUMBER

C-5

ANTENNA PIPE MOUNTING DETAIL		NO SCALE	1	PROPOSED ANTENNA SPECIFICATIONS		NO SCALE	2	PROPOSED ANTENNA SPECIFICATIONS		NO SCALE	3
ERICSSON RADIO 4478 B14 DIMENSIONS, WxDxH: 13.4"x8.26"x18.1" (mm) 342x210x460mm POWER CONSUMPTION: 650W TOTAL WEIGHT: 59.4 lbs 				ERICSSON RADIO 4890 B25/66 DIMENSIONS, HxWxD: 17.5"x15.1"x6.9" (mm) 444x384x176mm POWER CONSUMPTION: 480 WATTS TOTAL WEIGHT: 68 lbs 				ERICSSON RADIO 4415 B30 DIMENSIONS, WxDxH: 13.4"x4.8"x16.5" (mm) 342x123x420mm POWER CONSUMPTION: 670W TOTAL WEIGHT: 47 lbs PORTS: 4 x 4.3–10 (f) GBPS eCPRI PORTS 			
RRU SPECIFICATIONS		NO SCALE	4	RRU SPECIFICATIONS		NO SCALE	5	RRU SPECIFICATIONS		NO SCALE	6
DETAIL NOT USED			7	DETAIL NOT USED		NO SCALE	8	DETAIL NOT USED		NO SCALE	9



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4600 SOUTH SYRACUSE STREET
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DENVER, COLORADO 80237



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IDLO4323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
C-6

DETAIL NOT USED1

DETAIL NOT USED2

DETAIL NOT USED3

DETAIL NOT USED4

DETAIL NOT USED5

DETAIL NOT USED6

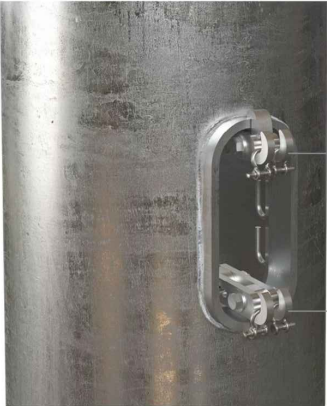
SITEPRO1# PHH-AL-SP14

SPECIFICATIONS:

- FITS 3", 3-1/2", 4" AND 4-1/2" PORT RIMS
- 7/8" VERTICAL CLEARANCE ACCEPTS 1/4" SHACKLES
- 1,200 LB VERTICAL FACTORED DEAD LOAD PER HANGER

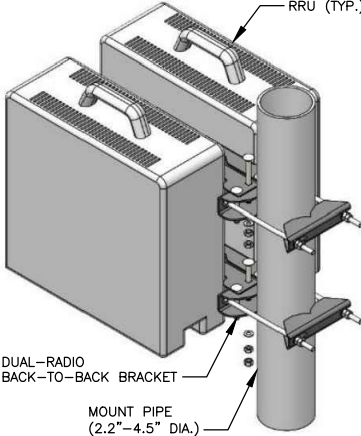
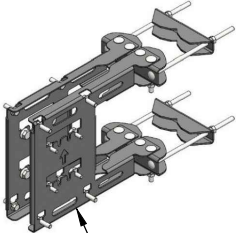
NOTES:

- ALL HOIST GRIPS SHALL BE SECURED TO TOWER STRUCTURE
- WRAPPING HOIST GRIPS OVER TOWER STEEL IS NOT PERMITTED
- USE OF SHACKLES IS PREFERRED
- BEAM CLAMPS OR ANGLE ADAPTERS ARE NOT PERMITTED FOR HOIST GRIPS
- HOIST GRIPS SHALL BE INSTALLED EVERY 200 FT OR PER CABLE MANUFACTURER REQUIREMENTS
- CHAIN NOT PERMITTED FOR HOIST GRIP SUPPORT



ERICSSON SXK1255394/2

NOTE:
OR ENGINEER APPROVED EQUIVALENT



CABLE HANGER BRACKET DETAILNO SCALE7

DUAL RRU B2B MOUNTING DETAILNO SCALE8

DETAIL NOT USED9



1. EXISTING CONDUCTORS AND CONDUIT TO REMAIN ARE NOT NOTED HEREIN. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
2. PANEL BREAKER CONFIGURATION SHOWN ONLY INDICATES PROPOSED CIRCUITS TO BE INSTALLED AND IS INTENDED TO BE DIAGRAMMATICAL ONLY. REFER TO PANEL SCHEDULE FOR PROPOSED BREAKER CONFIGURATION. CONTRACTOR SHALL BE RESPONSIBLE FOR PERFORMING A VISUAL READING OF THE PANEL AT PEAK OPERATING CURRENT TO VERIFY THAT PANEL SCHEDULE LOADS ARE NOT EXCEEDED. IN THE EVENT THE READING EXCEEDS THE CALCULATED PANEL SCHEDULE LOADS, RECORD THE READING AND CONSULT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH INSTALLATION.
4. ALL GROUNDING AND BONDING PER THE NEC.

AC CIRCUIT SCHEDULE			
NO.	FROM	TO	CONFIGURATION
1	AC LOAD CENTER	RECTIFIERS #1 & #2	(2) #8 CU THHN/THWN-2, (1) #10 CU EGC
2	AC LOAD CENTER	RECTIFIERS #3 & #4	(2) #8 CU THHN/THWN-2, (1) #10 CU EGC
3	AC LOAD CENTER	RECTIFIERS #5 & #6	(2) #8 CU THHN/THWN-2, (1) #10 CU EGC
4	AC LOAD CENTER	RECTIFIERS #7 & #8	(2) #8 CU THHN/THWN-2, (1) #10 CU EGC
5	AC LOAD CENTER	RECTIFIERS #9 & #10	(2) #8 CU THHN/THWN-2, (1) #10 CU EGC
6	AC LOAD CENTER	RECTIFIERS #11 & #12	(2) #8 CU THHN/THWN-2, (1) #10 CU EGC

1. CIRCUIT #1 - #3 TO BE RAN TOGETHER IN MINIMUM 1" CONDUIT.
2. CIRCUIT #4 - #6 TO BE RAN TOGETHER IN MINIMUM 1" CONDUIT.

1. CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTOR'S FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.
2. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL ELECTRICAL CODES AND ALL STATE AND LOCAL CODES, LAWS, AND ORDINANCES. PROVIDE ALL COMPONENTS AND WIRING SIZES AS REQUIRED TO MEET NEC STANDARDS.
3. LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION.
4. CONDUIT ROUGH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION CONFLICTS. VERIFY WITH THE MECHANICAL EQUIPMENT CONTRACTOR AND COMPLY AS REQUIRED.
5. CONTRACTOR SHALL PROVIDE ALL BREAKERS, CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETE SYSTEM.
6. CONTRACTOR SHALL PROVIDE PULL BOXES AND JUNCTION BOXES AS REQUIRED BY THE NEC ARTICLE 314.
7. CONTRACTOR SHALL PROVIDE ALL STRAIN RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
8. ALL DISCONNECTS AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED PHENOLIC NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS INSTALLED ON, AND PANEL FIELD LOCATIONS FED FROM.
9. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS PER THE SPECIFICATIONS AND NEC 250. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULL BOXES, AND ALL DISCONNECT SWITCHES, AND EQUIPMENT CABINETS.
10. ALL NEW MATERIAL SHALL HAVE A U.L. LABEL.
11. PANEL SCHEDULE LOADING AND CIRCUIT ARRANGEMENTS REFLECT POST-CONSTRUCTION EQUIPMENT.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR AS-BUILT PANEL SCHEDULE AND SITE DRAWINGS.
13. AIR CONDITIONING SYSTEM IS COMPRISED OF TWO COMPRESSOR/CONDENSER AND AIR HANDLING UNITS. THE ELECTRICAL CONTROLLER FOR THE AIR CONDITIONING SYSTEM WILL ONLY ALLOW PERMISSION FOR ONE HVAC TO BE ENERGIZED AT ANY GIVEN TIME. IN EXAMPLE ONE, IF HVAC #1 HAS A FAILURE, HVAC #2 WILL BE ENERGIZED. IN EXAMPLE TWO, WHEN HVAC CYCLE, THE CONTROLLER WILL DE-ENERGIZE FOR IT'S TIMED CYCLE.

<u>CIRCUIT SCHEDULE</u>	2	<u>NOTES</u>	3
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AC POWER PANEL													
120/240 VOLTS, 1-PHASE, 3-WIRE, 200A													
MAIN BREAKER RATING (A) :					200		SYSTEM VOLTAGE (V) :					240	
DESCRIPTION	VA	c/nc	BKR	POSN	L1	L2	POSN	BKR	c/nc	VA	DESCRIPTION		
HVAC 2	0	c	60/2	1	3120		2	60/2	c	3120	HVAC 1		
	0	c		3		3120	4		c	3120			
INT. / EXT. LTS.	840	c	15/1	5	1020		6	20/1	nc	180	RECEPTACLE		
SMOKE DETECTOR	240	c	15/1	7		240	8	---	nc	0	---		
RECTIFIERS #1 / #2	2400	c	30/2	9	4800		10	30/2	c	2400	RECTIFIER #7 / #8		
	2400	c		11		4800	12		c	2400			
RECTIFIERS #3 / #4	2400	c	30/2	13	4800		14	30/2	c	2400	RECTIFIER #9 / #10		
	2400	c		15		4800	16		c	2400			
RECTIFIERS #5 / #6	2400	c	30/2	17	4800		18	30/2	c	2400	RECTIFIER #11 / #12		
	2400	c		19		4800	20		c	2400			

PENDING AC POWER PANEL PHOTOS

CURRENT PER PHASE (A):	197	200	Amperes/phase cannot exceed main breaker rating	
PANEL TOTAL (VA):	47670	Legend: c = continuous, nc = non-continuous		
PANEL CAPACITY (kVA):	48.0	CONNECTED LOAD (kVA):	47.7	
PANEL LOADING (100% non-cont. load) (kVA):	0.7			
PANEL LOADING (125% continuous load) (kVA):	47.0			
PANEL LOADING (TOTAL) (kVA):	47.7			
SPARE CAPACITY (kVA):	0.3			

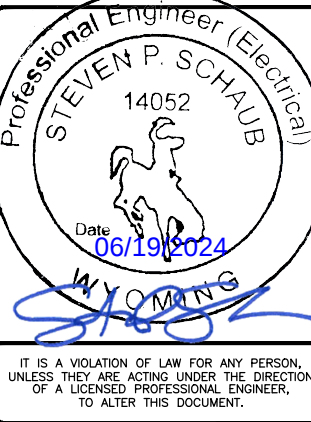
1. REMOVE EXISTING DC POWER PLANT RECTIFIER CIRCUIT BREAKERS.
2. INSTALL (6) NEW 30A/2P CIRCUIT BREAKERS FOR RECTIFIERS SLOTS. MATCH AIC RATING OF EXISTING BREAKERS. CONTRACTOR MAY RE-USE EXISTING BREAKERS IF THEY ARE IN GOOD WORKING CONDITION.

**PERSUANT TO NFPA 70 (NEC) ARTICLE 220.60: THE NONCOINCIDENT HVAC LOAD IS REMOVED, HVAC CONTROLLER AT NO TIME WILL ALLOW BOTH HVAC UNITS TO OPERATE AT THE SAME TIME.*



GPD JOB #:	2024723.02/143230.0
DRAWN BY:	DR
CHECKED BY:	MR
RFDS:	589418

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JACKSON FAIRGROUNDS
IDL04323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
ELECTRICAL AC ONE-LINE
DIAGRAM

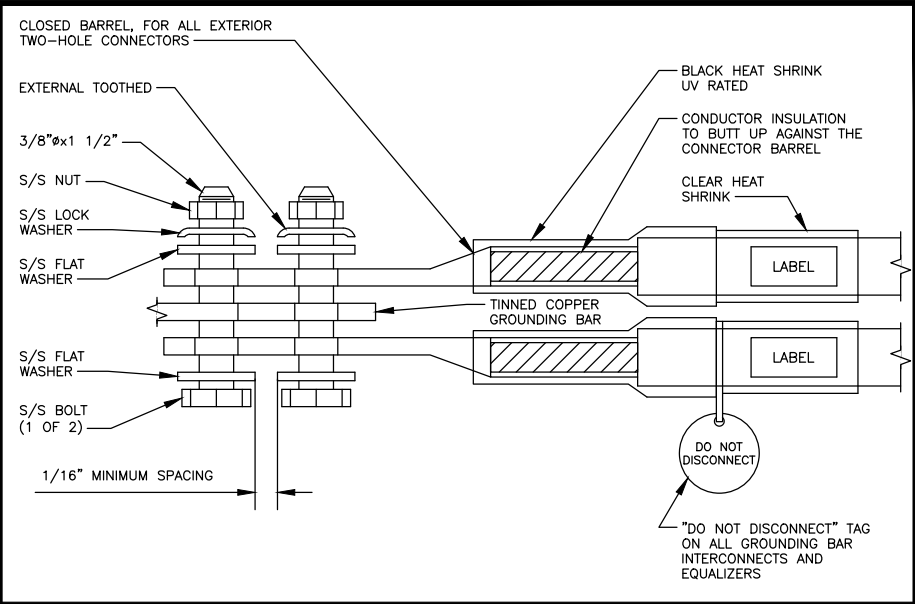
SHEET NUMBER

E-1

<u>ELECTRICAL AC ONE-LINE DIAGRAM</u>	NO SCALE	1	<u>PANEL SCHEDULE</u>	NO SCALE	4
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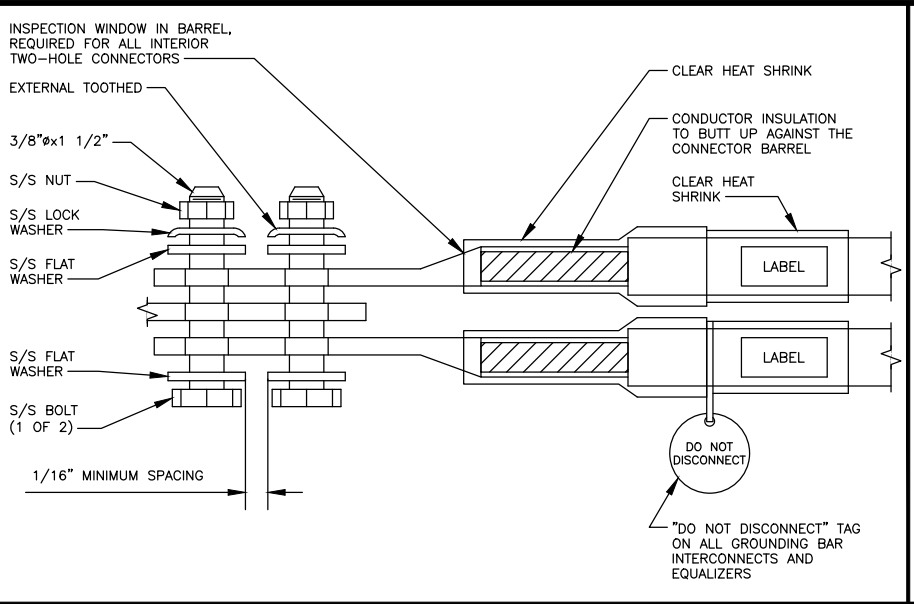
G-1



INTERIOR TWO HOLE LUG

NO SCALE

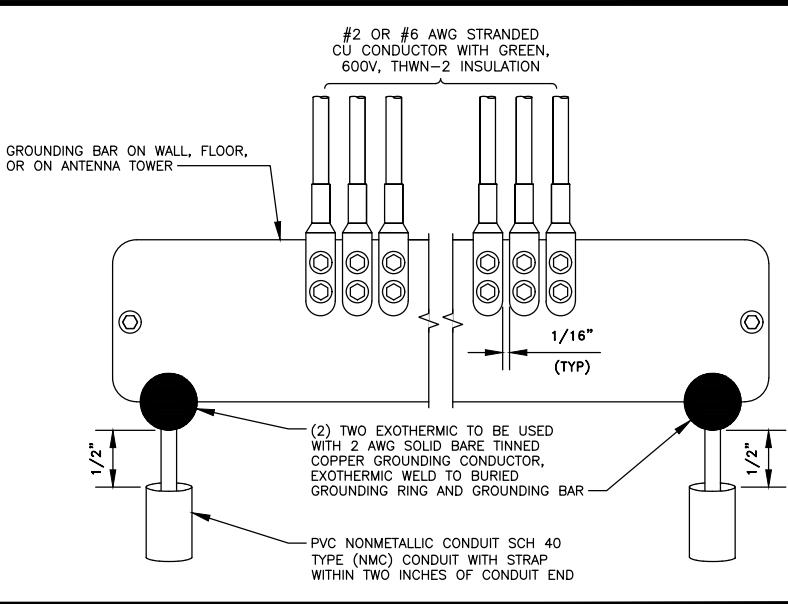
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EXTERIOR TWO HOLE LUG

NO SCALE

2



INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR

NO SCALE

3

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION

SECTION "P" – SURGE PROTECTORS

- (EC) CABLE ENTRY PORTS (HATCH PLATES) (#2)
- (EC) TELCO GROUND BAR (#2)
- (EC) COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- (AT&T) CELL SITE +24V POWER SUPPLY RETURN BAR (#2)
- (AT&T) CELL SITE –48V POWER SUPPLY RETURN BAR (#2)
- (EC) GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- (AT&T) RECTIFIER FRAMES
- (AT&T) ANTENNA SUPPRESSION

SECTION "A" – SURGE ABSORBERS

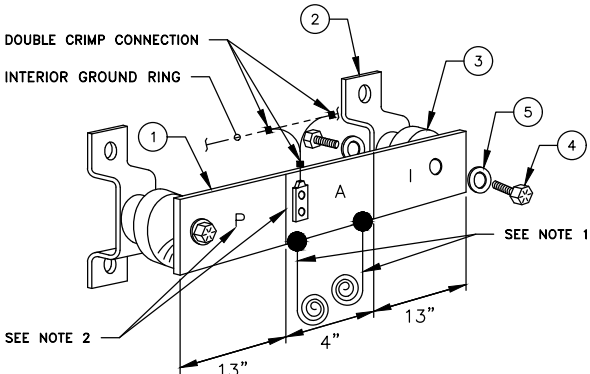
- (EC) INTERIOR GROUND RING (#2)
- (EC) EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- (EC) METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- (EC) BUILDING STEEL (IF AVAILABLE) (#2)

SECTION "I" – ISOLATED GROUNDING ZONE

- (AT&T) ALL CELL SITE COMMUNICATIONS EQUIPMENT FRAMES

DETAIL NOTES

- EXOTHERMICALLY WELD #2 AWG BARE TINNED SOLID COPPER CONDUCTOR TO GROUND BAR. ROUTE CONDUCTOR TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
- EC SHALL PERMANENTLY MARK THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "I") WITH 1" HIGH LETTERS.
- GROUND BAR SHALL BE ENGRAVED PER AT&T SPECIFICATIONS TO PREVENT THEFT.



- ALL MAIN CABLES WILL BE GROUNDED W/ COAXIAL CABLE GROUND KITS AT:
 - A. THE ANTENNA LEVEL.
 - B. MID LEVEL IF TOWER IS OVER 200'.
 - C. BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
 - D. OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
 - E. INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
- ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE CADWELDED TO THE EXISTING ADJACENT GROUND BAR DOWNLEADS A MINIMUM DISTANCE OF FOUR FEET BELOW GROUND BAR.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ANTENNA AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
- DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED GUY WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO EXOTHERMICALLY WELDED CONNECTION SHALL BE MADE TO THE GUY WIRE.
- SUBCONTRACTOR SHALL GROUND ALL EQUIPMENT INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED PERSONEL IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
- DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BAR.
- WEATHERPROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
- ALL EXTERIOR HEAT SHRINK OR HEAT SHRINK EXPOSED TO U/V LIGHT SHALL BE BLACK. ALL INTERIOR HEAT SHRINK SHALL BE CLEAR.
- NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
- PROVIDE GROUNDING KIT 6" BEFORE TURN TRANSITION FROM TOWER TO ICE BRIDGE.

(MGB) REFERENCE GROUNDING BAR

NO SCALE

4

NOTES

NO SCALE

5

NOT USED

NO SCALE

6

NOT USED

NO SCALE

7

NOT USED

NO SCALE

8



188 INVERNESS DRIVE WEST
SUITE 400
ENGLEWOOD, CO 80112



4600 SOUTH SYRACUSE STREET
SUITE 800
DENVER, COLORADO 80237



520 South Main Street, Suite 2531
Akron, OH 44311
330.572.2100 Fax 330.572.2101

GPD JOB #: 2024723.02/143230.01

DRAWN BY: DRD

CHECKED BY: MRL

RFDS: 5894188

REV	DATE	DESCRIPTION
0	06/19/24	FINALS
A	05/17/24	ISSUED FOR REVIEW
REV	DATE	DESCRIPTION

Professional Engineer (Electrical)

STEVEN P. SCHAUB

14052

Date 06/19/2024

WYOMING

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

JACKSON FAIRGROUNDS
IDLO4323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
G-2

AB	ANCHOR BOLT	IN	INCH
ABV	ABOVE	INT	INTERIOR
AC	ALTERNATING CURRENT	LB(S)	POUND(S)
ADDL	ADDITIONAL	LF	LINEAR FEET
AFF	ABOVE FINISHED FLOOR	LTE	LONG TERM EVOLUTION
AFG	ABOVE FINISHED GRADE	MAS	MASONRY
AGL	ABOVE GROUND LEVEL	MAX	MAXIMUM
AIC	AMPERAGE INTERRUPTION CAPACITY	MB	MACHINE BOLT
ALUM	ALUMINUM	MECH	MECHANICAL
ALT	ALTERNATE	MFR	MANUFACTURER
ANT	ANTENNA	MGB	MASTER GROUND BAR
APPROX	APPROXIMATE	MIN	MINIMUM
ARCH	ARCHITECTURAL	MISC	MISCELLANEOUS
ATS	AUTOMATIC TRANSFER SWITCH	MTL	METAL
AWG	AMERICAN WIRE GAUGE	MTS	MANUAL TRANSFER SWITCH
BATT	BATTERY	MW	MICROWAVE
BLDG	BUILDING	NEC	NATIONAL ELECTRIC CODE
BLK	BLOCK	NM	NEWTON METERS
BLKG	BLOCKING	NO.	NUMBER
BM	BEAM	#	NUMBER
BTC	BARE TINNED COPPER CONDUCTOR	NTS	NOT TO SCALE
BOF	BOTTOM OF FOOTING	OC	ON-CENTER
CAB	CABINET	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
CANT	CANTILEVERED	OPNG	OPENING
CHG	CHARGING	P/C	PRECAST CONCRETE
CLG	CEILING	PCS	PERSONAL COMMUNICATION SERVICES
CLR	CLEAR	PCU	PRIMARY CONTROL UNIT
COL	COLUMN	PRC	PRIMARY RADIO CABINET
COMM	COMMON	PP	POLARIZING PRESERVING
CONC	CONCRETE	PSF	POUNDS PER SQUARE FOOT
CONSTR	CONSTRUCTION	PSI	POUNDS PER SQUARE INCH
DBL	DOUBLE	PT	PRESSURE TREATED
DC	DIRECT CURRENT	PWR	POWER CABINET
DEPT	DEPARTMENT	QTY	QUANTITY
DF	DOUGLAS FIR	RAD	RADIUS
DIA	DIAMETER	RECT	RECTIFIER
DIAG	DIAGONAL	REF	REFERENCE
DIM	DIMENSION	REINF	REINFORCEMENT
DWG	DRAWING	REQ'D	REQUIRED
DWL	DOWEL	RET	REMOTE ELECTRIC TILT
EA	EACH	RF	RADIO FREQUENCY
EC	ELECTRICAL CONDUCTOR	RMC	RIGID METALLIC CONDUIT
EL.	ELEVATION	RRH	REMOTE RADIO HEAD
ELEC	ELECTRICAL	RRU	REMOTE RADIO UNIT
EMT	ELECTRICAL METALLIC TUBING	RWY	RACEWAY
ENG	ENGINEER	SCH	SCHEDULE
EQ	EQUAL	SHT	SHEET
EXP	EXPANSION	SIAD	SMART INTEGRATED ACCESS DEVICE
EXT	EXTERIOR	SIM	SIMILAR
EW	EACH WAY	SPEC	SPECIFICATION
FAB	FABRICATION	SQ	SQUARE
FF	FINISH FLOOR	SS	STAINLESS STEEL
FG	FINISH GRADE	STD	STANDARD
FIF	FACILITY INTERFACE FRAME	STL	STEEL
FIN	FINISH(ED)	TEMP	TEMPORARY
FLR	FLOOR	THK	THICKNESS
FDN	FOUNDATION	TMA	TOWER MOUNTED AMPLIFIER
FOC	FACE OF CONCRETE	TN	TOE NAIL
FOM	FACE OF MASONRY	TOA	TOP OF ANTENNA
FOS	FACE OF STUD	TOC	TOP OF CURB
FOW	FACE OF WALL	TOF	TOP OF FOUNDATION
FS	FINISH SURFACE	TOP	TOP OF PLATE (PARAPET)
FT	FOOT	TOS	TOP OF STEEL
FTG	FOOTING	TOW	TOP OF WALL
GA	GAUGE	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
GEN	GENERATOR	TYP	TYPICAL
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	UG	UNDERGROUND
GLB	GLUE LAMINATED BEAM	UL	UNDERWRITERS LABORATORY
GLV	GALVANIZED	UNO	UNLESS NOTED OTHERWISE
GPS	GLOBAL POSITIONING SYSTEM	UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
GND	GROUND	UPS	UNINTERRUPTIBLE POWER SYSTEM (DC POWER PLANT)
GSM	GLOBAL SYSTEM FOR MOBILE	VIF	VERIFIED IN FIELD
HDG	HOT DIPPED GALVANIZED	W	WIDE
HDR	HEADER	W/	WITH
HGR	HANGER	WD	WOOD
HVAC	HEAT/VENTILATION/AIR CONDITIONING	WP	WEATHERPROOF
HT	HEIGHT	WT	WEIGHT
IGR	INTERIOR GROUND RING		

SHEET NUMBER
GN-1

GENERAL SITE WORK AND DRAINAGE NOTES

PART 1 – GENERAL

CONTRACTOR SHALL PROVIDE CLEARING, GRUBBING, STRIPPING, EROSION CONTROL, SURVEY, LAYOUT, SUBGRADE PREPARATION, AND FINISH GRADING AS REQUIRED TO COMPLETE THE PROPOSED WORK SHOWN IN THESE PLANS.

1.1 REFERENCES:

- A. DOT (STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, CURRENT EDITION)
- B. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
- C. OSHA (OCCUPATION SAFETY AND HEALTH ADMINISTRATION)

1.2 INSPECTION AND TESTING:

- A. FIELD TESTING OF EARTHWORK COMPACTION AND CONCRETE CYLINDERS SHALL BE PERFORMED BY AN INDEPENDENT TESTING LAB. THIS WORK SHALL BE COORDINATED BY THE SUBCONTRACTOR.
- B. ALL WORK SHALL BE INSPECTED AND RELEASED BY THE GENERAL CONTRACTOR. THE INSPECTIONS SHALL BE CARRIED OUT WITH SPECIFIC CONCERN FOR PROPER PERFORMANCE OF THE WORK AS SPECIFIED AND/OR CALLED FOR ON THE PLAN. IT IS THE SUBCONTRACTOR'S RESPONSIBILITY TO REQUEST THE REQUIRED INSPECTIONS PRIOR TO PROCEEDING WITH FURTHER WORK THAT WOULD MAKE PARTS OF WORK INACCESSIBLE OR DIFFICULT TO INSPECT.

1.3 SITE MAINTENANCE AND PROTECTION:

- A. PROVIDE ALL NECESSARY JOB SITE MAINTENANCE FROM COMMENCEMENT OF WORK UNTIL COMPLETION OF THE SUBCONTRACT.
- B. AVOID DAMAGE TO THE SITE AND TO EXISTING FACILITIES, STRUCTURES, TREES, AND SHRUBS DESIGNATED TO REMAIN. TAKE PROTECTIVE MEASURES TO PREVENT DAMAGED TO EXISTING FACILITIES THAT ARE NOT DESIGNATED FOR MODIFICATION OR REMOVAL.
- C. KEEP SITE FREE OF PONDING WATER.
- D. PROVIDE EROSION CONTROL MEASURES IN ACCORDANCE WITH STATE DOT AND EPA REQUIREMENTS.
- E. PROVIDE AND MAINTAIN ALL TEMPORARY FENCING, BARRICADES, WARNING SIGNS, AND SIMILAR DEVICES NECESSARY TO PROTECT AGAINST THEFT FROM PROPERTY DURING THE ENTIRE DURATION OF CONSTRUCTION. REMOVE ALL SUCH DEVICES UPON COMPLETION OF THE WORK.
- F. DO NOT INTERRUPT EXISTING UTILITIES SERVING FACILITIES OCCUPIED BY THE OWNER OR OTHERS, EXCEPT WHEN PERMITTED IN WRITING BY THE ENGINEER AND THEN ONLY AFTER ACCEPTABLE TEMPORARY UTILITY SERVICES HAVE BEEN PROVIDED.

- 1. NOTICE TO ENGINEER SHALL BE PROVIDED A MINIMUM OF 48 HOURS PRIOR TO OUTAGE.

PART 2 – PRODUCTS

- 2.1 SUITABLE BACKFILL: ASTM D2321 (CLASS I, II, III OR IVA) FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN THREE (3) INCHES IN ANY DIMENSION.
- 2.2 NON-POROUS GRANULAR EMBANKMENT AND BACKFILL: ASTM D2321 (CLASS III, IVA OR IVB) COARSE AGGREGATE. FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN THREE (3) INCHES IN ANY DIMENSION.
- 2.3 POROUS GRANULAR EMBANKMENT AND BACKFILL: ASTM D2321 (CLASS IA, IB OR II) COARSE AGGREGATE FREE FROM FROZEN LUMPS, REFUSE, STONES, OR ROCKS LARGER THAN THREE (3) INCHES IN DIAMETER, OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- 2.4 SELECT STRUCTURAL FILL: GRANULAR FILL MATERIAL MEETING THE REQUIREMENTS OF ASTM E850-95. FOR USE AROUND AND UNDER STRUCTURES WHERE STRUCTURAL FILL MATERIAL IS REQUIRED.
- 2.5 GRANULAR BEDDING AND TRENCH BACKFILL: WELL-GRADED SAND MEETING THE GRADATION REQUIREMENTS OF ASTM D2487 (CLASSIFIED AS SE OR SW-SM SOILS).
- 2.6 COARSE AGGREGATE FOR ACCESS ROAD SUBBASE COURSE SHALL CONFORM TO ASTM D2940.
- 2.7 UNSUITABLE MATERIAL: HIGH AND MODERATELY PLASTIC SILTS AND CLAYS (LL>45). MATERIAL CONTAINING REFUSE, FROZEN LUMPS, DEMOLISHED BITUMINOUS MATERIAL, VEGETATIVE MATTER, WOOD, STONES IN EXCESS OF 3 INCHES IN DIAMETER, AND DEBRIS. THESE WILL BE SOILS CLASSIFIED BY ASTM AS PT, MH, CH, OH, ML, AND OL.
- 2.8 GEOTEXTILE FABRIC: MIRAFI 500X OR APPROVED EQUIVALENT.
- 2.9 PLASTIC MARKING TAPE SHALL BE ACID AND ALKALI RESISTANT POLYETHYLENE FILM SPECIFICALLY MANUFACTURED FOR MARKING AND LOCATING UNDERGROUND UTILITIES, SIX (6) INCHES WIDE WITH A MINIMUM THICKNESS OF 0.004" TAPE SHALL HAVE MINIMUM STRENGTH OF 1,500 PSI IN BOTH DIRECTIONS AND MANUFACTURED WITH INTEGRAL CONDUCTORS, FOIL BACKING OR OTHER MEANS TO ENABLE DETECTION BY A METAL DETECTOR WHEN BURIED UP TO 3 FEET DEEP. THE METALLIC CORE OF THE TAPE SHALL BE ENCASED IN A PROTECTIVE JACKET OR PROVIDED WITH OTHER MEANS TO PROTECT IT FROM CORROSION. TAPE COLOR SHALL BE RED FOR ELECTRIC UTILITIES AND ORANGE FOR TELECOMMUNICATION UTILITIES.

PART 3 – EXECUTION

3.1 GENERAL:

- A. BEFORE STARTING GENERAL SITE PREPARATION ACTIVITIES, INSTALL EROSION AND SEDIMENT CONTROL MEASURES. THE WORK AREA SHALL BE CONSTRUCTED AND MAINTAINED IN SUCH CONDITION THAT IN THE EVENT OF A RAIN EVENT, THE SITE CAN PROPERLY DRAIN AT ANY TIME.
- B. PRIOR TO SURVEY, LAYOUT, STAKING, AND MARKING, ESTABLISH AND MAINTAIN ALL LINES, GRADES, ELEVATIONS, AND BENCHMARKS NEEDED FOR EXECUTION OF THE WORK.
- C. CLEAR AND GRUB THE AREA WITHIN THE LIMITS OF THE SITE. REMOVE TREES, BRUSH, STUMPS, RUBBISH, OTHER DEBRIS, AND VEGETATION RESTING ON OR PROTRUDING THROUGH THE GROUND SURFACE.
 - 1. REMOVE THE FOLLOWING MATERIALS TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE ORIGINAL GROUND SURFACE: ROOTS, STUMPS, BRUSH, REFUSE, AND OTHER DEBRIS EMBEDDED IN OR PROTRUDING THROUGH THE GROUND SURFACE. RAKE, DISK, OR PLOW THE AREA TO A DEPTH OF NO LESS THAN 6 INCHES, AND REMOVE MATERIAL TO A DEPTH OF 12 INCHES BELOW THE BOTTOM DEPTH OF ROOTS AND OTHER DEBRIS.
 - 2. REMOVE TOPSOIL MATERIAL COMPLETELY FROM THE SURFACE UNTIL THE SOIL NO LONGER MEETS THE DEFINITION OF TOPSOIL. AVOID MIXING TOPSOIL WITH SUBSOIL OR OTHER UNDESIRABLE MATERIALS.
 - 3. EXCEPT WHERE EXCAVATION TO GREATER DEPTH IS INDICATED, FILL DEPRESSIONS RESULTING FROM CLEARING, GRUBBING, AND DEMOLITION WORK COMPLETELY WITH SUITABLE FILL.
- D. ALL DEBRIS RESULTING FROM CLEARING AND GRUBBING OPERATIONS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN AN AUTHORIZED LANDFILL. BURNING OF DEBRIS WILL NOT BE PERMITTED.
- E. PRIOR TO EXCAVATING, THOROUGHLY EXAMINE THE AREA TO BE EXCAVATED AND/OR TRENCHED TO VERIFY THE LOCATIONS OF FEATURES INDICATED ON THE DRAWINGS AND TO ASCERTAIN THE EXISTENCE AND LOCATION OF ANY STRUCTURE, UNDERGROUND STRUCTURE, OR OTHER ITEM NOT SHOWN THAT MIGHT INTERFERE WITH THE PROPOSED CONSTRUCTION. NOTIFY THE CONSTRUCTION MANAGER OF ANY OBSTRUCTIONS THAT WILL PREVENT ACCOMPLISHMENT OF THE WORK AS INDICATED ON THE PLANS.
- F. SEPARATE AND STOCKPILE ALL EXCAVATED MATERIALS SUITABLE FOR BACKFILL. ALL EXCESS EXCAVATED AND UNSUITABLE MATERIALS SHALL BE DISPOSED OF OFF-SITE IN A LEGAL MANNER.

3.2 BACKFILL:

- A. AFTER COMPLETING CONSTRUCTION OF A STRUCTURE, INCLUDING EXPIRATION OF THE SPECIFIED MINIMUM CURING PERIOD FOR CAST-IN-PLACE CONCRETE, BACKFILL THE EXCAVATION WITH APPROVED MATERIAL TO RESTORE THE REQUIRED FINISHED GRADE.
 - 1. PRIOR TO PLACING BACKFILL AROUND STRUCTURES, ALL FORMS SHALL BE REMOVED AND THE EXCAVATION CLEANED OF ALL TRASH, DEBRIS, AND UNSUITABLE MATERIALS.
 - 2. BACKFILL BY PLACING AND COMPACTING SUITABLE BACKFILL MATERIAL IN UNIFORM HORIZONTAL LAYERS OF NO GREATER THAN 8-INCHES LOOSE THICKNESS. WHERE HAND OPERATED COMPACTORS ARE USED, THE FILL MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED 4 INCHES IN LOOSE DEPTH.
 - 3. IF THE DENSITY TESTING INDICATES THAT THE CONTRACTOR HAS NOT OBTAINED THE SPECIFIED DENSITY, THE SUCCEEDING LAYER SHALL NOT BE PLACED UNTIL THE SPECIFICATION REQUIREMENTS ARE MET UNLESS OTHERWISE AUTHORIZED BY THE GEOTECHNICAL ENGINEER. THE CONTRACTOR SHALL TAKE WHATEVER APPROPRIATE ACTION IS NECESSARY, SUCH AS DISKING AND DRYING, ADDING WATER, OR INCREASING THE COMPACTIVE EFFORT TO MEET THE MINIMUM COMPACTION REQUIREMENTS.
- B. THOROUGHLY COMPACT EACH LAYER OF BACKFILL TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D698.

3.3 TRENCH EXCAVATION:

- A. UTILITY TRENCHES SHALL BE EXCAVATED AT LOCATIONS, DEPTHS, AND WIDTHS SHOWN ON PLAN, OR AS DIRECTED BY THE GENERAL CONTRACTOR. EXCAVATION CONTRACTOR SHALL PROVIDE SHORING, SHEETING, AND BRACING AS REQUIRED TO PREVENT CAVING OR SLOUGHING OF THE TRENCH WALLS.
- B. THE TRENCH WIDTH SHALL EXTEND A MINIMUM OF 6 INCHES BEYOND THE OUTSIDE EDGE OF THE OUTERMOST CONDUIT.

3.4 TRENCH BACKFILL:

- A. NOTIFY THE GENERAL CONTRACTOR 24 HOURS IN ADVANCE OF BACKFILLING.
- B. PROVIDE GRANULAR BEDDING MATERIAL IN ACCORDANCE WITH THE PLAN AND THE UTILITY REQUIREMENTS.
- C. CONDUCT UTILITY CHECK TESTS BEFORE BACKFILLING. BACKFILL AND COMPACT TRENCH BEFORE ACCEPTANCE TESTING.
- D. PLACE GRANULAR TRENCH BACKFILL UNIFORMLY ON BOTH SIDES OF THE CONDUITS IN 6-INCH UNCOMPACTED LIFTS AND TO 12 INCHES OVER THE CONDUITS. SOLIDLY RAM AND TAMP BACKFILL INTO SPACE AROUND CONDUITS.
- E. PROTECT CONDUIT FROM LATERAL MOVEMENT, IMPACT DAMAGE, OR UNBALANCED LOADING.
- F. ABOVE THE CONDUIT EMBEDMENT ZONE, PLACE AND COMPACT THE BACKFILL MATERIAL IN MAXIMUM 8-INCH THICK LOOSE LIFTS TO RESTORE THE REQUIRED FINISHED SURFACE GRADE.
- G. COMPACT THE TRENCH BACKFILL A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D698.

3.5 AGGREGATE ACCESS ROAD:

- A. CLEAR, GRUB, STRIP, AND EXCAVATE FOR THE ACCESS ROAD AS SHOWN ON PLAN. SCARIFY TO A DEPTH OF 6 INCHES AND PROOF-ROLL. ALL HOLES, RUTS, SOFT PLACES, AND OTHER DEFECTS SHALL BE CORRECTED.
- B. THE SUBGRADE OF THE DISTURBED AREA SHALL BE COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE MODIFIED PROCTOR TEST, ASTM D1557.
- C. AFTER PREPARATION OF THE ROAD SUBGRADE IS COMPLETE, INSTALL THE GEOTEXTILE FABRIC (MIRAFI 500X) AT LOCATIONS INDICATED ON THE PLAN BY ROLLING THE FABRIC OUT LONGITUDINALLY ALONG THE ROADWAY. THE FABRIC SHALL NOT BE DRAGGED ACROSS THE SUBGRADE. PLACE THE ENTIRE ROLL IN A SINGLE OPERATION AND ROLL IT OUT AS SMOOTHLY AS POSSIBLE.

- 1. GEOTEXTILE FABRIC OVERLAPS THAT ARE PARALLEL TO THE ROADWAY WILL BE PERMITTED ALONG THE CENTERLINE OF THE ROAD AND AT LOCATIONS BEYOND THE ROADWAY SURFACE WIDTH (I.E. WITHIN THE SHOULDER WIDTH) ONLY. NO LONGITUDINAL OVERLAPS SHALL BE LOCATED BETWEEN THE CENTERLINE AND THE SHOULDER. PARALLEL OVERLAPS SHALL BE A MINIMUM OF 3 FEET WIDE.
- 2. TRANSVERSE (PERPENDICULAR TO THE ROADWAY) GEOTEXTILE FABRIC OVERLAPS AT THE END OF A ROLL SHALL OVERLAP IN THE DIRECTION OF THE AGGREGATE PLACEMENT WITH THE PREVIOUS ROLL ON TOP OF THE NEW ROLL, AND SHALL HAVE A MINIMUM LENGTH OF 3 FEET.
- 3. ALL GEOTEXTILE FABRIC OVERLAPS SHALL BE PINNED WITH STAPLES OR NAILS A MINIMUM OF 10 INCHES LONG TO INSURE PROPER POSITIONING DURING PLACEMENT OF AGGREGATE. PIN LONGITUDINAL SEAMS AT A MINIMUM OF 25-FOOT INTERVALS AND TRANSVERSE SEAMS AT A MINIMUM OF 5-FOOT INTERVALS.

- D. THE AGGREGATE BASE AND SURFACE AGGREGATE SHALL BE CONSTRUCTED IN LAYERS NOT MORE THAN 4 INCHES (COMPACTED) IN THICKNESS. AGGREGATE TO BE PLACED ON GEOTEXTILE FABRIC SHALL BE END-DUMPED ON THE FABRIC FROM THE FREE END OF THE FABRIC OR OVER PREVIOUSLY PLACED AGGREGATE. THE FIRST LIFT SHALL BE BLADED DOWN TO A THICKNESS OF 8 INCHES PRIOR TO COMPACTION. AT NO TIME SHALL EQUIPMENT, EITHER TRANSPORTING THE AGGREGATE OR GRADING THE AGGREGATE, BE PERMITTED ON THE ROADWAY WITH LESS THAN 4 INCHES OF MATERIAL COVERING THE GEOTEXTILE FABRIC.
- E. THE AGGREGATE SHALL BE IMMEDIATELY COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST, ASTM D1557. A TAMPING ROLLER, PNEUMATIC-TIRED ROLLER, OR VIBRATORY MACHINE, OR ANY COMBINATION THEREOF MAY BE USED FOR COMPACTION PROCEDURES. THE TOP LAYER SHALL BE GIVEN A FINAL ROLLING WITH A THREE-WHEEL OR TANDEM ROLLER.

3.6 FINISH GRADING:

- A. PERFORM ALL GRADING TO PROVIDE POSITIVE DRAINAGE AWAY FROM STRUCTURES AND SMOOTH SURFACE DRAINAGE OF THE ENTIRE AREA WITHIN THE LIMITS OF CONSTRUCTION. GRADING SHALL PROPERLY BLEND WITH SURROUNDING TOPOGRAPHY AND STRUCTURES.
- B. IF DEEMED SUITABLE PER GEOTECHNICAL ENGINEER, UTILIZE FILL MATERIAL RESULTING FROM EXCAVATION FOR THE CONSTRUCTION OF FILLS, EMBANKMENTS, AND FOR REPLACEMENT OF REMOVED UNSUITABLE MATERIALS.
- C. ACHIEVE FINISHED GRADE BY PLACING A MINIMUM OF 4 INCHES OF 1/2" – 3/4" CRUSHED STONE ON IF APPLICABLE, TOP OF SOIL STABILIZER FABRIC.
- D. REPAIR ALL ACCESS ROADS AND SURROUNDING AREAS DISTURBED DURING THE COURSE OF THIS WORK TO THEIR ORIGINAL CONDITION.

- 3.7 ASPHALT PAVING: SHALL BE PERFORMED PER COLORADO DEPARTMENT OF TRANSPORTATION (CDOT), DIVISION 400 – CDOT PAVEMENT STANDARDS AND SPECIFICATIONS.



188 INVERNESS DRIVE WEST
SUITE 400
ENGLEWOOD, CO 80112



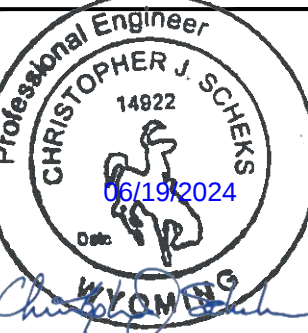
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GPD JOB #:	2024723.02/143230.01
DRAWN BY:	DRD
CHECKED BY:	MRL
RFDS:	5894188

0	06/19/24	FINALS
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REV	DATE	DESCRIPTION



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JACKSON FAIRGROUNDS
IDLO4323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
GENERAL SITE WORK &
DRAINAGE NOTES

SHEET NUMBER
GN-3

GENERAL CONCRETE WORK NOTES

PART 1 – GENERAL

- 1.1 SCOPE:
- A. FORM WORK, REINFORCING STEEL, ACCESSORIES, CAST-IN PLACE CONCRETE, FINISHING, CURING, AND TESTING FOR STRUCTURAL CONCRETE FOUNDATIONS.
- 1.2 REFERENCES:
- A. ACI (AMERICAN CONCRETE INSTITUTE)
1. ACI 301 SPECIFICATION FOR STRUCTURAL CONCRETE FOR BUILDINGS.
2. ACI 304 RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING AND PLACING CONCRETE.
3. ACI 305 RECOMMENDED PRACTICE FOR HOT WEATHER CONCRETING.
4. ACI 306 RECOMMENDED PRACTICE FOR COLD WEATHER CONCRETING.
5. ACI 308 STANDARD PRACTICE FOR CURING CONCRETING.
6. ACI 309 STANDARD PRACTICE FOR CONSOLIDATION OF CONCRETE.
7. ACI 318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
8. ACI 347 RECOMMENDED PRACTICE FOR CONCRETE FORMWORK.
- B. THE APPLICABLE STANDARDS OF THE AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) ARE REFERENCED IN THE ACI STANDARDS AND ARE A PART OF THIS SPECIFICATION.

PART 2 – PRODUCTS

- 2.1 REINFORCING MATERIALS:
- B. REINFORCING BARS: ASTM A615, GRADE 60, PROPOSED DEFORMED BILLET-STEEL BARS, PLAIN FINISH.
- C. CONTRACTOR SHALL FURNISH CHAIRS, BOLSTERS, BAR SUPPORTS, SPACERS AS REQUIRED FOR SUPPORT OF REINFORCING STEEL AND WIRE FABRIC.
- 2.2 CONCRETE MATERIALS:
- A. PORTLAND CEMENT SHALL BE TYPE II, CONFORMING TO ASTM C-150.
- B. AGGREGATE SHALL CONFORM TO ASTM C-33.
1. FINE AGGREGATE SHALL BE UNIFORMLY GRADED, CLEAN, SHARP, AND WASHED NATURAL OR CRUSHED SAND, FREE FROM ORGANIC IMPURITIES.
2. COARSE AGGREGATE SHALL BE NATURAL WASHED GRAVEL OR CRUSHED ROCK CONSISTING HARD, STRONG, DURABLE PIECES, FREE FROM ADHERENT COATINGS.
3. MAXIMUM SIZE OF COARSE AGGREGATE SHALL BE 3/4 INCH IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C-33 GRADATION SIZE NO. 67.
- C. WATER USED IN CONCRETE MIX SHALL BE POTABLE, CLEAN, AND FREE FROM OILS, ACIDS, SALTS, CHLORIDES, ALKALI, SUGAR, VEGETABLE, OR OTHER DELETARIOUS SUBSTANCES.
- D. THE CONCRETE SHALL CONTAIN AN AIR-ENTRAINING ADMIXTURE COMPLYING WITH THE REQUIREMENTS OF ASTM C-260 AND ACI 212. 1R AND A WATER-REDUCING ADMIXTURE COMPLYING WITH THE REQUIREMENTS OF ASTM C-494 AND ACI 212.1R. ADMIXTURES SHALL BE PURCHASED AND BATCHED IN LIQUID SOLUTION. THE USE OF CALCIUM CHLORIDE OR AN ADMIXTURE CONTAINING CALCIUM CHLORIDE IS PROHIBITED. ADMIXTURES SHALL BE OF THE SAME MANUFACTURER TO ASSURE COMPATIBILITY. ACCEPTABLE MANUFACTURERS ARE:
1. W.R. GRACE
2. SIKA CORPORATION
3. MASTER BUILDERS
4. EUCLID CHEMICAL COMPANY
- E. CURING COMPOUND SHALL CONFORM TO ASTM C309, TYPE I, ID, CLASS A AND B, AND ASTM C171 AS APPLICABLE.
- 2.3 CONCRETE MIX:
- A. PROPORTION CONCRETE MIX IN ACCORDANCE WITH REQUIREMENTS OF ACI 301. THE STRENGTH OF CONCRETE SHALL BE AS INDICATED ON THE DRAWINGS. WHERE STRENGTH IS NOT CLEARLY INDICATED, CONCRETE OF MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI SHALL BE USED.
- B. THE CONCRETE MIX SHALL BE DESIGNED FOR A MAXIMUM SLUMP OF THREE INCHES AT THE POINT OF DISCHARGE. MIXES OF THE STIFFEST CONSISTENCY THAT CAN BE EFFICIENTLY PLACED SHALL BE USED.
- C. ALL CONCRETE SHALL HAVE THREE (3) TO FIVE (5) PERCENT ENTRAINED AIR.
- D. ALL STRUCTURAL CONCRETE SHALL CONTAIN A WATER-REDUCING AGENT.

PART 3 – EXECUTION

- 3.1 GENERAL:
- A. CONSTRUCT AND ERECT THE FORM WORK IN ACCORDANCE WITH ACI 301 AND ACI 347.
- B. COLD-WEATHER CONCRETING SHALL BE IN ACCORDANCE WITH ACI 306.
- C. HOT-WEATHER CONCRETING SHALL BE IN ACCORDANCE WITH ACI 305.
- 3.2 INSERTS, EMBEDDED COMPONENTS, AND OPENINGS:
- A. CONTRACTOR SHALL CHECK ALL CIVIL, ARCHITECTURAL, STRUCTURAL, AND ELECTRICAL DRAWINGS FOR OPENINGS, SLEEVES, ANCHOR BOLTS, INSERTS, AND OTHER ITEMS TO BE INCORPORATED INTO THE CONCRETE WORK.
- B. COORDINATE THE WORK OF OTHER SECTION IN FORMING AND SETTING OPENINGS, RECESSES, SLOTS, CHASES, ANCHORS, INSERTS, AND OTHER ITEMS TO BE EMBEDDED.
- C. EMBEDDED ITEMS SHALL BE SET ACCURATELY IN LOCATION, ALIGNMENT, ELEVATION AND PLUMBNESS, LOCATED AND MEASURED FROM ESTABLISHED SURVEYED REFERENCE BENCHMARKS.

- D. EMBEDDED ITEMS SHALL BE ANCHORED INTO PLACE IN A MANNER TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT AND CONSOLIDATION. COMPONENTS FORMING A PART OF A COMPLETE ASSEMBLY SHALL BE ALIGNED BEFORE ANCHORING INTO PLACE. PROVIDE TEMPORARY BRACING, ANCHORAGE, AND TEMPLATES AS REQUIRED TO MAINTAIN THE SETTING AND ALIGNMENT.

3.3 REINFORCEMENT PLACEMENT:

- A. PLACE REINFORCEMENT ACCORDING TO CONSTRUCTION PLAN SET DRAWINGS AND IN ACCORDANCE WITH ACI 301 AND ACI 318.
- B. ACCURATELY POSITION, SUPPORT, AND SECURE REINFORCEMENT AGAINST DISPLACEMENT FROM FORM WORK CONSTRUCTION OR CONCRETE PLACEMENT AND CONSOLIDATION. SUPPORT REINFORCING ON METAL CHAIRS, RUNNERS, BOLSTERS, SPACERS AND HANGERS.
- C. SPLICES OF REINFORCING BARS SHALL BE CLASS B UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS. SPLICES SHALL BE STAGGERED AND FULL DEVELOPMENT LENGTH SHALL BE PROVIDED ACROSS JOINTS.
- D. LOCATE REINFORCING TO PROVIDE CONCRETE COVER AND SPACING SHOWN ON THE DRAWINGS. MINIMUM COVER SHALL BE AS REQUIRED BY ACI 318.
- E. WELDING OF AND TO ANY REINFORCING MATERIALS, INCLUDING TACK WELDING OF CROSSING BARS, IS STRICTLY PROHIBITED.

3.4 CONCRETE PLACEMENT:

- A. PRIOR TO PLACING CONCRETE, THE FORMS AND REINFORCEMENT SHALL BE THOROUGHLY INSPECTED; ALL TEMPORARY BRACING, TIES, AND CLEATS REMOVED; ALL OPENINGS FOR UTILITIES PROPERLY BOXED; ALL FORMS PROPERLY SECURED IN THEIR CORRECT POSITION AND MADE TIGHT. ALL REINFORCEMENT AND EMBEDDED ITEMS SHALL BE SECURED IN THEIR PROPER LOCATIONS. ALL OLD AND DRY CONCRETE AND DIRT SHALL BE CLEANED OFF AND ALL STANDING WATER AND OTHER FOREIGN MATERIAL REMOVED.
- B. CONCRETE SHALL BE IN ACCORDANCE WITH ACI 301 AND ACI 304 AND SHALL BE PLACED AT SUCH A RATE THAT THE CONCRETE PREVIOUSLY PLACED IS STILL PLASTIC AND INTEGRATED WITH THE FRESH CONCRETE. CONCRETE PLACEMENT, ONCE STARTED, SHALL BE CARRIED ON AS A CONTINUOUS OPERATION UNTIL THE SECTION IS COMPLETED. COLD JOINTS ARE NOT ALLOWED UNLESS PRE-APPROVED BY ENGINEER.
- C. ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED AND COMPACTED BY VIBRATION SPACING, RODDING, OR FORKING DURING THE OPERATION OF PLACING IN ACCORDANCE WITH ACI 309. THE CONCRETE SHALL BE THOROUGHLY WORKED AROUND REINFORCEMENT, EMBEDDED ITEMS, AND INTO THE CORNER OF THE FORMS SO AS TO ELIMINATE ALL AIR POCKETS AND VOIDS.

3.5 FINISHING:

- A. FINISHING OF THE FLOOR SLABS SHALL BE IN ACCORDANCE WITH ACI 302.1 SECTION 7.2 AND SHALL INCLUDE A MINIMUM OF THREE TROWELINGS. IN ACCORDANCE WITH ASTM E 1155 THE SLAB FINISH TOLERANCE AS MEASURED SHALL HAVE AN OVERALL TEST NUMBER FOR FLATNESS OF Ff= 20 AND F1 = 15. THE MINIMUM LOCAL NUMBER FOR FLATNESS, Ff= 15 AND F1=10.
- B. SURFACE OF FLOOR SLAB SHALL RECEIVE TWO COATS OF CLEAR SEALER/HARDNER.
- C. ABOVE GRADE WALL SURFACES SHALL HAVE A SMOOTH FORM FINISH AS DEFINED IN CHAPTER 10 OF ACI 301.

3.6 CURING:

- A. FRESHLY DEPOSITED CONCRETE SHALL BE PROTECTED FROM PREMATURE DRYING AND EXCESSIVELY HOT AND COLD TEMPERATURES, AND SHALL BE MAINTAINED WITH MINIMUM MOISTURE LOSS AT A RELATIVELY CONSTANT TEMPERATURE FOR A PERIOD OF TIME NECESSARY FOR THE HYDRATION OF THE CEMENT AND PROPER CURING OF THE CONCRETE.
- B. CONCRETE SHALL BE KEPT CONTINUOUSLY MOIST AT LEAST OVERNIGHT, IMMEDIATELY FOLLOWING THE INITIAL CURING. BEFORE THE CONCRETE HAS DRIED. ADDITIONAL CURING SHALL BE ACCOMPLISHED BY ONE OF THE FOLLOWING MATERIALS OR METHODS:
1. PONDING OR CONTINUOUS SPRINKLING.
2. ABSORPTIVE MAT OR FABRIC KEPT CONTINUOUSLY WET.
3. NON-ABSORPTIVE FILM (POLYETHYLENE) OVER PREVIOUSLY SPRINKLED SURFACE.
4. SAND OR OTHER COVERING KEPT CONTINUOUSLY WET.
5. CONTINUOUS STEAM (NOT EXCEEDING 150 DEGREES FAHRENHEIT OR VAPOR MIST BATH.
6. CURING COMPOUND APPLIED IN TWO COATS, SPRAYED IN PERPENDICULAR DIRECTION
- C. THE FINAL CURING SHALL CONTINUE UNTIL THE CUMULATIVE NUMBER OF DAYS OR FRACTION THEREOF, NOT NECESSARILY CONSECUTIVE, DURING WHICH TEMPERATURE OF THE AIR IN CONTACT WITH CONCRETE IS ABOVE 50 DEGREES FAHRENHEIT HAS TOTALED SEVEN (7) DAYS. CONCRETE SHALL NOT BE PERMITTED TO FREEZE DURING THE CURING PERIOD. RAPID DRYING AT THE END OF THE CURING PERIOD SHALL BE PREVENTED.



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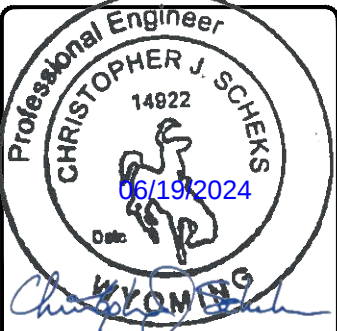
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CELL SITE RF MODIFICATIONS

SHEET TITLE
GENERAL CONCRETE WORK
NOTES

SHEET NUMBER
GN-4

GENERAL STRUCTURAL STEEL NOTES

PART 1 – GENERAL

1.1 SCOPE:

- A. PROVIDE FABRICATION AND ERECTION OF STRUCTURAL STEEL AND OTHER ELEMENTS AS SHOWN ON THE DRAWINGS OR REQUIRED BY OTHER SECTIONS OF THESE SPECIFICATIONS.

1.2 REFERENCES:

- A. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC). MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN (ASD).
- B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
ASTM A36: STRUCTURAL STEEL
ASTM A53: PIPE, STEEL BLACK AND HOT DIPPED, ZINC-COATED WELDED AND SEAMLESS.
ASTM A108: STEEL BARS, CARBON, COLD FINISHED, STANDARD QUALITY.
ASTM A123: ZINC (HOT-DIPPED GALVANIZED) COATING ON IRON AND STEEL PRODUCTS.
ASTM A307: CARBON STEEL BOLTS AND STUD, 60,000 P.S.I. TENSILE STRENGTH.
ASTM A325: HIGH-STRENGTH BOLT FOR STRUCTURAL STEEL JOINTS.
ASTM A490: HEAT-TREATED, STRUCTURAL STEEL BOLTS, 150 (KSI) (1035MPA) TENSILE STRENGTH.
ASTM A500: COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
ASTM A563: CARBON AND ALLOY STEEL NUTS.
ASTM B695: COATINGS OF ZINC MECHANICALLY DEPOSITED ON IRON AND STEEL.
ASTM F436: HARDENED STEEL WASHERS.
ASTM F959: COMPRESSIBLE-WASHER-TYPE DIRECT TENSION INDICATOR FOR USE WITH STRUCTURAL FASTENERS.
- C. AMERICAN WELDING SOCIETY (AWS):
AWS A5.1: COVERED CARBON STEEL ARC WELDING ELECTRODES.
AWS A5.5: LOW ALLOY STEEL COVERED ARC WELDING ELECTRODES.
AWS D1.1: STRUCTURAL WELDING CODE – STEEL.
- D. RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC): "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS OR ASTM A490 BOLTS." AS ENDORSED BY AISC.
- E. STEEL STRUCTURES PAINTING COUNCIL (SSPC):
SSPC-SP3: POWER TOOL CLEANING.
SSPC-PAINT 11: RED IRON OXIDE, ZINC CHROME, RAW LINSEED OIL OR ALKYD PAINT.

1.3 SUBMITTALS:

- A. SUBMIT THE FOLLOWING FOR APPROVAL:
 - 1. FABRICATION AND ERECTION DRAWINGS SHOWING ALL DETAILS, CONNECTIONS, MATERIAL DESIGNATIONS, AND ALL TOP STEEL ELEVATIONS.
- B. WELDERS SHALL BE QUALIFIED AS PRESCRIBED IN AWS D1.1.

PART 2 – PRODUCTS

2.1 STRUCTURAL STEEL:

- A. SHAPES, PLATES, AND BARS SHALL CONFORM TO ASTM A36.
- B. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B. STEEL PIPE SHALL CONFIRM TO ASTM A53, TYPE E OR S, GRADE B.

2.2 ANCHOR BOLTS:

- A. ANCHOR BOLTS SHALL CONFORM TO ASTM A307 WITH HEAVY HEXAGONAL NUTS.

2.3 BOLTS:

- A. COMMON (MACHINE) BOLTS SHALL CONFORM TO ASTM A307 GRADE A AND NUTS TO ASTM A563. ONE COMMON BOLT ASSEMBLY SHALL CONSIST OF A BOLT, A HEAVY HEX NUT, AND A HARDENED WASHER.
- B. HIGH-STRENGTH BOLTS SHALL CONFORM TO ASTM A325 ONE HIGH. STRENGTH BOLT ASSEMBLY SHALL CONSIST OF A HEAVY HEX STRUCTURAL BOLT, A HEAVY HEX NUT, AND A HARDENED WASHER CONFORMING TO ASTM F436. THE HARDENED WASHER SHALL BE INSTALLED AGAINST THE ELEMENT TURNED IN TIGHTENING. UNLESS NOTED OTHERWISE ON THE DRAWINGS, ALL CONNECTIONS SHALL BE BEARING TYPE CONNECTIONS.

2.4 WELDING ELECTRODES:

- A. WELDING ELECTRODES SHALL COMPLY WITH AWS D1.1 USING A5.1 OR A5.5 E70XX AND SHALL BE COMPATIBLE WITH THE WELDING PROCESS SELECTED.

2.5 PRIMER:

- A. PRIMER SHALL BE RED OXIDE-CHROMATE PRIMER COMPLYING WITH SSPC PAINT SPECIFICATION NO. 11.

PART 3 – EXECUTION

3.1 FABRICATION:

- A. SHOP FABRICATE AND ASSEMBLY MATERIALS AS SPECIFIED HEREIN.
 - 1. FABRICATE ITEMS OF STRUCTURAL STEEL IN ACCORDANCE WITH THE AISC-ASD SPECIFICATIONS, AND AS INDICATED ON THE APPROVED SHOP DRAWINGS.
 - 2. ALL EXPOSED STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED PER ASTM.
 - 3. PROPERLY MARK AND MATCH-MARK MATERIALS FOR FIELD ASSEMBLY AND FOR IDENTIFICATION AS TO INTENDED LOCATION.
 - 4. FABRICATE AND DELIVER IN A SEQUENCE WHICH WILL EXPEDITE ERECTION AND MINIMIZE FIELD HANDLING OF MATERIALS.
 - 5. WHERE FINISHING IS REQUIRED, COMPLETE THE ASSEMBLY, INCLUDING THE WELDING OF UNITS, BEFORE START OF FINISHING OPERATIONS.
 - 6. THE FINISH SURFACE OF MEMBERS EXPOSED IN THE FINISHED STRUCTURE SHALL BE FREE FROM MARKINGS, BURNS, AND OTHER DEFECTS.
- B. PROVIDE CONNECTIONS AS SPECIFIED HEREIN:
 - 1. PROVIDE BOLTS AND WASHERS OF TYPES AND SIZE REQUIRED FOR COMPLETION OF FIELD ERECTION. USE 3/4" DIAMETER A325 BOLTS UNLESS NOTED OTHERWISE.
 - 2. INSTALL HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS."

- 3. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1 FOR PROCEDURES, APPEARANCE, QUALITY OF WELD, AND METHODS USED IN CORRECTING WELDED WORK.
- 4. THE FABRICATOR SHALL FURNISH AND INSTALL ERECTION CLIPS FOR FIT-UP OF WELDED CONNECTIONS.
- 5. DOUBLE ANGLE MEMBERS SHALL HAVE WELDED FILLERS SPACED IN ACCORDANCE WITH CHAPTER E4 OF THE AISC-ASD SPECIFICATION.
- 6. GUSSET AND STIFFENER PLATES SHALL BE 3/8" THICK MINIMUM.

3.2 PRIMING:

- A. STRUCTURAL STEEL SHALL BE PRIMED AS SPECIFIED HEREIN, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.
- B. STRUCTURAL STEEL SURFACE PREPARATION SHALL CONFIRM TO SSPC-SP3, "POWER TOOL CLEANING."
- C. SURFACE PREPARATION AND PRIMER SHALL BE IN ACCORDANCE WITH AISC CODE OF STANDARD PRACTICE IN THE ASD MANUAL OF STEEL CONSTRUCTION.
- D. MATERIALS SHALL REMAIN CLOSED UNTIL REQUIRED FOR USE. MANUFACTURER'S POT-LIFE REQUIREMENTS SHALL BE STRICTLY ADHERED TO.
- E. PRIMER SHALL BE APPLIED TO DRY, CLEAN, PREPARED SURFACE AND UNDER FAVORABLE CONDITIONS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER, PRIMING SHALL NOT BE DONE WHEN AMBIENT TEMPERATURE IS LESS THAN 50 DEGREES FAHRENHEIT, THE RELATIVE HUMIDITY IS MORE THAN 90 PERCENT, OR THE SURFACE TEMPERATURE IS LESS THAN 5 DEGREES FAHRENHEIT ABOVE THE DEW POINT.
- F. GENERALLY ALL PRIMER SHALL BE SPRAY APPLIED. BRUSH OR ROLLER APPLICATION SHALL BE LIMITED TO TOUCHUP AND TO AREAS NOT ACCESSIBLE BY SPRAY GUN.
- G. PRIMER SHALL BE UNIFORMLY APPLIED WITHOUT RUNS, SAGS, SOLVENT BLISTERS, DRY SPRAY, OR OTHER BLEMISHES. ALL BLEMISHES AND OTHER IRREGULARITIES SHALL BE REPAIRED OR REMOVED AND THE AREA RE-COATED. SPECIAL ATTENTION SHALL BE PAID TO CREVICES, WELD LINES, BOLT HEADS, CORNERS, EDGES, ETC., TO OBTAIN THE REQUIRED NOMINAL FILM THICKNESS.
- H. DRY COAT FILM THICKNESS OF THE PRIMER SHALL BE 2.0 MILLIMETERS
- I. IF THE PRIMER IS DAMAGED BY WELDING OR IN ANY OTHER MANNER, THE AREA SHALL BE TOUCHED UP AND REPAIRED. THE TOUCHUP PAINT SHALL BE COMPATIBLE WITH THE PREVIOUS APPLIED PRIMER COAT WITH MINIMUM DRY FILM THICKNESS OF 1.5 MILLIMETERS.

3.3 INSTALLATION:

- A. INSTALLATION OF STRUCTURAL STEEL SHALL COMPLY WITH AISC "CODE OF STANDARD PRACTICE."
- B. STRUCTURAL FIELD WELDING SHALL BE DONE BY THE ELECTRIC SUBMERGED OR SHIELDED METAL ARC PROCESS. WELDED CONSTRUCTION METHODS SHALL COMPLY WITH AWS D1.1.
- C. PROVIDE ANCHOR BOLTS AND OTHER CONNECTORS REQUIRED FOR SECURING STRUCTURAL STEEL TO MASONARY WALLS AND TO OTHER IN-PLACE WORK. PROVIDE TEMPLATES AND OTHER DEVICES NECESSARY FOR PRESETTING BOLTS AND ANCHORS TO ACCURATE LOCATIONS.
- D. SPLICE MEMBERS ONLY WHERE INDICATED ON THE DRAWINGS.
- E. PROVIDE TEMPORARY SHORING BRACING WITH CONNECTIONS OF SUFFICIENT STRENGTH TO BEAR IMPOSED LOADS. REMOVE TEMPORARY CONNECTIONS AND MEMBERS WHEN PERMANENT MEMBERS ARE IN PLACE AND THE FINAL CONNECTIONS HAVE BEEN MADE.
- F. BEFORE ASSEMBLY ALIGN AND ADJUST MEMBERS AND OTHER SURFACES WHICH WILL BE IN THE PERMANENT CONTACT, BEFORE ASSEMBLY.
- G. AS A MINIMUM, HIGH-STRENGTH BOLTS, SHALL BE TIGHTENED TO A "SNUG-TIGHT" CONDITION AS DEFINED IN THE LATEST AISC SPECIFICATIONS. ALL HIGH-STRENGTH BOLTS SPECIFIED ON THE DESIGN DRAWINGS TO BE USED IN PRETENSIONED OR SLIP-CRITICAL JOINTS SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN SPECIFIED IN AISC TABLE J3.1. INSTALLATION SHALL BE BY ANY OF THE FOLLOWING METHODS: TURN-OF NUT METHOD, A DIRECT-TENSION-INDICATOR, TWIST-OFF-TYPE TENSION-CONTROL BOLT, CALIBRATED WRENCH, OR ALTERNATIVE DESIGN BOLT.



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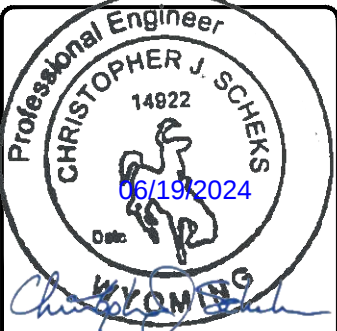
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CELL SITE RF MODIFICATIONS

SHEET TITLE
GENERAL STRUCTURAL
STEEL NOTES

SHEET NUMBER
GN-5

GENERAL ELECTRICAL NOTES

PART 1 – GENERAL

- 1.1 GENERAL CONDITIONS:
- A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO PERFORMING WORK. ANY QUESTIONS ARISING DURING THE BID PERIOD REGARDING THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, PRIOR TO THE AWARD OF THE CONTRACT.
- B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE OF THE WORK UNDER THIS SECTION.
- C. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION.
- 1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES, AND CODES:
- A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES, AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.
- 1.3 REFERENCES:
- A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE OF CONSTRUCTION, EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS. WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.
1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3. ICE (INSULATED CABLE ENGINEERS ASSOCIATION)
4. NEMA (NATIONAL ELECTRICAL MANUFACTURER’S ASSOCIATION)
5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7. UL (UNDERWRITERS LABORATORIES. INC.)
8. AT&T GROUNDING AND BONDING STANDARDS TP–76416

- 1.4 SCOPE OF WORK:
- A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND TO ACHIEVE OPERATIONAL STATUS.
- 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, TRENCHING, BACKFILLING, AND REMOVAL OF EXCESS SOIL, FILL, AND DEBRIS.
- D. THE CONTRACTOR SHALL FURNISH THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE JURISDICTIONAL AUTHORITIES.
- E. IF APPLICABLE, THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS–BUILT DRAWINGS TO DOCUMENT ALL WIRING EQUIPMENT CONDITIONS AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS–BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT TO THE APPROPRIATE PARTY.

PART 2 – PRODUCTS

- 2.1 GENERAL:
- A. ALL MATERIALS AND EQUIPMENT SHALL BE NEW, UL LISTED, AND FREE FROM DEFECTS.
- B. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES (UL) LABEL OF APPROVAL AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
- C. ALL ITEMS, MATERIALS, AND EQUIPMENT SHALL BE ACCEPTABLE TO THE JURISDICTIONAL AUTHORITY AND SUITABLE FOR THE USE INTENDED.
- D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING OF GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED (10,000 AIC MINIMUM). CONTRACTOR SHALL VERIFY THAT AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.
- 2.2 MATERIALS AND EQUIPMENT:
- A. CONDUIT:
1. RIGID METAL CONDUIT (RMC) SHALL BE HOT–DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS, AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
3. CONDUIT CLAMPS, STRAPS, AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE–TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC AND INSTALLED USING SOLVENT–CEMENT–TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.
- B. CONDUCTORS AND CABLE:
1. CONDUCTORS AND CABLE SHALL BE FLAME–RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN–2, 600 VOLT, SIZE AS INDICATED, ON PLANS THE MINIMUM SIZE CONDUCTOR USED SHALL BE #12 AWG.
2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED. #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS COMPRESSION TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
4. STRAIN–RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER’S RECOMMENDATIONS.
5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J–BOXES, EQUIPMENT. CABINETS SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).
- C. DISCONNECT SWITCHES:
1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD–FRONT, QUICK–MAKE, QUICK–BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE, INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED, FURNISHED IN NEMA 3R ENCLOSURE, SQUARE–D, OR ENGINEERED APPROVED EQUAL.

- D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:
1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2–(*)CS OR K2L–(*)CS (*) LENGTH AS REQUIRED.
2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON–TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH “BREATHER” HOLES, XIT MODEL #XB–22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS IDENTIFICATION NUMBERING, AND THE ELECTRICAL POWER SOURCE.
3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.
- E. SYSTEM GROUNDING:
1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED COPPER. ABOVE–GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
2. GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AND THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4” LETTERS BY STENCILING OR DESIGNATION PLATE.
3. CONNECTORS SHALL BE HIGH CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO–HOLE COMPRESSION LUGS WITH CLEAR HEAT SHRINK FOR MECHANICAL CONNECTIONS. USE TWO–HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK FOR INTERIOR AND BLACK HEAT SHRINK FOR EXTERIOR.
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 ERICO #615800, COPPER–CLAD STEEL WITH HIGH STRENGTH STEEL CORE AND ELECTROLYTIC GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, AND 5/8”x10’–0”. ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES AS SHOWN ON DRAWINGS.
6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.
- F. 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.
2. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.
- G. PANELS AND LOAD CENTERS:
1. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 – EXECUTION

- 3.1 GENERAL:
- A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER’S RECOMMENDATIONS.
- B. DURING INSTALLATION AND CONSTRUCTION PERIODS EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT, WATER, AND CHEMICAL OR MECHANICAL INJURY.
- 3.2 LABOR AND WORKMANSHIP:
- A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN IN A NEAT AND WORKMAN–LIKE MANNER.
- B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED, AND TESTED BY THE CONTRACTOR AS REQUIRED TO CONFIRM THE INTENDED PERFORMANCE.
- C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL NECESSARY LABELS, 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 SCHEDULED WORK.
- 3.4 INSTALLATION:
- B. CONDUIT:
1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN ¾” TRADE SIZE SHALL BE UTILIZED.
2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS UNLESS OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24” UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18” IN ALL NON–TRAFFIC APPLICATIONS (REFER TO 2020 OR LATEST NEC, TABLE 300.5).
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT AT LOCATIONS OF DIRECT CONNECTION TO EQUIPMENT THAT MOVES OR VIBRATES, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORTS TO ALLOW FOR EXPANSION AND CONTRACTION.
5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER–BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
7. 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.
8. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
9. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
10. INSTALL 2” HIGHLY VISIBLE AND DETECTABLE TAPE 12” ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
11. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.

12. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL BE INSTALLED TO PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.
- B. CONDUCTORS AND CABLE:
1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:
- | DESCRIPTION | 208/240/120 VOLT SYSTEMS |
|-------------|--------------------------|
| PHASE A | BLACK |
| PHASE B | RED |
| PHASE C | BLUE |
| NEUTRAL | WHITE |
| GROUNDING | GREEN |
2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDULETS APPROVED FOR THIS PURPOSE.
3. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES, AND EQUIPMENT TO ALLOW FOR A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS AND/OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS ARE PROHIBITED. DAMAGED CABLES SHALL BE REPLACED AT THE CONTRACTOR’S EXPENSE.
- C. DISCONNECT SWITCHES:
1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB, AND CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS REQUIRED.
- D. GROUNDING:
1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP–76416, TP–76300, AND THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS, AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. AT BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWER GROUND RING, TO THE EXISTING GROUNDING SYSTEM. THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN #2 AWG COPPER. ROOFTOP GROUND RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, THE LIGHTNING PROTECTION SYSTEM, AND/OR THE BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2.
5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER’S PUBLISHED TORQUE TIGHTENING SPECIFICATIONS. WHERE MANUFACTURER’S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE–IN POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER’S INSTRUCTIONS.
7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION PRIOR TO PERMANENT CONCEALMENT.
8. APPLY CORROSION–RESISTANCE FINISH TO FIELD CONNECTIONS AND AREAS/COMPONENTS WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED.
9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
11. DIRECT–BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 30” MINIMUM BELOW GRADE, OR 6” MINIMUM BELOW THE FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
13. THE INSTALLATION OF A CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER’S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL THE PROTECTIVE BOX FLUSH WITH GRADE.
14. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FEET FROM THE GROUND BAR AT THE BASE OF THE TOWER, INSTALL A SECOND GROUND BAR AT THE END OF THE ICE BRIDGE TO GROUND THE COAX CABLE GROUNDING KITS AND IN–LINE ARRESTORS.
15. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
- 3.5 ACCEPTANCE TESTING:
- A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.
- B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND TO BE NON–COMPLIANT WITH THE SPECIFIED REQUIREMENTS, THE NON–COMPLIANT ITEMS/ELEMENTS SHALL BE PROMPTLY REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS.
- C. TEST PROCEDURES:
1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1,000VOLT DC.
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 CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES TO APPROPRIATE PARTS.
4. PERFORM GROUNDING TEST TO MEASURE RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3–POINT “FALL–OF–POTENTIAL” METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.



188 INVERNESS DRIVE WEST
SUITE 400
ENGLEWOOD, CO 80112



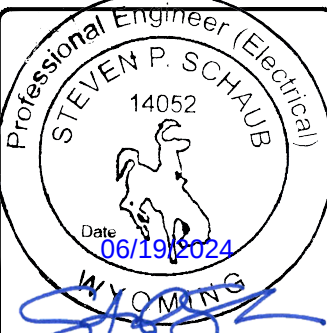
BLACK & VEATCH
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GPD JOB #:	2024723.02/143230.01
DRAWN BY:	DRD
CHECKED BY:	MRL
RFDS:	5894188

0	06/19/24	FINALS
A	05/17/24	ISSUED FOR REVIEW
REV	DATE	DESCRIPTION



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

JACKSON FAIRGROUNDS
IDL04323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
GENERAL ELECTRICAL
NOTES

SHEET NUMBER
GN-6

BATTERY SAFETY NOTES

PART 1 – GENERAL

- 1.1 LAWS, REGULATIONS, ORDINANCES, STATUTES, AND CODES:
- A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES, AND CODES.
- 1.2 REFERENCES:
- A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE OF CONSTRUCTION. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)

2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

3. ICE (INSULATED CABLE ENGINEERS ASSOCIATION)

4. NEMA (NATIONAL ELECTRICAL MANUFACTURER’S ASSOCIATION)

5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)

6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)

7. UL (UNDERWRITERS LABORATORIES. INC.)

8. AT&T GROUNDING AND BONDING STANDARDS TP–76416

9. IFC (INTERNATIONAL FIRE CODE)

10. IMC (INTERNATIONAL MECHANICAL CODE)
- 1.3 SCOPE OF WORK:
- A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND TO ACHIEVE OPERATIONAL STATUS.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.

C. THE BATTERY & POWER SYSTEMS ARE EQUIPPED WITH TEMPERATURE SENSORS & ARE PRE–PROGRAMMED WITH THE BATTERY VOLTAGE TEMPERATURE COMPENSATION & BATTERY THERMAL RUNAWAY MANAGEMENT FEATURES ENABLED PER AT&T MOBILITY’S SPECIFICATIONS.

D. DOOR(S) INTO EQUIPMENT ROOM MUST BE PROVIDED WITH APPROVED SIGNS AND APPROPRIATELY MARKED NFPA 704 PLACARD THAT STATE THE FOLLOWING:

• EQUIPMENT ROOM CONTAINS ENERGIZED BATTERY SYSTEMS

• EQUIPMENT ROOM CONTAINS ENERGIZED ELECTRICAL CIRCUITS

• BATTERY ELECTROLYTE SOLUTIONS WHERE PRESENT, ARE CORROSIVE LIQUIDS

E. CABINETS SHALL HAVE EXTERIOR LABELS THAT IDENTIFY THE MANUFACTURER AND MODEL NUMBER OF THE SYSTEM AND ELECTRICAL RATING (VOLTAGE AND CURRENT) OF THE CONTAINED BATTERY SYSTEM. SIGNS WITHIN THE CABINET SHALL INDICATE RELEVANT ELECTRICAL, CHEMICAL, AND FIRE HAZARDS.

PART 2 – PRODUCTS

- 2.1 GENERAL:
- A. ALL MATERIALS AND EQUIPMENT SHALL BE NEW, UL LISTED, AND FREE FROM DEFECTS.

B. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES (UL) LABEL OF APPROVAL AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

C. ALL ITEMS, MATERIALS, AND EQUIPMENT SHALL BE ACCEPTABLE TO THE JURISDICTIONAL AUTHORITY AND SUITABLE FOR THE USE INTENDED.

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING OF GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED (10,000 AIC MINIMUM). CONTRACTOR SHALL VERIFY THAT AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.
- 2.2 MATERIALS AND EQUIPMENT:
- A. BATTERIES:

1. BATTERIES SHALL BE VRLA (VALVE REGULATED LEAD–ACID) BATTERIES COMPLYING WITH IFC 1207.

2. CONTRACTOR TO INSTALL ENERSYS POWERSAFE SBS BATTERIES OR ENGINEERING APPROVED EQUIVALENT.

B. POWER PLANTS/CABINETS:

1. POWER PLANTS/CABINETS SHALL BE EQUIPPED WITH TEMPERATURE SENSORS AND ARE PRE–PROGRAMMED WITH THE BATTERY VOLTAGE TEMPERATURE COMPENSATION & BATTERY THERMAL RUNAWAY MANAGEMENT FEATURES ENABLED PER AT&T MOBILITY’S SPECIFICATIONS.

2. CONTRACTOR TO INSTALL POWER PLANTS/CABINETS PER AT&T SPECIFICATIONS; AND COMPLYING WITH IFC 1207 AND IMC 502.4.

C. BATTERY RACKS/CABINETS:

1. BATTERY RACKS/CABINETS SHALL BE EQUIPPED WITH TEMPERATURE SENSORS PER AT&T MOBILITY’S SPECIFICATIONS.

2. CONTRACTOR TO INSTALL BATTERY RACKS/CABINETS PER AT&T SPECIFICATIONS; AND COMPLYING WITH IFC 1207 AND IMC 502.4.

IFC 1207 CODE ANALYSIS & COMPLIANCE INFORMATION

- SAFETY CAPS (IFC 1207.6.4) – VRLA BATTERIES HAVE SELF–RESEALING SAFETY VENTS WITH FLASH ARRESTORS WHICH SATISFY THIS CODE REQUIREMENT.

• THERMAL RUNAWAY MANAGEMENT (IFC 1207.6.5) – POWER PLANTS/CABINETS SHALL BE EQUIPPED WITH TEMPERATURE SENSORS AND ARE PRE–PROGRAMMED WITH THE BATTERY VOLTAGE TEMPERATURE COMPENSATION AND BATTERY THERMAL RUNAWAY MANAGEMENT FEATURES ENABLED. BATTERY RACKS/CABINETS SHALL BE EQUIPPED WITH TEMPERATURE SENSORS.

• SPILL CONTROL (IFC 1207.6.2) –NOT REQUIRED FOR VRLA BATTERIES PER EXCEPTION.

• NEUTRALIZATION (IFC 1207.6.2) –CONTRACTOR TO ENSURE THAT BATTERY SPILL CLEAN–UP KIT IS PROVIDED ON SITE, CAPABLE OF NEUTRALIZING A MINIMUM OF X GALLONS OF SPILLED ELECTROLYTE (WHERE X=3% OF THE TOTAL VOLUME CALCULATED IN THE ELECTROLYTE CALCULATIONS).

• VENTILATION (IFC 1207.6.1) – EXHAUST FAN WILL LIMIT CONCENTRATION TO 1% VIA HYDROGEN SENSOR AND MAKEUP AIR INTAKE. HYDROGEN SENSOR TO ACTIVATE DAMPER/FAN AT 1% CONCENTRATION AND SIGNAL AN ALARM TO A MONITORED FACILITY AT 2% CONCENTRATION.

• SIGNAGE (IFC 1207.4.8) – AT&T WILL PLACE UV–RESISTANT SIGNS ON THE EXTERIOR OF THE SHELTER DOOR CAPABLE OF WITHSTANDING THE HARSH SUNLIGHT OUTDOORS PER IFC 1207.4.8. IN THE CASE THAT BATTERIES ARE INSTALLED IN A CABINET, CONTRACTOR SHALL PLACE SIGNAGE ON THE CABINET DOOR PER IFC 1207.4.8.

• SEISMIC PROTECTION (IFC 1207.4.4) – CONTRACTOR WILL ENSURE THAT ANY NEW BATTERY RACKS HAVE THE REQUIRED BRACING TO MEET SEISMIC ZONE 4.

• SMOKE DETECTION (IFC 1207.5.4) – SMOKE DETECTORS TO BE TIED INTO EXISTING ALARMING SYSTEMS. AT&T TO VERIFY OPERATION OF SMOKE DETECTOR/ALARM.

IMC 502.4 CODE ANALYSIS & COMPLIANCE INFORMATION

- (IMC 502.4) STATIONARY STORAGE BATTERY SYSTEMS. STATIONARY STORAGE BATTERY SYSTEMS, AS REGULATED BY SECTION 1207 OF THE INTERNATIONAL FIRE CODE, SHALL BE PROVIDED WITH VENTILATION IN ACCORDANCE WITH IMC 502.4.

EXCEPTION: LITHIUM–ION AND LITHIUM METAL POLYMER BATTERIES SHALL NOT REQUIRE ADDITIONAL VENTILATION BEYOND THAT WHICH WOULD NORMALLY BE REQUIRED FOR HUMAN OCCUPANCY OF THE SPACE.

THIS ROOM (OR CABINET) CONTAINS:

1. ENERGIZED BATTERY SYSTEMS
2. ENERGIZED ELECTRICAL CIRCUITS

BATTERY ELECTROLYTE SOLUTIONS,
WHERE PRESENT, ARE CORROSIVE



BATTERY SIGNAGE NOTES:

REFER TO AT&T SIGNAGE STANDARD ATT–790–202–062 DAS (DISTRIBUTED ANTENNA SYSTEM) AND CRAN (CENTRALIZED RADIO ACCESS NETWORK) SIGNAGE STANDARD DOCUMENT FOR SIGNAGE REQUIREMENTS. SPECIFIC SIGNAGE REQUIREMENTS ARE DETAILED IN AT&T PRACTICE CRE–50–37–00–ATP–1, “SPACES CONTAINING STATIONARY STORAGE BATTERY SYSTEMS, VENTILATION, AND HYDROGEN EMISSIONS CONTROL/DETECTION”.

SIGNAGE SHALL COMPLY WITH LOCALLY ADOPTED CODE (IFC OR NFPA REQUIRED VERBIAGE) AND THE AUTHORITY HAVING JURISDICTION (AHJ). REFER TO SECTION 6 FOR EXAMPLES OF SIGN PLACEMENT.

- DOORS/ENTRY POINTS ACCESSING ROOMS OR SPACES CONTAINING STATIONARY STORAGE BATTERY SYSTEMS SHALL BE PROVIDED WITH AHJ APPROVED SIGNS. AT&T MINIMUM REQUIREMENTS FOR SIGNAGE SHALL BE 1/2 INCH BLACK LETTERING ON A WHITE BACKGROUND. APPROXIMATE SIGN SIZE WILL BE 8.5 INCH X 14 INCH UNLESS OTHERWISE DIRECTED BY THE AHJ.

• IN SITUATIONS WERE AHJ APPROVED SIGNS CANNOT BE PLACED ON DOORS/ENTRY POINTS ACCESSING ROOMS OR SPACES CONTAINING STATIONARY STORAGE BATTERY SYSTEMS (I.E., CUSTOMER DOES NOT DESIRE SIGN POSTED FOR AESTHETIC REASONS), REFER TO CRE–50–37–00–ATP–1 , SECTION 5.1.5. A VARIANCE TO THE LOCALLY ADOPTED CODE WILL NEED TO BE APPLIED FOR IAW AT&T PRACTICE CRE–50–01–16–ATP–001 “FIRE PROTECTION VARIANCE, EXCEPTION NOTIFICATION, AND APPROVAL FOR ABANDONMENT OR REMOVAL OF EXISTING SYSTEM.”

• THE SIGN WILL CONTAIN THE LEGAL LANGUAGE STIPULATED BY THE CODE. SEE EXAMPLE SIGNAGE ABOVE.

• NFPA 704 CAN BE FOUND ON THE AT&T EHS WEB SITE.

THE DIAMOND SHAPED NFPA 704 SIGN (EXAMPLE ABOVE) SHALL BE POSTED AT ENTRY POINTS TO SPACES CONTAINING BATTERIES OR ON OUTDOOR CABINETS CONTINING BATTERIES WHEN REQUESTED BY THE AHJ. THE DETERMINATION FOR THE HAZARD INDEX SHALL BE DEVELOPED UTILIZING THE SDS SHEET FOR THE BATTERIES CONTAINED WITHIN THE SPACE OR IF REQUIRED WITHIN THE BUILDING. THE MOST HAZARDOUS INDEX SHALL BE USED FOR WHAT IS IN THE SPACE.

IFC, CHAPTER 12, SECTION 1207 COMPLIANCE					
STATIONARY STORAGE BATTERY SYSTEMS HAVING CAPACITIES EXCEEDING THE VALUES SHOWN IN TABLE 1207.1.1 SHALL COMPLY w/ SECTION 1207, AS APPLICABLE.					
BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES					
BATTERY TECHNOLOGY	CAPACITY ALLOWED				
LEAD ACID, ALL TYPES	70 kWh				
AH = VOLTAGE (AH) / 1000					
VOLTS	AH		kWh	NO. OF BATTERIES	TOTAL kWh
12	190	1000	2.28	16	36.48
CONCLUSIONS					
36.48	<	70 kWh	SECTION 1207 DOES NOT APPLY		
BATTERY DATA CHART					



188 INVERNESS DRIVE WEST
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BLACK & VEATCH
4600 SOUTH SYRACUSE STREET
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GPD JOB #:	2024723.02/143230.01
DRAWN BY:	DRD
CHECKED BY:	MRL
RFDS:	5894188

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REV	DATE	DESCRIPTION



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TO ALTER THIS DOCUMENT.

JACKSON FAIRGROUNDS
IDLO4323
305 WEST SNOW KING AVE
JACKSON, WY 83001
CELL SITE RF MODIFICATIONS

SHEET TITLE
BATTERY SAFETY NOTES

SHEET NUMBER
GN-7

Structural Analysis 80-ft Monopole

Prepared For:
Diamond Communications, LLC
120 Mountain Ave.
Springfield, NJ 07081

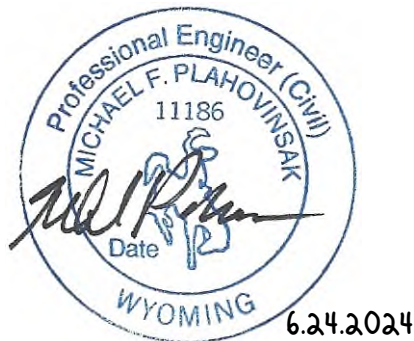
MFP Project #97324-010

Site Location:
WY005 Jackson Fairground
Teton Co., WY
Lat/Long: 43°28'23", -110°46'5"

Analysis Type:
TIA-222-H

Member	Proposed Usage	Status
Pole Shaft	36.7%	PASS
Foundation	31.1%	PASS

June 24, 2024



Michael F. Plahovinsak, P.E.
18301 State Route 161 W, Plain City, OH 43064
614-398-6250 - mike@mfpeng.com

Project Summary:

I have completed a structural analysis of the existing monopole for the following new configuration:

- 53' – AT&T:
 - o (3) Commscope NNH4-65C-R6-UPM Antennas
 - o (3) Ericsson AIR6419 B77G Antennas
 - o (3) Ericsson 4478 B14 + (3) 4890 B25/B66 RRH's
 - o (2) Raycap DC6-48-60-18-8F
 - o (5) ¾" DC + (2) 3/8" Fiber + (3) 2" Conduit
 - o Flush Mounts
- 38' – AT&T:
 - o (3) Commscope NNH4-65C-R6-UPM Antennas
 - o (3) Ericsson AIR6419 B77D Antennas
 - o (3) Ericsson 4415 B30 RRH's
 - o (1) Raycap DC6-48-60-18-8F
 - o Flush Mounts

The pole has been analyzed in accordance with the requirements of the International Building Code per IBC section 3108, and the recommendations of the Telecommunications Industry Association "*Structural Standard for Steel Antenna Supporting Structures*" **TIA-222-H**.

This analysis may be considered a "Rigorous Structural Analysis" as defined in TIA-222-H.

As indicated in the conclusions of this analysis, I have determined that the existing pole and foundation have *sufficient capacity* to support the existing, reserved and proposed antenna loads as detailed herein. Based on the results of my analysis, structural modifications are not required at this time.

Source of Data:

Resource	Source	Job Number	Date
Pole Drawings	Valmont	256973	07/21/14
Foundation Drawings	Valmont	B-139541	07/21/14
Geotechnical Report	Tetra Tech	114-570750	03/18/14
Final Erection Drawings	Valmont	256973	01/12/15
Concrete Test	Nelson Engineering	14-237-01	11/14/14
Previous Structural Analysis	PJF & Co.	A70220-0058.001.7805	12/10/20
AT&T Mount Analysis	GPD Group	2024723.02.143230.01	04/01/06

Michael F. Plahovinsak, P.E. - Since 2011

mike@mfpeng.com

Analysis Criteria:

2021 International Building Code
Structural Standards for Steel Antenna Supporting Structures **TIA-222-H**

- TIA-222-H Wind Speed 105 mph
- TIA-222-H Wind w/ 1/4" Ice 50 mph
- Operational Wind Speed 60 mph

Risk Category	Exposure Category	Topographic Category
II (I = 1.0)	C	I

Appurtenance Listing:

Status	Elev.	Antenna / Mounting	Coax	Owner
Existing	77'	(3) RFS APX17DWV-17DWV-S-E-A20 Antennas (3) RFS APXVAARR24_43-U-NA20 Antennas (3) Ericsson AIR6449 B41 Antennas (3) Ericsson 4415 B66A + (3) 4424 B25 RRU's (3) Ericsson 4449 B71/B85A + (3) TME-RRUS 11 B4 (3) Commscope SDX1926Q-43 Diplexer (3) T-Arm Mounts	(12) 7/8" + (4) 1 5/8"	T-Mobile
Existing	59'	(4) Stadium Lights Cross-Arm Mount	-	-
Proposed	53'	(3) Commscope NNH4-65C-R6-UPM Antennas (3) Ericsson AIR6419 B77G Antennas (3) Ericsson 4478 B14 + (3) 4890 B25/B66 RRH's (2) Raycap DC6-48-60-18-8F Flush Mounts	(5) 3/4" DC + (2) 3/8" Fiber + (3) 2" Conduit	AT&T
Proposed	38'	(3) Commscope NNH4-65C-R6-UPM Antennas (3) Ericsson AIR6419 B77D Antennas (3) Ericsson 4415 B30 RRH's (1) Raycap DC6-48-60-18-8F Flush Mounts		AT&T

All antenna lines assumed internally mounted, not exposed to the wind.

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Foundation Analysis:

The existing monopole foundation design was analyzed in conjunction with site specific geotechnical report. The existing foundation has sufficient capacity to support the pole with the proposed antenna configuration.

Conclusion:

I have completed a structural analysis of the existing monopole and foundation in accordance with the project specifics outlined above. My analysis indicates that the existing monopole and foundation are structurally adequate when considering the existing plus proposed loading. Please refer to the attached calculations for an itemized listing of all member stress ratios. The existing pole is safe and adequate to support the proposed loads, and no structural reinforcing is required to support the above loading.

Recommendations:

As a part of routine maintenance, I recommend periodic inspection of the pole and foundation structure for signs of fatigue or corrosion.

If you have any questions about the contents of this structural report or require any additional information, please feel free to contact my office.

Sincerely,

Michael F. Plahovinsak, P.E.



mike@mfpeng.com - 614.398-6250

Michael F. Plahovinsak, P.E. - Since 2011

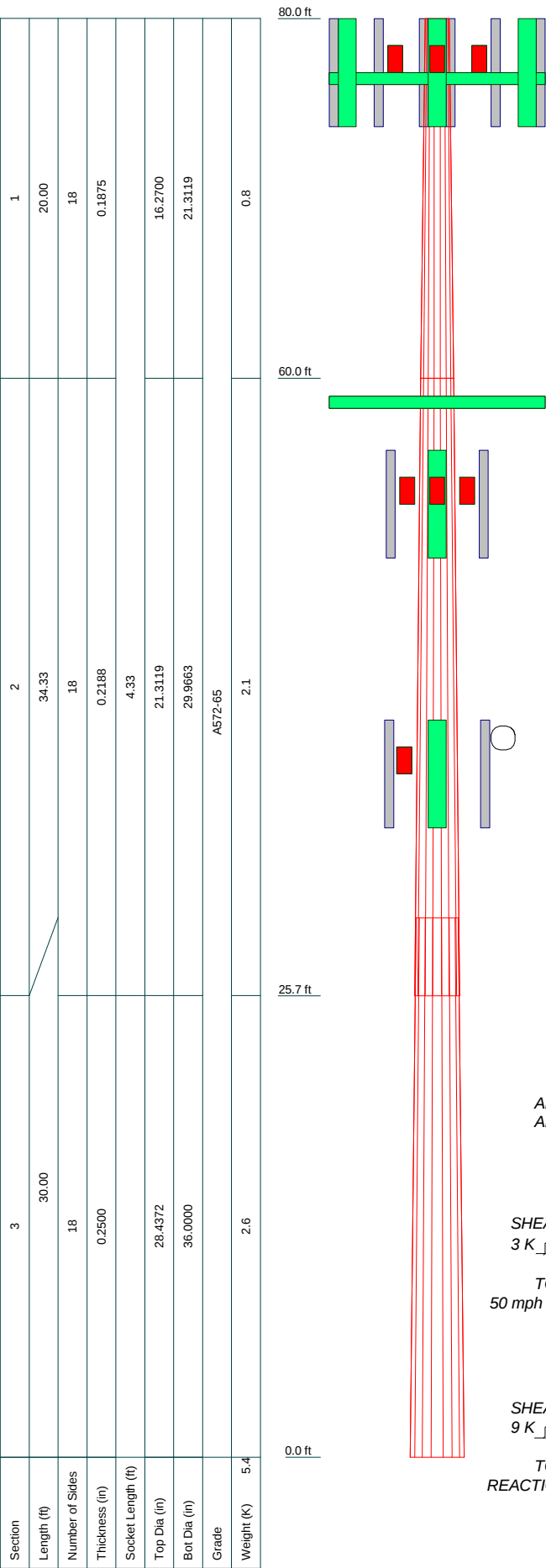
mike@mfpeng.com

Standard Conditions for Providing Structural Consulting Services on Existing Structures

1. The following standard conditions are a general overview of key issues regarding the work product supplied.
2. If the existing conditions are not as represented in this structural report or attached sketches, I should be contacted to evaluate the significance of the deviation and revise the structural assessment accordingly.
3. The structural analysis has been performed assuming that the structure is in "like new" condition. No allowance was made for excessive corrosion, damaged or missing structural members, loose bolts, etc. If there are any known deficiencies in the structure that potentially compromise structural integrity, I should be made aware of the deficiencies. If I am aware of a deficiency that exists in a structure at the time of my analysis, a general explanation of the structural concern due to the deficiency will be included in the structural report, but the deficiency will not be reflected in capacity calculations.
4. The structural analysis provided is an assessment of the primary load carrying capacity of the structure. I provide a limited scope of service in that I have not verified the capacity of every weld, plate, connection detail, etc. In most cases, structural fabrication details are unknown at the time of my analysis, and the detailed field measurement of this information is beyond the scope of my services. In instances where I have not performed connection capacity calculations, it is assumed that existing manufactured connections develop the full capacity of the primary members being connected.
5. The structural integrity of the existing foundation system can only be verified if exact foundation sizes and soils conditions are known. I will not accept any responsibility for the adequacy of the existing foundations unless this site-specific data is supplied.
6. Miscellaneous items such as antenna mounts, coax supports, etc. have not been designed, detailed, or specified as part of my work. It is assumed that material of adequate size and strength will be purchased from a reputable component manufacturer. The attached report and sketches are schematic in nature and should not be used to fabricate or purchase hardware and accessories to be attached to the structure. I recommend field measurement of the structure before fabricating or purchasing new hardware and accessories. I am not responsible for proper fit and clearance of hardware and accessory items in the field.
7. The structural analysis has been performed considering minimum code requirements or recommendations. If alternate wind, ice, or deflection criteria are to be considered, then I shall be made aware of the alternate criteria.

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DESIGNED APPURTENANCE LOADING

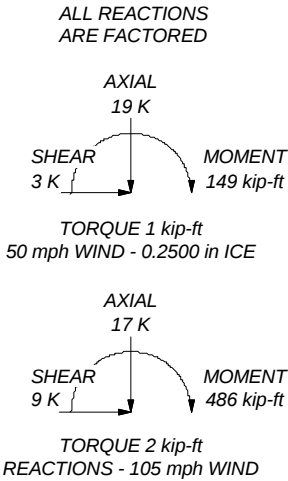
TYPE	ELEVATION	TYPE	ELEVATION
RFS APX17DWV-17DWVS-E-A20 (T-Mobile)	77	Commscope NNH4-65C-R6 w/ mount pipe (ATT)	53
RFS - APXVAARR24_43-U-NA20 (T-Mobile)	77	Ericsson AIR6419 B77G w/ mount pipe (ATT)	53
Ericsson AIR6449 B41 (T-Mobile)	77	Commscope NNH4-65C-R6 w/ mount pipe (ATT)	53
RFS APX17DWV-17DWVS-E-A20 (T-Mobile)	77	Ericsson AIR6419 B77G w/ mount pipe (ATT)	53
RFS - APXVAARR24_43-U-NA20 (T-Mobile)	77	(3) Ericsson 4478 B14 (ATT)	53
Ericsson AIR6449 B41 (T-Mobile)	77	(3) Ericsson 4890 B25/B66 (ATT)	53
RFS APX17DWV-17DWVS-E-A20 (T-Mobile)	77	(2) Raycap DC6-48-60-18-8F (ATT)	53
RFS - APXVAARR24_43-U-NA20 (T-Mobile)	77	(3) Flush Mounts (ATT)	53
Ericsson AIR6449 B41 (T-Mobile)	77	Commscope NNH4-65C-R6 w/ mount pipe (ATT)	38
(3) Ericsson 4415 B66A (T-Mobile)	77	Ericsson AIR6419 B77D w/ mount pipe (ATT)	38
(3) Ericsson 4424 B25 (T-Mobile)	77	Commscope NNH4-65C-R6 w/ mount pipe (ATT)	38
(3) Ericsson 4449 B71+B85 (T-Mobile)	77	Ericsson AIR6419 B77D w/ mount pipe (ATT)	38
(3) Ericsson RRUS-11 (T-Mobile)	77	Commscope NNH4-65C-R6 w/ mount pipe (ATT)	38
(3) Commscope SDX1926Q-43 E14F05P86 (T-Mobile)	77	Ericsson AIR6419 B77D w/ mount pipe (ATT)	38
12' T-Arm Mounts (T-Mobile)	77	(3) Ericsson 4415 B30 (ATT)	38
(4) Stadium Lights - 24"	59	Raycap DC6-48-60-18-8F (ATT)	38
Light Cross Arm	59	(3) Flush Mounts (ATT)	38
Commscope NNH4-65C-R6 w/ mount pipe (ATT)	53		
Ericsson AIR6419 B77G w/ mount pipe (ATT)	53		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 105 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 0.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 36.7%



Michael Plahovinsak, P.E.

18301 State Route 161
Plain City, OH 43064
Phone: 614-398-6250
FAX: mike@mfpeng.com

Job: **80-ft Monopole - MFP #97324-010**

Project: **WY005 Jackson Fairground**

Client: Diamond Communications	Drawn by: Mike	App'd:
Code: TIA-222-H	Date: 06/24/24	Scale: NTS
Path: C:\Users\Mike\Dropbox\MFP Engineering\Files\Projects\97324-010\97324-010.dwg		Dwg No. E-1

tnxTower Michael Plahovinsak, P.E. 18301 State Route 161 Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mpeng.com	Job	80-ft Monopole - MFP #97324-010	Page	1 of 8
	Project	WY005 Jackson Fairground	Date	06:35:43 06/24/24
	Client	Diamond Communications	Designed by	Mike

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

Tower base elevation above sea level: 6207.00 ft.

Basic wind speed of 105 mph.

Risk Category II.

Exposure Category C.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

Topographic Category: 1.

Crest Height: 0.00 ft.

Nominal ice thickness of 0.2500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Tower analysis based on target reliabilities in accordance with Annex S.

Maximum demand-capacity ratio is: 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	80.00-60.00	20.00	0.00	18	16.2700	21.3119	0.1875	0.7500	A572-65 (65 ksi)
L2	60.00-25.67	34.33	4.33	18	21.3119	29.9663	0.2188	0.8750	A572-65 (65 ksi)
L3	25.67-0.00	30.00		18	28.4372	36.0000	0.2500	1.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	16.4921	9.5711	312.7565	5.7093	8.2652	37.8403	625.9245	4.7865	2.5335	13.512
	21.6117	12.5716	708.7568	7.4992	10.8264	65.4654	1418.4462	6.2870	3.4209	18.245
L2	21.6069	14.6452	823.2187	7.4881	10.8264	76.0379	1647.5206	7.3240	3.3659	15.387
	30.3948	20.6541	2309.1066	10.5604	15.2229	151.6868	4621.2516	10.3290	4.8891	22.35
L3	29.9457	22.3665	2245.1202	10.0065	14.4461	155.4137	4493.1945	11.1854	4.5649	18.26
	36.5168	28.3676	4580.4961	12.6913	18.2880	250.4646	9167.0194	14.1865	5.8960	23.584

tnxTower Michael Plahovinsak, P.E. 18301 State Route 161 Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mpeng.com	Job	80-ft Monopole - MFP #97324-010	Page	2 of 8
	Project	WY005 Jackson Fairground	Date	06:35:43 06/24/24
	Client	Diamond Communications	Designed by	Mike

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 80.00-60.00				1	1	1			
L2 60.00-25.67				1	1	1			
L3 25.67-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		$C_A A_A$ ft ² /ft	Weight plf
Safety Climb & Step Bolts Exposed ***	C	No	Yes	CaAa (Out Of Face)	80.00 - 0.00	1	No Ice 1/2" Ice	0.06 0.14	0.09 0.63
7/8" (T-Mobile)	C	No	Yes	Inside Pole	77.00 - 0.00	12	No Ice 1/2" Ice	0.00 0.00	0.35 0.35
1 5/8" (T-Mobile) ***	C	No	Yes	Inside Pole	77.00 - 0.00	4	No Ice 1/2" Ice	0.00 0.00	0.92 0.92
3/4" (ATT)	C	No	Yes	Inside Pole	53.00 - 0.00	5	No Ice 1/2" Ice	0.00 0.00	1.71 1.71
3/8" (ATT)	C	No	Yes	Inside Pole	53.00 - 0.00	2	No Ice 1/2" Ice	0.00 0.00	0.08 0.08
2" (ATT)	C	No	Yes	Inside Pole	53.00 - 0.00	3	No Ice 1/2" Ice	0.00 0.00	1.22 1.22

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
L1	80.00-60.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.100	0.13
L2	60.00-25.67	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.888	0.61
L3	25.67-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.412	0.52

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
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tnxTower Michael Plahovinsak, P.E. 18301 State Route 161 Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mpeng.com	Job	80-ft Monopole - MFP #97324-010	Page	3 of 8
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	Client	Diamond Communications	Designed by	Mike

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	80.00-60.00	A	0.229	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.855	0.14
L2	60.00-25.67	A	0.218	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.122	0.62
L3	25.67-0.00	A	0.193	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.334	0.53

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
RFS	A	From Face	3.00	0.0000	77.00	No Ice	9.39	4.93	0.08
APX17DWV-17DWVS-E-A			0.00			1/2" Ice	9.94	6.11	0.14
20			0.00						
(T-Mobile)									
RFS -	A	From Face	3.00	0.0000	77.00	No Ice	20.24	10.79	0.16
APXVAARR24_43-U-NA20			0.00			1/2" Ice	20.89	12.21	0.29
(T-Mobile)			0.00						
Ericsson AIR6449 B41	A	From Face	3.00	0.0000	77.00	No Ice	5.65	3.00	0.11
(T-Mobile)			0.00			1/2" Ice	5.96	3.41	0.16
			0.00						
RFS	B	From Face	3.00	0.0000	77.00	No Ice	9.39	4.93	0.08
APX17DWV-17DWVS-E-A			0.00			1/2" Ice	9.94	6.11	0.14
20			0.00						
(T-Mobile)									
RFS -	B	From Face	3.00	0.0000	77.00	No Ice	20.24	10.79	0.16
APXVAARR24_43-U-NA20			0.00			1/2" Ice	20.89	12.21	0.29
(T-Mobile)			0.00						
Ericsson AIR6449 B41	B	From Face	3.00	0.0000	77.00	No Ice	5.65	3.00	0.11
(T-Mobile)			0.00			1/2" Ice	5.96	3.41	0.16
			0.00						
RFS	C	From Face	3.00	0.0000	77.00	No Ice	9.39	4.93	0.08
APX17DWV-17DWVS-E-A			0.00			1/2" Ice	9.94	6.11	0.14
20			0.00						
(T-Mobile)									
RFS -	C	From Face	3.00	0.0000	77.00	No Ice	20.24	10.79	0.16
APXVAARR24_43-U-NA20			0.00			1/2" Ice	20.89	12.21	0.29
(T-Mobile)			0.00						
Ericsson AIR6449 B41	C	From Face	3.00	0.0000	77.00	No Ice	5.65	3.00	0.11
(T-Mobile)			0.00			1/2" Ice	5.96	3.41	0.16
			0.00						
(3) Ericsson 4415 B66A	A	From Face	2.00	0.0000	77.00	No Ice	1.64	0.68	0.05
(T-Mobile)			0.00			1/2" Ice	1.80	0.79	0.06
			0.00						
(3) Ericsson 4424 B25	B	From Face	2.00	0.0000	77.00	No Ice	1.86	1.32	0.05
(T-Mobile)			0.00			1/2" Ice	2.03	1.47	0.06
			0.00						
(3) Ericsson 4449 B71+B85	C	From Face	2.00	0.0000	77.00	No Ice	1.64	1.30	0.08
(T-Mobile)			0.00			1/2" Ice	1.80	1.45	0.09

tnxTower Michael Plahovinsak, P.E. 18301 State Route 161 Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mpeng.com	Job	80-ft Monopole - MFP #97324-010	Page	4 of 8
	Project	WY005 Jackson Fairground	Date	06:35:43 06/24/24
	Client	Diamond Communications	Designed by	Mike

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(3) Ericsson RRUS-11 (T-Mobile)	A	From Face	0.00 2.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice	2.79 3.00	1.19 1.34	0.05 0.07
(3) Commscope SDX1926Q-43 E14F05P86 (T-Mobile)	B	From Face	2.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice	0.24 0.31	0.17 0.23	0.01 0.01
12' T-Arm Mounts (T-Mobile)	C	None		0.0000	77.00	No Ice 1/2" Ice	15.00 18.00	15.00 18.00	1.14 1.27

(4) Stadium Lights - 24"	C	None		0.0000	59.00	No Ice 1/2" Ice	4.87 5.29	1.47 1.60	0.35 0.50
Light Cross Arm	C	None		0.0000	59.00	No Ice 1/2" Ice	15.00 18.00	15.00 18.00	1.14 1.27

Commscope NNH4-65C-R6 w/ mount pipe (ATT)	A	From Face	2.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice	17.07 17.70	10.06 11.49	0.12 0.23
Ericsson AIR6419 B77G w/ mount pipe (ATT)	A	From Face	2.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice	3.80 4.09	2.24 2.61	0.08 0.11
Commscope NNH4-65C-R6 w/ mount pipe (ATT)	B	From Face	2.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice	17.07 17.70	10.06 11.49	0.12 0.23
Ericsson AIR6419 B77G w/ mount pipe (ATT)	B	From Face	2.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice	3.80 4.09	2.24 2.61	0.08 0.11
Commscope NNH4-65C-R6 w/ mount pipe (ATT)	C	From Face	2.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice	17.07 17.70	10.06 11.49	0.12 0.23
Ericsson AIR6419 B77G w/ mount pipe (ATT)	C	From Face	2.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice	3.80 4.09	2.24 2.61	0.08 0.11
(3) Ericsson 4478 B14 (ATT)	A	From Face	1.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice	2.02 2.20	1.25 1.40	0.06 0.08
(3) Ericsson 4890 B25/B66 (ATT)	B	From Face	1.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice	2.20 2.39	1.01 1.15	0.07 0.09
(2) Raycap DC6-48-60-18-8F (ATT)	C	From Face	1.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice	2.20 2.40	2.20 2.40	0.03 0.06
(3) Flush Mounts (ATT)	C	None		0.0000	53.00	No Ice 1/2" Ice	2.50 3.00	2.50 3.00	0.07 0.10

Commscope NNH4-65C-R6 w/ mount pipe (ATT)	A	From Face	2.00 0.00 0.00	0.0000	38.00	No Ice 1/2" Ice	17.07 17.70	10.06 11.49	0.12 0.23
Ericsson AIR6419 B77D w/ mount pipe (ATT)	A	From Face	2.00 0.00 0.00	0.0000	38.00	No Ice 1/2" Ice	3.89 4.18	2.37 2.75	0.08 0.11
Commscope NNH4-65C-R6 w/ mount pipe (ATT)	B	From Face	2.00 0.00 0.00	0.0000	38.00	No Ice 1/2" Ice	17.07 17.70	10.06 11.49	0.12 0.23
Ericsson AIR6419 B77D w/ mount pipe (ATT)	B	From Face	2.00 0.00 0.00	0.0000	38.00	No Ice 1/2" Ice	3.89 4.18	2.37 2.75	0.08 0.11

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Commscope NNH4-65C-R6 w/ mount pipe (ATT)	C	From Face	2.00 0.00 0.00	0.0000	38.00	No Ice 1/2" Ice	17.07 17.70	10.06 11.49	0.12 0.23
Ericsson AIR6419 B77D w/ mount pipe (ATT)	C	From Face	2.00 0.00 0.00	0.0000	38.00	No Ice 1/2" Ice	3.89 4.18	2.37 2.75	0.08 0.11
(3) Ericsson 4415 B30 (ATT)	A	From Face	1.00 0.00 0.00	0.0000	38.00	No Ice 1/2" Ice	1.84 2.01	0.82 0.94	0.05 0.06
Raycap DC6-48-60-18-8F (ATT)	A	From Face	1.00 0.00 0.00	0.0000	38.00	No Ice 1/2" Ice	2.20 2.40	2.20 2.40	0.03 0.06
(3) Flush Mounts (ATT)	C	None		0.0000	38.00	No Ice 1/2" Ice	2.50 3.00	2.50 3.00	0.07 0.10

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 90 deg - No Ice
5	0.9 Dead+1.0 Wind 90 deg - No Ice
6	1.2 Dead+1.0 Wind 180 deg - No Ice
7	0.9 Dead+1.0 Wind 180 deg - No Ice
8	1.2 Dead+1.0 Ice+1.0 Temp
9	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
10	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
11	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
12	Dead+Wind 0 deg - Service
13	Dead+Wind 90 deg - Service
14	Dead+Wind 180 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	80 - 60	Pole	Max Tension	3	0.00	-0.00	-0.00
			Max. Compression	8	-5.14	0.42	0.03
			Max. Mx	4	-4.45	-51.11	-0.03
			Max. My	6	-4.46	0.38	-50.09
			Max. Vy	4	3.28	-51.11	-0.03
			Max. Vx	2	-3.19	0.38	50.06
			Max. Torque	5			1.26
L2	60 - 25.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-14.76	0.81	0.60

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	25.67 - 0	Pole	Max. Mx	4	-12.96	-235.44	0.54
			Max. My	2	-12.97	0.73	231.17
			Max. Vy	4	7.92	-235.44	0.54
			Max. Vx	2	-7.75	0.73	231.17
			Max. Torque	5			2.19
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-19.22	0.81	0.60
			Max. Mx	4	-17.26	-485.73	0.54
			Max. My	2	-17.26	0.74	476.38
			Max. Vy	4	8.76	-485.73	0.54
			Max. Vx	2	-8.59	0.74	476.38
			Max. Torque	5			2.19

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	80 - 60	5.624	13	0.5635	0.0013
L2	60 - 25.67	3.344	13	0.5010	0.0008
L3	30 - 0	0.875	13	0.2618	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
77.00	RFS APX17DWV-17DWVS-E-A20	13	5.271	0.5571	0.0105	40147
59.00	(4) Stadium Lights - 24"	13	3.238	0.4957	0.0062	9793
53.00	Commscope NNH4-65C-R6 w/ mount pipe	13	2.633	0.4582	0.0051	8181
38.00	Commscope NNH4-65C-R6 w/ mount pipe	13	1.369	0.3349	0.0030	5860

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	80 - 60	18.482	4	1.8575	0.0044
L2	60 - 25.67	10.976	4	1.6467	0.0027
L3	30 - 0	2.868	4	0.8587	0.0011

Critical Deflections and Radius of Curvature - Design Wind

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Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
77.00	RFS APX17DWV-17DWVS-E-A20	4	17.317	1.8355	0.0341	12078
59.00	(4) Stadium Lights - 24"	4	10.629	1.6291	0.0202	2949
53.00	Commscope NNH4-65C-R6 w/ mount pipe	4	8.639	1.5051	0.0166	2473
38.00	Commscope NNH4-65C-R6 w/ mount pipe	4	4.489	1.0988	0.0096	1783

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio
	ft		ft	ft		in ²	K	K	$\frac{P_u}{\phi P_n}$
L1	80 - 60 (1)	TP21.3119x16.27x0.1875	20.00	0.00	0.0	12.5716	-4.45	735.44	0.006
L2	60 - 25.67 (2)	TP29.9663x21.3119x0.2188	34.33	0.00	0.0	19.8962	-12.96	1163.93	0.011
L3	25.67 - 0 (3)	TP36x28.4372x0.25	30.00	0.00	0.0	28.3676	-17.26	1659.51	0.010

Pole Bending Design Data

Section No.	Elevation	Size	M _{ux}	φM _{nx}	Ratio	M _{uy}	φM _{ny}	Ratio
	ft		kip-ft	kip-ft	$\frac{M_{ux}}{\phi M_{nx}}$	kip-ft	kip-ft	$\frac{M_{uy}}{\phi M_{ny}}$
L1	80 - 60 (1)	TP21.3119x16.27x0.1875	51.11	387.42	0.132	0.00	387.42	0.000
L2	60 - 25.67 (2)	TP29.9663x21.3119x0.2188	235.44	792.72	0.297	0.00	792.72	0.000
L3	25.67 - 0 (3)	TP36x28.4372x0.25	485.73	1364.28	0.356	0.00	1364.28	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V _u	φV _n	Ratio	Actual T _u	φT _n	Ratio
	ft		K	K	$\frac{V_u}{\phi V_n}$	kip-ft	kip-ft	$\frac{T_u}{\phi T_n}$
L1	80 - 60 (1)	TP21.3119x16.27x0.1875	3.28	220.63	0.015	1.26	408.16	0.003
L2	60 - 25.67 (2)	TP29.9663x21.3119x0.2188	7.92	349.18	0.023	2.19	876.27	0.002
L3	25.67 - 0 (3)	TP36x28.4372x0.25	8.76	497.85	0.018	2.19	1558.67	0.001

Pole Interaction Design Data

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Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	80 - 60 (1)	0.006	0.132	0.000	0.015	0.003	0.138	1.000	✓
L2	60 - 25.67 (2)	0.011	0.297	0.000	0.023	0.002	0.309	1.000	✓
L3	25.67 - 0 (3)	0.010	0.356	0.000	0.018	0.001	0.367	1.000	✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	80 - 60	Pole	TP21.3119x16.27x0.1875	1	-4.45	735.44	13.8	Pass
L2	60 - 25.67	Pole	TP29.9663x21.3119x0.2188	2	-12.96	1163.93	30.9	Pass
L3	25.67 - 0	Pole	TP36x28.4372x0.25	3	-17.26	1659.51	36.7	Pass
							Summary	
							Pole (L3)	Pass
							RATING =	Pass

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Anchor Rod and Base Plate Calculation

TIA-222-H

Factored Base Reactions:	Pole Shape:	Anchor Rods:	Base Plate:
Moment: 486 ft-kips	18-Sided	(8) 2.25 in. A615 GR. 75	2.5 in. x 49.06 in. Round
Shear: 9 kips	Pole Dia. (D_f):	Anchor Rods Evenly Spaced	$f_y = 50$ ksi
Axial: 17 kips	36.00 in	On a 43.06 in Bolt Circle	

Anchor Rod Calculation According to TIA-222-H section 4.9.9

$\phi_t, \phi_v =$	0.75	TIA 4.9.6
$I_{bolts} =$	1854.16	in ² Momet of Inertia
$P_u =$	66	kips Tension Force
$V_u =$	1.1	kips Shear Force
$R_{nt} =$	325.00	kips Nominal Tensile Strength
$R_{nv} =$	198.80	kips (0.5 x f_u x a_g)
Stress Rating =	26.9%	Satisfies TIA-H 4.9.9

Base Plate Calculation According to TIA-222-H

$\phi =$	0.90	TIA 4.7
$M_{PL} =$	147.5	in-kip Plate Moment
$L =$	14.1	in Section Length
$Z =$	22.1	Plastic Section Modulus
$M_P =$	1104.5	in-kip Plastic Moment
$\phi M_n =$	994.0	in-kip Factored Resistance
Stress Rating = 14.8%		

Calculated Moment vs Factored Resistance
147.53 in-kip ≤ 994 in-kip

Anchor Rods Are Adequate	26.9%	✓
Base Plate is Adequate	14.8%	✓

Pier and Pad Foundation

TIA-222 Revision:
 Tower Type:

Top & Bot. Pad Rein. Different?:	☒
Block Foundation?:	☐
Rectangular Pad?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp} :	17	kips
Base Shear, V_{u_comp} :	9	kips
Moment, M_u :	486	ft-kips
Tower Height, H :	80	ft
BP Dist. Above Fdn, bp_{dist} :	3	in

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, d_{pier} :	6	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	9	
Pier Rebar Quantity, mc :	22	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	6	in

Pad Properties		
Depth, D :	5	ft
Pad Width, W_1 :	18	ft
Pad Thickness, T :	2	ft
Pad Rebar Size (Top dir. 2), Sp_{top2} :	5	
Pad Rebar Quantity (Top dir. 2), mp_{top2} :	17	
Pad Rebar Size (Bottom dir. 2), Sp_2 :	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	17	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	3.0	ksi
Dry Concrete Density, δc :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	120	pcf
Ultimate Net Bearing, Q_{net} :	5.000	ksf
Cohesion, C_u :		ksf
Friction Angle, ϕ :	30	degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :		
Neglected Depth, N :	3.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	N/A	ft

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	96.04	9.00	8.9%	Pass
Bearing Pressure (ksf)	4.20	1.25	28.3%	Pass
Overturning (kip*ft)	1728.25	537.75	31.1%	Pass
Pier Flexure (Comp.) (kip*ft)	2874.74	517.50	17.1%	Pass
Pier Compression (kip)	13497.04	34.81	0.2%	Pass
Pad Flexure (kip*ft)	1134.28	162.01	13.6%	Pass
Pad Shear - 1-way (kips)	346.05	38.47	10.6%	Pass
Pad Shear - 2-way (Comp) (ksi)	0.164	0.017	9.8%	Pass
Flexural 2-way (Comp) (kip*ft)	1040.02	310.50	28.4%	Pass

*Rating per TIA-222-H Section 15.5

Soil Rating*:	31.1%
Structural Rating*:	28.4%

<--Toggle between Gross and Net