City of Aurora
Building Division
15151 E Alameda Pkwy
Aurora, CO 80012
(303) 739-7420

Notice

This material is subject to copyright protection pursuant to Federal Law: 17 United States Code Section 106.

Building Permit Application

Permit Center - 15151 E Alameda Pkwy ❖ Ste 2400❖Aurora, CO 80012❖(303)739-7420
Email buildingplans@auroragov.org

Project Address:1501 S. Potomac St | Unit # | Zip code:80012

Project Name:AT&T LTE Upgrade

Contractor Company Name:MC Squared Holdings, Inc. | Phone:(303) 929-0335 | Fax:n/a

Contact Person: Rory Hisel | Phone: (303)929035

Email: rory@mc2telecom.com | Fax: n/a

Architect and/or Engineer Contact information for correction items:

Architect or Engineer Name: Black & Veatch | Email: johnsonj@b-v.com

Phone #: 720-834-4331 | Fax #: (303) 343-6520

Owner:(Required for Certificate of Occupancy) only:The Medical Center of Auroa

Owner address:1501 S. Potomac, Aurora 80012

Email:

Valuation / FDA$4300.00 | **Materials cost** $2900.00

FDA = Fee Determination Assessment. (Also known as the value of project. The Fee Determination Assessment, EDA has no relationship to the construction costs for the building which can vary greatly. Rather, the Assessment is used only to determine the appropriate level of fees to fund our code compliance activities.

Describe the work you will be doing: Remove and Replace Antennas on Existing Screen Wall with New Antennas Measuring up to 8' in Length. Relocate (4) Antennas from Existing Screen Wall to exist facade of building.

I declare under penalty that this application has been examined by me; and that the statements made herein are made in good faith pursuant to City of Aurora tax and licensing regulations; and to the best of my knowledge and belief are true, correct and complete.

Print Name: Peter McWally **Signature:** P. McWally **Date:** 12/16/11

BOARD OF APPEALS - Contractor's Appeals and Standards Board. Applicants have the right to have the board hear appeals of orders, decisions or determinations made by the building official relative to the application and interpretation of the building code. Any application for appeal to the board shall be based on a claim that the true intent of the code or the rules legally adopted there under have been incorrectly interpreted, the provisions of the building code do not fully apply or an equally good or better form of construction is proposed.

Sprinkler & Alarm permits are separate submittals, and the value is NOT included on main permit.

◆◆◆◆ **THIS SPACE FOR OFFICE USE ONLY** ◆◆◆◆

Change of occupancy/use: ☐ Yes ☑ No

FDA: 4300.00

Reviews		Inspections	
☑	Structural	☑	Structural
☐	Mechanical	☐	Mechanical
☐	Plumbing	☐	Plumbing
☑	Electrical	☑	Electrical
☐	Fire Life Safety	☐	Life Safety
☐	Bldg Life Safety	☐	Gate/Haz.

Intake Date: 12/23/11 PE Initial JMW

Balance Due: $

Initials

Pre-approval(s): Zoning: ☐ Water: ☐

Exterior changes? ☐ Yes ☐ No

Homeowner Verified ☐ Yes

Permit Type LT

Mid roof /Avg. bldg height 4/4

Parent Permit RSN

Plans Examiner JMW

Sub Type Roof Top Antennas 242

RSN: [redacted] 693347

Plans Picked up by
Company Nam
Phone #

See reverse side for Fence/sign/Public Improvements application

at&t

City of Aurora Building Division

Project: *AT&T Cell Tower: Adding and Removing Antennas*
Address: *1501 S Potomac St*
Occupancy Group: *IBC U*
Construction Type: *IBC TYPE VB*
RSN: *643347*
Permit: *12-583367-LT*

site name: HUMANA
search ring number: COU1176
LATITUDE: 39° 41' 22.9"
LONGITUDE: 104° 49' 54"

LTE CD

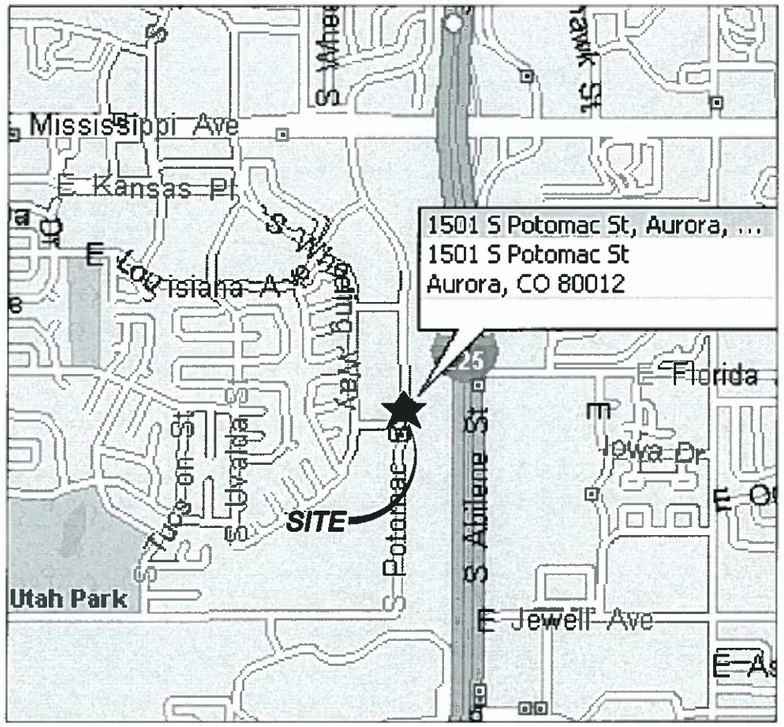
Failure to follow the approved plans may result in a 2 hour minimum fee to review the field changes for code compliance.

Field inspection consultation is available upon request. Call 303-739-7420 to request a consultation.

PROJECT INFORMATION

PROPERTY OWNER:	THE MEDICAL CENTER OF AURORA 1501 S. POTOMAC AURORA, CO, 80012
AT&T SITE ID#:	COU1176
AT&T SITE NAME:	HUMANA
SITE ADDRESS:	1501 S. POTOMAC
CITY, COUNTY:	AURORA, ARAPAHOE COUNTY
STATE, ZIP:	CO, 80012
APPLICANT:	AT&T
ADDRESS:	188 INVERNESS DRIVE WEST, STE. 400 ENGLEWOOD, CO 80112
ENGINEERING MANAGER:	JEREMY JOHNSON
ADDRESS:	BLACK & VEATCH 6300 S. SYRACUSE WAY., SUITE 300 CENTENNIAL, CO 80111 PHONE: (720) 834-4331
SITE ACQUISITION MANAGER:	MIKE MCCREEDY 303-332-1212
SITE ACQUISITION CONTACT:	RICK HOLPP 303-681-1185
RF ENGINEER:	WINNIE LAI 314-724-9605
CONSTRUCTION MANAGER:	MISHA MORROW-KRALJIC 720-834-4320
PROJECT MANAGER:	MICHAEL DERRICK 303-408-3090
A&E FIRM:	ZUMA CONSULTANTS INC. 13969 W. 1ST AVE. GOLDEN, CO 80401 P: (303) 325-5606 F: (303) 325-5629 CONTACT: KHRISTOPHER SCOTT PE
ELECTRICAL ENGINEER:	PRIEST ENGINEERING, INC. 6909 SOUTH HOLLY CIRCLE, SUITE 304 CENTENNIAL, CO. 80112-1045 PHONE: (303) 773-8773 FAX: (303) 779-8333 CONTACT: LOREN PRIEST

VICINITY MAP



APPROVALS

TITLE	SIGNATURE	DATE
AT&T RF ENGINEER		
AT&T PROJECT MGR		
AT&T OPS		
AT&T COMPLIANCE		
B&V CONST MGR		
B&V SITE ACQUISITION		
SITE OWNER		

ACKNOWLEDGMENT OR "SIGN-OFF" BY PARTIES TO THE CONSTRUCTION DRAWINGS DOES NOT CONSTITUTE ALTERATION OF THE LEASE TERMS.

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NOTES

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY BLACK & VEATCH WHO WILL CONTACT THE ARCHITECT TO DISCUSS ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

DRAWINGS WILL BE SCALED AS REQUIRED BY THE PERMITTING GOVERNING AGENCY. ALL OTHER DRAWINGS SUPPLIED TO AT&T PLOTTED ON 11x17 SHEETS AT HALF SCALE.

CALL BEFORE YOU DIG – COLORADO STATE REQUIRES 3 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION OPERATIONS. LOCATES ARE REQUIRED TO BE COMPLETED WITHIN 5 WORKING DAYS PRIOR TO BEGINNING THIS PROJECT. UTILITY NOTIFICATION CENTER OF COLORADO – 800.922.1987

THESE DRAWINGS MAY NOT INDICATE ALL UNDERGROUND UTILITIES. THE GENERAL CONTRACTOR SHALL EXERCISE EXTREME CARE DURING ALL EXCAVATIONS AND OTHER CONSTRUCTION ACTIVITIES.

City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *J Van Essen*
Date: *Feb 22, 2012*
2009 INTERNATIONAL CODES & 2011 NEC

PROJECT DESCRIPTION

RELOCATE EXISTING AND INSTALL NEW ANTENNAS ON EXISTING SCREEN WALL AND BUILDING FACADE. NEW EQUIPMENT RACKS IN EXISTING EQUIPMENT SHELTER

PROJECT DATA

JURISDICTION:	–	CITY OF AURORA
ZONING DESIGNATION:	–	PD
OCCUPANCY GROUP:	–	U2
CONSTRUCTION TYPE:	–	V-B
FULLY SPRINKLERED:	–	N/A
NO. OF STORIES:	–	1

GOVERNING CODES:
2009 IBC, 2009 IFC, 2008 NEC

A.D.A. COMPLIANCE:
THIS FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.

Structural plan review is limited to a general survey for code compliance. No review is implied nor was undertaken to verify structural adequacy.

at&t

AT&T Project Information:

HUMANA
COU1176
1501 S. POTOMAC
AURORA, CO 80012
ARAPAHOE COUNTY

BLACK & VEATCH

Rev:	Date:	Description:	By:
1	11/8/11	PRELIM. CONST	SL
2	11/18/11	CONSTRUCTION	SL

Plans Prepared By:

Zuma Consultants, Inc.
13969 W. 1st Ave.
Golden, CO 80401
P:303-325-5606 F:303-325-5629

License No:

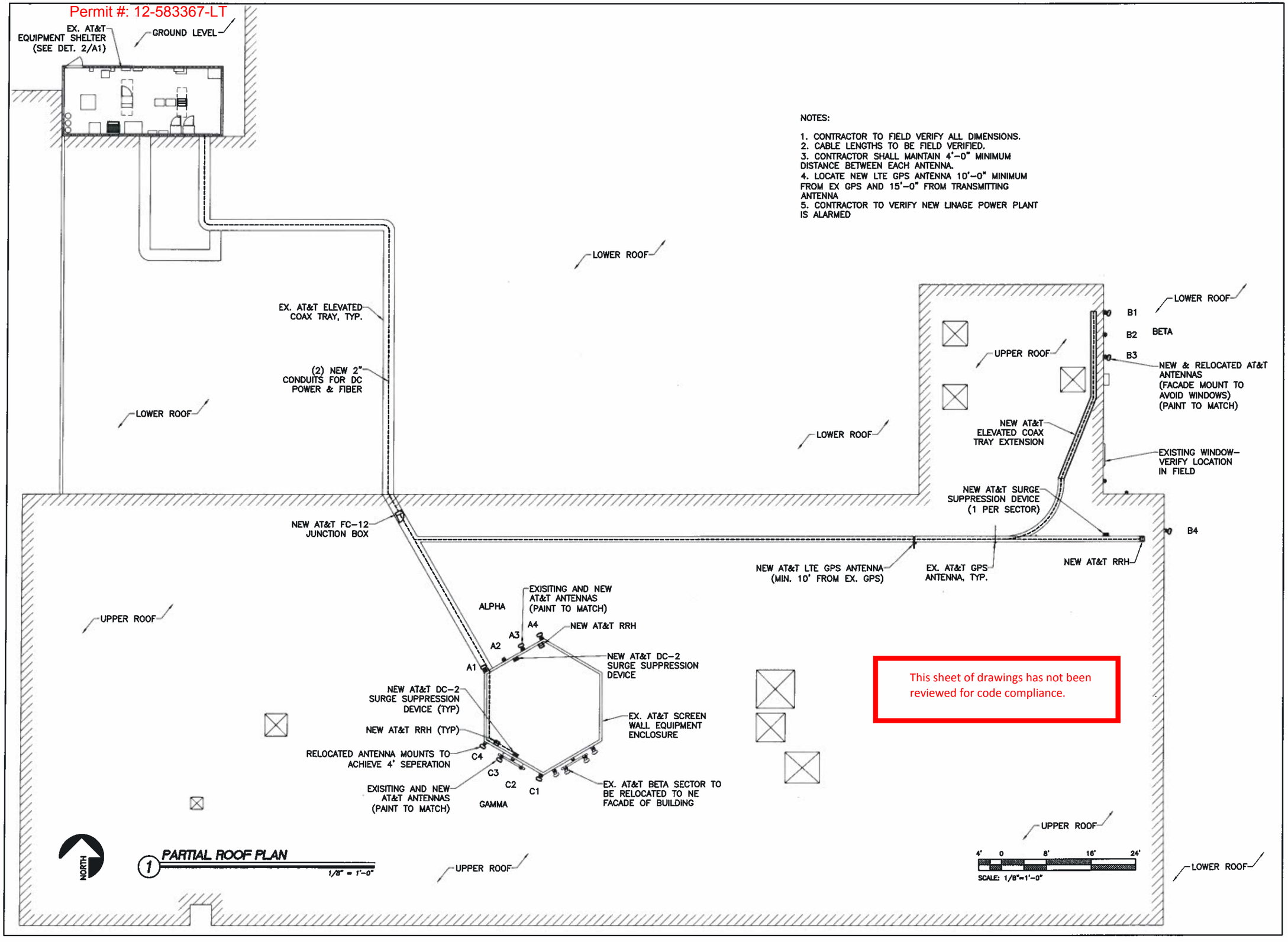
COLORADO REGISTERED
KHRISTOPHER JAMES SCOTT
34610
PROFESSIONAL ENGINEER
July 18 2012

TITLE SHEET

Sheet Number:

T1

RSN: 643347
Permit #: 12-583367-LT



NOTES:

1. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS.
2. CABLE LENGTHS TO BE FIELD VERIFIED.
3. CONTRACTOR SHALL MAINTAIN 4'-0" MINIMUM DISTANCE BETWEEN EACH ANTENNA.
4. LOCATE NEW LTE GPS ANTENNA 10'-0" MINIMUM FROM EX GPS AND 15'-0" FROM TRANSMITTING ANTENNA
5. CONTRACTOR TO VERIFY NEW LINAGE POWER PLANT IS ALARMED

This sheet of drawings has not been reviewed for code compliance.

at&t

AT&T Project Information:

HUMANA
COU1176
1501 S. POTOMAC
AURORA, CO 80012
ARAPAHOE COUNTY

BLACK & VEATCH

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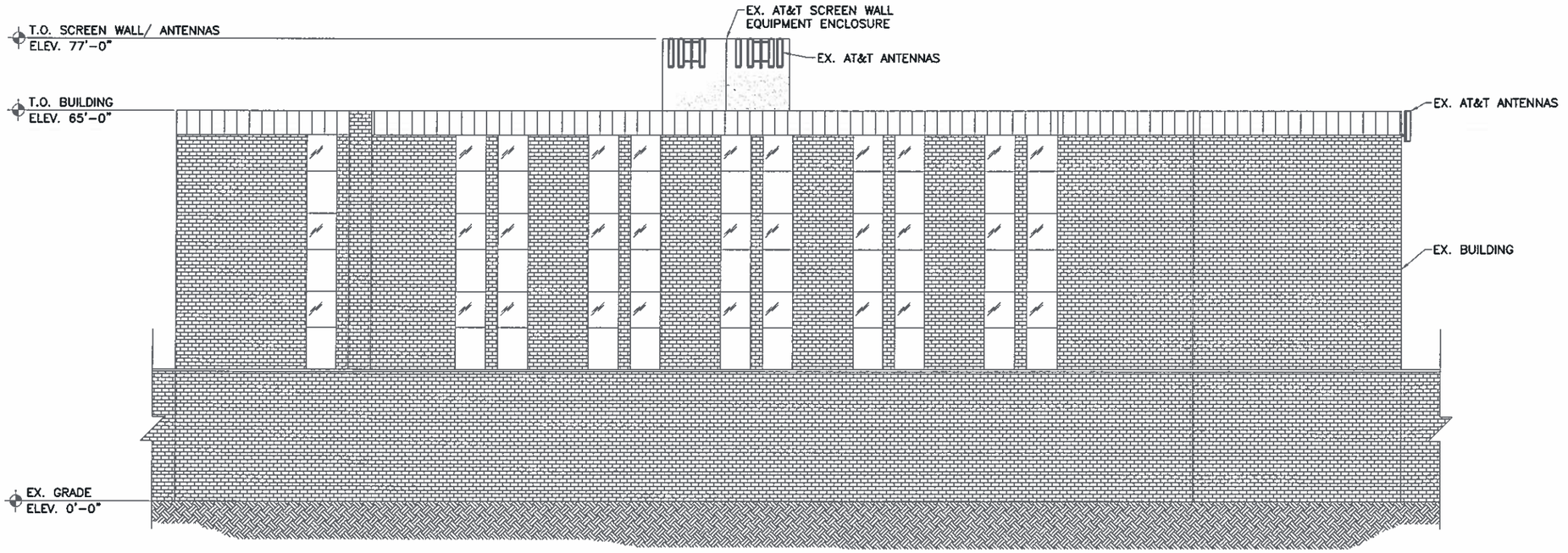
COLORADO REGISTERED PROFESSIONAL ENGINEER
KHRISTOPHER JAMES SCOTT
34610
NOV 18 2011

ROOF PLAN

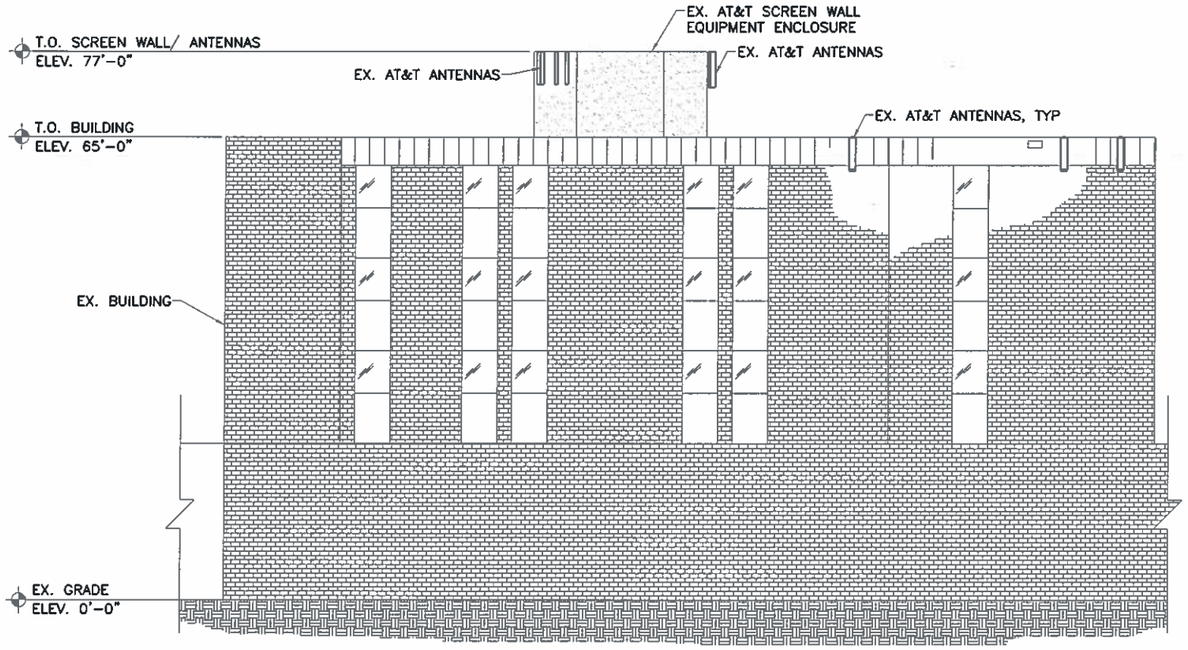
Sheet Number:

A1

RSN: 643347
Permit #: 12-583367-LT



1 PARTIAL SOUTH ELEVATION
3/32" = 1'-0"



2 PARTIAL EAST ELEVATION
3/32" = 1'-0"

This sheet of drawings has not been reviewed for code compliance.

5' 0 10' 20' 30'
SCALE: 3/32"=1'-0"

at&t

AT&T Project Information:

HUMANA
COU1176
1501 S. POTOMAC
AURORA, CO 80012
ARAPAHOE COUNTY

BLACK & VEATCH

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Plans Prepared By:

Zuma Consultants, Inc.
13969 W. 1st Ave.
Golden, CO 80401
P:303-325-5606 F:303-325-5629

Licensure No:

COLORADO REGISTERED
CHRISTOPHER JAMES SEIDL
34610
NOV 18 2011
PROFESSIONAL ENGINEER

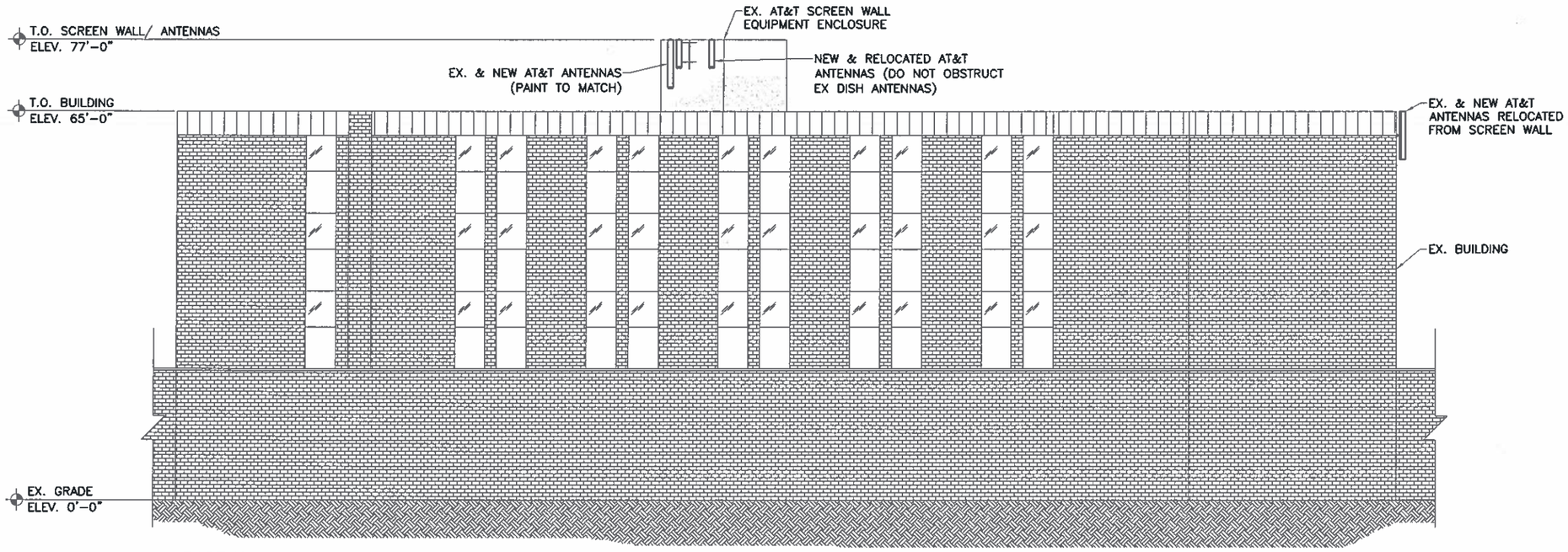
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EXISTING ELEVATIONS

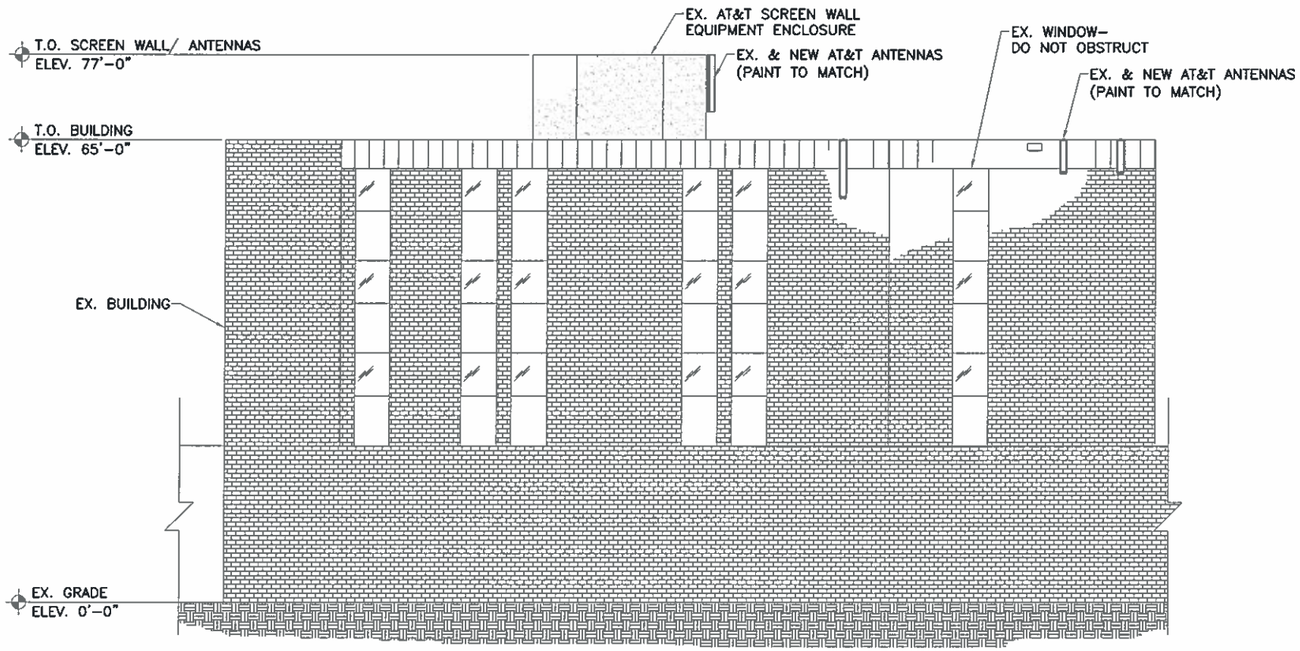
Sheet Number:

A2.1

RSN: 643347
Permit #: 12-583367-LT



1 PARTIAL SOUTH ELEVATION
3/32" = 1'-0"



2 PARTIAL EAST ELEVATION
3/32" = 1'-0"

This sheet of drawings has not been reviewed for code compliance.

5' 0 10' 20' 30'
SCALE: 3/32"=1'-0"

at&t

AT&T Project Information:

HUMANA
COU1176
1501 S. POTOMAC
AURORA, CO 80012
ARAPAHOE COUNTY

BLACK & VEATCH

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Plans Prepared By:

ZCI Zuma Consultants, Inc.
13969 W. 1st Ave.
Golden, CO 80401
P:303-325-5606 F:303-325-5629

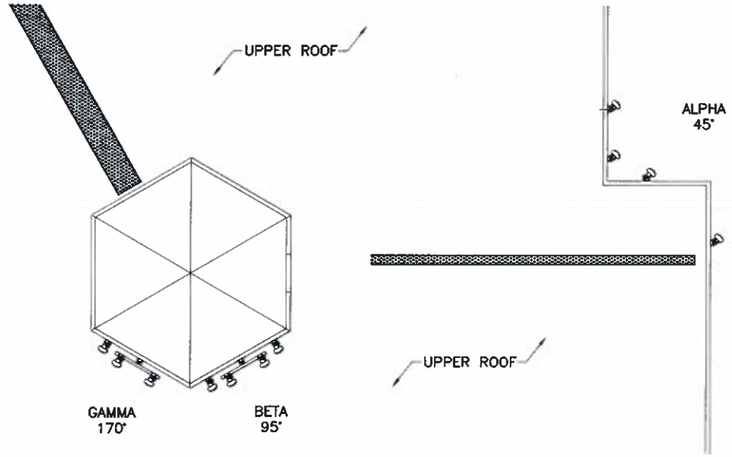
Licensure No:

COLORADO REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER JAMES SCOTT
34610
NOV 18 2011

NEW
ELEVATIONS

Sheet Number:

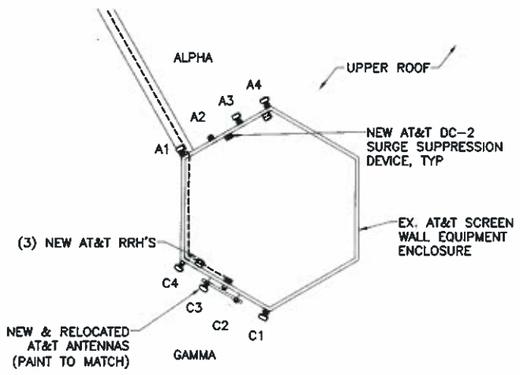
A2.2



1 EX ANTENNA LAYOUT

1/8" = 1'-0"

SECTOR	TYPE	TECHNOLOGY	CABLE	ANTENNA MODEL	AZIMUTH
A1	EX.	UMTS	EX.		335°
A2	FUTURE				
A3	EX.	GSM	EX.		
A4	NEW	LTE	FIBER	KATHERIN 80010766	
B1	EX.	UMTS	EX.		105°
B2	FUTURE				
B3	EX.	GSM	EX.		
B4	NEW	LTE	FIBER	KATHERIN 80010766	
C1	EX.	UMTS	EX.		215°
C2	FUTURE				
C3	EX.	GSM	EX.		
C4	NEW	LTE	FIBER	KATHERIN 80010766	



2 NEW ANTENNA LAYOUT

1/8" = 1'-0"

NORTH

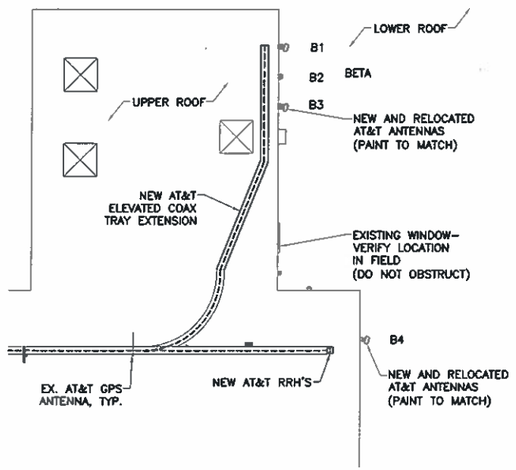
4' 0 8' 16' 24'

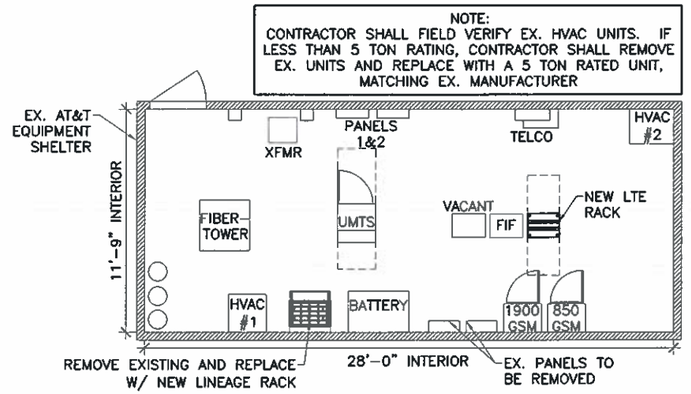
SCALE: 1/8"=1'-0"

This sheet of drawings has not been reviewed for code compliance.

NOTES:

1. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS.
2. CABLE LENGTHS TO BE FIELD VERIFIED.
3. CONTRACTOR SHALL MAINTAIN 4'-0" MINIMUM DISTANCE BETWEEN EACH ANTENNA.
4. CONTRACTOR TO VERIFY NEW LINAGE POWER PLANT IS ALARMED





3 EQUIPMENT SHELTER

1/4" = 1'-0"

ANTENNA MOUNTING NOTES:

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
7. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
8. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
9. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
10. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
11. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE PREFERABLY IN A VERTICAL POSITION.
12. ANTENNAS SHALL HAVE A 4' MIN CENTER TO CENTER HORIZONTAL SEPARATION.

TORQUE REQUIREMENTS:

1. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
2. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
   - 2.A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
   - 2.B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
3. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
4. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
5. ALL GROUND GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
6. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
7. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING NOTES:

1. THE OPTIC FIBER TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING OPTIC FIBER TRUNK CABLES INTO A CABLE TRAYS SYSTEM, THE OPTIC FIBER TRUNK CABLES SHALL BE INSTALLED INTO AN INTER DUCT AND PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
2. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
3. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

GENERAL NOTES:

1. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
2. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
3. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
4. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
5. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
   - 5.A. TEMPERATURE SHALL BE ABOVE 50°
   - 5.B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
   - 5.C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
   - 5.D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.

at&t

AT&T Project Information:

HUMANA
COU1176
1501 S. POTOMAC
AURORA, CO 80012
ARAPAHOE COUNTY

BLACK & VEATCH

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License No.
COLORADO REGISTERED
KARISTOPHER JAMES [illegible]
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PROFESSIONAL ENGINEER
NOV. 18, 2011

ANTENNA LAYOUT

Sheet Number:

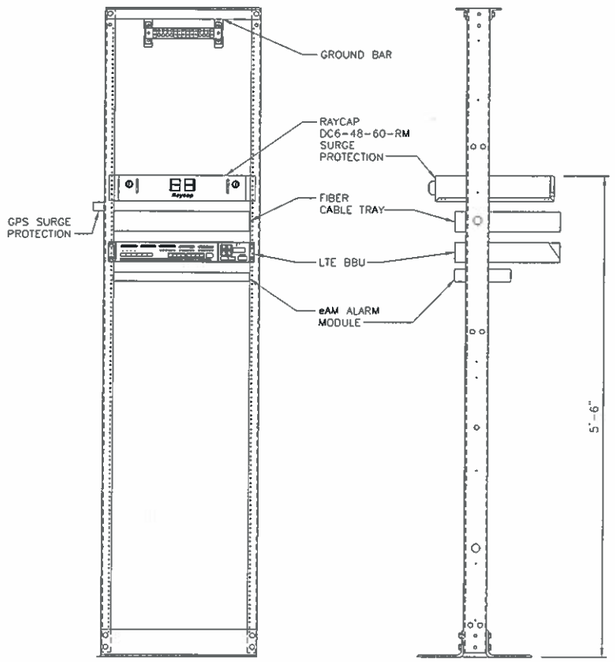
A3

RSN: 643347
Permit #: 12-583367-LT

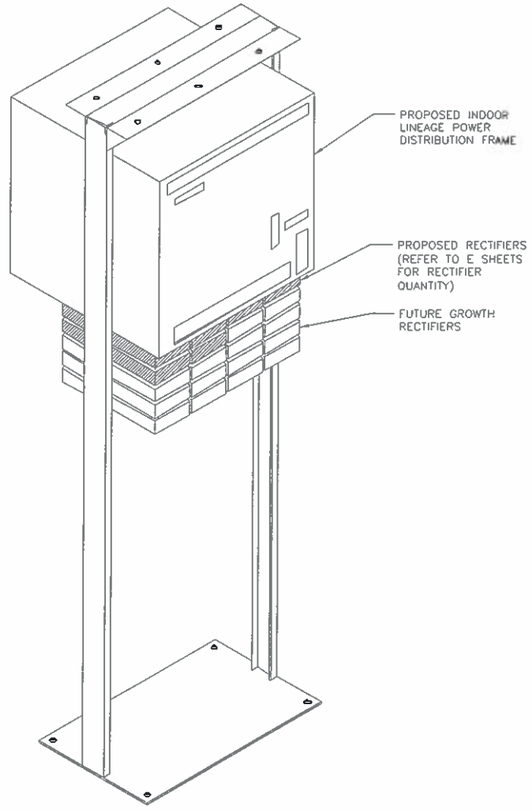
SHEET 6 of 28

NOTES:

1. SPACING BETWEEN EQUIPMENT WITHIN THE LTE RACK SHALL BE ONE RACK UNIT (OR APPROXIMATELY 3").



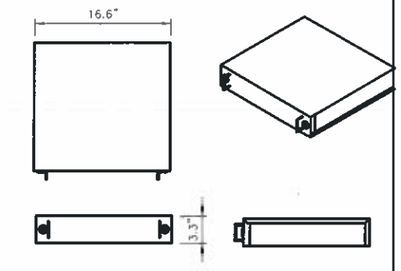
DETAIL A
PROPOSED 19" LTE EQUIPMENT RACK
NO SCALE



DETAIL B
PROPOSED INDOOR LINEAGE POWER DISTRIBUTION FRAME
NO SCALE

RAYCAP DC6-48-60-RM

NOMINAL OPERATING VOLTAGE:	48 VDC
NOMINAL DISCHARGE CURRENT:	20 kA 8/20µs
MAXIMUM DISCHARGE CURRENT:	60 kA 8/20µs
MAXIMUM CONTINUOUS OPERATING VOLTAGE:	75 VDC
VOLTAGE PROTECTION RATING:	400 V
TOTAL WEIGHT:	53 lbs



DETAIL C
ANTENNA SPECIFICATIONS
NO SCALE

ALCATEL-LUCENT 9442 RRH2x40-07-L

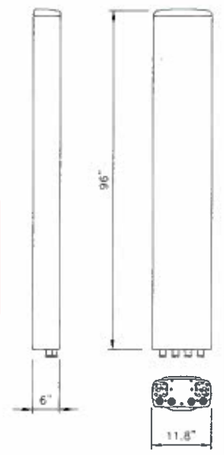
DIMENSIONS, WxDxH:	10.63"x9.7"x19.3"
WEIGHT, WITHOUT BRACKETS:	52.4 lbs



DETAIL D
RRH SPECIFICATIONS (700 MHz)
NO SCALE

KATHREIN ANTENNA 800-10766

RADOME MATERIAL:	GRP
RADOME COLOR:	LIGHT GRAY
WEIGHT:	58.3 lbs
CONNECTOR:	7/16 DIN FEMALE



DETAIL E
ANTENNA SPECIFICATIONS
NO SCALE

This sheet of drawings has not been reviewed for code compliance.

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HUMANA
COU1176
1501 S. POTOMAC
AURORA, CO 80012
ARAPAHOE COUNTY

BLACK & VEATCH

Rev:	Date:	Description:	By:
1	11/8/11	PRELIM. CONST	SL
2	11/18/11	CONSTRUCTION	SL

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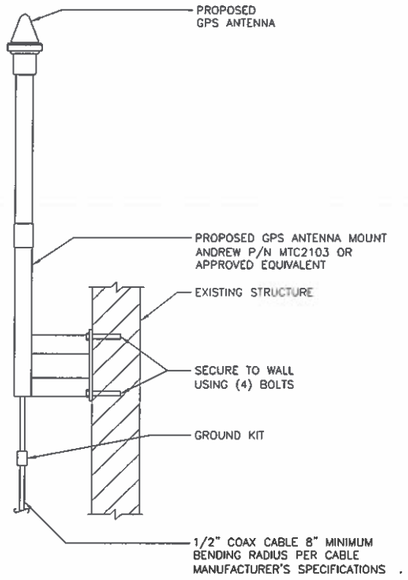


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EQUIPMENT DETAILS

Sheet Number:

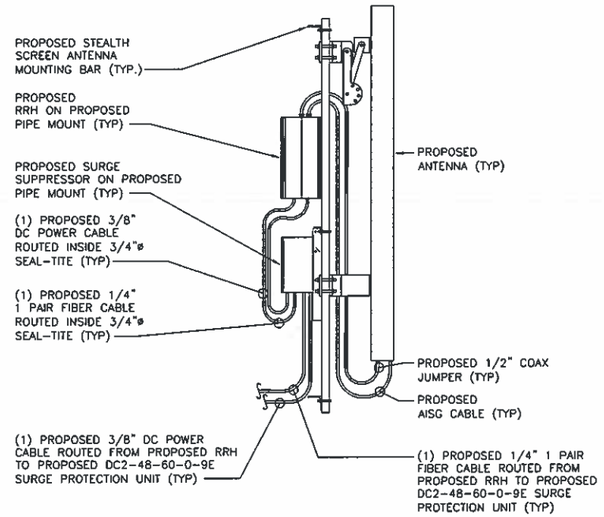
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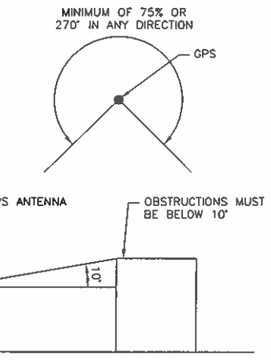
DETAIL A
LTE GPS ANTENNA MOUNTING
NO SCALE

NOTES

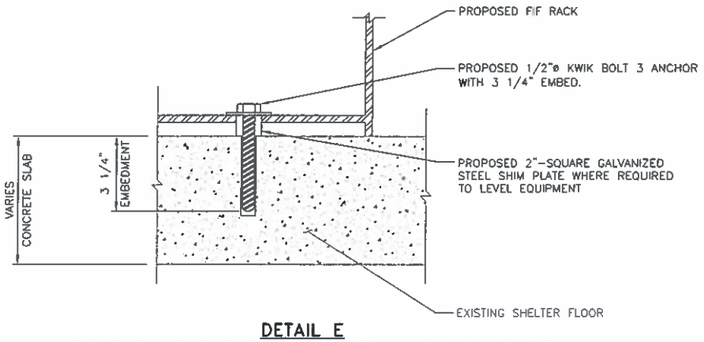
1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 1-1/4" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 18 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE REAMED AND SMOOTH EDGES IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.
3. IT IS CRITICAL THAT THE GPS ANTENNA IS MOUNTED SUCH THAT IT IS WITHIN 2 DEGREES OF VERTICAL AND THE BASE OF THE ANTENNA IS WITHIN 2 DEGREES OF LEVEL.
4. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED LTE GPS ANTENNA AND TRANSMITTING ANTENNAS.
5. DO NOT SWEEP TEST GPS ANTENNA.



DETAIL B
ANTENNA MOUNTING
NO SCALE



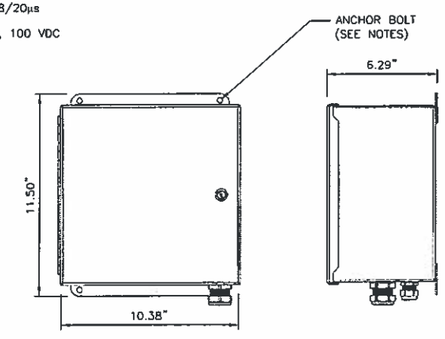
DETAIL C
GPS MINIMUM SKY VIEW REQUIREMENTS
NO SCALE



DETAIL E
INDOOR EQUIPMENT TO CONCRETE SLAB ANCHORAGE
NO SCALE

RAYCAP DC2-48-60-0-9E

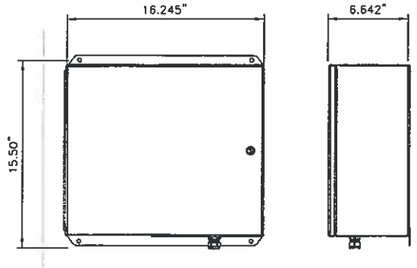
NOMINAL OPERATING VOLTAGE:	48 VDC
NOMINAL DISCHARGE CURRENT:	20 kA 8/20µs
MAXIMUM DISCHARGE CURRENT:	60 kA 8/20µs
MAXIMUM CONTINUOUS OPERATING VOLTAGE:	75 VAC, 100 VDC
VOLTAGE PROTECTION RATING:	500 V
TOTAL WEIGHT:	16 lbs



DC SURGE SUPPRESSOR WALL MOUNT
NO SCALE

RAYCAP FC12-PC6-10E

TOTAL WEIGHT:	20.35 lbs



DETAIL D
JUNCTION BOX DETAIL
NO SCALE

NOTES (WALL ATTACHMENT)

1. CONCRETE
   ANCHOR: HILTI HIT HY 150 ADHESIVE ANCHOR
   SIZE: ø = 3/8"
   EMBEDMENT: 1 3/4"
   SPACING: S = 8" (MIN)
   * IF THE WALL THICKNESS IS LESS THAN 2", THE 1/2"ø A325 BOLT SHALL BE USED TO GO THROUGH THE WALL WITH A 3/8" BACK PLATE INSIDE OF THE WALL.
2. FULLY-GROUTED CMU WALL
   ANCHOR: HILTI HIT HY 150 ADHESIVE ANCHOR
   SIZE: ø = 3/8"
   EMBEDMENT: 1 3/4"
   SPACING: ONE (1) ANCHOR PER CELL (MAX) AND 8" (MIN).
3. SOLID BRICK WALL
   ANCHOR: HILTI HIT HY 20 ADHESIVE ANCHOR
   SIZE: ø = 3/8"
   EMBEDMENT: 2"
4. HOLLOW, UNGROUTED CMU WALL & BRICK WALL WITH HOLES
   ANCHOR: HILTI HIT HY 20 ADHESIVE ANCHOR
   SIZE: ø = 3/8"
   EMBEDMENT: THROUGH FACE OF HOLLOW BASE ≥ 6" (MIN)
   SPACING: S = (1) ANCHOR PER BLOCK CELL (CMU)
5. STEEL
   BOLT: A36
   BOLT SIZE: ø = 1/2"
   BOLT HOLE SIZE: ø = 9/16"
6. IF THE WALL MATERIAL IS DIFFERENT FROM ABOVE, CONTRACTOR SHALL INFORM DESIGN ENGINEER IMMEDIATELY.
7. ALL HARDWARE AND PARTS SHALL BE HOT-DIPPED GALVANIZED WITH LOCK WASHERS AND HEAVY HEX NUTS.
8. ALL BOLT HOLES SHALL BE 7/16"ø UNLESS NOTED OTHERWISE.

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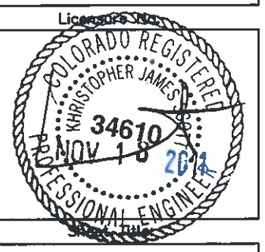
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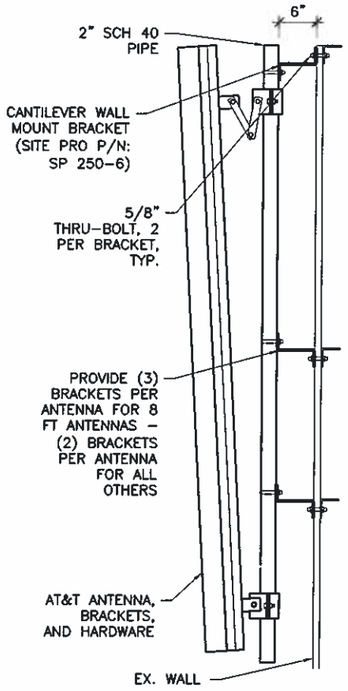


EQUIPMENT DETAILS

Sheet Number:

A5

RSN: 643347
Permit #: 12-583367-LT



REPLACE OR UPGRADE ALL ANTENNA BRACKETS TO MATCH DETAIL

1 ANTENNA MOUNT DETAIL
1" = 1'-0"

STRUCTURAL NOTES

1.0 GENERAL CONDITIONS

1.1 DESIGN AND CONSTRUCTION OF ALL WORK SHALL CONFORM TO THE IBC 2009 EDITION AND ALL OTHER APPLICABLE STATE CODES, ORDINANCES, AND REGULATIONS. IN CASE OF CONFLICT BETWEEN THE CODES, STANDARDS, AND REGULATIONS. SPECIFICATIONS, GENERAL NOTES AND/OR MANUFACTURER'S REQUIREMENTS. USE THE MOST STRINGENT PROVISION.

1.2 IT IS THE EXPRESS INTENT OF THE PARTIES INVOLVED IN THIS PROJECT THAT THE CONTRACTOR OR SUBCONTRACTOR OR INDEPENDENT CONTRACTOR OR THEIR RESPECTIVE EMPLOYEES SHALL EXCULPATE THE ARCHITECT, THE ENGINEER, THE CONSTRUCTION MANAGER, THE OWNER, AND THEIR AGENTS, FROM ANY LIABILITY WHATSOEVER AND HOLD THEM HARMLESS AGAINST LOSS, DAMAGES, LIABILITY OR ANY EXPENSE ARISING IN ANY MATTER FROM THE WRONGFUL OR NEGLIGENT ACT, OR FAILURE TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, OR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OR FAILURE TO CONFORM TO THE STATE SCAFFOLDING ACT IN CONNECTION WITH THE WORK.

1.3 DO NOT SCALE DRAWINGS.

1.4 VERIFY ALL EQUIPMENT MOUNTING DIMENSIONS PER MANUFACTURER DRAWINGS.

1.5 SUBMIT ONE SEPIA AND TWO PRINTS OF ALL STRUCTURAL SHOP DRAWINGS. MARKED UP SEPIA SHALL BE RETURNED.

1.6 DESIGN LOADS ARE:

WIND SPEED	105 MPH 3 SEC EXP B
SEISMIC ZONE	1
SNOW LOAD	30 PSF

2.0 STEEL

2.1 MEET OR EXCEED THE FOLLOWING CODES & STANDARDS (LATEST EDITION) EXCEPT AS NOTED:

A. STRUCTURAL STEEL...AISC SPECIFICATION & CODE OF STANDARD PRACTICE
-SHAPES AND PLATES...ASTM A572
-PLATES BENT OR COLD FORMED...ASTM A 283, GRADE C
-PIPES...ASTM A 53, GRADE B
-STRUCTURAL SHEETS, HOT ROLLED...ASTM A 510
-COLD FORMED STEEL TUBING...ASTM A 500 GRADE B
-BOLTS, NUTS & WASHERS FOR ANCHOR BOLTS AND SECONDARY CONNECTIONS...ASTM A307
-ALL STEEL SHALL BE HOT-DIPPED GALVANIZED.

B. WELDS...AWS E 70XX
EXCEPTION IS TAKEN TO AISC CODE OF STANDARD PRACTICE PARAGRAPH 4.2.1 REGARDING OWNERS AND FABRICATOR'S RESPONSIBILITY FOR CONNECTION DESIGN AND DETAILING IS THE CONTRACTORS RESPONSIBILITY. ENGINEER'S REVIEW OF SHOP DRAWINGS IS FOR GENERAL CONSIDERATIONS ONLY AND DOES NOT CONSTITUTE AN ACCEPTANCE OF THESE RESPONSIBILITIES BY THE OWNER AND/OR ENGINEER.

Structural plan review is limited to a general survey for code compliance. No review is implied nor was undertaken to verify structural adequacy.

City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *J Van Essen*
Date: *Feb 22, 2012*
2009 INTERNATIONAL CODES & 2011 NEC

at&t

AT&T Project Information:

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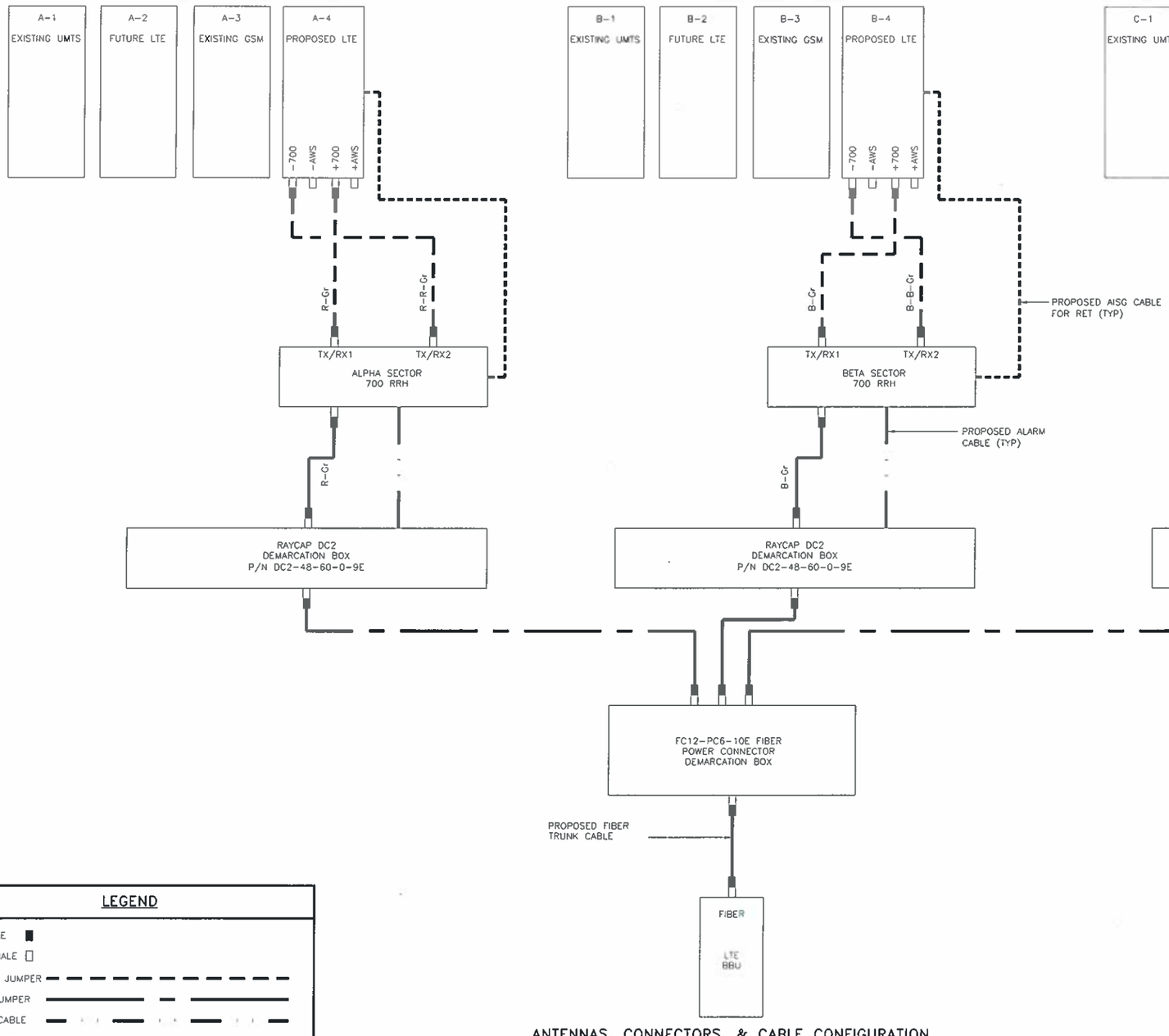
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CHRISTOPHER JAMES
34610
PROFESSIONAL ENGINEER
NOV 18 2011
Sheet Title:

ANTENNA MOUNT DETAILS & NOTES

Sheet Number:

S1

CONFIGURATION AS VIEWED FROM THE REAR OF ANTENNA



ANTENNAS, CONNECTORS, & CABLE CONFIGURATION
NO SCALE

NOTES:

1. FOR BOTTOM JUMPERS (FROM THE MAIN COAX TO THE BTS CONNECTOR) LONGER THAN 15' USE 7/8" COAX. FOR BOTTOM JUMPERS LESS THAN 15' USE 1/2" EC4 OR EQUIVALENT.
2. FABRICATE JUMPERS TO ASSURE THAT THE 90° CONNECTOR IS 56" FROM THE FLOOR ALLOWING ENOUGH SLACK TO REACH ALL BTS (DUAMCO) CONNECTIONS IF CABINET IS NOT IN PLACE.
3. MOUNT PDU IN FIF RACK. ASSURE THAT THE PREFABRICATED CONDUCTORS SUPPLIED WITH BIAS TEE WILL REACH THE DESIGNATED TERMINATION POINTS.
4. SUPPLY AND INSTALL #6 AWG GROUND TO TELCO RACK FROM THE MAIN GROUNDING BUS. SUPPLIED AND INSTALLED BY CONTRACTOR.
5. GREY TAPING TO BE USED FOR 700 MHZ AND PURPLE TAPING TO BE USED FOR AWS. TAPING TO FOLLOW AT&T STANDARD.

ABBREVIATIONS

R	RED
B	BLUE
G	GREEN
GR	GRAY

LEGEND

- DIN MALE
- DIN FEMALE
- COAXIAL JUMPER
- FIBER JUMPER
- ALARM CABLE
- RET CABLE
- FIBER TRUNK CABLE

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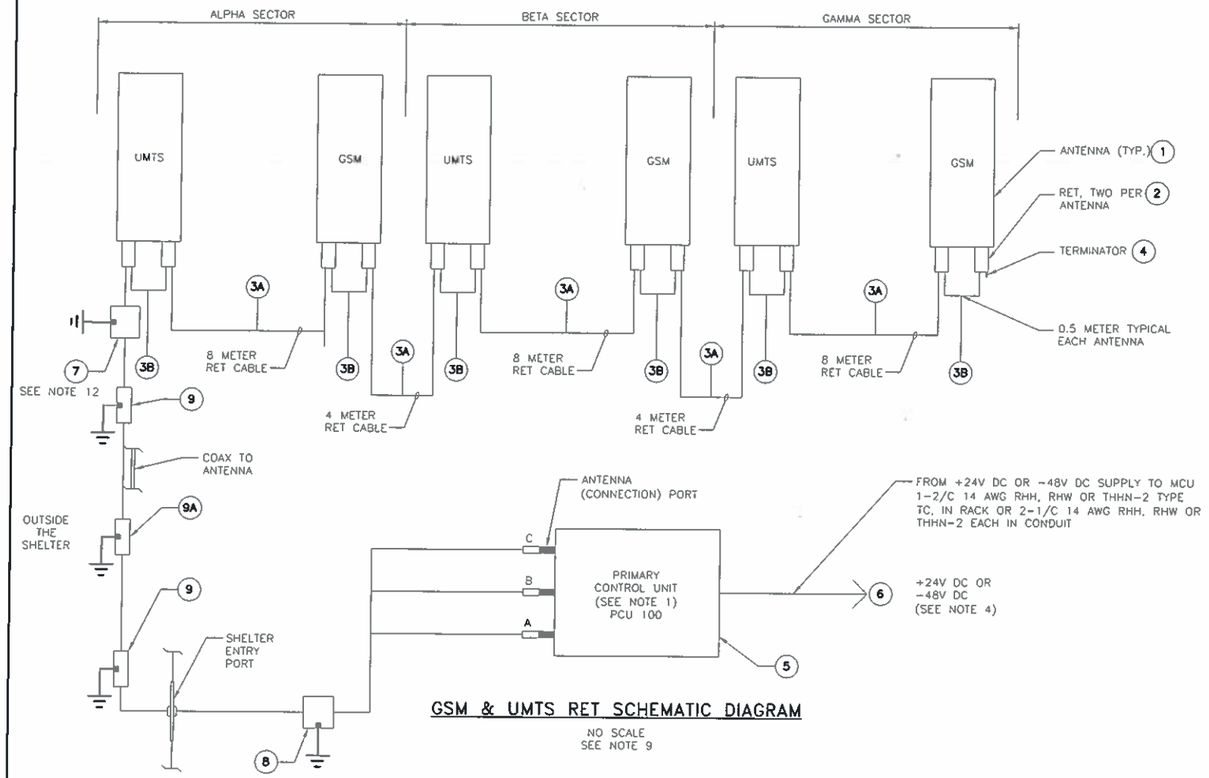
Sheet Title:

LTE
CONFIGURATION

Sheet Number:

RF1

RSN: 643347
Permit #: 12-583367-LT



GSM & UMTS RET SCHEMATIC DIAGRAM

NO SCALE
SEE NOTE 9

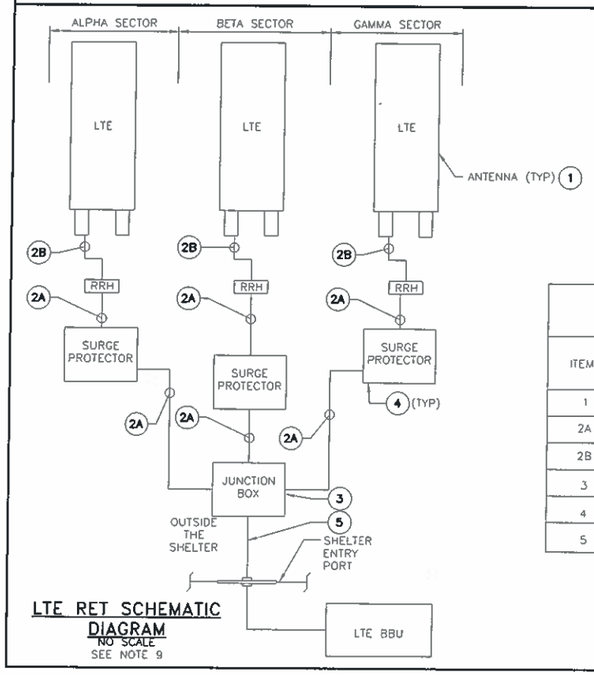
NOTES:

1. ROUTE CIRCUITS IN CABLE TRAY OR CONDUITS TO THE EXISTING +24VDC UPS OR -48VDC UPS PANELS. PROVIDE THE APPROPRIATE SIZE OF OVERCURRENT PROTECTION AND FOLLOW THE TERMINATION PROCEDURES IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
2. SEE DETAIL ON SECTOR CONFIGURATION SHEETS FOR AISG BIAS-T PLACEMENT.

EXAMPLE BILL OF MATERIAL

ITEM #	ITEM DESCRIPTION	SECTOR A	SECTOR B	SECTOR C	TOTAL QUANTITY	APPLICATION
1	DUAL BAND ANTENNA	2	2	2	6	DUAL BAND
2	DUAL BAND RET MOTOR	4	4	4	12	DUAL BAND
3A	RET CABLE	2	2	1	5	DUAL BAND
3B	RET CABLE	2	2	2	6	DUAL BAND
4	RET MOTOR TERMINATION CAP	0	0	1	1	DUAL OR SINGLE BAND
5	19" RACK MOUNTED PCU (+24V DC) (-48V DC)		1		1 PER 24 RET MOTORS	DUAL OR SINGLE BAND
6	DC BREAKER OR FUSE (MATCH EXISTING)		1		1 PER 24 RET MOTORS	DUAL OR SINGLE BAND
7	RET JUNCTION BOX		-		1 (AS REQ'D.)	DUAL OR SINGLE BAND
8	RET LIGHTNING PROTECTION UNIT		-		1 (AS REQ'D.)	REQUIRED
9	RET CABLE GROUNDING KIT		-		1 (AS REQ'D.)	REQUIRED
9A	MIDPOINT GROUNDING REQUIRED WHEN RET CABLE EXCEEDS 200'		-		1 (AS REQ'D.)	REQUIRED

This sheet of drawings has not been reviewed for code compliance.



LTE RET SCHEMATIC DIAGRAM

NO SCALE
SEE NOTE 9

BILL OF MATERIAL

ITEM #	ITEM DESCRIPTION	SECTOR A	SECTOR B	SECTOR C	TOTAL QUANTITY	APPLICATION
1	DUAL BAND ANTENNA	1	1	1	3	DUAL BAND
2A	FIBER JUMPER	2	2	2	6	DUAL BAND
2B	RET CABLE	1	1	1	3	DUAL BAND
3	RAYCAP FC12-PC6-10E		-		1 (AS REQ'D)	REQUIRED
4	RAYCAP DC2-48-60-0-9E	1	1	1	3	REQUIRED
5	FIBER TRUNK CABLE		-		1 (AS REQ'D)	REQUIRED

NOTES

1. LIMIT OVERALL RET AISG CABLE RUN TO LESS THAN 400 FT.
2. SUPPORT RET AISG CABLE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. RET CABLE TO BE SUPPORTED USING 1/2" CLIPS WITH 3/8" RUBBER INSERT GROMMETS.
3. USE 6 AWG STRANDED COPPER THHN-2 GREEN INSULATED GROUNDING CONDUCTOR UNLESS OTHERWISE NOTED. CONNECT THE PCU TO EXISTING TELCO RACK GROUNDING BAR.
4. TOWER MOUNT APPLICATION WILL DICTATE THE LENGTH OF CABLE TO BE USED.
5. RET AISG CABLES PROVIDE CONTROL AND POWER TO ELECTRICAL DOWN TILT DRIVES ON THE ANTENNAS.
6. THE RET AISG CABLES ARE FACTORY ASSEMBLED WITH ONE MALE AND ONE FEMALE CONNECTOR ON EACH END. SUPPORT EVERY 18" USING TIE WRAPS SUITABLE FOR OUTDOOR USE. INSTALL DRIP LOOPS AT EVERY LOCATION WHERE WATER MAY ACCUMULATE.
7. NO TESTING OF THE CABLE IS REQUIRED.
8. DURING INSTALLATION, RECORD THE FOLLOWING INFORMATION FOR USE DURING THE COMMISSIONING PHASE:
   RET ACTUATOR/MOTOR SERIAL NUMBER
   ANTENNA SERIAL NUMBER
   LOCATION (SECTOR IN WHICH THE ANTENNA WILL OPERATE)
9. ANTENNA CONFIGURATION IS SHOWN DIAGRAMMATICALLY ONLY AS A REPRESENTATION.
10. IF A JUNCTION BOX WILL NOT BE USED AT THE TOP OF THE RET SYSTEM, IT IS RECOMMENDED THAT AN ADDITIONAL LIGHTNING PROTECTION UNIT BE INSTALLED AT THE TOWER TOP.
11. FOR RET AISG CABLES 50 METERS OR LESS, THE RET AISG CABLE GROUNDING KIT IS NOT REQUIRED AT THE SHELTER END.
12. USE THIS DRAWING FOR RET GROUNDING SPECIFICATIONS, SEE DRAWING G-1 FOR GENERAL REQUIREMENTS.
13. ALL RET CONNECTIONS SHALL BE WEATHERPROOFED. PREFERED METHOD OF WEATHER PROOFING SHALL BE TO HEAT SHRINK ALL RET CONNECTIONS PER ND-135 RET GUIDE LINES SECTION 3.3 AISG(RS 485) CABLE- " ALL CABLE CONNECTORS REQUIRE WEATHERPROOFING."
14. AISG SOFTWARE 2.0 OR NEWEST SOFTWARE TO BE UTILIZED.

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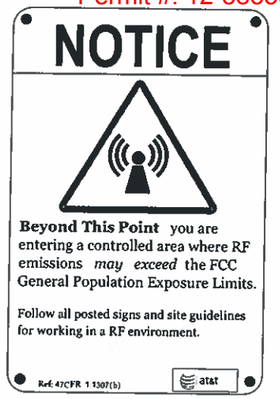
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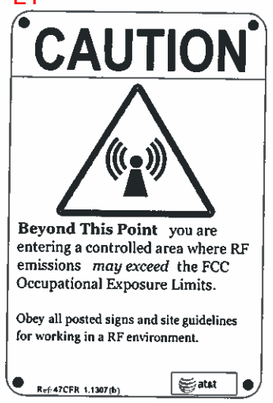
RET CONFIGURATION

Sheet Number:

RF2

RSN: 643347
Permit #: 12-583367-LT





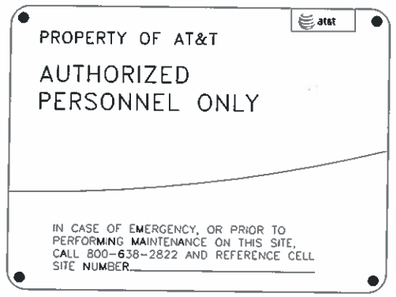
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NO SCALE



ALERTING SIGN
NO SCALE



ALERTING SIGN
NO SCALE



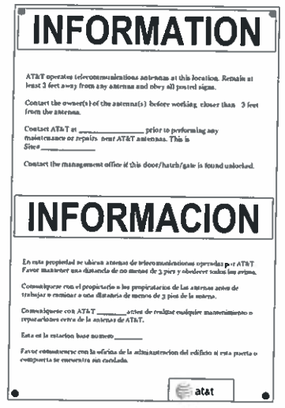
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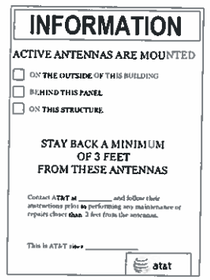
INFO SIGN #4
NO SCALE



INFO SIGN #3
NO SCALE



INFO SIGN #1
NO SCALE



INFO SIGN #2
NO SCALE

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GENERAL SIGNAGE GUIDELINES

Structure Type	INFO SIGN #1	INFO SIGN #2	INFO SIGN #3	INFO SIGN #4	Striping	NOTICE SIGN	CAUTION SIGN
Towers							
Monopole/Monopine/Monopalm	entrance gates, shelter doors OR on the outdoor cabinets	climbing side of the Tower	On backside of Antennas	On the side of Antennas			At the height of the first climbing step, min. 9ft above ground
SCE Towers/ Towers with high voltage	entrance gates, shelter doors OR on the outdoor cabinets	climbing side of the Tower	On backside of Antennas	On the side of Antennas			At the height of the first climbing step, min. 9ft above ground
Light Poles / Flag Poles	entrance gates, shelter doors OR on the outdoor cabinets	on the pole, no less than 3ft below the Antenna and no less than 9ft above ground	On backside of Antennas	On the side of Antennas			
Utility Wood Poles (JPA)	entrance gates, shelter doors OR on the outdoor cabinets	on the pole, no less than 3ft below the Antenna and no less than 9ft above ground	On backside of Antennas	On the side of Antennas		If GP max value of MPE at antenna level is: 0-99%: Notice sign; over 99%: Caution sign at no less than 3ft below antenna and 9ft above ground	
Microcells mounted on non-JPA poles	entrance gates, shelter doors OR on the outdoor cabinets	on the pole, no less than 3ft below the Antenna and no less than 9ft above ground	On backside of Antennas	On the side of Antennas		Notice or Caution sign at no less than 9ft above ground: only if the exposure exceeds 90% of the General Public exposure at 6ft above ground or at outside surface of adjacent buildings	
Roof Tops							
At all access points to the roof	X						
On Antennas	X		X	X			
Concealed Antennas	X	X					
antennas mounted facing outside the building	X	X					
antennas on support structure	X	X					
Roofview Graph:							
Radiation area is within 3ft from antenna	X	adjacent to each antenna				either Notice or Caution sign (based on Roofview results) at antennas/barrier	
Radiation area is beyond 3ft from antenna	X	adjacent to each antenna			diagonal, yellow striping as to Roofview graph		
Church Steeples	Access to steeple	adjacent to antennas if antennas are concealed	On backside of Antennas	On the side of Antennas			Caution sign at the antennas
Water Stations	Access to ladder	adjacent to antennas if antennas are concealed	On backside of Antennas	On the side of Antennas			Caution sign beside Info sign #1, min. 9ft above ground

Notes for Rooftop sites:
1. Either NOTICE or CAUTION signs need to be posted at each sector as close as possible to: the outer edge of the striped off area or the outer antennas of the sector.
2. If Roofview shows: only blue = Notice Sign, blue and yellow = Caution Sign, only yellow = Caution Sign to be installed.
3. Should the required striping area interfere with any structures or equipment (A/C, vents, roof hatch, doors, other antennas, dishes, etc.), please notify AT&T to modify the striping area, prior to starting the work

SIGNAGE GUIDELINES CHART
NO SCALE

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AT&T Project Information:

HUMANA
COU1176
1501 S. POTOMAC
AURORA, CO 80012
ARAPAHOE COUNTY

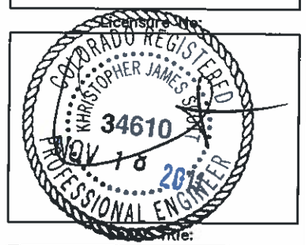
BLACK & VEATCH

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1	11/8/11	PRELIM. CONST	SL
2	11/18/11	CONSTRUCTION	SL

Plans Prepared By:

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13969 W. 1st Ave.
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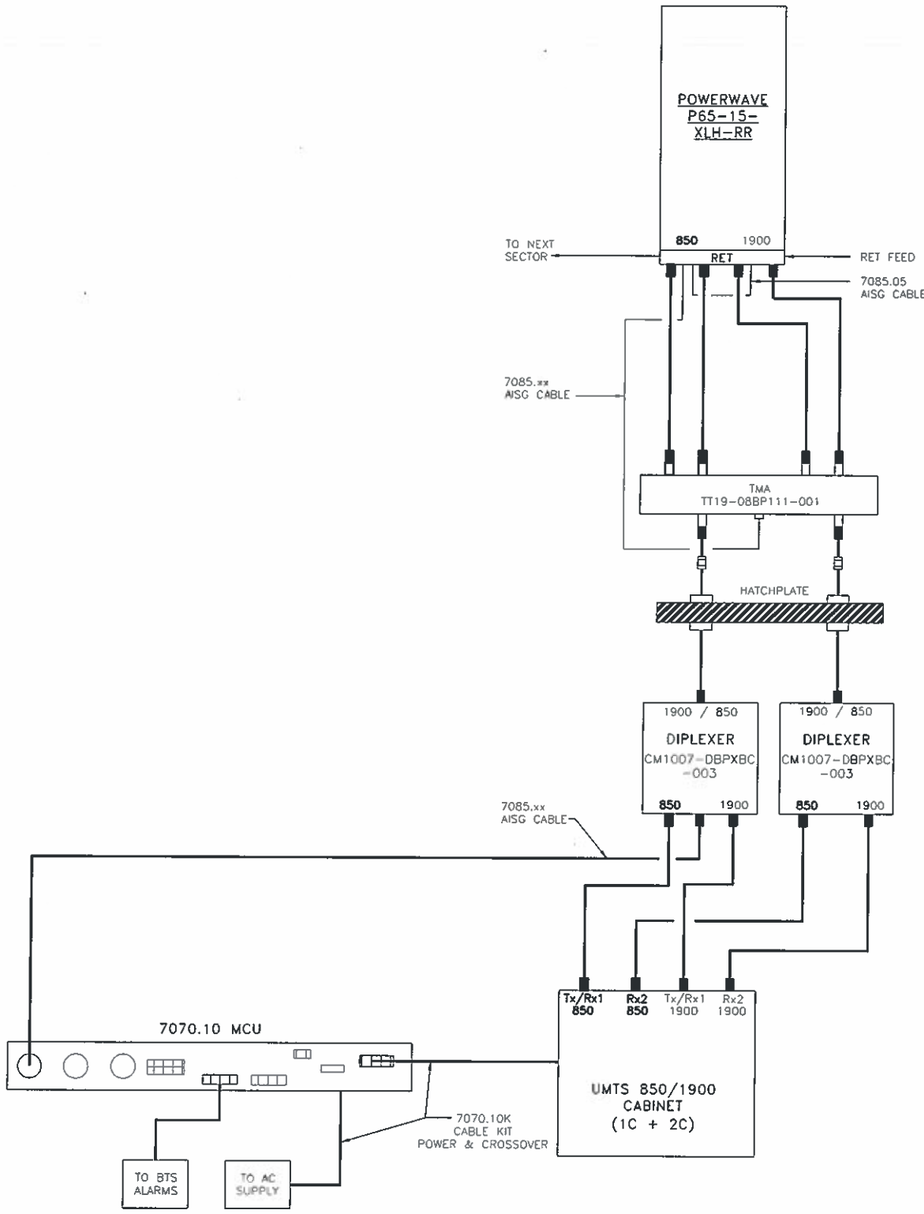
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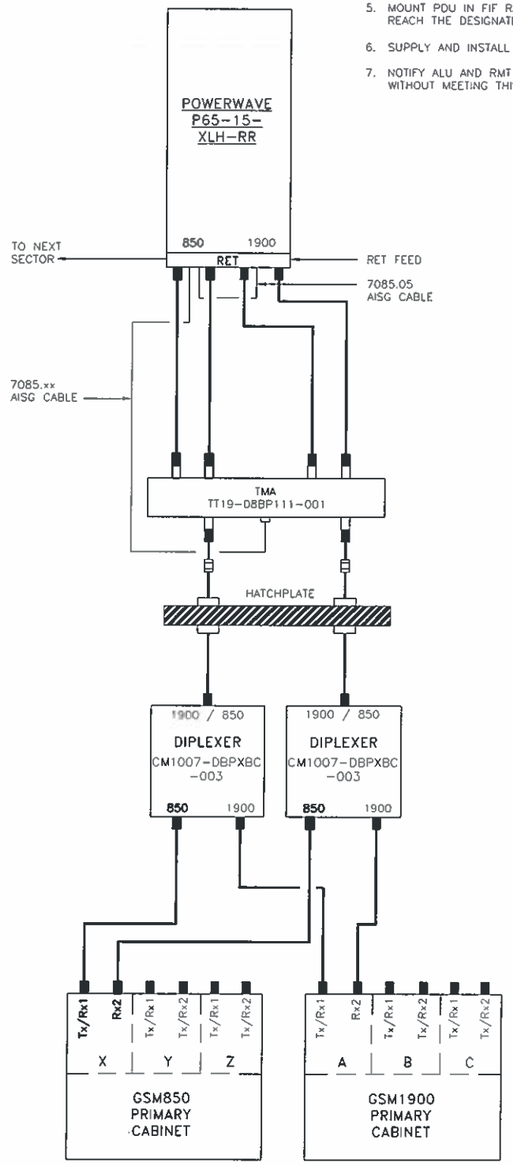
RF SIGNAGE DETAILS

Sheet Number:

RF3

1. FOR BOTTOM JUMPERS (FROM THE MAIN COAX TO THE BTS CONNECTOR) LONGER THAN 15' USE 7/8" COAX. FOR BOTTOM JUMPERS LESS THAN 15' USE 1/2" LDF4 OR EQUIVALENT.
2. FABRICATE JUMPERS TO ASSURE THAT THE 90° CONNECTOR IS 56" FROM THE FLOOR ALLOWING ENOUGH SLACK TO REACH ALL BTS (DUAMCO) CONNECTIONS IF CABINET IS NOT IN PLACE.
3. PDU SUPPLIED BY AT&T AND INSTALLED BY CONTRACTOR.
4. #6 AWG GROUND FROM BIAS-T TO GROUNDING BAR SUPPLIED AND INSTALLED BY CONTRACTOR.
5. MOUNT PDU IN FIF RACK. ASSURE THAT THE PREFABRICATED CONDUCTORS SUPPLIED WITH BIAS TEE WILL REACH THE DESIGNATED TERMINATION POINTS.
6. SUPPLY AND INSTALL #6 AWG GROUND TO TELCO RACK FROM THE MAIN GROUNDING BUS.
7. NOTIFY ALU AND RMT TO CHANGE THE THRESHOLDS ON TTLNA, AT&T OPPERATIONS WILL NOT ACCEPT SITE WITHOUT MEETING THIS REQUIREMENT





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ARAPAHOE COUNTY

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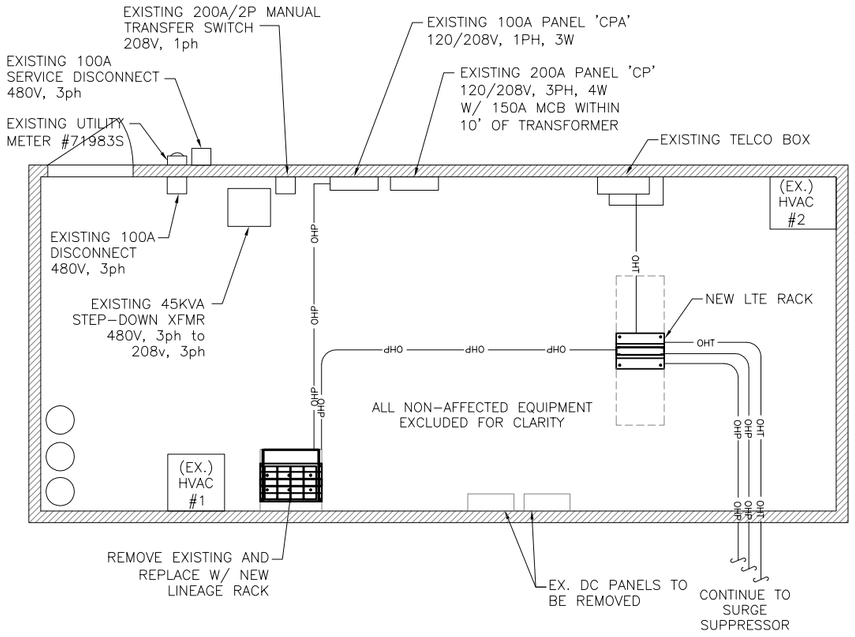
COLORADO REGISTERED
KHRISTOPHER JAMES SLAGLE
34610
PROFESSIONAL ENGINEER
11/18

Sheet Title:

UMTS AND GSM CONFIGURATION

Sheet Number:

RF4



ELECTRICAL PLAN
SCALE: 3/8" = 1'-0"

NOTES:

1. CONTRACTOR TO INSTALL 6" RACEWAY ATTACHED TO EXISTING RACEWAY BY L-BRACKETS. PROPOSED DC AND FIBER OPTIC CABLE TO BE ROUTED WITHIN.
2. THE CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY ON THE PLANS AND IS ONLY AN APPROXIMATION. THE EXACT LOCATION AND ROUTING SHALL BE FIELD VERIFIED.
3. ALL DISCONNECTS AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES, INDICATING THE CIRCUITS ORIGINATION AND ALL EQUIPMENT TERMINATIONS.
4. CONTRACTOR SHALL PROVIDE ALL CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETED SYSTEM AND SHALL BE IN COMPLIANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
5. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND AISG RET CABLES. CABLE STRAIN-RELIEF & CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
6. FIBER TO BE ROUTED IN NEW 6" RACEWAY OR ATTACHED TO L-BRACKETS ALONG SIDE OF THE EXISTING RACEWAY.

ABBREVIATIONS

AC	ALTERNATING CURRENT
AIC	AMPERAGE INTERRUPTION CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BTC	BARE TINNED COPPER CONDUCTOR
BATT	BATTERY
CHG	CHARGING
COMM	COMMON
DC	DIRECT CURRENT
DIA	DIAMETER
DWG	DRAWING
EC	ELECTRICAL CONDUCTOR
EMT	ELECTRICAL METALLIC TUBING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
HVAC	HEAT/VENTILATION/ AIR CONDITIONING
IGR	INTERIOR GROUNDING RING (HALO)
MGB	MASTER GROUNDING BAR
MIN	MINIMUM
MTS	MANUAL TRANSFER SWITCH
M/W	MICROWAVE
NEC	NATIONAL ELECTRICAL CODE
OC	ON CENTER
PP	POLARIZING PRESERVING
PCU	PRIMARY CONTROL UNIT
PDU	PROTOCOL DATA UNIT
RECT	RECTIFIER
RET	REMOTE ELECTRICAL TILT
RMC	RIGID METALLIC CONDUIT
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
RWY	RACEWAY
SIAD	SMART INTEGRATED ACCESS DEVICE
TMA	TOWER MOUNT AMPLIFIER
TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
UPS	UNINTERRUPTIBLE POWER SUPPLY (DC POWER PLANT)

This sheet of drawings has not been reviewed for code compliance.

LEGEND

FENCE	X X X
ICE BRIDGE	
OVERHEAD POWER	OHP OHP OHP
OVERHEAD TELCO	OHT OHT OHT

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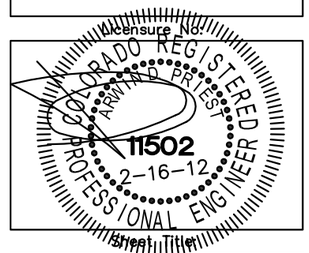
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Plans Prepared By:

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Sheet Title:

ELECTRICAL PLAN

Sheet Number:

E1

RSN: 643347

Permit #: 12-583367-LT

SHORT CIRCUIT CALCULATIONS

POINT TO POINT METHOD FOR SHORT CIRCUIT CALCULATIONS AS ILLUSTRATED IN BUSSMAN MANUFACTURING PUBLICATION FORM SPD90.

FROM EXISTING 480V, 3PH, 500KVA PAD MOUNT TRANSFORMER TO EXISTING 100A SERVICE DISCONNECT (APPROX. 90')

$I_{SCA\ 1}$: AVAILABLE SHORT CIRCUIT CURRENT FROM UTILITY = 33,400A.

FIND $f = \frac{1.73 \times 90 \times 33{,}400}{4811 \times 480} = 2.25$

FIND $M = \frac{1}{1+f} = 0.308$

SHORT CIRCUIT CURRENT AT EXISTING 100A SERVICE DISC. = M x AVAILABLE S.C.

$I_{SCA\ 2}$: I = 10,287 A

FROM EXISTING 100A SERVICE DISCONNECT TO EXISTING 100A INTERIOR DISCONNECT (APPROX. 4')

FIND $f = \frac{1.73 \times 4 \times 10{,}287}{4774 \times 480} = 0.031$

FIND $M = \frac{1}{1+f} = 0.97$

SHORT CIRCUIT CURRENT AT EXISTING 100A INTERIOR DISC. = M x AVAILABLE S.C.

$I_{SCA\ 3}$: I = 9,978 A

FROM EXISTING 100A INTERIOR DISCONNECT TO EXISTING 45KVA STEP-DOWN TRANSFORMER (APPROX. 6')

FIND $f = \frac{1.73 \times 6 \times 9{,}978}{3806 \times 480} = 0.057$

FIND $M = \frac{1}{1+f} = 0.946$

SHORT CIRCUIT CURRENT AT EXISTING 45KVA STEP-DOWN TRANS. = M x AVAILABLE S.C.

$I_{SCA\ 4}$: I = 9,439 A

THRU 45KVA STEP-DOWN TRANSFORMER

FIND $f = \frac{9{,}439 \times 480 \times 1.73 \times 3.8}{45 \times 100{,}000} = 6.62$

FIND $M = \frac{1}{1+f} = 0.131$

$I = \frac{480 \times 0.131 \times 9{,}439}{208}$

SHORT CIRCUIT CURRENT AT EXIST. TRANSF. SECONDARY = M x AVAILABLE S.C.

$I_{SCA\ 5}$: I = 2,853 A

FROM EXISTING 45KVA STEP-DOWN TRANSFORMER TO EXISTING PANEL 'CP' (APPROX. 6')

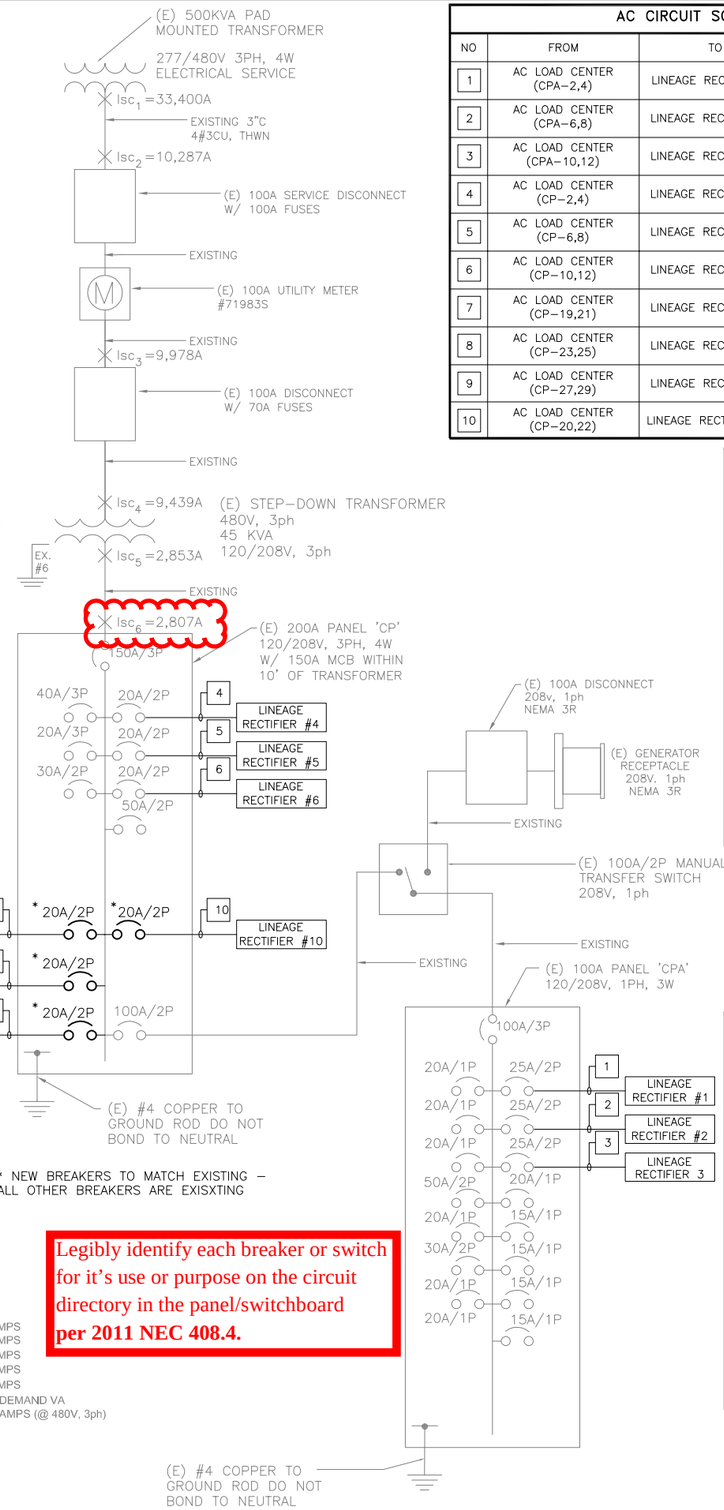
FIND $f = \frac{1.73 \times 6 \times 2{,}853}{8925 \times 208} = 0.016$

FIND $M = \frac{1}{1+f} = 0.984$

SHORT CIRCUIT CURRENT AT EXISTING PANEL 'CP' = M x AVAILABLE S.C.

$I_{SCA\ 6}$: I = 2,807 A

NOTE:
THE NEW LINEAGE RACK WILL CONTAIN THE (6) NEW LINEAGE 24VDC RECTIFIERS SHOWN ON THE ONELINE DIAGRAM. THE DC ONELINE DIAGRAM AND DC CIRCUITRY IS SHOWN ON SHEET E-3.



* NEW BREAKERS TO MATCH EXISTING – ALL OTHER BREAKERS ARE EXISXTING

ELECTRICAL ONE-LINE DIAGRAM
NO SCALE

AC CIRCUIT SCHEDULE			
NO	FROM	TO	CONFIGURATION
1	AC LOAD CENTER (CPA-2,4)	LINEAGE RECTIFIER #1	(2) #10, (1) #10 AWG GND
2	AC LOAD CENTER (CPA-6,8)	LINEAGE RECTIFIER #2	(2) #10, (1) #10 AWG GND
3	AC LOAD CENTER (CPA-10,12)	LINEAGE RECTIFIER #3	(2) #10, (1) #10 AWG GND
4	AC LOAD CENTER (CP-2,4)	LINEAGE RECTIFIER #4	(2) #10, (1) #10 AWG GND
5	AC LOAD CENTER (CP-6,8)	LINEAGE RECTIFIER #5	(2) #10, (1) #10 AWG GND
6	AC LOAD CENTER (CP-10,12)	LINEAGE RECTIFIER #6	(2) #10, (1) #10 AWG GND
7	AC LOAD CENTER (CP-19,21)	LINEAGE RECTIFIER #7	(2) #10, (1) #10 AWG GND
8	AC LOAD CENTER (CP-23,25)	LINEAGE RECTIFIER #8	(2) #10, (1) #10 AWG GND
9	AC LOAD CENTER (CP-27,29)	LINEAGE RECTIFIER #9	(2) #10, (1) #10 AWG GND
10	AC LOAD CENTER (CP-20,22)	LINEAGE RECTIFIER #10	(2) #10, (1) #10 AWG GND

NOTES:

1. THE SCOPE OF WORK SHALL DICTATE THE EQUIPMENT TO BE INSTALLED. EQUIPMENT SHALL BE EQUAL TO OR BETTER THAN REFERRED VENDORS.
2. CONTRACTOR SHALL VERIFY THAT THE SITE PANEL IS AS SHOWN. IF THE SITE PANEL IS NOT AS SHOWN, CONTRACTOR SHALL NOTIFY THE ENGINEER AS SOON AS PRACTICABLE.
3. CONTRACTOR SHALL PROVIDE ALL CONDUITS, CIRCUITS REQUIRED OF A COMPLETED SYSTEM AND SHALL BE IN COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR AS-BUILT PANEL SCHEDULE AND SITE DRAWINGS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR TESTING OF THE AC AND DC POWER SUPPLY SYSTEMS AND FOR VERIFYING THAT THE PROPOSED TELECOM EQUIPMENT CAN WORK PROPERLY IN CONJUNCTION WITH THE EXISTING ELECTRICAL SYSTEM. THE TEST RESULTS IN ACTUAL LOADS SHALL BE DOCUMENTED USING THE FORMS PROVIDED IN AT&T's DOCUMENT TITLED "SITE SURVEY A5." ALL FORMS SHALL BE COMPLETED IN THEIR ENTIRETY. THE A5 FORM SHALL BE PRESENTED TO THE CONSTRUCTION MANAGER WELL IN ADVANCE OF PLACEMENT OF NEW TELECOM EQUIPMENT.

PANEL CP (EXISTING)

120/208 VOLTS, 3 PHASE, 4 WIRES, SN, 225 AMP BUS, 225 AMP MAIN, CB
10,000 A.I.C. RATING (MINIMUM), NEMA 1 ENCLOSURE, SURFACE MOUNTED
MFG SQUARE D

DESCRIPTION	WIRE	BKR	POLE	CKT	VA	ϕ	VA	CKT	POLE	BKR	WIRE	DESCRIPTION
JOSYLN LIGHTNING	#8	40	3	1	500	A	1000	2	2	25	#12	LINEAGE RECTIFIER #4
				3	500	B	1000	4				
				5	500	C	1000	6	2	25	#12	LINEAGE RECTIFIER #5
POWER FAIL RELAY	#12	20	3	7	10	A	1000	8				
				9	10	B	1000	10	2	25	#12	LINEAGE RECTIFIER #6
				11	10	C	1000	12				
AC #1	#10	30	2	13	1950	A	3850	14	2	50	#6	CU-1
				15	1950	B	3850	16				
SPACE				17		C		18				SPACE
LINEAGE RECTIFIER #7	#10	20*	2	19	1000	A	1000	20	2	20*	#10	LINEAGE RECTIFIER #10
				21	1000	B	1000	22				
LINEAGE RECTIFIER #8	#10	20*	2	23	1000	C		24				SPACE
				25	1000	A		26				SPACE
LINEAGE RECTIFIER #9	#10	20*	2	27	1000	B	9680	28	2	100		PANEL 'CPA'
				29	1000	C	10280	30				

* NEW BREAKERS TO MATCH EXISTING – ALL OTHER BREAKERS ARE EXISXTING
PHASE A = 11,310 VOLTAMPS PHASE B = 20,990 VOLTAMPS PHASE C = 14,790 VOLTAMPS

PANEL 'CP' LOAD CALCULATIONS

LIGHTING	1940	VOLTAMPS X 1.25 =	2425	VOLTAMPS
RECEPTACLES	540	VOLTAMPS X 1.00 =	540	VOLTAMPS
MECHANICAL	23200	VOLTAMPS X 1.00 =	23200	VOLTAMPS
25% LARGEST MOTOR		=	1925	VOLTAMPS
SPECIAL	21410	VOLTAMPS X 1.00 =	21410	VOLTAMPS
			49,500	TOTAL DEMAND VA
			138	TOTAL AMPS

PANEL CPA (EXISTING)

120/208 VOLTS, 1 PHASE, 3 WIRES, SN, 100 AMP BUS, 100 AMP MAIN, CB
10,000 A.I.C. RATING (MINIMUM), NEMA 1 ENCLOSURE, SURFACE MOUNTED
MFG SQUARE D

DESCRIPTION	WIRE	BKR	POLE	CKT	VA	ϕ	VA	CKT	POLE	BKR	WIRE	DESCRIPTION
TELEPHONE	#12	20	1	1	180	A	1000	2	2	25	#12	LINEAGE RECTIFIER #1
RECEPTACLES	#12	20	1	3	540	B	1000	4				
TEMP. CONTROL	#12	20	1	5	200	A	1000	6	2	25	#12	LINEAGE RECTIFIER #2
CU #2	#6	50	2	7	3850	B	1000	8				
				9	3850	A	1000	10	2	25	#12	LINEAGE RECTIFIER #3
LIGHTING	#12	20	1	11	440	B	1000	12				
AC #2	#10	30	2	13	1950	A		14	1	20		SPARE
				15	1950	B		16	1	15		SPARE
FIBERTOWER	#12	20	1	17	500	A		18	1	15		SPARE
FIBERTOWER	#12	20	1	19	500	B		20	1	15		SPARE
SPACE				21		A		22	1	15		SPARE
SPACE				23		B		24				SPACE
SPACE				25		A		26				SPACE
SPACE				27		B		28				SPACE
SPACE				29		A		30				SPACE

PHASE A = 9,680 VOLTAMPS PHASE B = 10,280 VOLTAMPS

PANEL 'CPA' LOAD CALCULATIONS

LIGHTING	440	VOLTAMPS X 1.25 =	550	VOLTAMPS
RECEPTACLES	540	VOLTAMPS X 1.00 =	540	VOLTAMPS
MECHANICAL	11600	VOLTAMPS X 1.00 =	11600	VOLTAMPS
SPECIAL	7380	VOLTAMPS X 1.00 =	7380	VOLTAMPS
			20,070	TOTAL DEMAND VA
			96	TOTAL AMPS

SERVICE ENTRANCE LOAD CALCULATIONS

LIGHTING	1940	VOLTAMPS X 1.25 =	2425	VOLTAMPS
RECEPTACLES	540	VOLTAMPS X 1.00 =	540	VOLTAMPS
MECHANICAL	23200	VOLTAMPS X 1.00 =	23200	VOLTAMPS
25% LARGEST MOTOR		=	1925	VOLTAMPS
SPECIAL	15210	VOLTAMPS X 1.00 =	15210	VOLTAMPS
			43,300	TOTAL DEMAND VA
			52	TOTAL AMPS (@ 480V, 3ph)

City of Aurora Building Division
Reviewed for Code Compliance
Approved as Noted: *J Van Essen*
Date: *Feb 22, 2012*
2009 INTERNATIONAL CODES & 2011 NEC

The rating of all series rated panels shall be marked on the panels. Provide manufacturers information and cut sheets onsite and available during field inspections **per 2011 NEC 240.86 (B)**

Legibly identify each breaker or switch for it's use or purpose on the circuit directory in the panel/switchboard **per 2011 NEC 408.4.**

Provide a grounded electrode system bonded to the service equipment enclosure, grounded conductors, and grounded electrode conductors **per 2011 NEC 250.50 and 250.104**

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License No:
COLORADO REGISTERED 11502 PROFESSIONAL ENGINEER 2-16-12

Sheet Title:

ELECTRICAL PANEL SCHEDULE AND ONE-LINE DIAGRAM

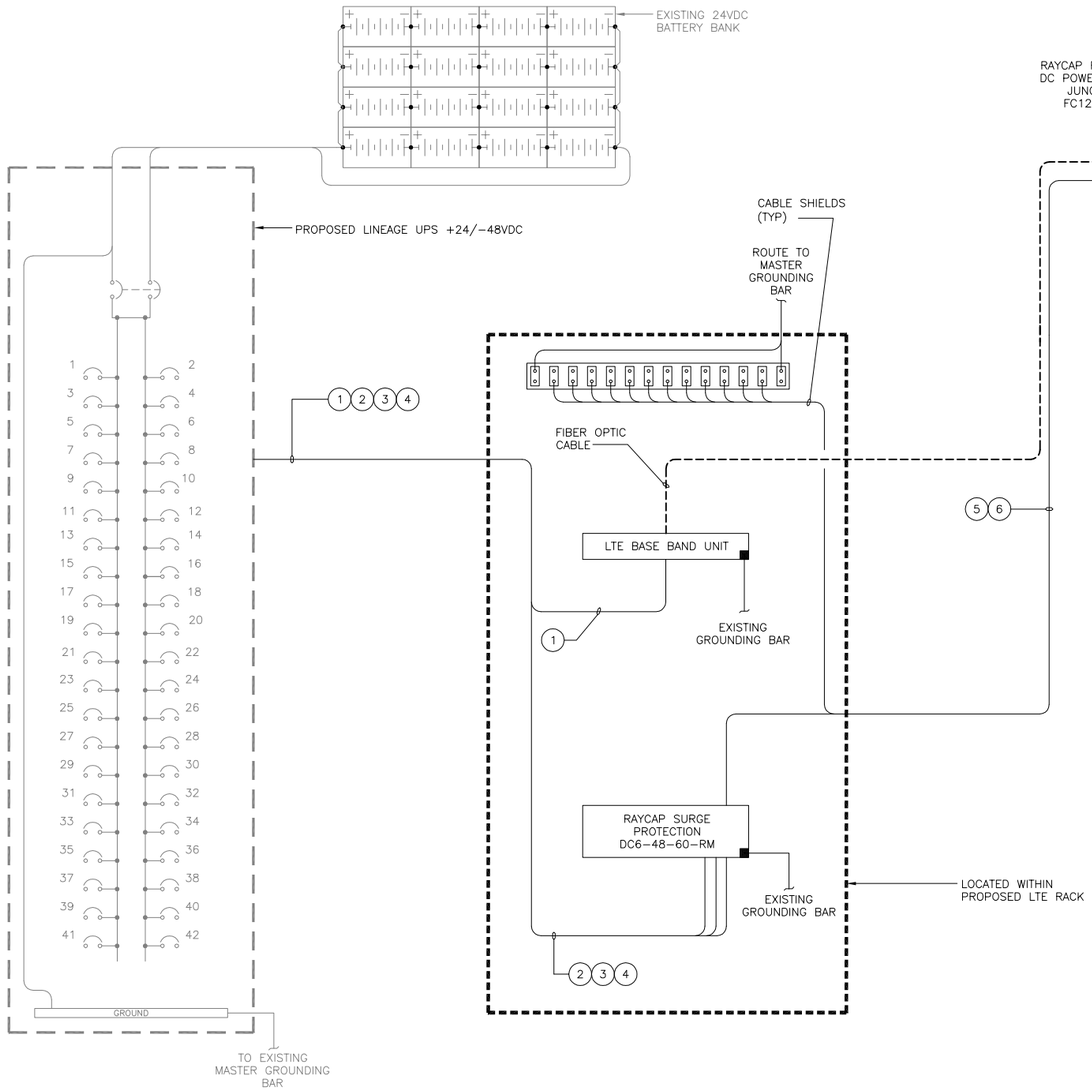
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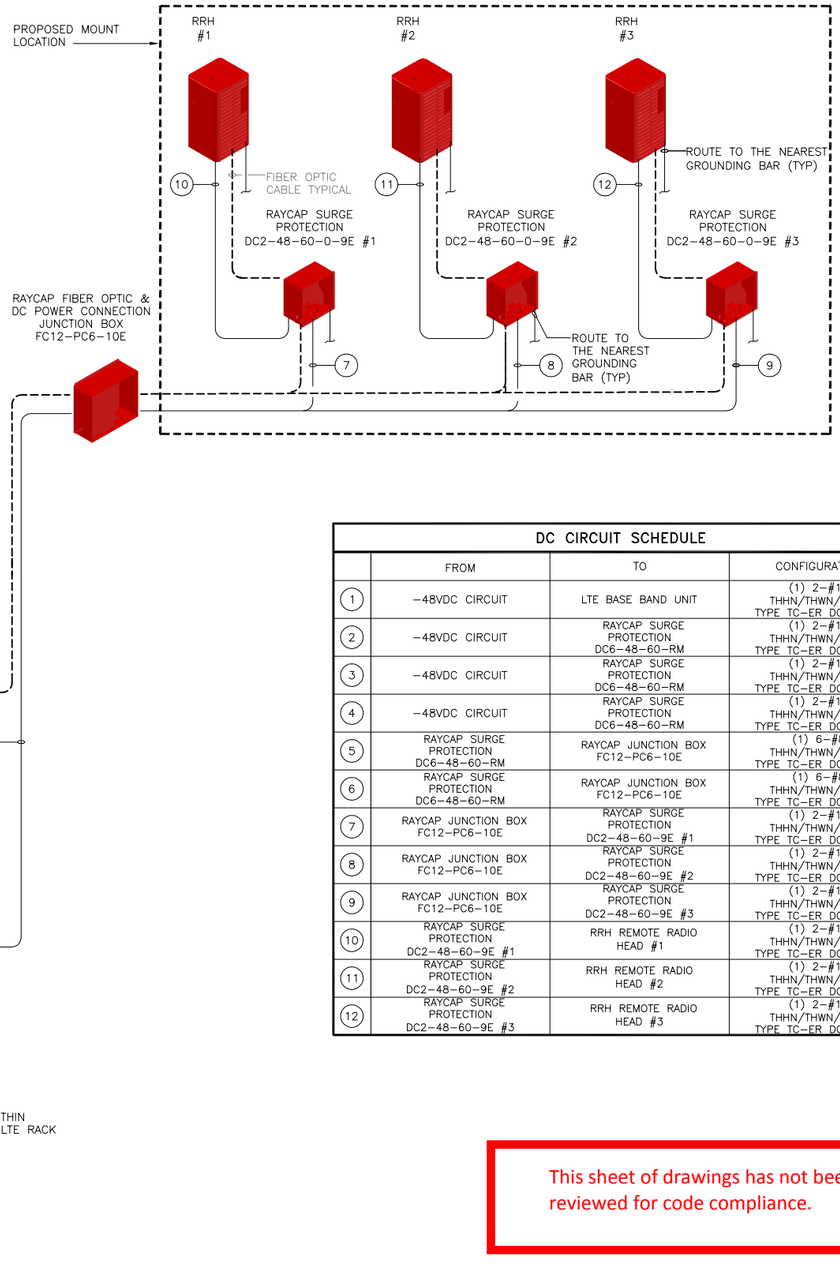
E2

RSN: 643347
Permit #: 12-583367-LT

NOTES:

1. INSTALL ADDITIONAL CIRCUITS TO RECTIFIERS AS REQUIRED, TO PROVIDE ADDITIONAL −48Vdc POWER FOR LTE SYSTEM.





DC CIRCUIT SCHEDULE

	FROM	TO	CONFIGURATION
1	−48VDC CIRCUIT	LTE BASE BAND UNIT	(1) 2−#10 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
2	−48VDC CIRCUIT	RAYCAP SURGE PROTECTION DC6−48−60−RM	(1) 2−#10 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
3	−48VDC CIRCUIT	RAYCAP SURGE PROTECTION DC6−48−60−RM	(1) 2−#10 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
4	−48VDC CIRCUIT	RAYCAP SURGE PROTECTION DC6−48−60−RM	(1) 2−#10 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
5	RAYCAP SURGE PROTECTION DC6−48−60−RM	RAYCAP JUNCTION BOX FC12−PC6−10E	(1) 6−#8 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
6	RAYCAP SURGE PROTECTION DC6−48−60−RM	RAYCAP JUNCTION BOX FC12−PC6−10E	(1) 6−#8 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
7	RAYCAP JUNCTION BOX FC12−PC6−10E	RAYCAP SURGE PROTECTION DC2−48−60−9E #1	(1) 2−#10 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
8	RAYCAP JUNCTION BOX FC12−PC6−10E	RAYCAP SURGE PROTECTION DC2−48−60−9E #2	(1) 2−#10 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
9	RAYCAP JUNCTION BOX FC12−PC6−10E	RAYCAP SURGE PROTECTION DC2−48−60−9E #3	(1) 2−#10 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
10	RAYCAP SURGE PROTECTION DC2−48−60−9E #1	RRH REMOTE RADIO HEAD #1	(1) 2−#12 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
11	RAYCAP SURGE PROTECTION DC2−48−60−9E #2	RRH REMOTE RADIO HEAD #2	(1) 2−#12 THHN/THWN/VW−1 TYPE TC−ER DC CABLE
12	RAYCAP SURGE PROTECTION DC2−48−60−9E #3	RRH REMOTE RADIO HEAD #3	(1) 2−#12 THHN/THWN/VW−1 TYPE TC−ER DC CABLE

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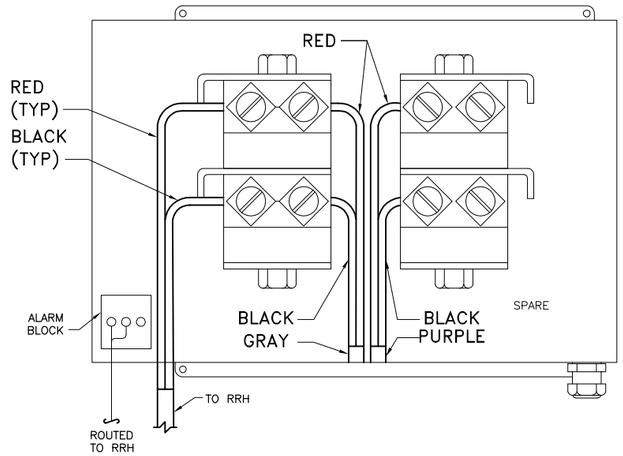
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ARMAND PREST
11502
2−16−12

Sheet Title:

ELECTRICAL DC ONE−LINE DIAGRAM

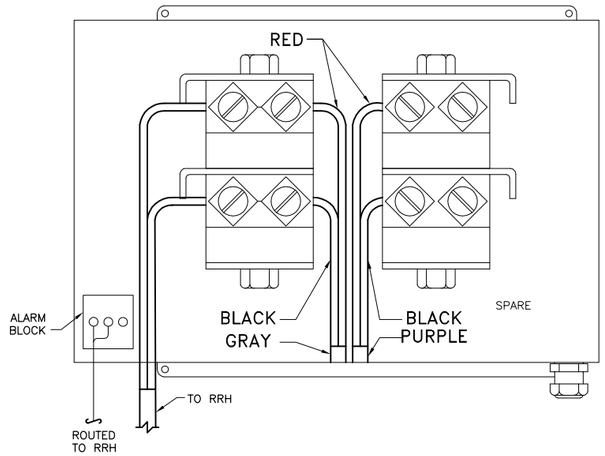
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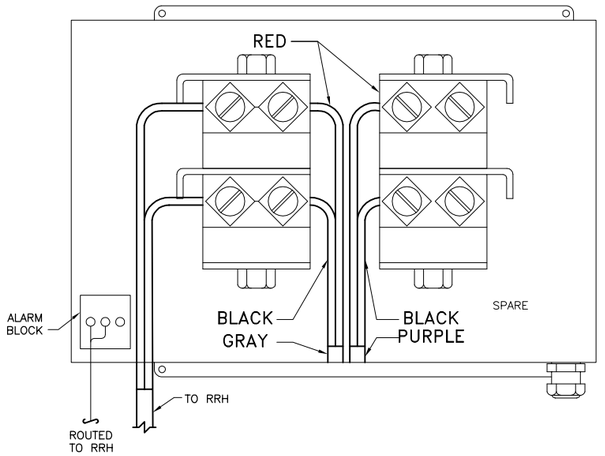
RAYCAP SURGE SUPPRESSION
DC2-48-60-0-9E #1

NO SCALE



RAYCAP SURGE SUPPRESSION
DC2-48-60-0-9E #2

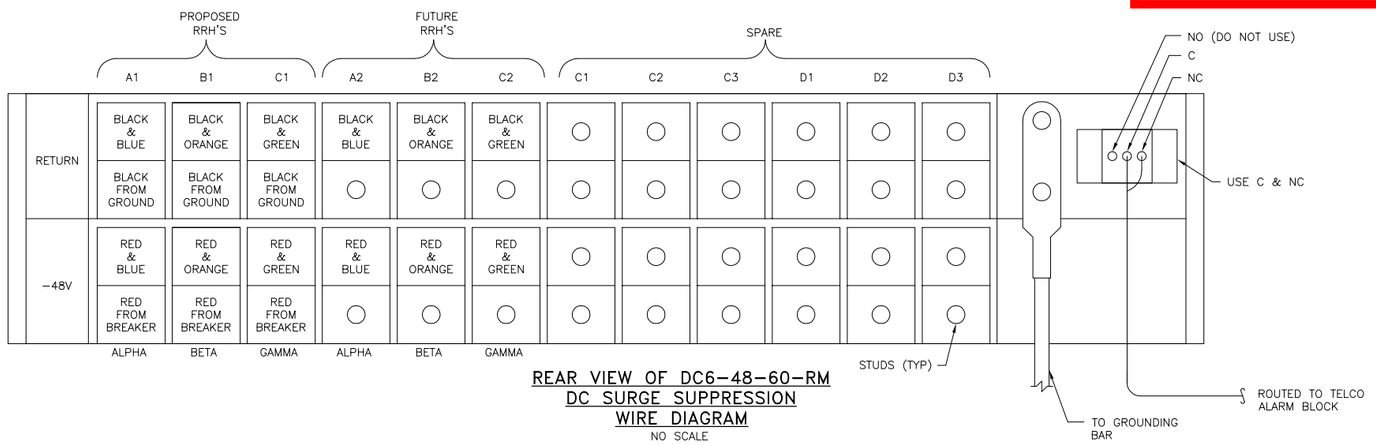
NO SCALE



RAYCAP SURGE SUPPRESSION
DC2-48-60-0-9E #3

NO SCALE

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REAR VIEW OF DC6-48-60-RM
DC SURGE SUPPRESSION
WIRE DIAGRAM

NO SCALE

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AT&T Project Information:

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ARAPAHOE COUNTY

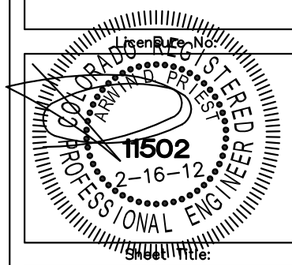
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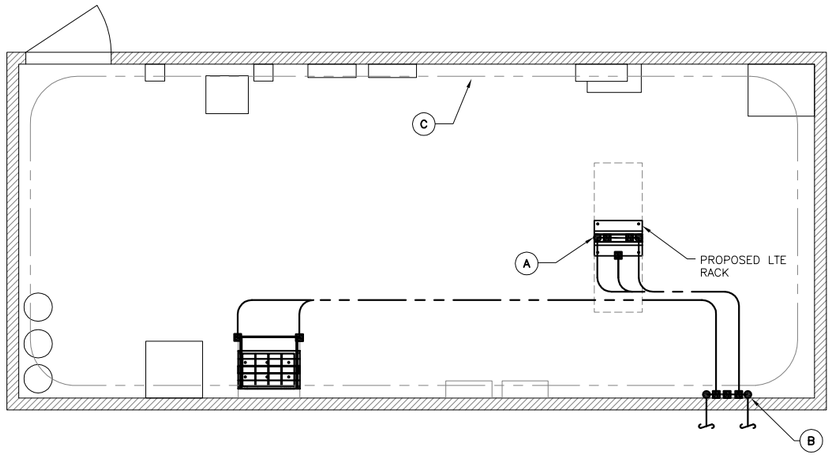
Sheet Title:

ELECTRICAL DC SURGE SUPPRESSOR DIAGRAMS

Sheet Number:

E4

RSN: 643347
Permit #: 12-583367-LT



SHELTER GROUNDING PLAN
SCALE: 3/8"=1'-0"

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NOTES:

1. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY. FOR GROUNDING DETAILS SEE G-2 THROUGH G-5.
2. CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-76416.
3. THE CONTRACTOR SHALL SUPPLY AT&T WITH THE RESULTS FROM PRE-CONSTRUCTION AND POST-CONSTRUCTION OHM TESTING (GROUNDING) RESULTS ON ALL MODIFIED CELL SITES AND AS REQUIRED BY AT&T GROUNDING & BONDING STANDARD TP-76416.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE TWO APPROVED "FALL OF POTENTIAL" TESTS. THE FIRST WILL BE CONDUCTED PRIOR TO MAKING CONNECTIONS AND THE SECOND WILL BE CONDUCTED AFTER THE FINAL CONNECTIONS HAVE BEEN MADE TO PROPOSED EQUIPMENT, THE SUPPLEMENTAL GROUNDING SYSTEM, AND THE EXISTING GROUNDING SYSTEM. THESE TESTS SHALL BE PERFORMED BY A QUALIFIED AND CERTIFIED TESTING AGENT. PROVIDE INDEPENDENT TEST RESULTS TO THE PROJECT MANAGER FOR REVIEW. THE GROUNDING SYSTEM RESISTANCE TO EARTH GROUNDING SHALL NOT EXCEED (5) OHMS. IF THE GROUNDING TEST EXCEEDS THE MAXIMUM OF (5) OHMS, THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ADDITIONAL GROUNDING RODS AND CONNECTIONS AS REQUIRED TO MEET THE (5) OHMS MAXIMUM.
5. THE INSPECTOR HAVING JURISDICTION SHALL INSPECT ALL GROUNDING CONNECTIONS FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BEFORE BEING PERMANENTLY CONCEALED.
6. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
7. CONTRACTOR SHALL GROUND ALL EQUIPMENT INCLUDING ANTENNAS, REMOTE RADIO HEADS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
8. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF ANTENNA SUPPORTING STRUCTURE, ANTENNA LOCATION, AND CONNECTION ORIENTATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BARS AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. TESTING SHALL BE PERFORMED AT ALL SITES WHERE MODIFICATIONS OR ADDITIONS ARE MADE TO THE EXISTING GROUNDING SYSTEM AND SHALL BE IN ACCORDANCE WITH AT&T GROUNDING AND BONDING STANDARDS TP-76416. THE CONTRACTOR SHALL SUPPLY AT&T WITH RESULTS FROM PRE-CONSTRUCTION AND POST-CONSTRUCTION OHM TESTING (GROUNDING) RESULTS AND BE IN COMPLIANCE WITH AT&T GROUNDING AND BONDING STANDARDS TP-76416.
10. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
11. ALL MAIN COAXIAL CABLES WILL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS AT THE FOLLOWING LOCATIONS:

TOWERS

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 THE ENTRY PORT
E. INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT

BUILDINGS

A. EACH ANTENNA SECTOR
B. ROOF LEVEL COAXIAL CABLE ENTRY PORT
C. OUTSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT
D. INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT

GROUNDING NOTES:

1. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
2. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
3. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T. MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
4. GROUNDING BAR: LOCATED CLOSE TO GRADE LOCK BOX TESSCO PART #351546: INSTALL PER MANUFACTURER GUIDELINES.
5. NOT USED
6. ALL GROUNDING CONDUCTORS SHALL BE #6 AWG COPPER TINNED UNLESS NOTED OTHERWISE.
7. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
8. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
9. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
10. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE-PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE 3/8" STAINLESS STEEL.
11. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CHOKE POINT.
12. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

KEY NOTES:

(A) GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU CONDUCTORS TO MASTER GROUNDING BAR AND MAKE A MECHANICAL CONNECTION.

(B) MASTER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU CONDUCTORS FROM EXISTING GROUNDING SYSTEM UP TO MASTER GROUNDING BAR & MAKE AN EXOTHERMIC CONNECTION.

(C) INTERIOR HALO GROUND RING

GROUNDING CONDUCTOR	EXOTHERMIC	CHEMICAL ELECTROLYTIC GROUNDING SYSTEM	TEST GROUND ROD WITH INSPECTION SLEEVE
GROUNDING BAR	COMPRESSION TYPE CONNECTIONS (TWO HOLE LUG OR EQUIVALENT)	GROUND ROD WITH INSPECTION SLEEVE	EXOTHERMIC WITH INSPECTION SLEEVE

GRAPHICS LEGEND

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11502
2-16-12
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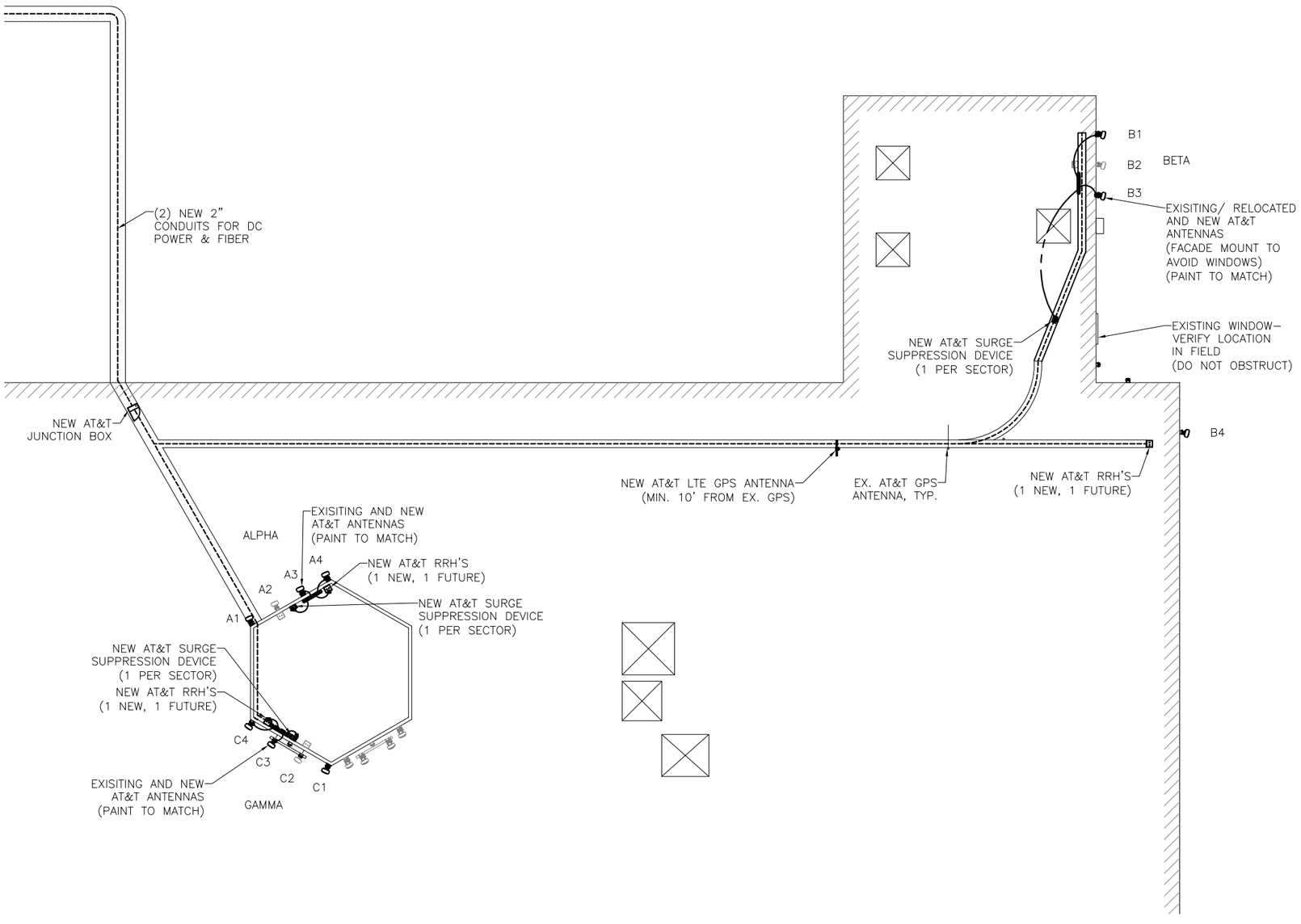
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GROUNDING PLAN

Sheet Number:

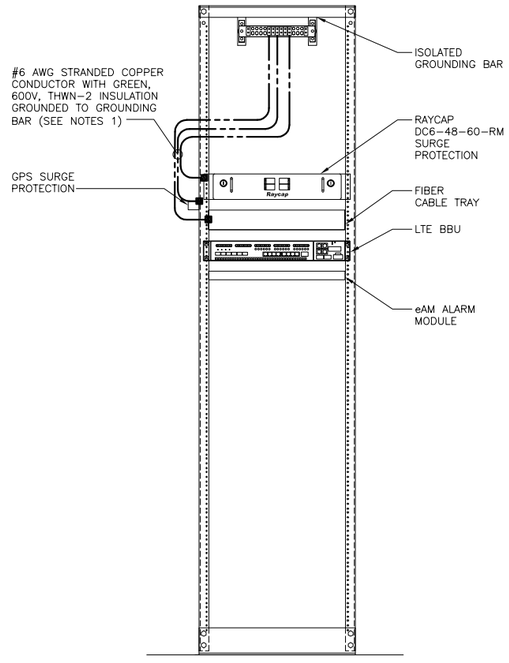
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Permit #: 12-583367-LT



PROPOSED ANTENNA GROUNDING PLAN
NO SCALE

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DETAIL A
LTE RACK GROUNDING
NO SCALE

GRAPHICS LEGEND			
GROUNDING CONDUCTOR	EXOTHERMIC	CHEMICAL ELECTROLYTIC GROUNDING SYSTEM	TEST GROUND ROD WITH INSPECTION SLEEVE
GROUNDING BAR	COMPRESSION TYPE CONNECTIONS (TWO HOLE LUG OR EQUIVALENT)	GROUND ROD WITH INSPECTION SLEEVE	EXOTHERMIC WITH INSPECTION SLEEVE

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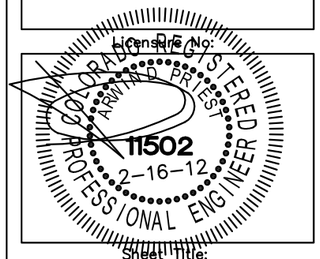
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Sheet Title:

GROUNDING DETAILS

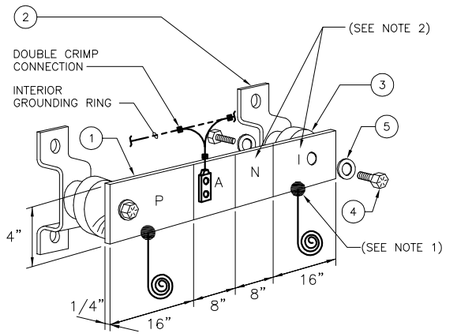
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RSN: 643347
Permit #: 12-583367-LT

NEWTON INSTRUMENT COMPANY, INC.
BUTNER, N.C.

NO	REQUIRED	PART NUMBER	DESCRIPTION
1	1	1/4"x4"x48"	SOLID GROUNDING BAR
2	2	A-6056	WALL MOUNTING BRACKET
3	2	3061-4	INSULATORS
4	4	3012-1	5/8"-11x1" H.H.C.S.
5	4	3015-8	5/8" LOCKWASHER



DETAIL A
(MGB) REFERENCE GROUNDING BAR DETAIL
NO SCALE

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

SECTION "P" – SURGE PROTECTORS

(EC) CELL REFERENCE GROUNDING BAR (IF COLLOCATED)
(EC) GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
(EC) TELCO GROUNDING BAR (#2 AWG)
(EC) COMMERCIAL POWER COMMON NEUTRAL/GROUNDING BOND (3/0)
(EC) FIBER GROUNDING BAR (#2 AWG)
(EC) POWER ROOM REFERENCE GROUNDING BAR (#2 AWG)
(AT&T) RECTIFIER FRAMES

SECTION "A" – SURGE ABSORBERS

(EC) INTERIOR GROUNDING RING (#2 AWG)
(EC) EXTERNAL EARTH GROUNDING FIELD (BURIED GROUNDING RING) (#2 AWG)
(EC) METALLIC COLD WATER PIPE (IF AVAILABLE) (1/0 AWG)
(EC) BUILDING STEEL (IF AVAILABLE) (1/0 AWG)

SECTION "N" – NON-ISOLATED GROUNDING ZONE EQUIPMENT

(EC) MISC NON-ISOLATED GROUNDING ZONE EQUIPMENT (AT&T)-48V POWER SUPPLY RETURN BARE

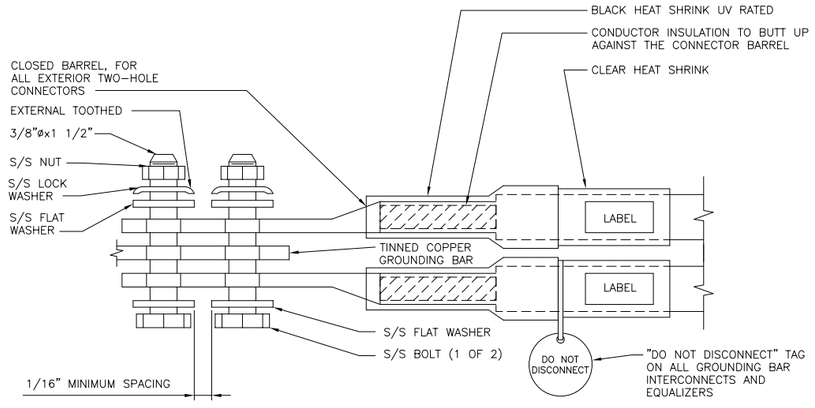
SECTION "I" – ISOLATED GROUNDING ZONE

(AT&T) ALL ISOLATED GROUNDING REFERENCE
(AT&T) GROUNDING WINDOW BAR

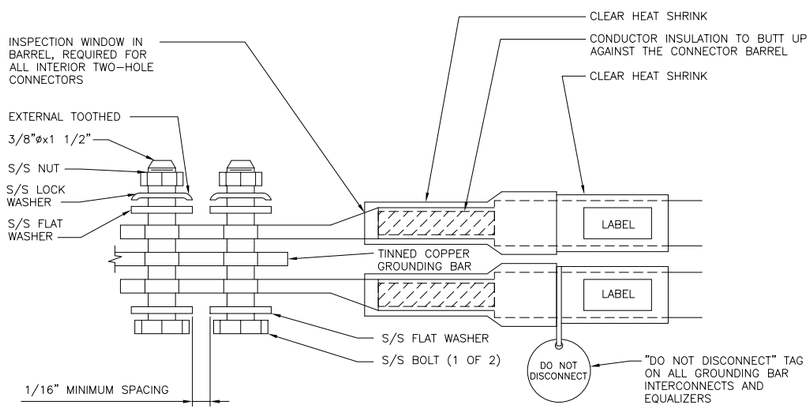
NOTES:

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL GROUNDING BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BUS.
6. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
7. SUPPLIED AND INSTALLED BY CONTRACTOR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).

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DETAIL B
EXTERIOR TWO HOLE LUG DETAIL
NO SCALE



DETAIL C
INTERIOR TWO HOLE LUG DETAIL
NO SCALE

SHEET 19 of 28

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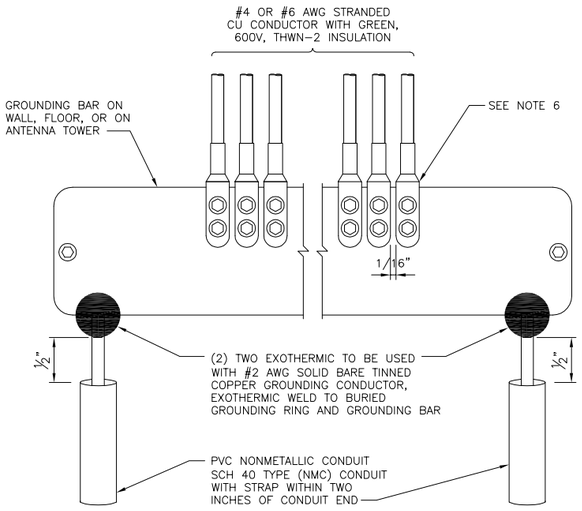
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STATE OF COLORADO

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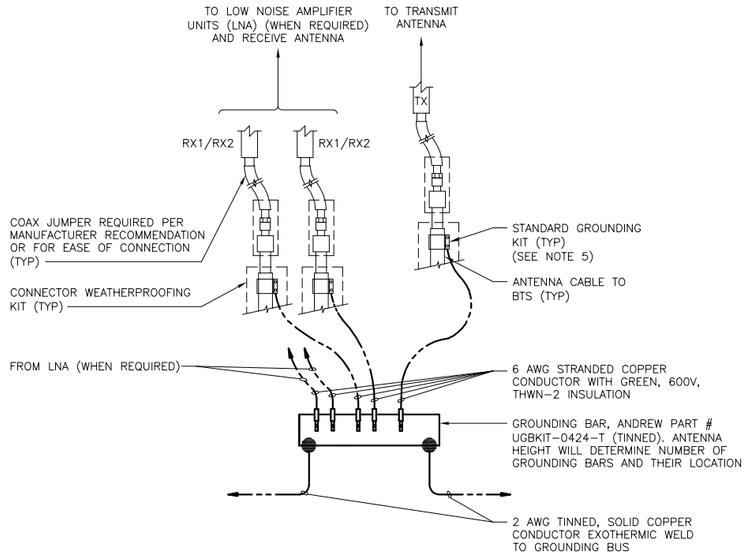
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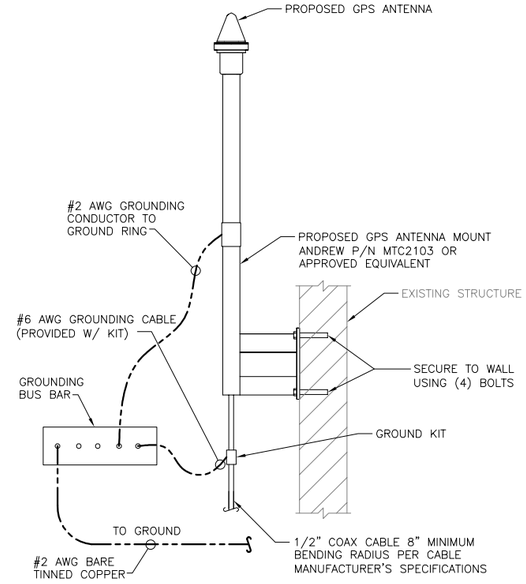
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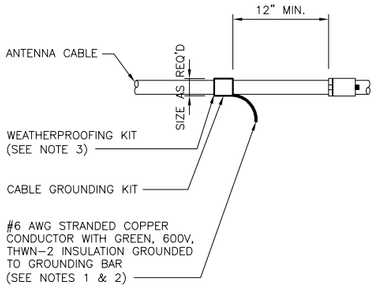
DETAIL A
GROUNDING BAR DETAIL
NO SCALE



DETAIL B
ANTENNA GROUNDING BAR
NO SCALE



DETAIL C
GPS ANTENNA
NO SCALE



DETAIL D
CONNECTION OF CABLE GROUNDING KIT TO ANTENNA CABLE
NO SCALE

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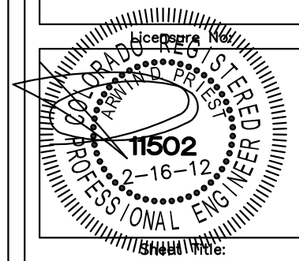
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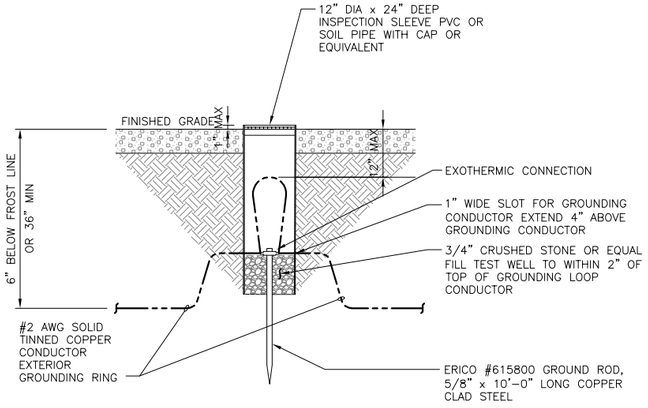
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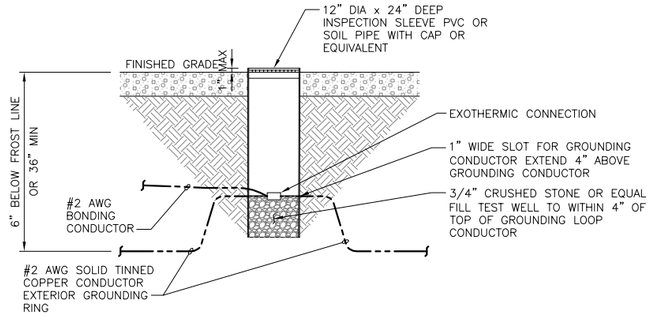
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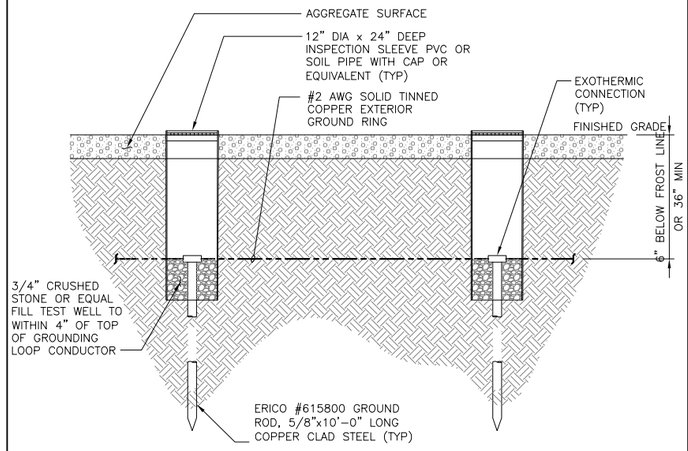
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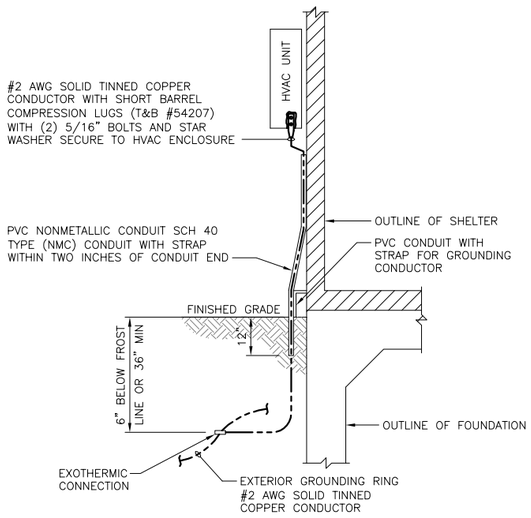
DETAIL A
TEST GROUND ROD WITH INSPECTION SLEEVE
NO SCALE



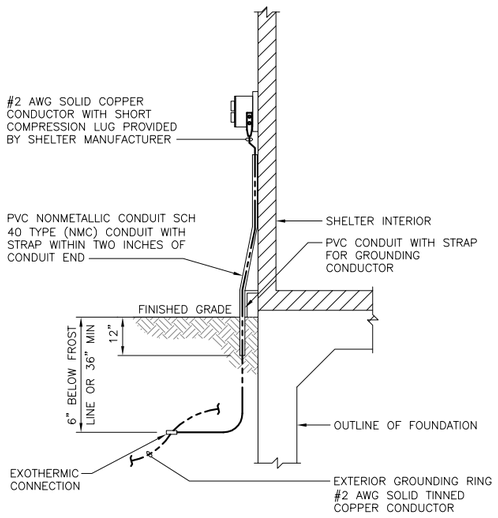
DETAIL B
EXOTHERMIC WITH INSPECTION SLEEVE
NO SCALE



DETAIL C
GROUNDING ROD WITH INSPECTION SLEEVE
NO SCALE

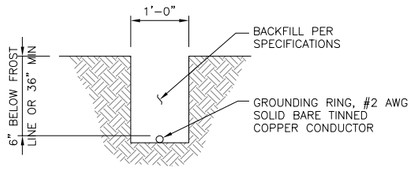


DETAIL D
HVAC GROUNDING
NO SCALE



DETAIL E
EXTERIOR RECEPTACLE GROUNDING
NO SCALE

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DETAIL F
GROUNDING RING TRENCH
NO SCALE

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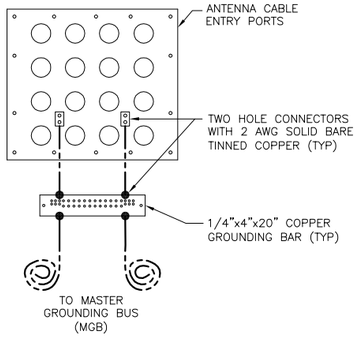
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GROUNDING DETAILS

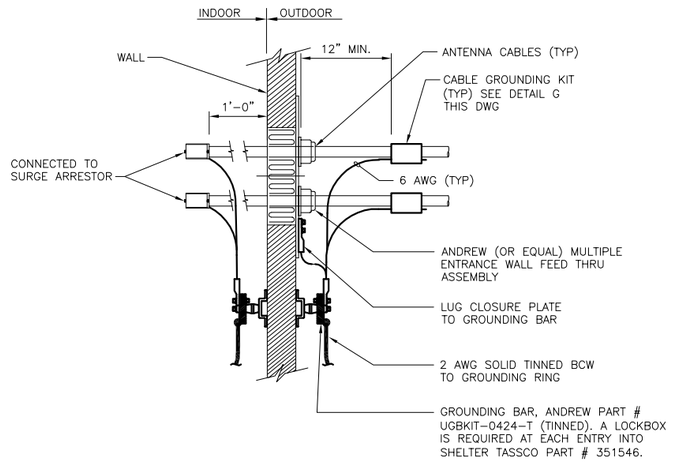
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Permit #: 12-583367-LT



DETAIL A
COAX ENTRY PANEL
GROUNDING AT SHELTER
NO SCALE



DETAIL B
COAX ENTRY PANEL GROUNDING BAR
& FEED THRU WALL ASSEMBLY
NO SCALE

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Sheet Title:

GROUNDING DETAILS

Sheet Number:

G6

RSN: 643347
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GENERAL CONSTRUCTION NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   GENERAL CONTRACTOR – OVERLAND CONTRACTING INC. (B&V)
   CONTRACTOR: (CONSTRUCTION)
   OWNER – AT&T
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOWN DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFIRM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2-A OT 2-A:10-B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
24. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE-APPROVED BY THE LOCAL JURISDICTION.
28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.
40. ALL COAXIAL CABLE INSTALLATIONS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

This sheet of drawings has not been reviewed for code compliance.

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Sheet Title:

GENERAL CONSTRUCTION NOTES

Sheet Number:

GN1

RSN: 643347
Permit #: 12-583367-LT

GENERAL SITE WORK & DRAINAGE NOTES:

PART 1 - GENERAL

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 CONTRACTORS INDEPENDENT TESTING LAB. THIS WORK TO BE COORDINATED BY THE CONTRACTOR.

B. ALL WORK SHALL BE INSPECTED AND RELEASED BY THE GENERAL CONTRACTOR WHO SHALL CARRY OUT THE GENERAL INSPECTION OF THE WORK WITH SPECIFIC CONCERN TO PROPER PERFORMANCE OF THE WORK AS SPECIFIED AND/OR CALLED FOR ON THE DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REQUEST TIMELY 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 EXISTING FACILITIES THAT ARE NOT DESIGNATED FOR REMOVAL FROM BEING DAMAGED BY THE WORK.

C. KEEP SITE FREE OF ALL PONDING WATER.

D. PROVIDE EROSION CONTROL MEASURES IN ACCORDANCE WITH STATE DOT AND EPA REQUIREMENTS.

E. PROVIDE AND MAINTAIN ALL TEMPORARY FENCING, BARRICADES, WARNING SIGNALS AND SIMILAR DEVICES NECESSARY TO PROTECT AGAINST THEFT FROM PROPERTY DURING THE ENTIRE PERIOD OF CONSTRUCTION. REMOVE ALL SUCH DEVICES UPON COMPLETION OF THE WORK.

F. EXISTING UTILITIES: 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. PROVIDE A MINIMUM 48-HOUR NOTICE TO THE ENGINEER AND RECEIVE WRITTEN NOTICE TO PROCEED BEFORE INTERRUPTING ANY UTILITY SERVICE.

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 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.

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 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.

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 3 INCHES IN ANY DIMENSION 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 ARE REQUIRED.

2.5 GRANULAR BEDDING AND TRENCH BACKFILL: WELL-GRADED SAND MEETING THE GRADATION REQUIREMENTS OF ASTM D2487 (SE OR SW-SM).

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 ANY DIMENSION, AND DEBRIS AS DETERMINED BY THE CONSTRUCTION MANAGER. TYPICAL THESE WILL BE SOILS CLASSIFIED BY ASTM AS PT, MH, CH, OH, ML, AND OL.

2.8 GEOTEXTILE FABRIC: MIRAFI 500X OR ENGINEERED APPROVED EQUAL.

2.9 PLASTIC MARKING TAPE: SHALL BE ACID AND ALKALI RESISTANT POLYETHYLENE FILM SPECIFICALLY MANUFACTURED FOR MARKING AND LOCATING UNDERGROUND UTILITIES, 6 INCHES WIDE WITH A MINIMUM THICKNESS OF 0.004 INCH. TAPE SHALL HAVE MINIMUM STRENGTH OF 1500 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 RAIN THE SITE WILL BE DRAINED AT ANY TIME.

B. BEFORE ALL 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 AND OTHER DEBRIS AND VEGETATION RESTING ON OR PROTRUDING THROUGH THE SURFACE OF THE SITE AREA TO BE CLEARED.

1. REMOVE THE FOLLOWING MATERIALS TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE ORIGINAL GROUND SURFACE: ROOTS, STUMPS, AND OTHER DEBRIS, BRUSH, AND REFUSE 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 TO A DEPTH OF 12 INCHES ALL ROOTS AND OTHER DEBRIS THEREBY EXPOSED.

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. REMOVE FROM THE SITE AND DISPOSE IN AN AUTHORIZED LANDFILL ALL DEBRIS RESULTING FROM CLEARING AND GRUBBING OPERATIONS. BURNING 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 DRAWINGS.

F. SEPARATE AND STOCK PILE 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. AS SOON AS PRACTICAL, AFTER COMPLETING CONSTRUCTION OF THE RELATED 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 OR SELECT GRANULAR BACKFILL MATERIAL WHEN REQUIRED IN UNIFORM HORIZONTAL LAYERS OF NO GREATER THAN 8-INCHES LOOSE THICKNESS AND COMPACTED. WHERE HAND OPERATED COMPACTORS ARE USED, THE FILL MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED 4 INCHES IN LOOSE DEPTH AND COMPACTED.

3. WHENEVER 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 D 698.

3.3 TRENCH EXCAVATION:

A. UTILITY TRENCHES SHALL BE EXCAVATED TO THE LINES AND GRADES SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE GENERAL CONTRACTOR. PROVIDE SHORING, SHEETING AND BRACING AS REQUIRED TO PREVENT CAVING OR SLOUGHING OF THE TRENCH WALLS.

B. EXTEND THE TRENCH WIDTH A MINIMUM OF 6 INCHES BEYOND THE OUTSIDE EDGE OF THE OUTERMOST CONDUIT.

C. WHEN SOFT YIELDING, OR OTHERWISE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, BACKFILL AT THE REQUIRED TRENCH TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE REQUIRED ELEVATION AND BACKFILL WITH GRANULAR BEDDING MATERIAL.

3.4 TRENCH BACKFILL:

A. PROVIDE GRANULAR BEDDING MATERIAL IN ACCORDANCE WITH THE DRAWINGS AND THE UTILITY REQUIREMENTS.

B. NOTIFY THE GENERAL CONTRACTOR 24 HOURS IN ADVANCE OF BACKFILLING.

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 UNTIL 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 SATISFACTORY BACKFILL MATERIAL IN 8-INCH MAXIMUM LOOSE THICKNESS LIFTS TO RESTORE THE REQUIRED FINISHED SURFACE GRADE.

G. COMPACT FINAL TRENCH BACKFILL TO A DENSITY EQUAL TO OR GREATER THAN THAT OF THE EXISTING UNDISTURBED MATERIAL IMMEDIATELY ADJACENT TO THE TRENCH BUT NO LESS THAN A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 698.

3.5 AGGREGATE ACCESS ROAD:

A. CLEAR, GRUB, STRIP AND EXCAVATE FOR THE ACCESS ROAD TO THE LINES AND GRADES INDICATED ON THE DRAWINGS. SCARIFY TO A DEPTH OF 6 INCHES AND PROOF-ROLL. ALL HOLES, RUTS, SOFT PLACES AND OTHER DEFECTS SHALL BE CORRECTED.

B. THE ENTIRE SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE MODIFIED PROCTOR TEST, ASTM D 1557.

C. AFTER PREPARATION OF THE SUBGRADE IS COMPLETE THE GEOTEXTILE FABRIC (MIRAFI 500X) SHALL BE INSTALLED TO THE LIMITS INDICATED ON THE DRAWINGS 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, ROLLING OUT AS SMOOTHLY AS POSSIBLE.

1. OVERLAPS PARALLEL TO THE ROADWAY WILL BE PERMITTED AT THE CENTERLINE 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) OVERLAPS AT THE END OF A ROLL SHALL OVERLAP IN THE DIRECTION OF THE AGGREGATE PLACEMENT (PREVIOUS ROLL ON TOP) AND SHALL HAVE A MINIMUM LENGTH OF 3 FEET.

3. ALL OVERLAPS SHALL BE PINNED WITH STAPLES OR NAILS A MINIMUM OF 10 INCHES LONG TO INSURE POSITIONING DURING PLACEMENT OF AGGREGATE. PIN LONGITUDINAL SEAMS AT 25 FOOT CENTERS AND TRANSVERSE SEAMS EVERY 5 FEET.

D. THE AGGREGATE BASE AND SURFACE COURSES SHALL BE CONSTRUCTED IN LAYERS NOT MORE THAN 4 INCH (COMPACTED) 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 FABRIC.

E. THE AGGREGATE SHALL BE IMMEDIATELY COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE MODIFIED PROCTOR TEST, ASTM D 1557 WITH A TAMPING ROLLER, OR WITH A PNEUMATIC-TIRED ROLLER, OR WITH A VIBRATORY MACHINE OR ANY COMBINATION OF THE ABOVE. 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, EVEN SURFACE DRAINAGE OF THE ENTIRE AREA WITHIN THE LIMITS OF CONSTRUCTION. GRADING SHALL BE COMPATIBLE WITH ALL SURROUNDING TOPOGRAPHY AND STRUCTURES.

B. UTILIZE SATISFACTORY FILL MATERIAL RESULTING FROM THE EXCAVATION WORK IN 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 TOP SOIL STABILIZER FABRIC.

D. REPAIR ALL ACCESS ROADS AND SURROUNDING AREAS USED DURING THE COURSE OF THIS WORK TO THEIR ORIGINAL CONDITION.

3.7 ASPHALT PAVING ROAD:

A. DIVISION 600 - KDOT FLEXIBLE PAVEMENT. (update per local DOT)

B. SECTION 403 - MODOT ASPHALT CONCRETE PAVEMENT.

This sheet of drawings has not been reviewed for code compliance.

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GENERAL SITE WORK AND DRAINAGE NOTES

Sheet Number:

GN2

RSN: 643347
Permit #: 12-583367-LT

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. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS). THE APPLICABLE STANDARDS OF THE AMERICAN SOCIETY FOR TESTING AND MATERIALS ARE LISTED IN THE ACI STANDARDS AND ARE A PART OF THIS SPECIFICATION.

PART 2 – PRODUCTS

2.1 REINFORCING MATERIALS:

A REINFORCING BARS: ASTM A615, GRADE 60, PROPOSED DEFORMED BILLET-STEEL BARS, PLAIN FINISH.

B. 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, WASHED NATURAL, OR CRUSHED SAND, FREE FROM ORGANIC IMPURITIES.
2. COARSE AGGREGATE SHALL BE NATURAL WASHED GRAVEL OR WASHED CRUSHED ROCK HAVING 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 INJURIOUS 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 CORP.
3. MASTER BUILDERS
4. EUCLID CHEMICAL CO.

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 4000 P.S.I. 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 (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 BUILT 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, LOCATE AND MEASURE 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 CHECKED AND RELEASED 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 SHOWN OTHERWISE ON THE DRAWINGS. SPLICES SHALL BE STAGGERED. 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 THERE 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. PLACING CONCRETE SHALL BE IN ACCORDANCE WITH ACI 301 AND ACI 304 AND SHALL BE CARRIED OUT AT SUCH A RATE THAT THE CONCRETE PREVIOUSLY PLACED IS STILL PLASTIC AND INTEGRATED WITH THE FRESHLY PLACED CONCRETE. CONCRETING ONCE STARTED, SHALL BE CARRIED ON AS A CONTINUOUS OPERATION UNTIL THE SECTION IS COMPLETED. NO COLD JOINTS SHALL BE ALLOWED.

C. ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED AND COMPACTED BY VIBRATION SPACING, RODDING, OR FORKING DURING THE OPERATION OF PLACING AND DEPOSITING 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 AND STONE POCKETS.

3.5 FINISHING:

A. FINISHING OF THE FLOOR SLABS SHALL BE IN ACCORDANCE WITH ACI 302.1 SECTION 7.2 WITH A MINIMUM OF THREE TROWELINGS. THE SLAB FINISH TOLERANCE AS MEASURED IN ACCORDANCE WITH ASTM E 1155 SHALL HAVE AN OVERALL TEST NUMBER FOR FLATNESS, FF= 20 AND FOR LEVEL. FL=15. THE MINIMUM LOCAL NUMBER FOR FLATNESS, FF= 15 AND FOR LEVEL FL=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 HARDENING 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 F) OR VAPOR MIST BATH.
6. SPRAYED- ON 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 50F 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.

This sheet of drawings has not been reviewed for code compliance.

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Sheet Title:

GENERAL CONCRETE WORK NOTES

Sheet Number:

GN3

RSN: 643347
Permit #: 12-583367-LT

GENERAL STRUCTURAL STEEL NOTES:

PART 1 – GENERAL

1.1 SCOPE:

A. PROVIDE FABRICATION AND ERECTION OF STRUCTURAL STEEL AND OTHER ITEMS 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 STUDS, 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: ACRBON 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 CONFIRM TO ASTM A36.

B. STRUCTURAL TUBING SHALL CONFIRM 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 CONFIRM TO ASTM A307 WITH HEAVY HEXAGONAL NUTS.

2.3 BOLTS:

A. COMMON (MACHINE) BOLTS SHALL CONFIRM 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 BOLT SHALL CONFIRM TO ASTM A325. ONE HIGH STRENGTH BOLT ASSEMBLY SHALL CONSIST OF A HEAVY HEX STRUCTURAL BOLT, A HEAVY HEX NUT , A HARDENED WASHER CONFIRMING WITH ASTM F436 AND A DIRECT TENSION INDICATOR CONFIRMING WITH STM F959. THE HARDENED WASHER SHALL BE INSTALLED AGAINST THE ELEMENT TURNED IN TIGHTENING

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 SPECIFICATION, 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 LOCATION FOR WHICH INTENDED.
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. PROVIDE FINISH SURFACE OF MEMBERS EXPOSED IN THE FINAL STRUCTURE 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 INCH DIAMETER A325 BOLTS UNLESS NOTED OTHERWISE.
2. INSTALL HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RCSC "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 INCH 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 AS INCLUDED 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 DEGREE F. THE RELATIVE HUMIDITY IS MORE THAN 90 PERCENT, OR THE SURFACE TEMPERATURE IS LESS THAN 5 DEGREE F ABOVE THE DEW POINT.

F. GENERALLY ALL PRIMER SHALL BE SPRAY APPLIED. BRUSH OR ROLLER APPLICATION SHALL BE RESTRICTED 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. THE DRY FILM THICKNESS OF THE PRIMER SHALL BE 2.0 MILS.

I. IF THE PRIMER IS DAMAGED BY WELDING OR PHYSICAL ABUSE, THE AREA SHALL BE TOUCHED UP AND REPAIRED. THE TOUCHUP PAINT SHALL BE COMPATIBLE WITH THE APPLIES PRIMER WITH MINIMUM DRY FILM THICKNESS OF 1.5 MILS.

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 SHALL COMPLY WITH AWS D1.1.

C. PROVIDE ANCHOR BOLTS AND OTHER CONNECTORS REQUIRED FOR SECURING STRUCTURAL STEEL TO ELEVATOR SHAFT WALLS AND 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. ANY GAS CUTTING TORCHES HAVE TO BE APPROVED IN WRITING BY THE PROJECT STRUCTURAL ENGINEER.

F. 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.

G. ALIGN AND ADJUST MEMBERS, AND OTHER SURFACES WHICH WILL BE IN THE PERMANENT CONTACT, BEFORE ASSEMBLY.

H. INSTALL AND FULLY TENSION HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RCSC, "SPECIFICATIONS FOR STRUCTURAL JOINT USING ASTM A325 OR ASTM A490 BOLTS."

This sheet of drawings has not been reviewed for code compliance.

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GENERAL STEEL NOTES

Sheet Number:

GN4

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GENERAL ELECTRICAL NOTES

PART 1 – GENERAL

1.1 GENERAL CONDITIONS:

A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO 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, NOT AFTER THE CONTRACT HAS BEEN AWARDED.

B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE 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 THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. 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 BE OPERATIONAL.

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

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

E. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 – PRODUCTS

2.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING EQUAL TO OR GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID 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. INSTALL 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, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #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 AND CABINETS AND 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 AND 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 ID 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. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF 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 HEAT SHRINK FOR MECHANICAL CONNECTIONS. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.
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, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
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. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE 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 PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

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

3.4 INSTALLATION:

A. CONDUIT:

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
3. INSTALL SCH. 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 OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2008 NEC, TABLE 300.5).
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, 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 SUPPORT 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. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
8. 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.
9. 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.
10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
13. 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 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 & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

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

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED 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 WITH GRADUAL BEND AS REQUIRED. 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. 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 TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM. THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND 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 VALUES FOR CONNECTORS AND BOLTS. 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 BEFORE BEING PERMANENTLY CONCEALED.
8. APPLY CORROSION-RESISTANCE FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
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 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE 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 CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
15. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS
16. 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 NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.

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 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
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
4. PERFORM GROUNDING TEST TO MEASURE GROUNDING 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.

This sheet of drawings has not been reviewed for code compliance.

at&t

AT&T Project Information:

HUMANA
COU1176
1501 S. POTOMAC
AURORA, CO 80012
ARAPAHOE COUNTY

BLACK & VEATCH

Rev:	Date:	Description:	By:
1	11/8/11	PRELIM. CONST	SL
2	11/18/11	CONSTRUCTION	SL

Plans Prepared By:

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NOV 18
PROFESSIONAL ENGINEER

GENERAL ELECTRICAL NOTES

Sheet Number:

GN5

Zuma Consultants Inc
13969 W. 1st Ave, Golden, CO 80401
P: (303) 325-5606

November 3, 2011

Mr. Patrick Doyle
Black & Veatch

RE: AT&T COU1176 "Humana"
Structural Review for LTE Antennas

Dear Mr. Doyle,

Zuma Consultants performed a review of the existing antenna mounts at the above referenced site. The new LTE antennas will be placed on the existing screen wall, the antennas will not extended above the wall and will not increase the total wind load on the existing wall framing.

The existing screen wall can safely support the new and existing antennas with the following conditions. All new and existing antennas shall be attached to the wall using new or upgraded antenna mounts per the construction drawings issued by this office.

Zuma Consultants did not review the existing building. We assume a complete review of the building and a design of the screen wall framing was completed at the time of the original installation.

Refer to the full set of construction drawings for this site for complete details.

Please contact me with any questions.

Sincerely,

COLORADO REGISTERED
KHRISTOPHER JAMES SCOTT
34610
PROFESSIONAL ENGINEER

Khristopher Scott, PE

NOV 0 3 2011