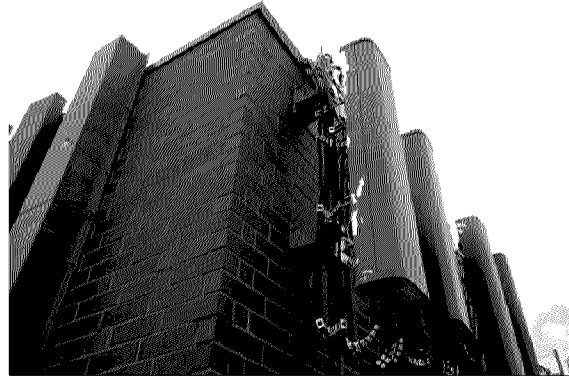


SITE PHOTO



PROJECT INFORMATION

SITE ADDRESS: 2051 KILLEBREW DR
BLOOMINGTON, MN 55454

COUNTY: HENNEPIN

SITE NAME: MALL OF AMERICA

AT&T SITE ID: MNL03123

FA NUMBER: 10081798

PACE NUMBER: MRUMW015861

PTN NUMBER: 3511A07VHK

USID NUMBER: 1764

LATITUDE (NAD 83): 44° 51' 15.61" N
44.8516667

LONGITUDE (NAD 83): 93° 14' 32.72" W
-93.2433333

GROUND ELEVATION: 811' AMSL

ZONING DISTRICT: HENNEPIN

BUILDING OWNER: BLN OFFICE BARK ASSOCIATION II
2001 KILLEBREW DR
BLOOMINGTON, MN 55425

GROUND OWNER: BLN OFFICE BARK ASSOCIATION II

LANDLORD CONTACT: NA

OCCUPANCY GROUP: U

CONSTRUCTION TYPE: V-B

AT&T PROJECT MANAGERS: ANTHONY SANTI
(952)229-9655
AS539A@ATT.COM

B&V PROJECT MANAGER: SARAH ARROYO
(612) 607-3533
ARROYOSL@BV.COM

B&V SITE ACQUISITION MANAGER: KATE HUNTER
(612) 206-7756
HUNTERK@BV.COM

B&V CONSTRUCTION MANAGER: MITCHELL LONNIE
(952) 896-0880
LONNIEEM@OVERLANDCONTRACTING.COM

B&V LEAD ENGINEER: ALEX FREDENDALL
(952) 896-0791
FREDENDALLA@BV.COM

CASE PL201700057

AT&T MOBILITY

PROJECT: BWE LTE
AT&T SITE ID: MNL03123
FA#: 10081798
PACE#: MRUMW015861
PTN#: 3511A07VHK

MALL OF AMERICA
BLOOMINGTON, MN 55454

ENGINEERING

2012 INTERNATIONAL BUILDING CODE
2015 MINNESOTA BUILDING CODE
2014 NATIONAL ELECTRIC CODE
TIA/EIA-222-G OR LATEST EDITION

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383

DRAWN BY: JAT

CHECKED BY: JAT

REFERENCE MATERIALS

THESE LTE DRAWINGS ARE BASED ON AT&T SCOPING DOCUMENT DATED 01/06/17.
CONTRACTOR SHALL USE THE LATEST VERSION OF THE RFDS WITH THE CONSTRUCTION
DRAWINGS PER THE SCOPE OF WORK.

DRAWING INDEX

SHEET NO:	SHEET TITLE
COVER	TITLE SHEET
C-1	COMPOUND PLAN
C-2	SHELTER PLAN
C-3	SITE DETAILS
C-4	SITE WORK AND DRAINAGE NOTES
T-1	TOWER ELEVATIONS
T-2	ANTENNA CONFIGURATION
T-3	ANTENNA AND RRH REQUIREMENTS
T-4	TOWER EQUIPMENT DETAILS
T-5	TOWER SECTION NOTES
E-1	ONE-LINE GROUNDING DIAGRAM
E-2	GROUNDING DETAILS
E-3	ELECTRICAL SECTION NOTES
N-1	LEGEND AND ABBREVIATIONS
N-2	GENERAL NOTES
S-1	STRUCTURAL DETAILS
S-2	STRUCTURAL DETAILS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE:

DATE: 03/03/2017 LICENSE# 43119
EXP. 6/18

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

MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE

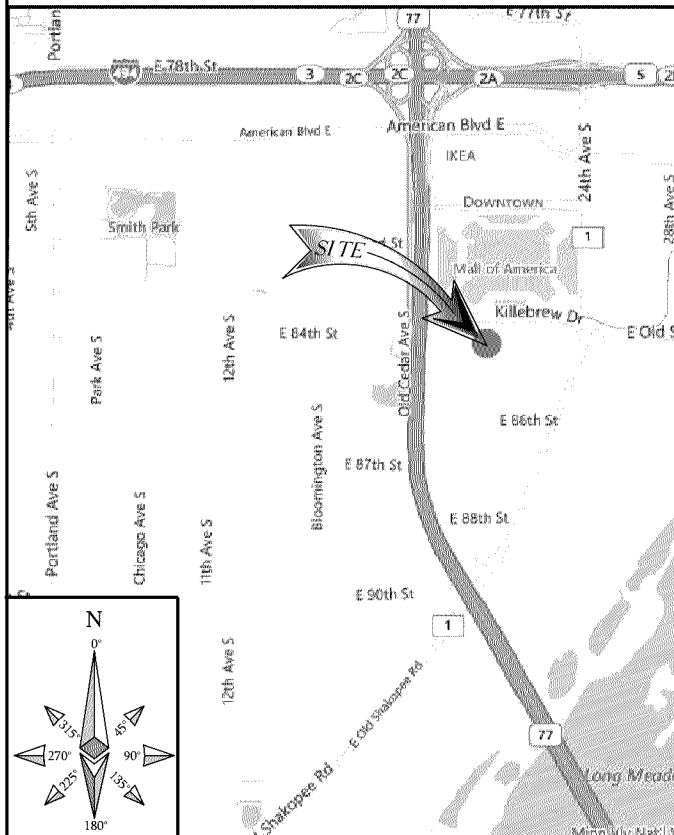
TITLE SHEET

SHEET NUMBER

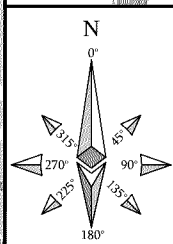
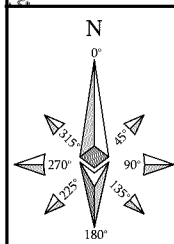
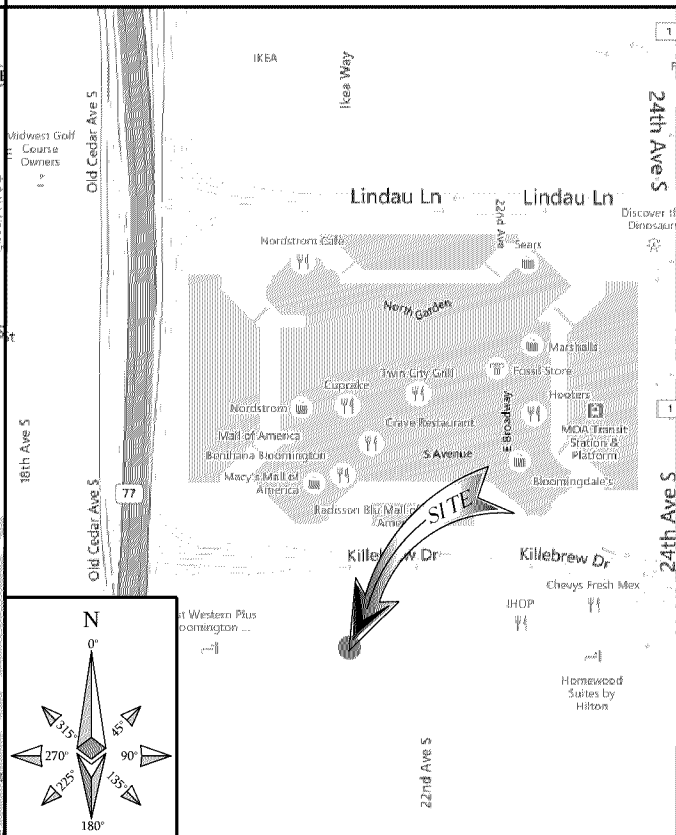
COVER

AREA MAP

VICINITY MAP



LOCAL MAP



DRIVING DIRECTIONS

DIRECTIONS FROM AT&T OFFICE:
HEAD NORTH ON MARQUETTE AVE TURN RIGHT (EAST) ONTO S 8TH ST TURN RIGHT (SOUTH) ONTO SR-65 TAKE RAMP (LEFT) ONTO SR-65 MERGE ONTO I-35W AT EXIT 9B, TAKE RAMP (RIGHT) ONTO I-494 AT EXIT 6A, TAKE RAMP RIGHT AND FOLLOW SIGNS FOR MN-77 SOUTH, TURN RIGHT TO STAY ON KILLEBREW DR, TURN RIGHT TO STAY ON KILLEBREW DR, SITE WILL BE LOCATED ON YOUR LEFT.

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

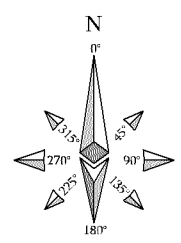
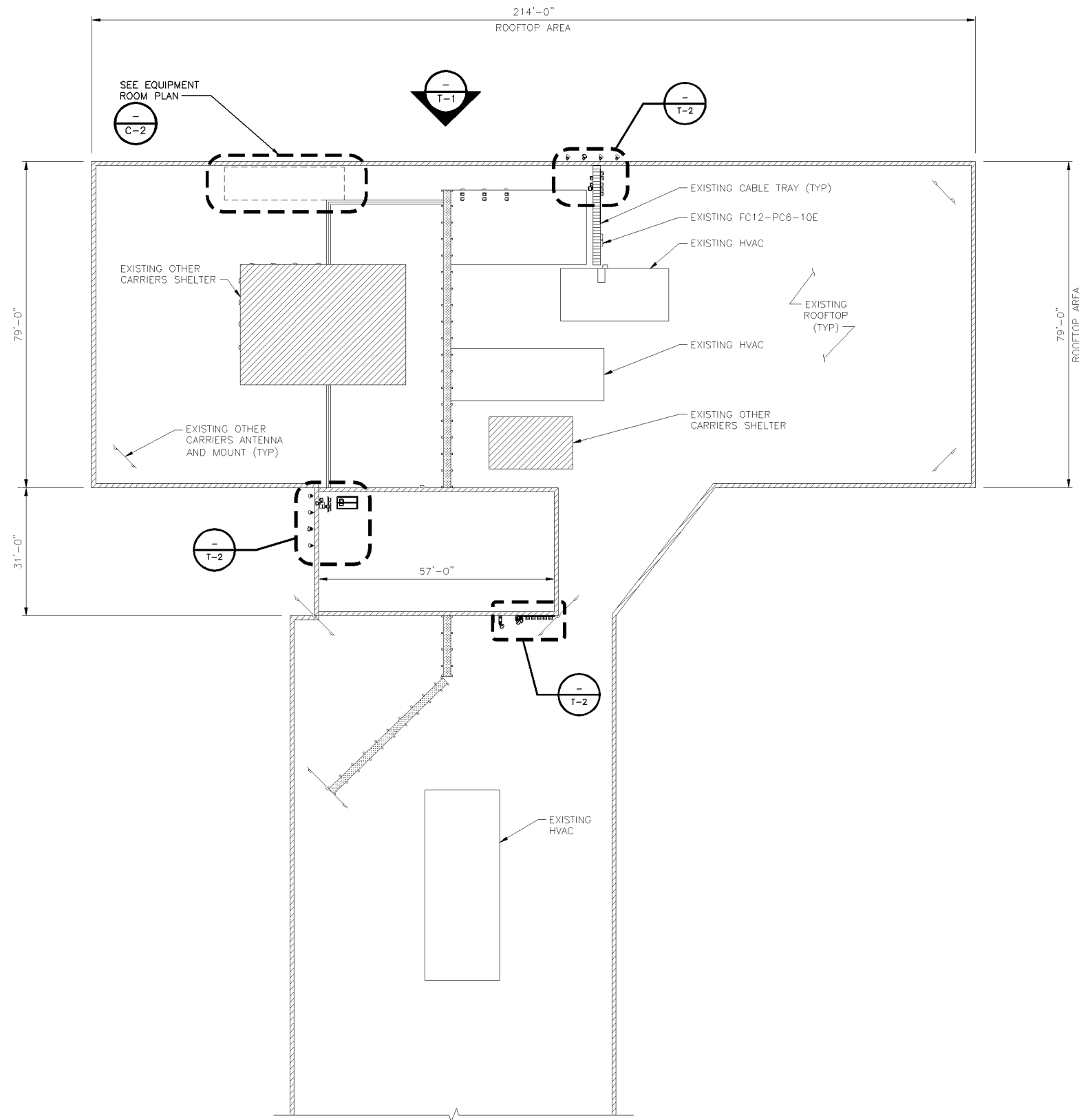


TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN MINNESOTA, CALL GOPHER STATE ONE CALL

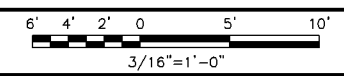
TOLL FREE: 1-800-252-1166 OR
FAX A LOCATE: 1-800-236-4967

MIN STATUTE REQUIRES MIN OF 48 HOURS NOTICE BEFORE YOU EXCAVATE

THESE PLANS CONFORM TO ALL OF THE REQUIREMENTS CALLED OUT IN THE JURISDICTION PLANNING AND ZONING FOR ANTENNAS AND SUPPORT STRUCTURES WHERE SITE IS LOCATED.
SUBCONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING CONDITIONS ON SITE. IMMEDIATELY NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO PERFORMING ANY WORK OR BE RESPONSIBLE FOR THE SAME.



COMPOUND PLAN



THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE.

THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:

PROPOSED-ROOFTOP:

- REMOVE (3) EXISTING DUAL BAND TMAS
- REMOVE ASSOCIATED COAX AS NECESSARY FOR PROPOSED CABLES
- REMOVE (2) EXISTING AT&T ANTENNAS
- INSTALL (4) KMW EPBQ-654LBH8-B ANTENNAS
- INSTALL (1) SET OF VALMONT WMU-12S ANTENNA MOUNTS
- INSTALL (1) SET OF VALMONT WMU-24S ANTENNA MOUNTS
- INSTALL (1) DC2-48-60-0-9E SURGE UNIT
- INSTALL (1) DC6-48-60-18-8F SURGE UNIT
- INSTALL (1) ALU 700 RRH UNIT (LTE 1C)
- INSTALL (1) ALU PCS B25 RRH UNIT (LTE 3C)
- INSTALL (1) ALU WCS RRH UNIT (LTE 4C)
- INSTALL (1) ALU 850 RRH UNIT (LTE 5C)
- INSTALL (3) ALU AWS B66 RRH UNITS (LTE BWE)
- INSTALL (2) DC TRUNKS
- INSTALL (1) FIBER TRUNK
- INSTALL (2) FIBER JUMPERS
- INSTALL (2) DC POWER JUMPERS
- INSTALL STRUCTURAL MODIFICATIONS, SEE S-SHEET AT END OF SET

PROPOSED-SHELTER:

- INSTALL (7) BREAKERS IN EXISTING DC POWER PLANT

AT&T TO VERIFY REQUIRED SHELTER EQUIPMENT.

PROJECT DESCRIPTION

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED LTE GPS ANTENNA AND TRANSMITTING ANTENNAS.
3. PROPERTY LINES ARE APPROXIMATIONS ONLY.
4. ANTENNAS & MOUNTS OMITTED FOR CLARITY.
5. FOR FIBER TRUNK REF AT&T LTE GUIDE LINES REV. 1.9 PAGE 13 TABLE 2.1.2.
6. FOR DC POWER CABLE TRUNK REF AT&T LTE GUIDE LINES REV 1.9 PAGE 14 TABLE 2.1.3

NOTES

WOOD FENCE	
CHAINLINK FENCE	
LEASE AREA	
PROPOSED ICE BRIDGE	
EXISTING ICE BRIDGE	

LEGEND

AT&T MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	129041.9383
DRAWN BY:	JAT
CHECKED BY:	JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS
SIGNATURE:
DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

MALL OF AMERICA
MNLO3123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
C-1

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS ANTENNAS AND TRANSMITTING ANTENNAS.

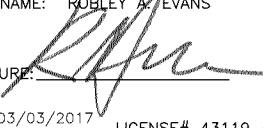
**AT&T
MOBILITY**
901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

BLACK & VEATCH
BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383
DRAWN BY: JAT
CHECKED BY: JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

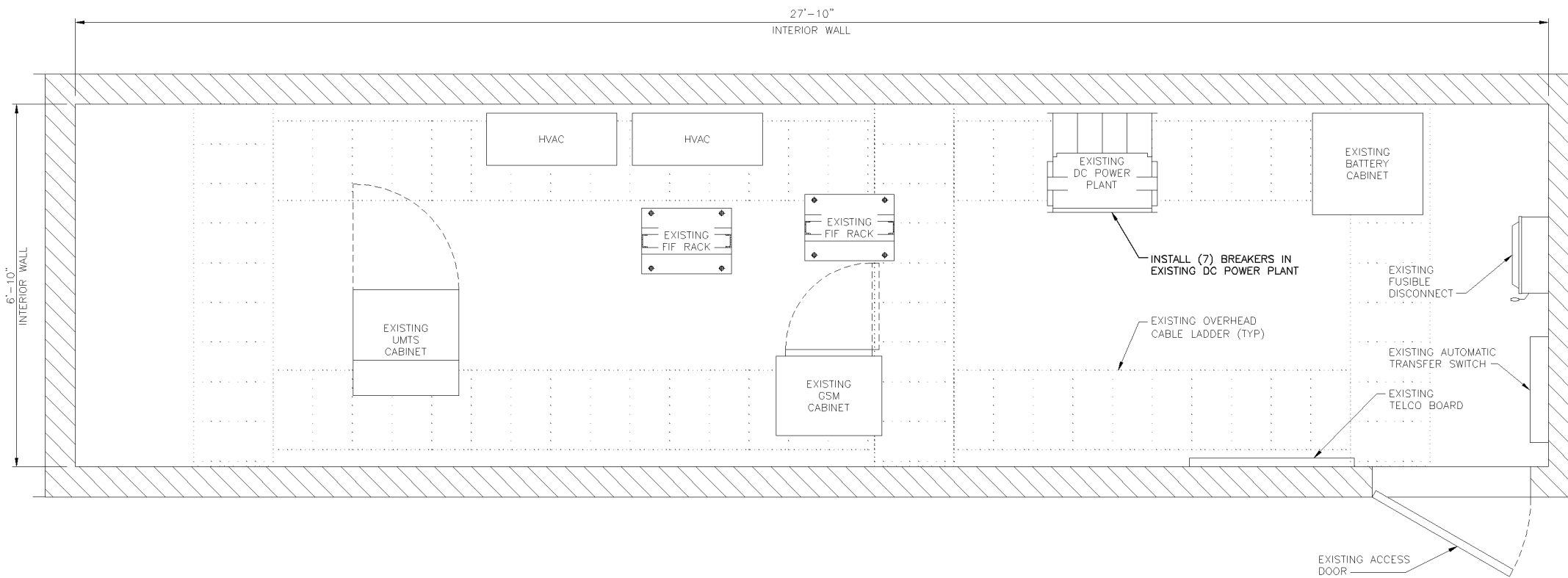
PRINT NAME: ROBLEY A. EVANS
SIGNATURE: 
DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

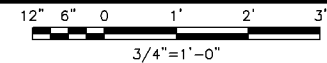
MALL OF AMERICA
MN03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
EQUIPMENT ROOM PLAN

SHEET NUMBER
C-2

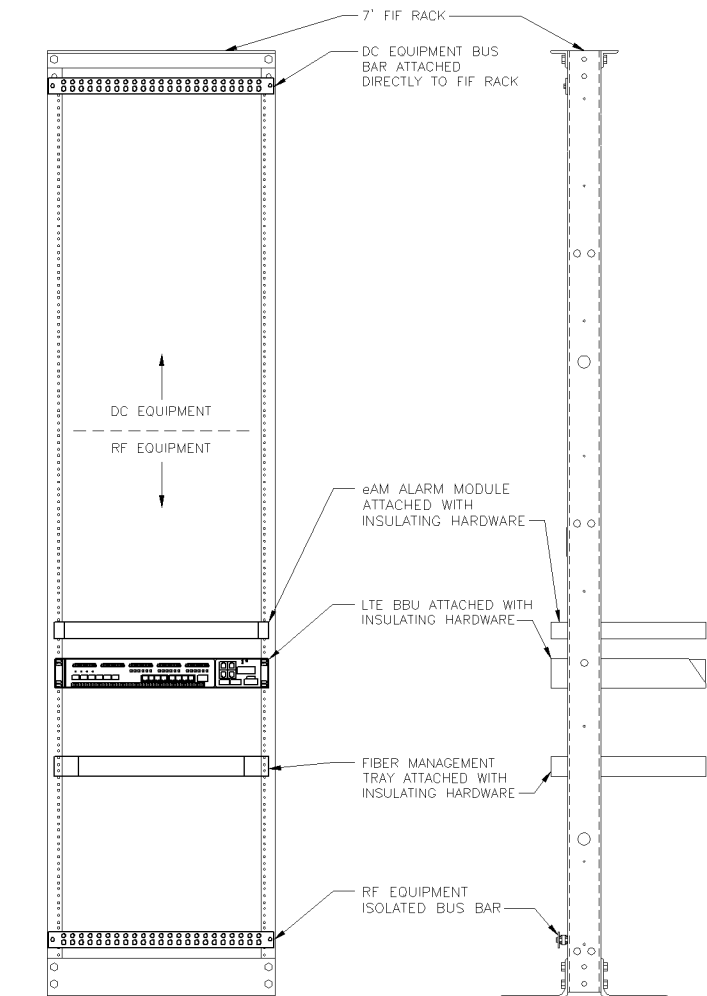


AT&T TO VERIFY
REQUIRED SHELTER
EQUIPMENT.



NOTE

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



*MAXIMUM WEIGHT CAPACITY: 1200 lbs

EXISTING FIF RACK DETAIL

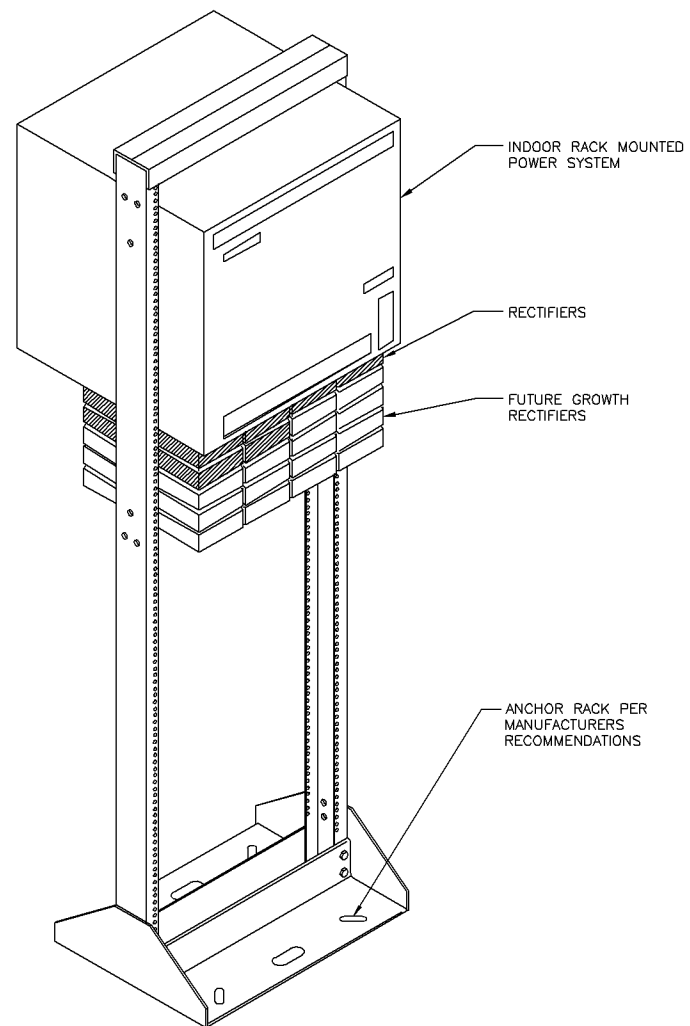
NO SCALE

1

CASE PL201700057

NOTE

CONTRACTOR TO ADD ALARM WIRING FROM POWER BAY TO ALARM BLOCK ON TELCO BOARD AS NEEDED.



*MAXIMUM WEIGHT CAPACITY: 1200 lbs

INDOOR POWER BAY

NO SCALE

2

NOT USED

NO SCALE

3

NOT USED

NO SCALE

4

NOT USED

NO SCALE

5

NOT USED

NO SCALE

6

NOT USED

NO SCALE

7

**AT&T
MOBILITY**

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383
DRAWN BY: JAT
CHECKED BY: JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS
SIGNATURE:
DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
SITE DETAILS

SHEET NUMBER
C-3

CASE PL201700057

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 IV) 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. TYPICALLY THESE WILL BE SOILS CLASSIFIED BY ASTM AS: PT, MH, CH, OH, ML, AND OL.
- 2.8 GEOTEXTILE FABRIC: MIRAFI 500X OR ENGINEER 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.
- A. REMOVE FROM THE SITE AND DISPOSE IN AN AUTHORIZED LANDFILL ALL DEBRIS RESULTING FROM CLEARING AND GRUBBING OPERATIONS. BURNING WILL NOT BE PERMITTED.

- B. 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.
- C. 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:

- KANSAS:
 - A. DIVISION 600 - KDOT FLEXIBLE PAVEMENT.
- MISSOURI:
 - A. SECTION 403 - MODOOT ASPHALT CONCRETE PAVEMENT.
- COLORADO:
 - A. DIVISION 400 - CDOT PAVEMENT
- MINNESOTA:
 - A. SECTION 2321 - MN/DOT ROAD-MIXED BITUMINOUS SURFACE.
 - B. SECTION 2360 - MN/DOT PLANT MIXED ASPHALT PAVEMENT.
- IOWA:
 - A. IOWA DOT CHAPTER 8 - HOT MIX ASPHALT (HMA) PAVEMENT, BASES, AND SUBBASES.
- NEBRASKA:
 - A. DIVISION 500 - BITUMINOUS PAVEMENT.
- WISCONSIN:
 - A. SECTION 460 - WISDOT HOT MIX ASPHALT PAVEMENT.
- ILLINOIS:
 - A. ILLINOIS DOT SECTION 403 - BITUMINOUS SURFACE TREATMENT.
 - B. ILLINOIS DOT SECTION 406 - BITUMINOUS CONCRETE BINDER AND SURFACE COURSE CLASS I.

**AT&T
MOBILITY**

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402


BLACK & VEATCH

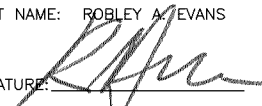
BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	129041.9383
DRAWN BY:	JAT
CHECKED BY:	JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: 

DATE: 03/03/2017 LICENSE# 43119
EXP. 6/18

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

MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE

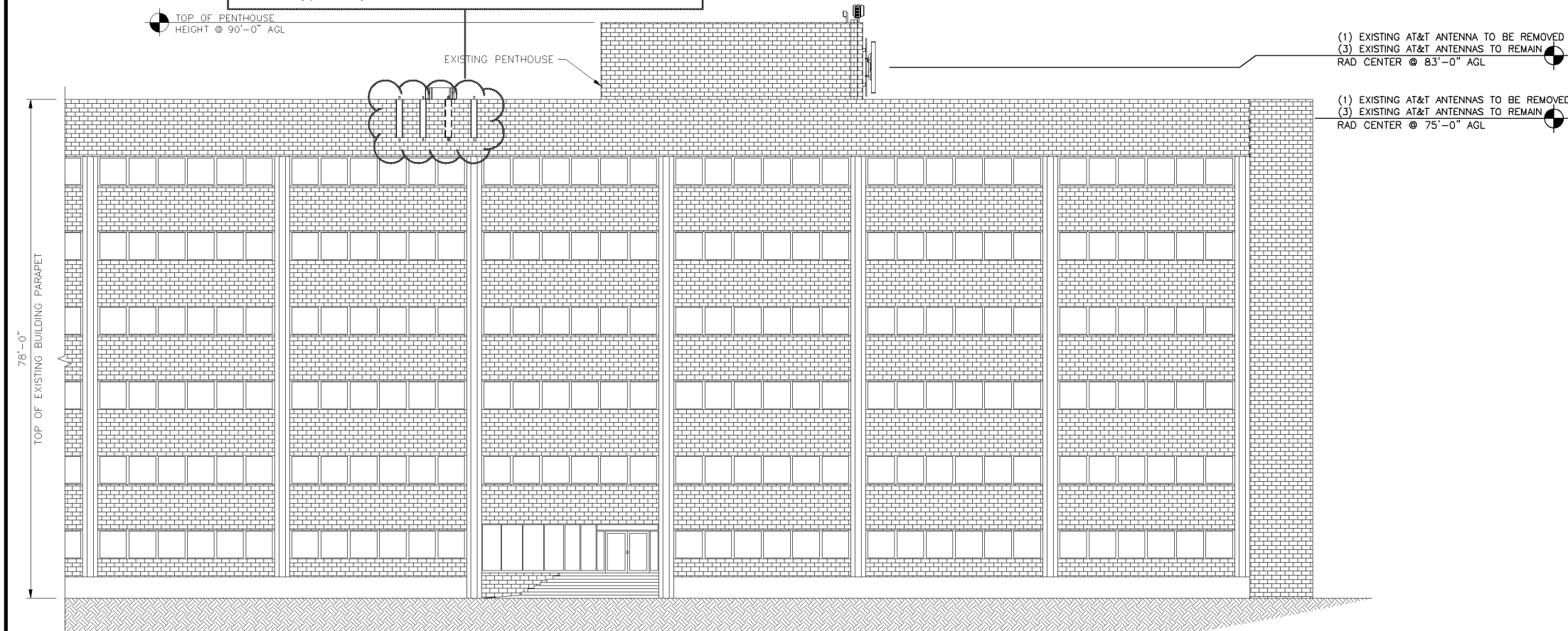
SITE WORK AND
DRAINAGE NOTES

SHEET NUMBER

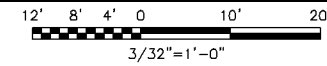
C-4

Existing and new antennas must not extend above the wall on which they are mounted. Existing antennas do not presently comply with the approved plans in Case 7986A-11 and must be corrected.

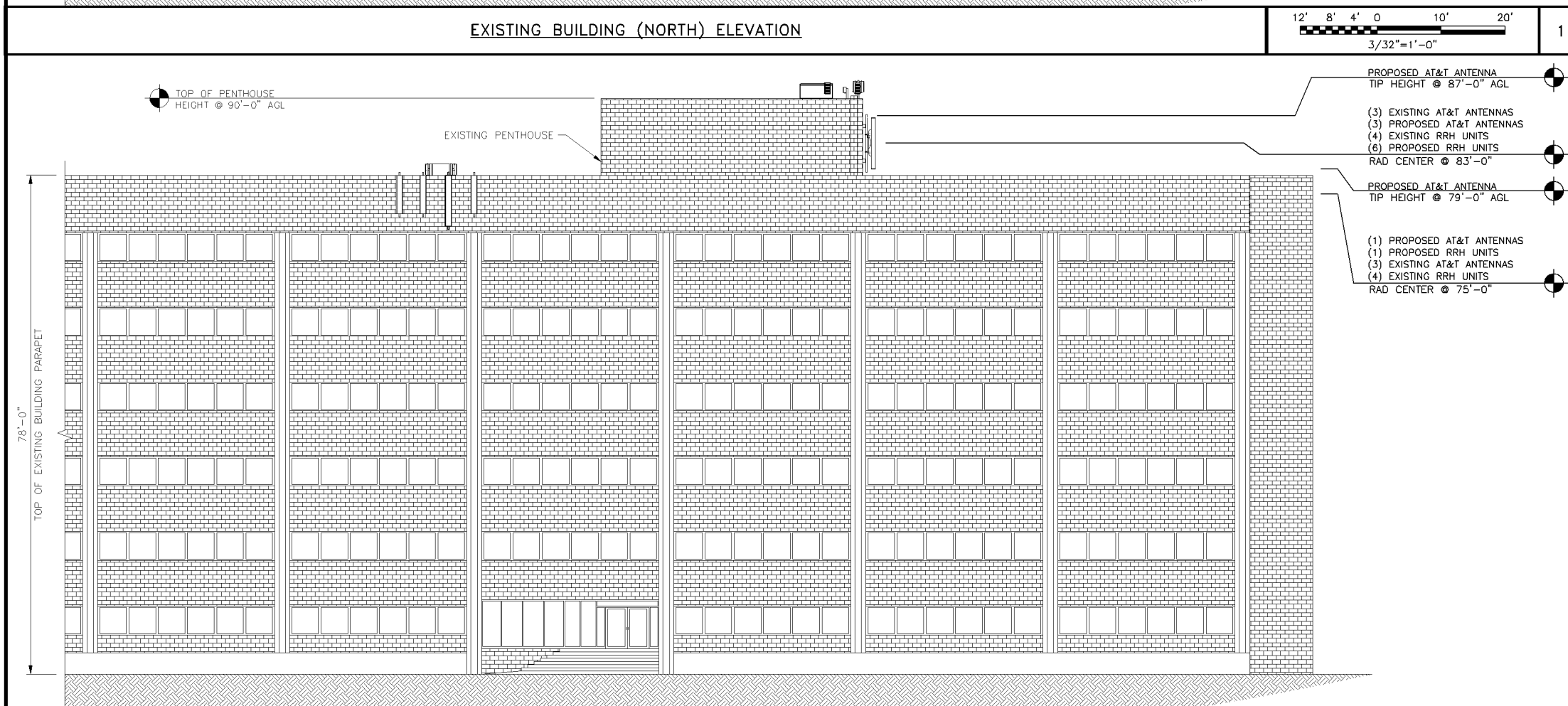
CASE PL201700057



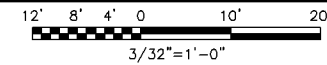
EXISTING BUILDING (NORTH) ELEVATION



1



PROPOSED BUILDING (NORTH) ELEVATION



2

THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE.

THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:

PROPOSED-ROOFTOP:

- REMOVE (3) EXISTING DUAL BAND TMAS
- REMOVE ASSOCIATED COAX AS NECESSARY FOR PROPOSED CABLES
- REMOVE (2) EXISTING AT&T ANTENNAS
- INSTALL (4) KMW EPBQ-654LBH8-B ANTENNAS
- INSTALL (1) SET OF VALMONT WMU-12S ANTENNA MOUNTS
- INSTALL (1) SET OF VALMONT WMU-24S ANTENNA MOUNTS
- INSTALL (1) DC2-48-60-0-9E SURGE UNIT
- INSTALL (1) DC6-48-60-18-8F SURGE UNIT
- INSTALL (1) ALU 700 RRH UNIT (LTE 1C)
- INSTALL (1) ALU PCS B25 RRH UNIT (LTE 3C)
- INSTALL (1) ALU WCS RRH UNIT (LTE 4C)
- INSTALL (1) ALU 850 RRH UNIT (LTE 5C)
- INSTALL (3) ALU AWS B66 RRH UNITS (LTE BWE)
- INSTALL (2) DC TRUNKS
- INSTALL (1) FIBER TRUNK
- INSTALL (2) FIBER JUMPERS
- INSTALL (2) DC POWER JUMPERS
- INSTALL STRUCTURAL MODIFICATIONS, SEE S-SHEET AT END OF SET

PROPOSED-SHELTER:

- INSTALL (7) BREAKERS IN EXISTING DC POWER PLANT

AT&T TO VERIFY REQUIRED SHELTER EQUIPMENT.

AT&T MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	129041.9383
DRAWN BY:	JAT
CHECKED BY:	JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

PROJECT DESCRIPTION

1. FENCE NOT ENTIRELY SHOWN FOR CLARITY.
2. WHEN STACKING CABLES 3 OR MORE DEEP, USE STACKABLE SNAP-INS, TALLEY PART NUMBER SSH-158-3 (OR ENGINEER APPROVED EQUAL)

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE:

DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

NOTES

THE EXISTING TOWER IS CURRENTLY BEING ANALYZED BY OTHERS TO DETERMINE ITS STRUCTURAL CAPACITY TO CARRY THE PROPOSED LOADS. THESE DRAWINGS HAVE BEEN CREATED BASED ON THE ASSUMPTION THAT THE STRUCTURAL ANALYSIS WILL SHOW THAT THE TOWER HAS SUFFICIENT CAPACITY TO SUPPORT THE PROPOSED NEW LOADS. INSTALLATION OF THE PROPOSED EQUIPMENT SHALL NOT COMMENCE UNTIL AN APPROVED STRUCTURAL ANALYSIS HAS BEEN RECEIVED BY THE OWNER OR AT&T AND HAS BEEN REVIEWED BY BLACK & VEATCH. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.

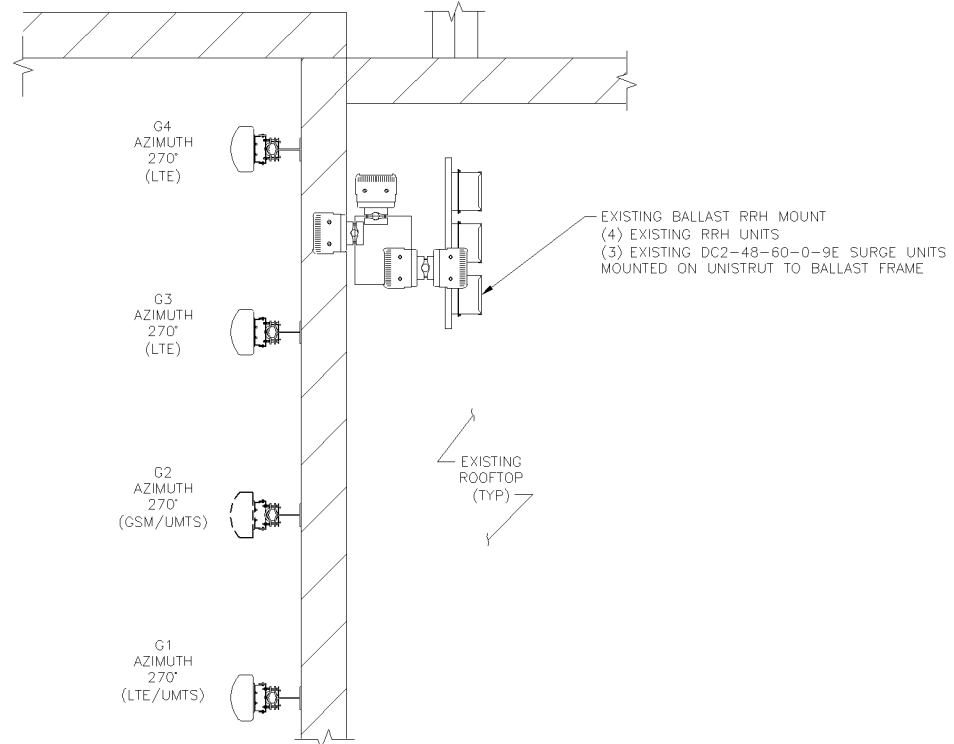
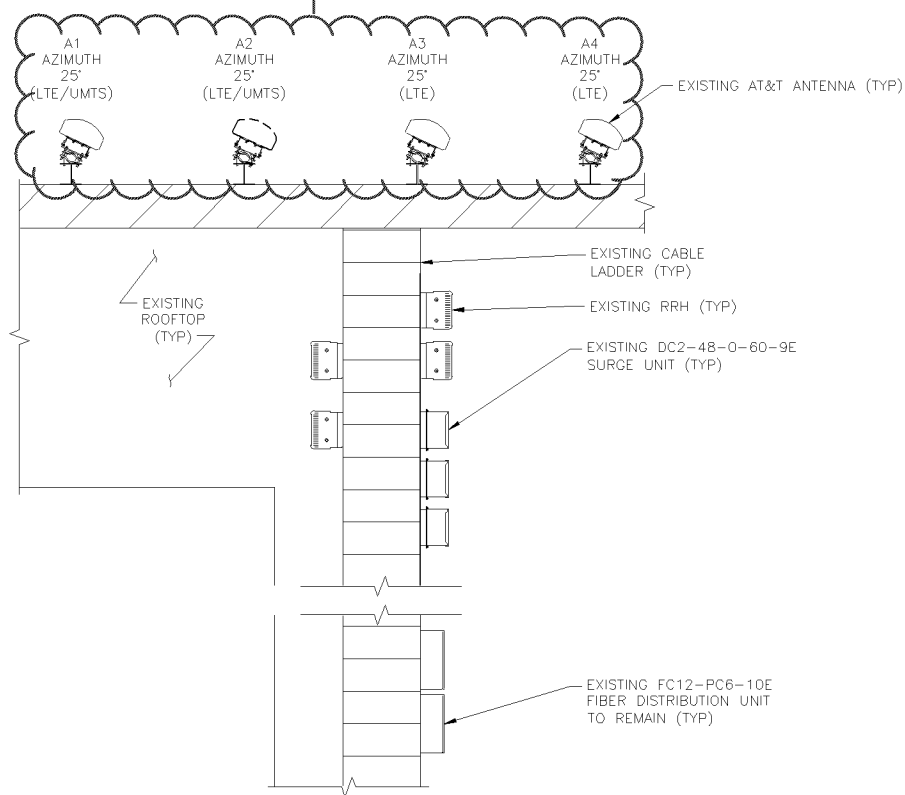
MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
TOWER ELEVATIONS

SHEET NUMBER
T-1

STRUCTURAL NOTE

Existing and new antennas must not extend above the wall on which they are mounted. Existing antennas do not presently comply with the approved plans in Case 7986A-11 and must be corrected.



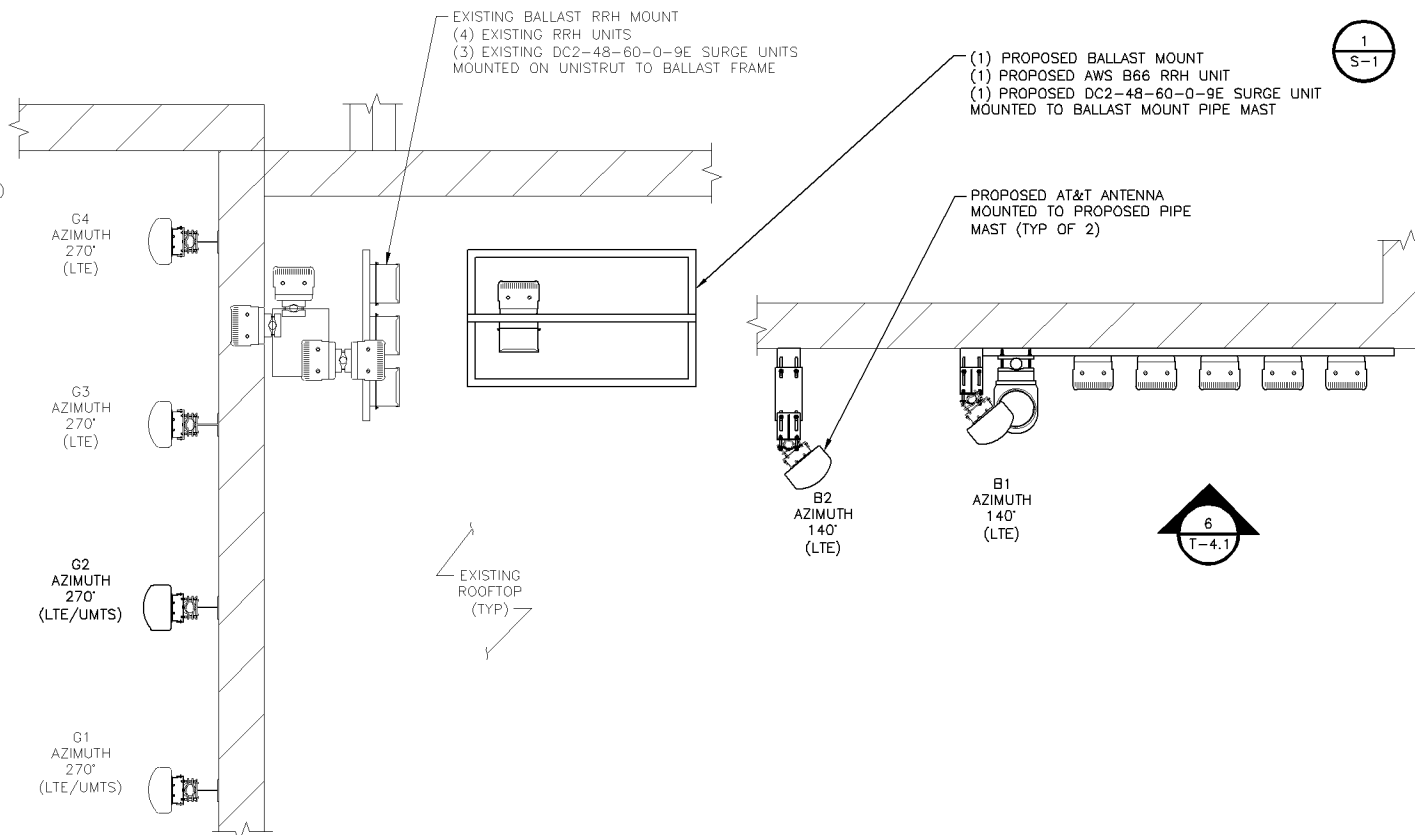
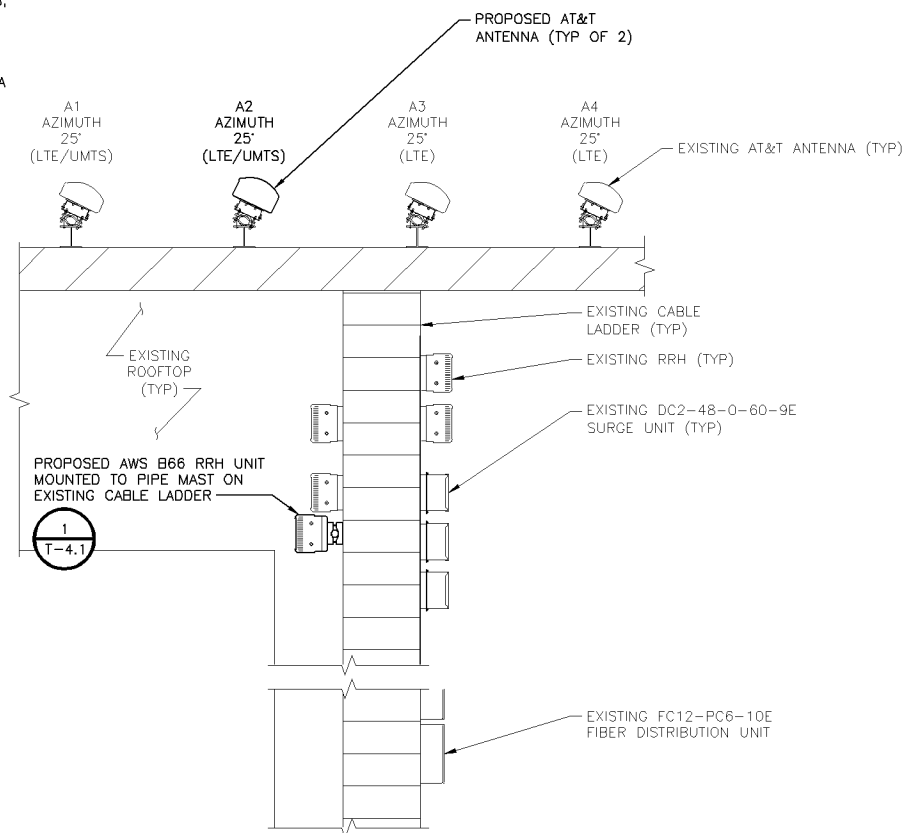
EXISTING ANTENNA ORIENTATION DIAGRAM

NO SCALE

1

NOTES

1. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S STANDARD DETAILS.
2. SEE ANTENNA & TRANSMISSION CABLE REQUIREMENTS ON SHEET T-3 FOR ANTENNA POSITION.
3. OTHER CARRIER ANTENNAS NOT SHOWN FOR CLARITY.
4. CONTRACTOR TO CONFIRM DC POWER AND TRANSMISSION CABLE PLUMBING.
5. CONTRACTOR TO CONFIRM SURGE AND DISTRIBUTION EQUIPMENT COUNTS AND LOCATIONS.



PROPOSED ANTENNA ORIENTATION DIAGRAM

NO SCALE

2

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383

DRAWN BY: JAT

CHECKED BY: JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: *[Signature]*

DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
ANTENNA
CONFIGURATION

SHEET NUMBER
T-2

EXISTING ANTENNA AND TRANSMISSION EQUIPMENT REQUIREMENTS (VERIFY WITH LATEST RFDS)										
SECTOR	RAD CENTER	POSITION	ANTENNA TILT		AZIMUTH	ANTENNA MODEL	TECHNOLOGY	RRH / TMA	SURGE & DISTRIBUTION	
			MECH	ELEC					MODEL	CABLE (QTY) TYPES
A	75'	1			25'	ALCATEL-LUCENT 9745AA B25A 700/900P (6')	LTE 3C UMTS	LTE PCS IRRH DUAL BAND TMA	(6) RAYCAP DC2-48-60-0-9E (2) RAYCAP FC12-PC6-10E	(8) 1-5/8" COAX (4) 3-PAIR DC POWER (2) 12-PAIR FIBER
		2			25'	CCI HPA-65R-BUU-H6	UMTS	DUAL BAND TMA		
		3			25'	CCI HPA-65R-BUU-H6	LTE 1C LTE 2C	LTE 700 RRH LTE AWS RRH		
		4			25'	CCI HPA-65R-BUU-H6	LTE 4C LTE 5C	LTE WCS RRH LTE 850 RRH		
G	83'	1			270'	ALCATEL-LUCENT 9745AA B25A 700/900P (6')	LTE 3C UMTS	LTE PCS IRRH DUAL BAND TMA		
		2			270'	CCI HPA-65R-BUU-H6	UMTS	DUAL BAND TMA		
		3			270'	CCI HPA-65R-BUU-H6	LTE 1C LTE 2C	LTE 700 RRH LTE AWS RRH		
		4			270'	CCI HPA-65R-BUU-H6	LTE 4C LTE 5C	LTE WCS RRH LTE 850 RRH		

FINAL ANTENNA AND TRANSMISSION EQUIPMENT REQUIREMENTS (VERIFY WITH LATEST RFDS)										
SECTOR	RAD CENTER	POSITION	ANTENNA TILT		AZIMUTH	ANTENNA MODEL	TECHNOLOGY	RRH / TMA	SURGE & DISTRIBUTION	
			MECH	ELEC					MODEL	CABLE (QTY) TYPES
A	75'	1			25'	ALCATEL-LUCENT 9745AA B25A 700/900P (6')	LTE 3C UMTS	LTE PCS IRRH DUAL BAND TMA	(7) RAYCAP DC2-48-60-0-9E (2) RAYCAP FC12-PC6-10E	(8) 1-5/8" COAX (6) 3-PAIR DC POWER (2) 12-PAIR FIBER (2) DC JUMPERS (2) FIBER JUMPERS
		2			25'	KMW EPBQ-654L8H8-B	LTE BWE UMTS	LTE AWS B66 RRH DUAL BAND TMA		
		3			25'	CCI HPA-65R-BUU-H6	LTE 1C LTE 2C	LTE 700 RRH LTE AWS RRH		
		4			25'	CCI HPA-65R-BUU-H6	LTE 4C LTE 5C	LTE WCS RRH LTE 850 RRH		
G	83'	1			270'	ALCATEL-LUCENT 9745AA B25A 700/900P (6')	LTE 3C UMTS	LTE PCS IRRH DUAL BAND TMA		
		2			270'	KMW EPBQ-654L8H8-B	LTE BWE UMTS	LTE AWS B66 RRH DUAL BAND TMA		
		3			270'	CCI HPA-65R-BUU-H6	LTE 1C LTE 2C	LTE 700 RRH LTE AWS RRH		
		4			270'	CCI HPA-65R-BUU-H6	LTE 4C LTE 5C	LTE WCS RRH LTE 850 RRH		
B	83'	1			140'	KMW EPBQ-654L8H8-B	LTE 1C LTE 3C LTE 4C LTE 5C	LTE 700 RRH LTE PCS B25 RRH LTE WCS RRH LTE 850 RRH	(1) RAYCAP DC6-48-60-18-8F	(1) 18-PAIR FIBER (2) 3-PAIR DC POWER
		2			140'	KMW EPBQ-654L8H8-B	LTE BWE	LTE AWS B66 RRH		

**AT&T
MOBILITY**

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383
DRAWN BY: JAT
CHECKED BY: JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: *[Signature]*

DATE: 03/03/2017 LICENSE# 43119
EXP. 6/18

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

MALL OF AMERICA
MN03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
**ANTENNA AND RRH
REQUIREMENTS**

SHEET NUMBER

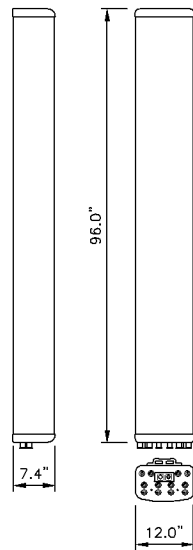
T-3

- CONTRACTOR IS TO REFER TO AT&T'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION.
- CABLE LENGTHS WERE DETERMINED BASED ON A VISUAL INSPECTION DURING SITE WALK. CONTRACTOR TO VERIFY ACTUAL LENGTH DURING PRE-CONSTRUCTION WALK.
- CONTRACTOR TO USE ROSENBERGER FIBER LINE HANGER COMPONENTS (OR ENGINEER APPROVED EQUAL).

NOTES

KMW EPBQ-654L8H8-B

RADOME MATERIAL: ASA
 RADOME COLOR: LIGHT GRAY
 DIMENSIONS, HxWxD.in(mm): 96.0"x12.0"x7.4" (2438x305x189mm)
 WEIGHT: 71.2 lbs (32.3 kg)
 CONNECTOR: (12) 4.3-10 DIN FEMALE



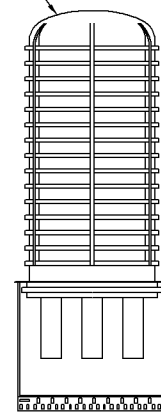
ANTENNA SPECIFICATIONS

NO SCALE

1

CASE PL201700057

PROPOSED SURGE SUPPRESSOR UNIT



PROPOSED 2"x24" SCH 40 PIPE MOUNT

PROPOSED UNIVERSAL UNISTRUT CONDUIT CLAMP (UNISTRUT P/N P1431 OR ENGINEER APPROVED EQUAL) (TYP OF 2)

EXISTING WALL

PROPOSED UNISTRUT MOUNTED TO MECHANICAL ROOM WALL (TYP)



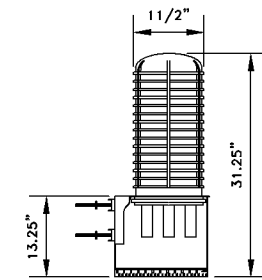
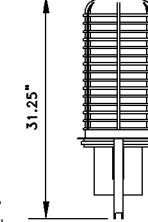
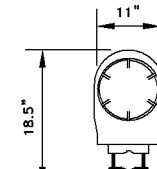
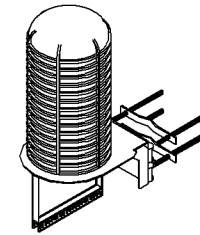
DC SURGE SUPPRESSION MOUNTING DETAIL

NO SCALE

2

RAYCAP DC6-48-60-18/0-8F

DIMENSIONS, DxH: 280x794mm (11"x31.25")
 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
 WIND LOADING: 150 MPH SUSTAINED (105.7 lbs)
 195 MPH GUST (213.6 lbs)
 TOTAL WEIGHT: 32.8 lbs

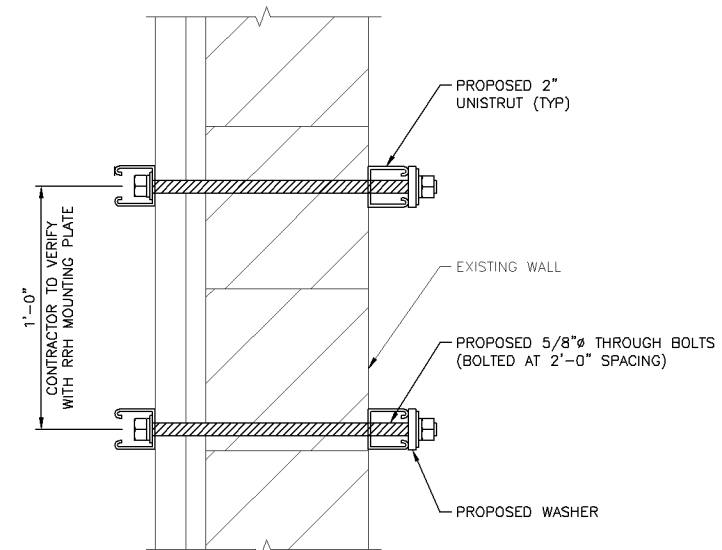


CONTRACTOR TO USE "THREAD LUBRICANT" ON MOUNTING BOLTS DURING INSTALLATION

DC SURGE SUPPRESSOR DETAIL

NO SCALE

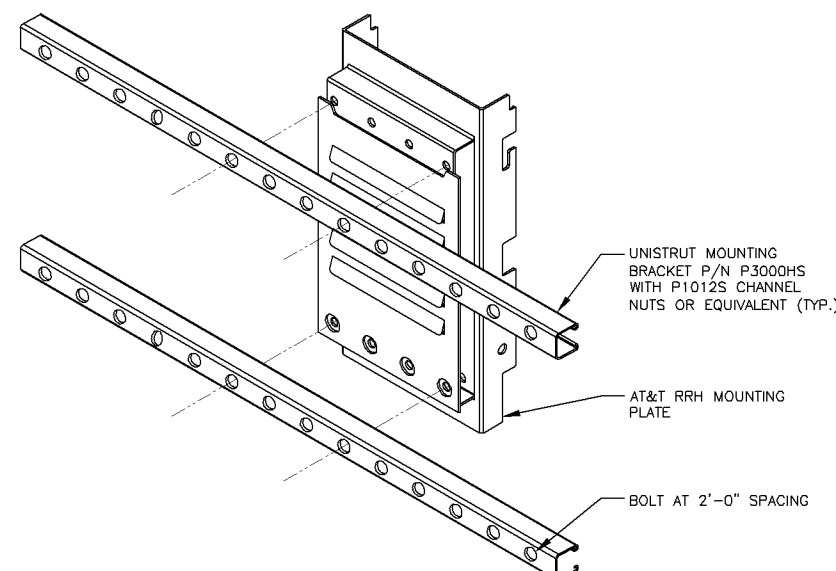
3



UNISTRUT ATTACHMENT DETAIL

NO SCALE

6



RRH WALL MOUNT DETAIL

NO SCALE

7

NOT USED

NO SCALE

4

NOT USED

NO SCALE

5

AT&T MOBILITY

901 MARQUETTE AVENUE
 MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
 7760 FRANCE AVENUE SOUTH
 SUITE 1200
 BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383
 DRAWN BY: JAT
 CHECKED BY: JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS
 SIGNATURE: *[Signature]*
 DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

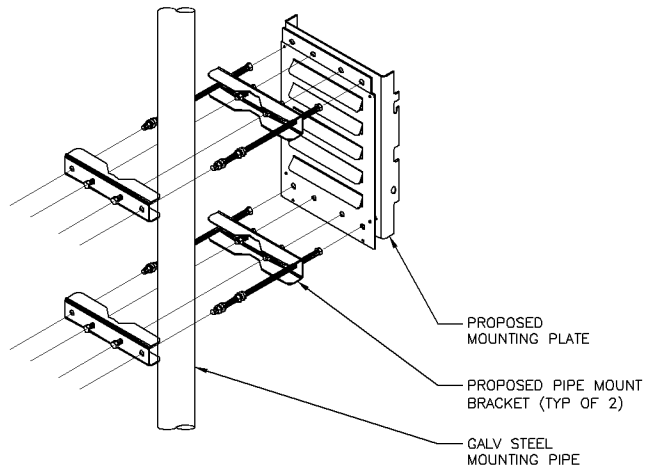
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

MALL OF AMERICA
 MNL03123
 2051 KILLEBREW DR
 BLOOMINGTON, MN 55454
 BWE LTE

SHEET TITLE
TOWER EQUIPMENT DETAILS

SHEET NUMBER
T-4

NOTE:
ANTENNA NOT SHOWN FOR
CLARITY



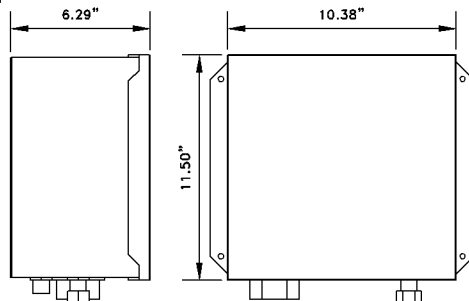
RRH MOUNTING PLATE DETAIL

NO SCALE

1

RAYCAP DC2-48-60-0-9E CASE PL201700057

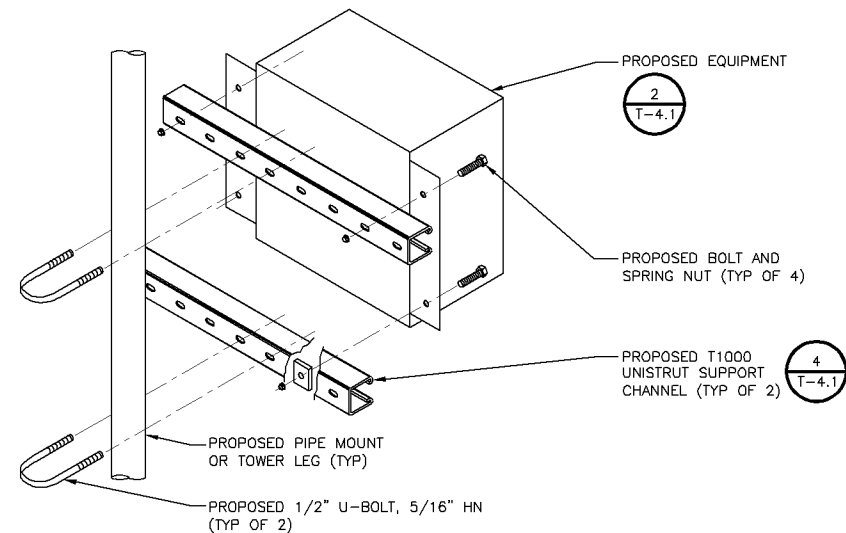
DIMENSIONS, WxDxH: 10.38"x6.29"x11.50" (263.61x159.87x292.10mm)
 NOMINAL OPERATING VOLTAGE: 48 VDC
 NOMINAL DISCHARGE CURRENT: 20 kA 8/20 μ s
 MAXIMUM DISCHARGE CURRENT: 60 kA 8/20 μ s
 MAXIMUM CONTINUOUS OPERATING VOLTAGE: 75 VAC, 100 VDC
 VOLTAGE PROTECTION RATING: 500 V
 TOTAL WEIGHT: 16 lbs



DC SURGE SUPPRESSOR DETAIL

NO SCALE

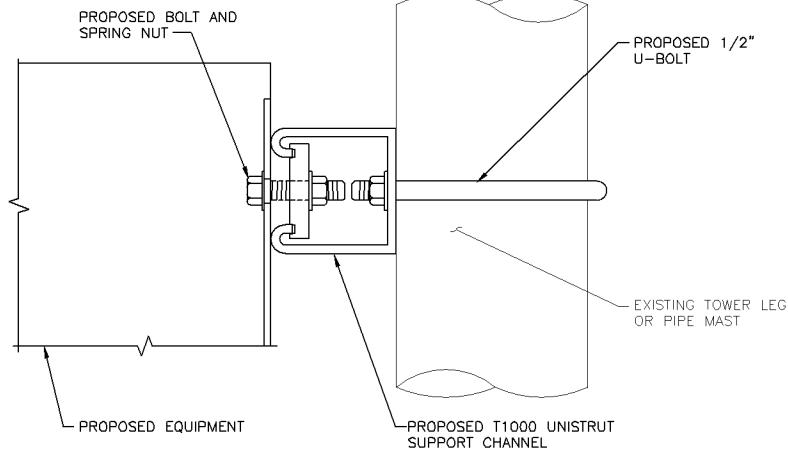
2



UNISTRUT MOUNTING DETAIL

NO SCALE

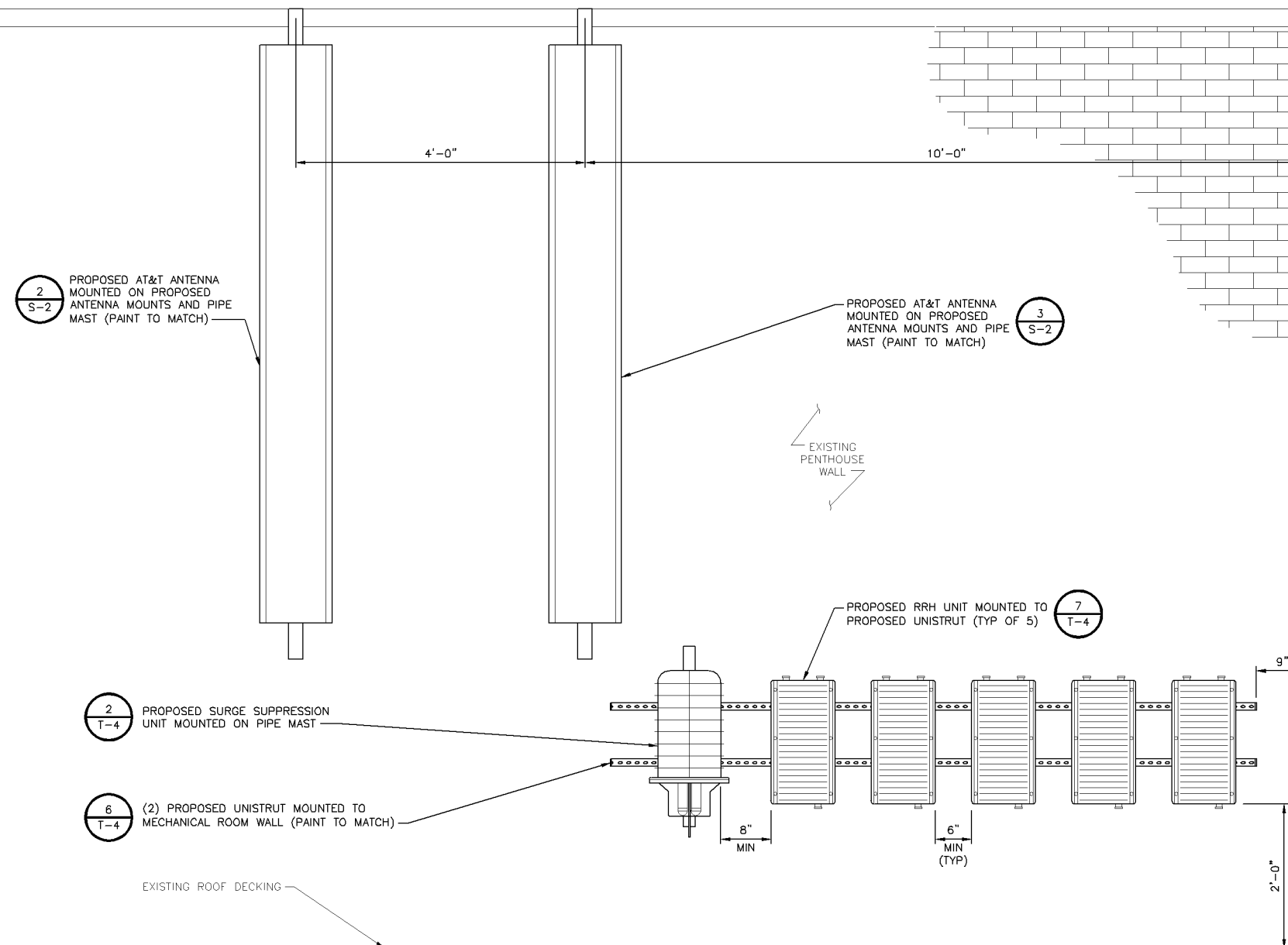
3



ENLARGED UNISTRUT MOUNTING DETAIL

NO SCALE

4



PROPOSED ENLARGED ELEVATION VIEW

NO SCALE

6

NOT USED

NO SCALE

5

**AT&T
MOBILITY**

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383
 DRAWN BY: JAT
 CHECKED BY: JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: *[Signature]*

DATE: 03/03/2017 LICENSE# 43119
EXP. 6/18

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

MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
TOWER EQUIPMENT
DETAILS

SHEET NUMBER
T-4.1

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 (13TH EDITION), 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 PSI TENSILE STRENGTH.
 ASTM A325: HIGH-STRENGTH BOLT FOR STRUCTURAL STEEL JOINTS.
 ASTM A490: HEAT-TREATED, STRUCTURAL STEEL BOLTS, 150 (KSI) (1035MPA) TENSILE STRENGTH.
 ASTM A500: COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
 ASTM A563: CARBON AND ALLOY STEEL NUTS.
 ASTM B695: COATINGS OF ZINC MECHANICALLY DEPOSITED ON IRON AND STEEL.
 ASTM F436: HARDENED STEEL WASHERS.
 ASTM F959: COMPRESSIBLE-WASHER-TYPE DIRECT TENSION INDICATOR FOR USE WITH STRUCTURAL FASTENERS.
 - C. AMERICAN WELDING SOCIETY (AWS):
 AWS A5.1: COVERED CARBON STEEL ARC WELDING ELECTRODES.
 AWS A5.5: LOW ALLOY STEEL COVERED ARC WELDING ELECTRODES.
 AWS D1.1: STRUCTURAL WELDING CODE – STEEL.
 - D. RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC): "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS OR ASTM A490 BOLTS" AS ENDORSED BY AISC.
 - E. STEEL STRUCTURES PAINTING COUNCIL (SSPC):
 SSPC-SP3: POWER TOOL CLEANING.
 SSPC-PAINT 11: RED IRON OXIDE, ZINC CHROME, RAW LINSEED OIL OR ALKYD PAINT.
- 1.3 SUBMITTALS:
 - A. SUBMIT THE FOLLOWING FOR APPROVAL:
 - 1. FABRICATION AND ERECTION DRAWINGS SHOWING ALL DETAILS, CONNECTIONS, MATERIAL DESIGNATIONS, AND ALL TOP STEEL ELEVATIONS.
 - B. WELDERS SHALL BE QUALIFIED AS PRESCRIBED IN AWS D1.1.

PART 2 – PRODUCTS

- 2.1 STRUCTURAL STEEL:
 - A. SHAPES, PLATES AND BARS SHALL CONFORM TO ASTM A36 AND ASTM A992.
 - B. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B. STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE E OR S, GRADE B.
- 2.2 ANCHOR BOLTS:
 - A. ANCHOR BOLTS SHALL CONFORM TO ASTM A307 WITH HEAVY HEXAGONAL NUTS.
- 2.3 BOLTS:
 - A. COMMON (MACHINE) BOLTS SHALL CONFORM TO ASTM A307 GRADE A AND NUTS TO ASTM A563. ONE COMMON BOLT ASSEMBLY SHALL CONSIST OF A BOLT, A HEAVY HEX NUT, AND A HARDENED WASHER.
 - B. HIGH STRENGTH BOLT SHALL CONFORM 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 CONFORMING WITH STM F959. THE HARDENED WASHER SHALL BE INSTALLED AGAINST THE ELEMENT TURNED IN TIGHTENING UNLESS NOTED OTHERWISE ON THE DRAWINGS, ALL CONNECTIONS SHALL BE BEARING TYPE CONNECTIONS.
- 2.4 WELDING ELECTRODES:
 - A. WELDING ELECTRODES SHALL COMPLY WITH AWS D1.1 USING A5.1 OR A5.5 E70XX AND SHALL BE COMPATIBLE WITH THE WELDING PROCESS SELECTED.
- 2.5 PRIMER:
 - A. PRIMER SHALL BE RED OXIDE-CHROMATE PRIMER COMPLYING WITH SSPC PAINT SPECIFICATION NO. 11.


PART 3 – EXECUTION

- 3.1 FABRICATION:
 - A. SHOP FABRICATE AND ASSEMBLY MATERIALS AS SPECIFIED HEREIN.
 - 1. FABRICATE ITEMS OF STRUCTURAL STEEL IN ACCORDANCE WITH THE AISC-ASD 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 CONFORM 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 DEGREES F. THE RELATIVE HUMIDITY IS MORE THAN 90 PERCENT, OR THE SURFACE TEMPERATURE IS LESS THAN 5 DEGREES 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 APPLIED 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 PERMANENT CONTACT, BEFORE ASSEMBLY.
 - H. HIGH-STRENGTH BOLTS AS A MINIMUM, SHALL BE TIGHTENED TO A "SNUG TIGHT" CONDITION AS DEFINED IN THE LATEST AISC SPECIFICATION. ALL HIGH-STRENGTH BOLTS SPECIFIED ON THE DESIGN DRAWINGS TO BE USED IN PRETENSIONED OR SLIP-CRITICAL JOINTS SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN AISC TABLE J3.1. INSTALLATION SHALL BE BY ANY OF THE FOLLOWING METHODS: TURN-OF NUT METHOD, A DIRECT-TENSION-INDICATOR, TWIST-OFF-TYPE TENSION-CONTROL BOLT, CALIBRATED WRENCH, OR ALTERNATIVE DESIGN BOLT.

**AT&T
MOBILITY**

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402


BLACK & VEATCH

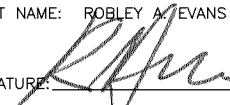
BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	129041.9383
DRAWN BY:	JAT
CHECKED BY:	JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: 

DATE: 03/03/2017 LICENSE# 43119
EXP. 6/18

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

MALL OF AMERICA
MN03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
**TOWER SECTION
NOTES**

SHEET NUMBER
T-5

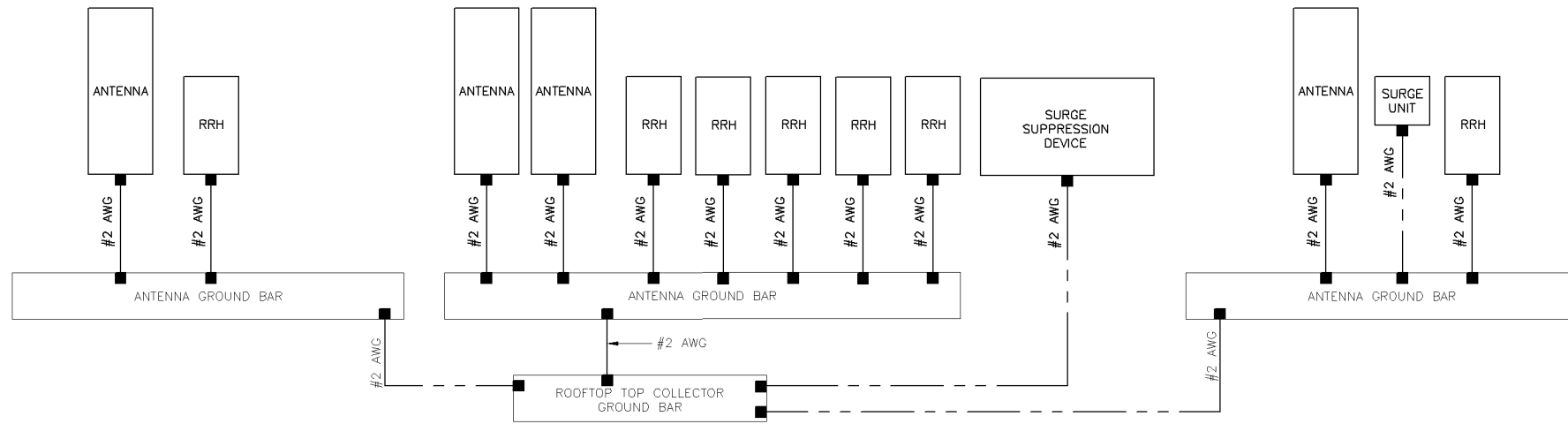
- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- ⊕ GROUND ROD
- ⊕ TEST GROUND ROD WITH INSPECTION SLEEVE

LEGEND

1. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
2. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
3. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
4. FOR ALCATEL-LUCENT 850 AND 1900 RRH's, TWO GROUNDS ARE REQUIRED (TOP AND BOTTOM).

NOTES

- (A) **ROOF GROUND RING:** WHEN AN ANTENNA TOWER IS MOUNTED ON THE ROOF OF A STRUCTURE, A ROOF RING GROUND SYSTEM IS REQUIRED. THE ROOF RING GROUND SYSTEM SHALL BE FORMED AROUND THE TOWER'S LEGS SIMILAR TO A BURIED TOWER RING GROUND SYSTEM. BONDS SHALL BE EXTENDED TO TOWER LEGS AND OTHER NEARBY METALLIC OBJECTS ON THE ROOF. (ATT-TP-76416 / 7.5.3.1)
- (B) **DOWN CONDUCTORS:** ON BUILDINGS NOT EXCEEDING 75 FEET IN HEIGHT THAT ARE REINFORCED CONCRETE OR OTHER TYPE OF CONSTRUCTION, WHERE CONTINUITY TO EARTH THROUGH BUILDING STEEL IS NOT ASSURED, A MINIMUM OF TWO #2 AWG DOWN CONDUCTORS SHALL BE EXTENDED FROM THE ROOF RING GROUND SYSTEM TO THE EXTERIOR RING GROUND SYSTEM. A DOWN CONDUCTOR SHALL BE ROUTED DOWN EACH CORNER AND CONNECT TO SEVERAL GROUND RODS. IF ALL CORNERS ARE NOT ACCESSIBLE, AT LEAST 2 DOWNLEADS SHALL BE RUN. WHEN STRUCTURAL STEEL SERVES AS DOWN CONDUCTORS BETWEEN A ROOF RING GROUND SYSTEM AND AN EXTERIOR RING GROUND SYSTEM, BONDS BETWEEN BUILDING STEEL AND THE EXTERIOR RING GROUND SYSTEM SHALL BE MADE AT THE STEEL COLUMN USED AS THE DOWNLEAD, WHERE ACCESSIBLE. (ATT-TP-76416 / 7.5.3)
- (C) **GROUND RING BOND:** WHEN STRUCTURAL STEEL IS USED IN PLACE OF DOWN CONDUCTORS, A BOND MUST EXIST BETWEEN THE OPGP AND A STRUCTURAL STEEL MEMBER. THE BOND MAY BE IN THE FORM OF THE OPGP BUS BAR'S MOUNTING STUDS, A MINIMUM #2 AWG CONDUCTOR BETWEEN THE OPGP AND STRUCTURAL STEEL, OR A CONNECTION BETWEEN A DRIVEN GROUND ROD SYSTEM THAT IS BONDED TO THE OPGP AND A STRUCTURAL STEEL MEMBER. (ATT-TP-76416 / 7.5.3.4)
- (D) **STRUCTURAL STEEL BONDS:** PERIPHERAL STRUCTURAL STEEL COLUMNS THAT ARE BARE OR ENCASED IN CONCRETE OR MASONRY SHALL BE BONDED TO THE EXTERIOR RING GROUND CONDUCTOR. STRUCTURAL STEEL BEAMS AND TRUSSES SUPPORTING THE ROOF OF A BUILDING ARE GENERALLY SUFFICIENTLY BONDED TO EARTH THROUGH HANGER RODS AND OTHER HARDWARE THAT SUPPORT SUPERSTRUCTURE, CONDUITS, PIPES, DUCTS AND OTHER METALLIC UNITS ABOVE THE RADIO EQUIPMENT AREA. INDIVIDUAL BEAMS NOT OBVIOUSLY GROUNDED IN THIS MANNER OR BY CONTACT WITH GROUNDED STEEL FRAME OR COLUMNS OF THE BUILDING SHALL BE BONDED TO THE PERIPHERAL CONDUCTOR AT BOTH ENDS. (ATT-TP-76416 / 7.14.1.6)
- (E) **ROOFTOP EQUIPMENT GROUNDS:** A TREE GROUNDING SYSTEM IS RECOMMENDED TO BOND OBJECTS ON THE EXTERIOR OF A BUILDING. THIS SYSTEM CONSISTS OF MAIN AND BRANCH CONDUCTORS. A MAIN CONDUCTOR IS CONNECTED TO AN EXTERIOR GROUND CONDUCTOR, AND IS ROUTED TOWARD A GROUP OF UNITS REQUIRING BONDS, TERMINATING ON THE UNIT FARTHEST FROM THE EXTERIOR GROUND SYSTEM. BRANCH CONDUCTORS BOND INDIVIDUAL UNITS TO THE MAIN CONDUCTOR AND SUB-BRANCHES MAY BE EXTENDED FROM BRANCH CONDUCTORS. MAIN CONDUCTORS SHALL BE MINIMUM #2 AWG AND BRANCH CONDUCTORS SHALL BE MINIMUM #6 AWG. BRANCH CONDUCTORS SHOULD BE NO LONGER THAN 15 FEET. WHERE UNITS BONDED TO DIFFERENT MAIN CONDUCTORS ARE WITHIN 7 FEET OF EACH OTHER, THE BRANCH CONDUCTORS OF THE TWO MAIN SYSTEMS SHOULD BE BONDED TOGETHER SO THAT THE LENGTH OF A DIRECT BOND BETWEEN THE UNITS IS NOT GREATER THAN 30 FEET. (ATT-TP-76416 / 7.12.2)
- (F) **CELL REFERENCE GROUND BAR:** POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUCTORS. (ATT-TP-76416 7.6.7)
- (G) **FRAME BONDING:** THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENTS METAL FRAMEWORK. BOND THE FRAME GROUND BUS TO THE "I" SECTION OF THE CELL REFERENCE GROUND BAR. (ATT-TP-76416 7.8)
- (H) **ICE BRIDGE SUPPORTS:** EACH ICE BRIDGE LEG SHALL BE BONDED TO THE GROUND RING WITH #2 AWG BARE TINNED COPPER CONDUCTOR. PROVIDE EXOTHERMIC WELDS AT BOTH THE ICE BRIDGE LEG AND BURIED GROUND RING. (ATT-TP-76416 7.4.2.6)
- (J) **DURING ALL DC POWER SYSTEM CHANGES** INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICES CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH A MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR (CRGB) PER TP76300 SECTION H 6 AND TP76416 FIGURE 7-11 REQUIREMENTS.



**AT&T
MOBILITY**
901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

BLACK & VEATCH
BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383
DRAWN BY: JAT
CHECKED BY: JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

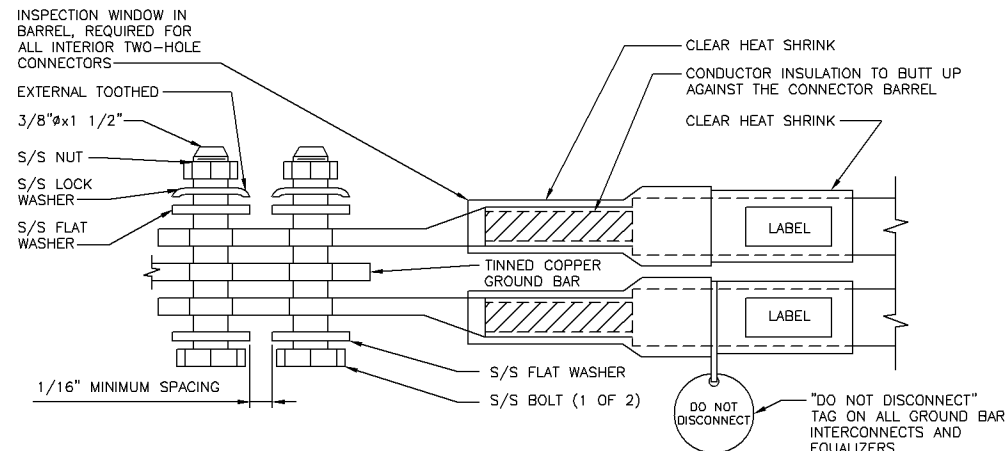
PRINT NAME: ROBLEY A. EVANS
SIGNATURE: *[Signature]*
DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
**ONE-LINE
GROUNDING DIAGRAM**

SHEET NUMBER
E-1



NOTES

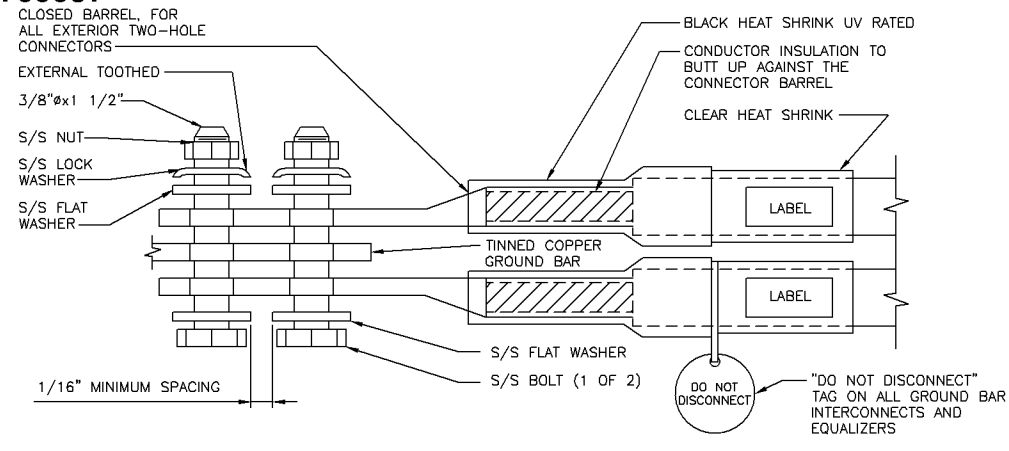
- EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR. ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
- ALL GROUND BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "I") WITH 1" HIGH LETTERS.
- 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.
- 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.
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUND BUS.
- NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUND TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
- SUPPLIED AND INSTALLED BY CONTRACTOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
- ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).
- BOLTS SHALL BE MADE "SNUG-TIGHT" PLUS 1/4 TURN.

INTERIOR TWO HOLE LUG DETAIL

NO SCALE

1

CASE PL20170057



NOTES

- EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR. ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
- ALL GROUND 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", "I") WITH 1" HIGH LETTERS.
- 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.
- 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.
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUND BUS.
- NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUND TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
- SUPPLIED AND INSTALLED BY CONTRACTOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
- ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).
- BOLTS SHALL BE MADE "SNUG-TIGHT" PLUS 1/4 TURN.

EXTERIOR TWO HOLE LUG DETAIL

NO SCALE

2

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

NO	REQUIRED	PART NUMBER	DESCRIPTION
1	1	HAGAR TCBI-14420C OR A.L.T. 382227	GALVANIZED STEEL GROUND BAR * (1/4" x 4" x 20)
2	2	A-6056	WALL MOUNTING BRACKET
3	2	3061-4	INSULATORS
4	2	3012-1	5/8"-11x1" H.H.C.S. BOLTS
5	4	3015-8	5/8" LOCKWASHER

* HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.

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

SECTION "P" - SURGE PROTECTORS

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

SECTION "A" - SURGE ABSORBERS

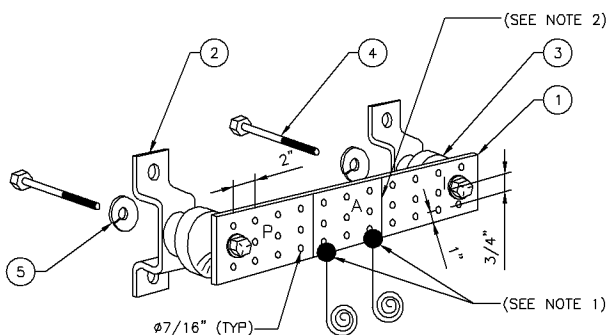
- (EC) INTERIOR GROUND RING (#2 AWG)
- (EC) EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)
- (EC) METALLIC COLD WATER PIPE (IF AVAILABLE) (1/0 AWG)
- (EC) BUILDING STEEL (IF AVAILABLE) (1/0 AWG)

SECTION "I" - ISOLATED GROUND ZONE

- (AT&T) ALL ISOLATED GROUND REFERENCE
- (AT&T) GROUND WINDOW BAR

DETAIL NOTES

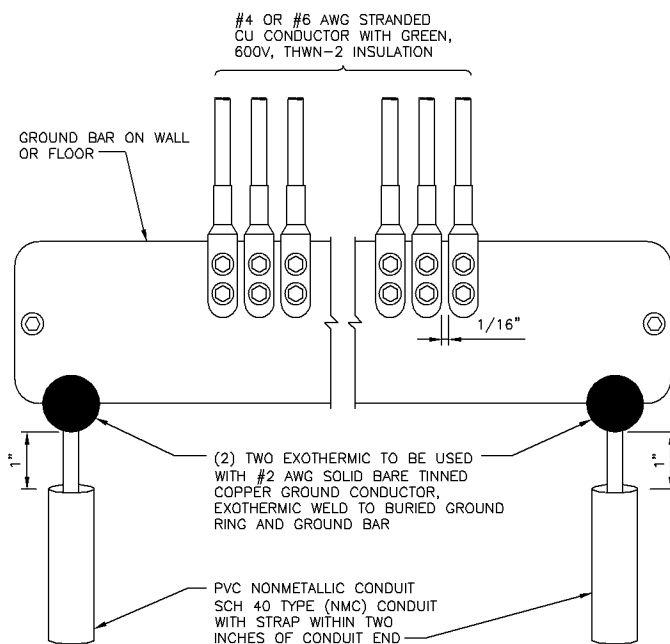
- EXOTHERMICALLY WELD #2 AWG BARE TINNED SOLID COPPER CONDUCTOR TO GROUND BAR. ROUTE CONDUCTOR TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
- THE INSTALLER SHALL USE PERMANENT MARKER TO DRAW THE LIKE BETWEEN SECTION AND LABEL EACH SECTION ("P", "A", "I") WITH 1" HIGH LETTERS



REFERENCE GROUNDING BAR DETAIL

NO SCALE

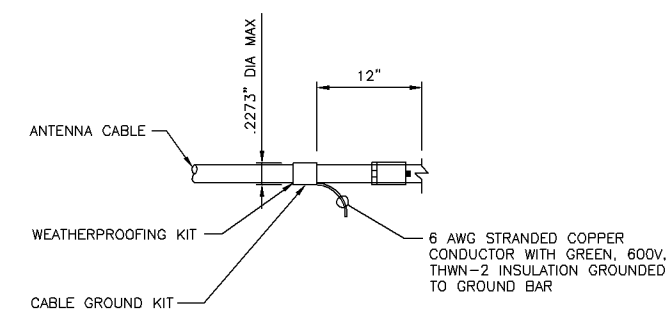
3



GROUNDING BAR DETAIL

NO SCALE

4



CONNECTION OF CABLE GROUNDING KIT TO ANTENNA CABLE

NO SCALE

5

AT&T MOBILITY
901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402

BLACK & VEATCH
BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	129041.9383
DRAWN BY:	JAT
CHECKED BY:	JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS
SIGNATURE: *[Signature]*
DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

**MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE**

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
E-2

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.
- ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
 - ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
 - ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
 - NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
 - NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
 - OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
 - UL (UNDERWRITERS LABORATORIES INC.)
 - 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 THAT SHALL BE 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 IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.
- 2.2 MATERIALS AND EQUIPMENT:
- A. CONDUIT:
- 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.
 - LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
 - 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.
 - NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.
- B. CONDUCTORS AND CABLE:
- 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.
 - #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
 - SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
 - 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.
 - 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:
- 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 ENGINEER APPROVED EQUAL.
- D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:
- INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.
 - GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHING" 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.
 - BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

CASE PL201700057

- E. SYSTEM GROUNDING:
- 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.
 - GROUNDING BUSSES 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.
 - 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.
 - 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.
 - GROUND RODS SHALL BE 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.
 - 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:
- THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
 - PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.
- G. PANELS AND LOAD CENTERS:
- ALL PANEL DIRECTORIES SHALL BE TYPEDWRITTEN.

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:
- ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
 - 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.
 - INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2008 NEC, TABLE 300.5).
 - 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.
 - 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.
 - FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
 - PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
 - 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.
 - 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.
 - INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
 - INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
 - CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
 - 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:
- 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 |
- SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.
 - PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
 - 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:
- INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.
- D. GROUNDING:
- 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.
 - 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.
 - 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.
 - 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.
 - 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.
 - 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.
 - ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
 - APPLY CORROSION-RESISTANT 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.
 - A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
 - BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
 - 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.
 - ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
 - 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.
 - DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
 - 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.
 - 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:
- 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.
 - PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
 - MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
 - 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.

**AT&T
MOBILITY**

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

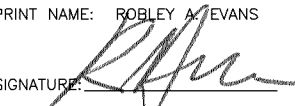
BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	129041.9383
DRAWN BY:	JAT
CHECKED BY:	JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: 












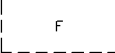




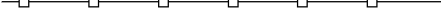



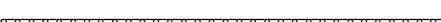
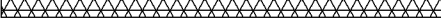
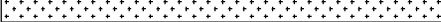
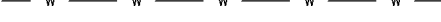

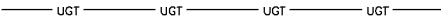
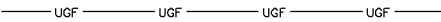









DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
ELECTRICAL SECTION
NOTES

SHEET NUMBER
E-3

- EXOTHERMIC CONNECTION 
- MECHANICAL CONNECTION 
- CHEMICAL ELECTROLYTIC GROUNDING SYSTEM 
- TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM 
- EXOTHERMIC WITH INSPECTION SLEEVE 
- GROUNDING BAR 
- GROUND ROD 
- TEST GROUND ROD WITH INSPECTION SLEEVE 
- SINGLE POLE SWITCH 
- DUPLEX RECEPTACLE 
- DUPLEX GFCI RECEPTACLE 
- FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48-T8 
- SMOKE DETECTION (DC) 
- EMERGENCY LIGHTING (DC) 
- SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DBBTXD 
- CHAINLINK FENCE 
- WOOD/WROUGHT IRON FENCE 
- WALL STRUCTURE 
- LEASE AREA 
- PROPERTY LINE (PL) 
- SETBACKS 
- PROPOSED ICE BRIDGE 
- PROPOSED CABLE TRAY 
- WATER LINE 
- UNDERGROUND POWER 
- UNDERGROUND TELCO 
- UNDERGROUND FIBER 
- OVERHEAD POWER 
- OVERHEAD TELCO 
- UNDERGROUND TELCO/POWER 
- ABOVE GROUND POWER 
- ABOVE GROUND TELCO 
- ABOVE GROUND TELCO/POWER 
- WORKPOINT 
- SECTION REFERENCE 
- DETAIL REFERENCE 

LEGEND

CASE PL201700057

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

ABBREVIATIONS

NOT USED

**AT&T
MOBILITY**

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402


BLACK & VEATCH

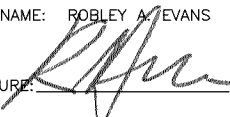
BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	129041.9383
DRAWN BY:	JAT
CHECKED BY:	JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: 

DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
**LEGEND AND
ABBREVIATIONS**

SHEET NUMBER
N-1

GENERAL CONSTRUCTION

- FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
GENERAL CONTRACTOR – OVERLAND CONTRACTING INC. (B&V)
CONTRACTOR: (CONSTRUCTION)
OWNER – AT&T
- ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
- 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.
- 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.
- ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- 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 SHOW 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.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- 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.
- 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.
- GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
- 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.
- 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.
- 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.
- CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
- 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.
- THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
- THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
- 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.
- CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
- CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
- 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).
- OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
- NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
- 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.

CASE PL 201700057

- CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND REGULATORY REQUIREMENTS FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
- CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
- 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.
- NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.
- ALL COAXIAL CABLE INSTALLATIONS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

ANTENNA MOUNTING

- DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
- 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.
- 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.
- DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
- ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
- CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
- ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
- 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.
- JUMPERS FROM THE TMA_s MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
- CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
- TMA_s SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

- ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
- 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.
 - RF CONNECTION BOTH SIDES OF THE CONNECTOR.
 - 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.
- ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
- ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
- ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
- ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
- ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING

- THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A 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.
- 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 OF (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
- WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

- TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
- CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
- CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
- ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
- ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" OC.
- CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
- CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
- CONTRACTOR SHALL GROUND ALL EQUIPMENT, INCLUDING ANTENNAS, RET MOTORS, TMA_s, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.

- 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.
- CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

- CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMA_s, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
- ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
- CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
- 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.
- IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
 - TEMPERATURE SHALL BE ABOVE 50° F.
 - PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
 - FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
 - DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
- ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
 - GROUNDING AT THE ANTENNA LEVEL.
 - GROUNDING AT MID LEVEL. TOWERS WHICH ARE OVER 200'-0". ADDITIONAL CABLE GROUNDING REQUIRED.
 - GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
 - GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
 - GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
- ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
- ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
- ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" STAND-OFF SECTOR ANTENNA MOUNT, OR 14'-16" PLATFORM WITH HANDRAIL, INCLUDING ALL HARDWARE AS REQUIRED AND NOTED ON DRAWINGS.

**AT&T
MOBILITY**

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

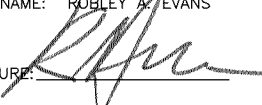
BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO:	129041.9383
DRAWN BY:	JAT
CHECKED BY:	JAT

REV	DATE	DESCRIPTION
0	02/28/17	ISSUED FOR CONSTRUCTION
B	02/16/16	ISSUED FOR REVIEW
A	11/23/16	ISSUED FOR REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: 

DATE: 03/03/2017 LICENSE# 43119 EXP. 6/18

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

MALL OF AMERICA
MNLO3123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

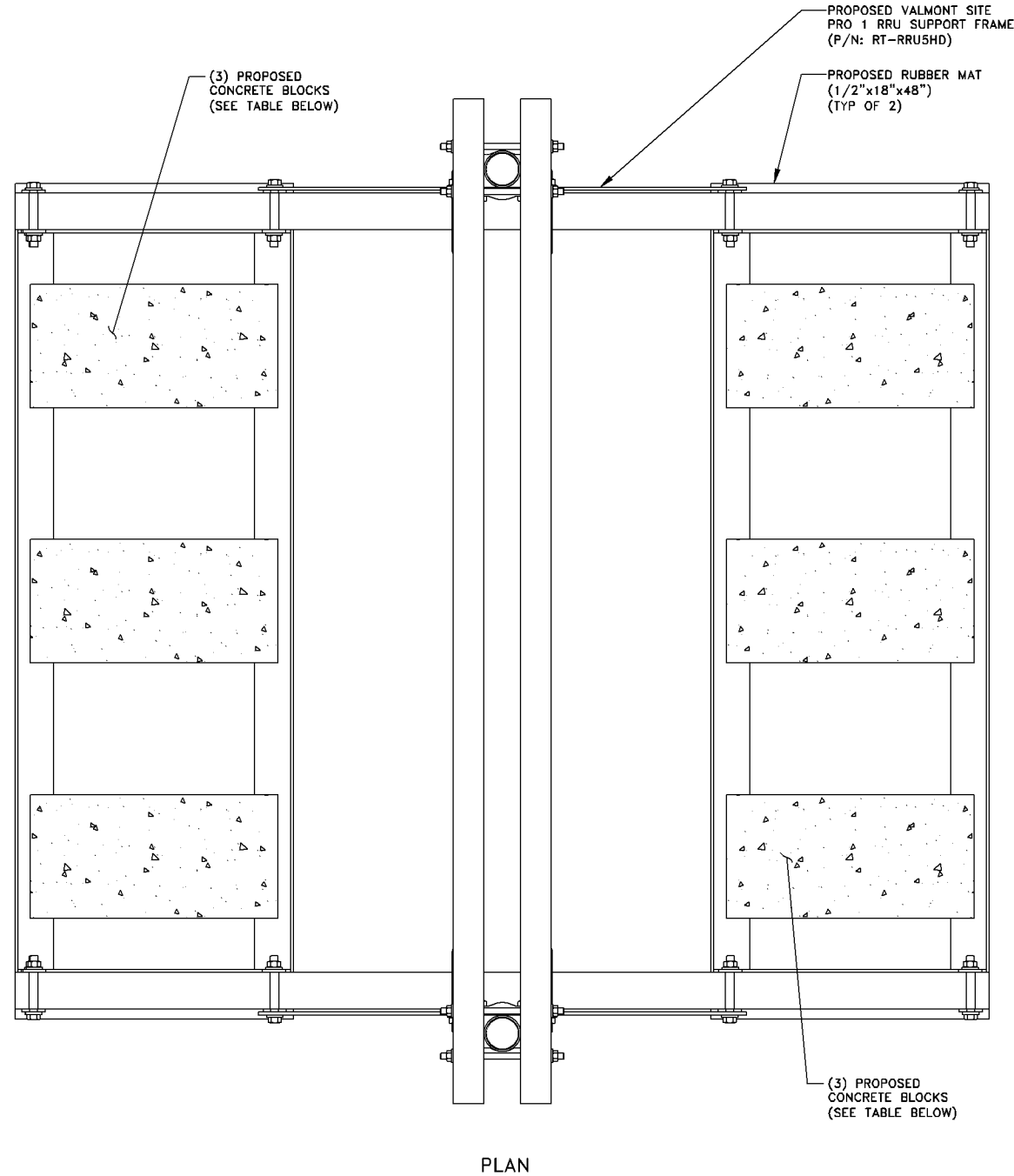
SHEET TITLE
GENERAL NOTES

SHEET NUMBER
N-2

GENERAL NOTES

NOTE:

1. CONTRACTOR SHALL FIELD VERIFY EXISTING FIELD CONDITIONS AND REPORT TO ENGINEER IF DIFFERENT THAN NOTED ON PLAN.
2. ALL CONCRETE BLOCKS SHALL BE SPACED EVENLY ACROSS TRAYS AND REDISTRIBUTED FROM TRAY TO TRAY AS NEEDED.



PLAN

SECTOR	NO. OF EXISTING/PROPOSED BLOCKS		TOTAL NO. OF BLOCKS	TOTAL REQUIRED WEIGHT (BASED ON 37 lbs. 8x8x16 HOLLOW BLOCKS)
	EXISTING	PROPOSED		
ALPHA	—	—	—	—
BETA	—	—	—	—
GAMMA	—	6	6	222

* NORMAL WEIGHT CMU BLOCK.

SLED PLAN

NO SCALE

1

CONTRACTOR SHALL FIELD VERIFY AND MEASURE DIMENSIONS OF THE SITE STRUCTURE BEFORE FABRICATION OF MATERIALS FOR ALL MODIFICATIONS.

1. CONTRACTOR SHALL FIELD VERIFY EXISTING ANTENNA MOUNT STRUCTURE, AND EXISTING BUILDING STRUCTURE, AS APPLICABLE, PRIOR TO START OF WORK. CONTRACTOR SHALL FIELD VERIFY AND MEASURE DIMENSIONS OF THE SITE STRUCTURE BEFORE FABRICATION OF MATERIALS FOR ALL PROPOSED INSTALLATIONS AND/OR MODIFICATIONS.
2. ALL EXPOSED STRUCTURAL STEEL ROLLED SHAPES, PLATES, SUPPORT BRACKETS, AND MOUNT PIPES SHALL BE HOT-DIP GALVANIZED PER ASTM A123.
3. U-BOLTS, THREADED RODS, BOLTS, AND HARDWARE SHALL BE HOT-DIP GALVANIZED PER ASTM A153, UNLESS NOTED OTHERWISE.
4. U-BOLTS SHALL BE A307, UNLESS NOTED OTHERWISE.
5. CONTRACTOR SHALL SUPPLY ALL NECESSARY CONNECTION HARDWARE.
6. MAINTAIN MINIMUM 1-1/8" EDGE DISTANCE FROM THE CENTER OF ANY HOLE TO NEAREST EDGE OF ANY PLATE OR ANGLE, UNLESS NOTED OTHERWISE.
7. ALL STEEL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION, UNLESS NOTED OTHERWISE. ALL PROPOSED STRUCTURAL STEEL MATERIAL SHALL CONFORM TO THE FOLLOWING PROPERTIES:
 W SHAPES: ASTM A992, 50 KSI
 ANGLES, PLATES, CHANNELS: ASTM A36, 36 KSI
 HSS SHAPES: ASTM A500, GR. B, 46 KSI
 HSS ROUND: ASTM A500, GR. B, 42 KSI
 PIPE SECTIONS: ASTM A53, GR. B, 35 KSI
8. CONTRACTOR SHALL TOUCH UP ANY DAMAGED PAINT AREAS WITH ZINC RICH PAINT. ALL AREAS OF FIELD DRILLING, WELDING, OR CUTTING SHALL BE TOUCHED UP WITH ZINC RICH PAINT.
9. ALL WELDING, IF INDICATED ON DRAWING(S), SHALL BE PERFORMED USING E70XX ELECTRODES. WELDING SHALL CONFORM TO AWS D1.1.
10. CONSTRUCTION SHALL BE IN ACCORDANCE WITH APPLICABLE OSHA REGULATIONS. THESE DRAWINGS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES, AND PROCEDURES.
11. CONTRACTOR SHALL PROVIDE ADEQUATE TEMPORARY SUPPORT AS REQUIRED TO COMPLETE THE WORK.
12. ALL CHANGES/ALTERNATES/REVISIONS TO THESE DRAWINGS SHALL BE DOCUMENTED BY REQUEST FOR INFORMATION (RFI) FORM APPROVED BY ENGINEER OF RECORD. FINAL WORK AUTHORIZATION AND ALL CHANGE ORDERS SHALL BE APPROVED BY CLIENT AND/OR CLIENT REPRESENTATIVE PRIOR TO PROCEEDING WITH ANY WORK THAT DEVIATES FROM THE ORIGINAL DESIGN, SCOPE, PRICE AND/OR SCHEDULE.
13. WALL MOUNTS SHALL NOT BE INSTALLED VERTICALLY IN LINE WITH OR HORIZONTALLY WITHIN 8 INCHES OF A WINDOW OR DOOR OPENING.
14. CONTRACTOR SHALL TOUCH-UP ANY DAMAGED AREAS OF GALVANIZING USING ZINC RICH PAINT CONFORMING TO THE REQUIREMENTS OF ASTM A780/A780M.

Black & Veatch Contacts and Phone Numbers

Name	Title	Office Phone	E-Mail
David Stenstrom	Lead Project Engineer	913-458-6159	StenstromD@bv.com
Tyson Hodge	Lead Design Engineer	913-458-2918	HodgeT@bv.com

GENERAL NOTES

AT&T
MOBILITY

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383

DRAWN BY: SAN

CHECKED BY: MK

REV	DATE	DESCRIPTION
0	02/23/17	ISSUED FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: *[Signature]*

DATE: 02/23/2017 LICENSE# 43119
EXP. 6/18

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

MALL OF AMERICA
MNL03123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
STRUCTURAL DETAILS

SHEET NUMBER
S-1

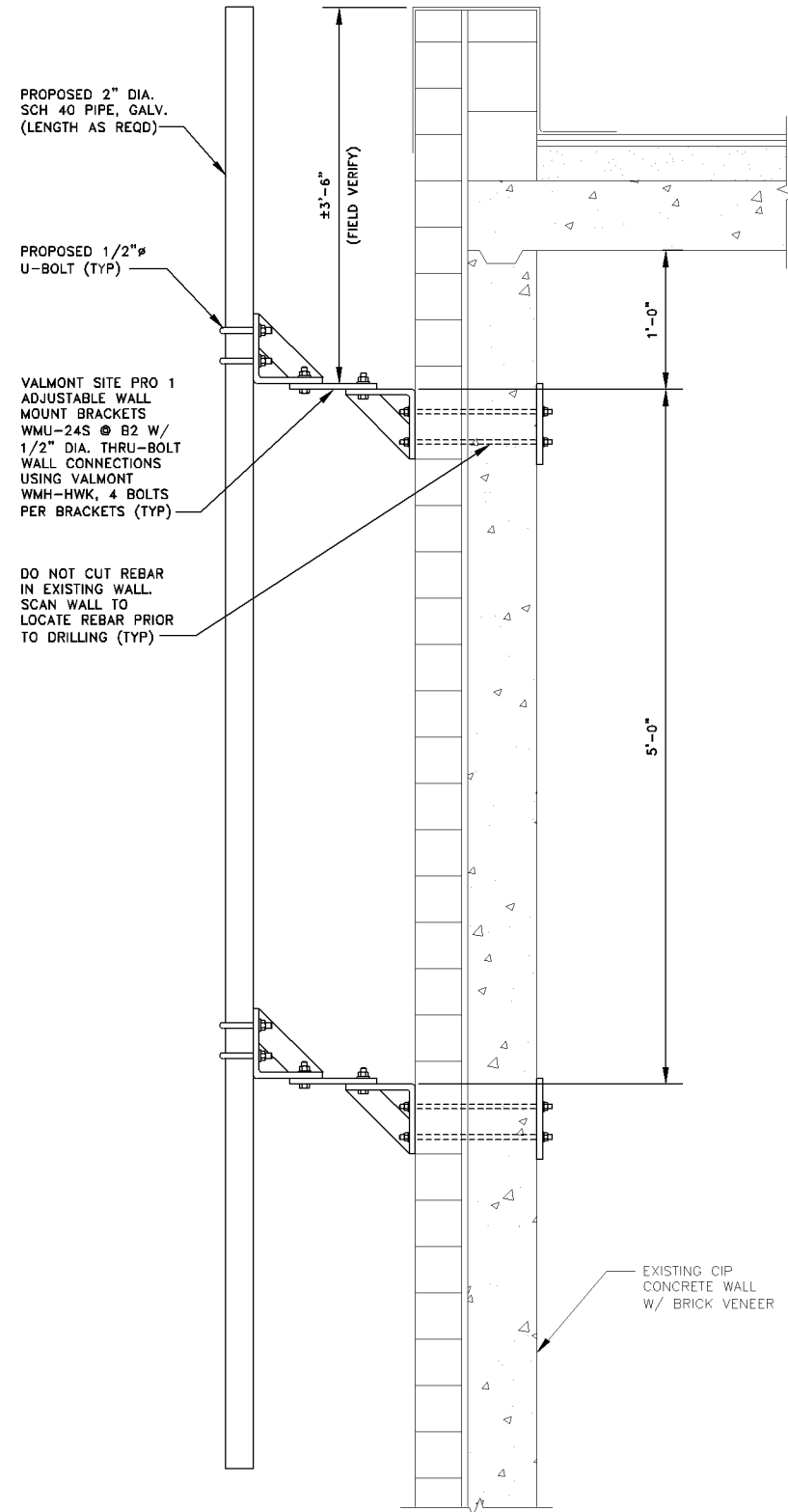
NOT USED

NO SCALE

2

NOTE:

1. FIELD VERIFY THAT WALL THICKNESS IS COMPATIBLE WITH THRU-BOLT HARDWARE KIT PRIOR TO PURCHASE. IF WALL IS TOO THICK FOR STD KIT, PROVIDE 1/2" DIAMETER A36 THREADED ROD (GALV) WITH 3/8" THICK A36 STEEL PLATE (GALV) ON INSIDE FACE OF WALL.
2. ANTENNA NOT SHOWN FOR CLARITY.

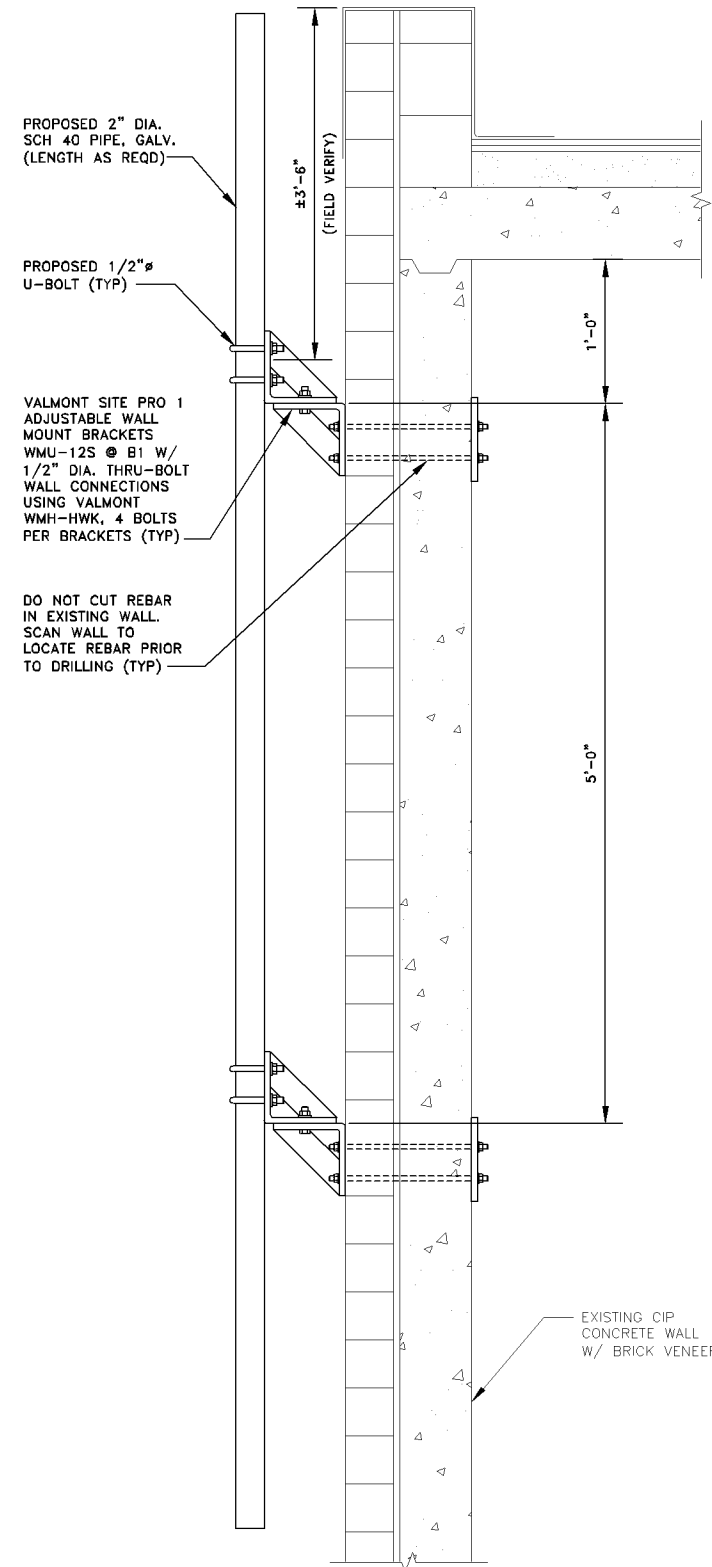


PROPOSED VALMONT
SITE PRO 1 ANTENNA POLE
MOUNT (P/N: WMU-24S)

CASE PL201700057

NOTE:

1. FIELD VERIFY THAT WALL THICKNESS IS COMPATIBLE WITH THRU-BOLT HARDWARE KIT PRIOR TO PURCHASE. IF WALL IS TOO THICK FOR STD KIT, PROVIDE 1/2" DIAMETER A36 THREADED ROD (GALV) WITH 3/8" THICK A36 STEEL PLATE (GALV) ON INSIDE FACE OF WALL.
2. ANTENNA NOT SHOWN FOR CLARITY.



PROPOSED VALMONT
SITE PRO 1 ANTENNA POLE
MOUNT (P/N: WMU-12S)

**AT&T
MOBILITY**

901 MARQUETTE AVENUE
MINNEAPOLIS, MN 55402



BLACK & VEATCH

BLACK & VEATCH CORPORATION
7760 FRANCE AVENUE SOUTH
SUITE 1200
BLOOMINGTON, MN 55435

PROJECT NO: 129041.9383

DRAWN BY: SAN

CHECKED BY: MK

REV	DATE	DESCRIPTION
0	02/23/17	ISSUED FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: ROBLEY A. EVANS

SIGNATURE: *[Signature]*

DATE: 02/23/2017 LICENSE# 43119
EXP. 6/18

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

MALL OF AMERICA
MNLO3123
2051 KILLEBREW DR
BLOOMINGTON, MN 55454
BWE LTE

SHEET TITLE
STRUCTURAL DETAILS

SHEET NUMBER
S-1