

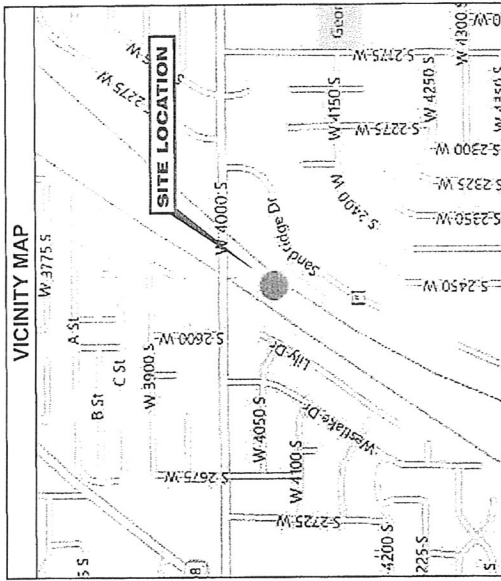
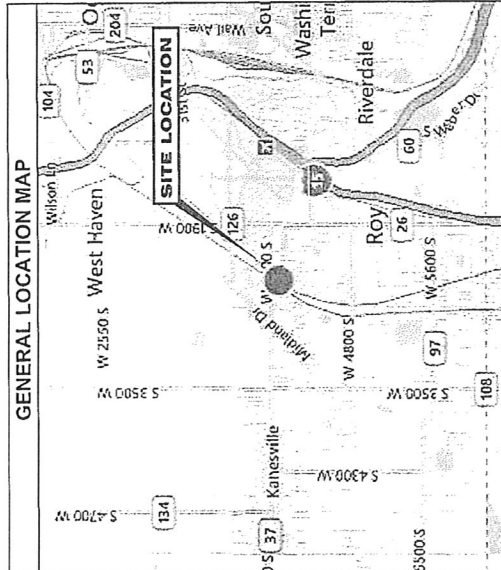
THE INFORMATION CONTAINED HEREIN IS FOR THE EXCLUSIVE USE OF THE CLIENT AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER.

# T-Mobile

**SL01807A**  
**SPRINT KWIK CITY**  
 2449 WEST 4000 SOUTH  
 ROY, UT 84067

NO SITE WORK WAS CONDUCTED FOR THIS PROJECT. THE INFORMATION CONTAINED HEREIN IS FOR THE EXCLUSIVE USE OF THE CLIENT AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER.

**SCOPE OF WORK**  
 T-MOBILE IS PROPOSING TO REMOVE SIX (6) ANTENNAS, THREE (3) TMAs, AND SIX (6) LINES OF COAX. T-MOBILE IS PROPOSING TO INSTALL SIX (6) NEW ANTENNAS, THREE (3) NEW TMAs, AND ONE (1) NEW FIBER CABLE. FINAL CONFIGURATION WILL BE SIX (6) ANTENNAS, THREE (3) TMAs, TWELVE (12) LINES OF COAX AND ONE (1) FIBER CABLE.



**MODERNIZATION EQUIPMENT LIST**

SECTOR	TYPE	MODEL	QUANTITY
ALPHA	ANTENNA	ERICSSON AIR 21	2
ALPHA	TMA	ANDREW TWIN AWS	1
ALPHA	COAX	7/8" - 130'	4
BETA	ANTENNA	ERICSSON AIR 21	2
BETA	TMA	ANDREW TWIN AWS	1
BETA	COAX	7/8" - 130'	4
GAMMA	ANTENNA	ERICSSON AIR 21	2
GAMMA	TMA	ANDREW TWIN AWS	1
GAMMA	COAX	7/8" - 130'	4
SITE	FIBER	9X18 FAL HYBRID	1

**APPROVALS**

APPROVED BY	PRINT NAME	INITIALS	DATE
PROJECT MANAGER			
RF ENGINEER			
OPS MANAGER			
CONSTRUCTION			
LANDLORD			

**CONTACT INFORMATION**

STRUCTURE OWNER  
 CROWN CASTLE INTERNATIONAL  
 5350 NORTH 48TH ST. STE. 305  
 CHANDLER, AZ 85226-5141

NETWORK SYSTEMS OWNER  
 T-MOBILE  
 121 WEST ELECTION RD. STE. 330  
 DRAPER, UT 84020

SITE ACQUISITION FIRM  
 RAGE DEVELOPMENT LLC  
 2181 HUGO AVENUE  
 SALT LAKE CITY, UT 84117

AME FIRM  
 STILLWATER MANAGEMENT, LLC  
 2977 CONNOR STREET  
 SALT LAKE CITY, UT 84109



DATE: 10-30-2012  
 DRAWN BY: CJS (STILLWATER)  
 CHECKED BY: ROCKY SCHUTTER

**REVISIONS**

DATE	DESCRIPTION	INT.
10-30-12	PRELIM ZDs	CJS
10-31-12	FINAL ZDs	CJS
11-01-12	PRELIM CD's	CJS
11-15-12	FINAL CD's	CJS

CROWN CASTLE SITE:  
 880584  
 KWIK CITY  
 MUFFLER

T-MOBILE SITE:  
 SL01807A  
 SPRINT KWIK CITY

SITE ADDRESS:  
 2449 WEST 4000 SOUTH  
 ROY, UT 84067

DRAWING NO.:  
 T-1

DRAWING TITLE:  
 T-1

TITLE SHEET

**GENERAL CONSTRUCTION NOTES**

1. DRAWINGS WERE PREPARED FROM STANDARDIZED DETAILS DEVELOPED AND PROVIDED BY T-MOBILE WEST, LLC ("T-MOBILE"). STANDARDIZED DETAILS ARE TO BE CONFIRMED AND CORRELATED AT THE SITE BY THE CONTRACTOR. STANDARDIZED DETAILS THAT REQUIRE MODIFICATIONS DUE TO ACTUAL FIELD CONDITIONS AND REQUIREMENTS MUST BE SUBMITTED TO, AND APPROVED BY, T-MOBILE PRIOR TO START OF WORK.
2. DRAWINGS ARE NOT TO BE SCALED. WRITTEN DIMENSIONS TAKE PRECEDENCE. THIS SET OF DOCUMENTS IS INTENDED TO BE USED FOR DIAGRAM PURPOSES ONLY. UNLESS OTHERWISE NOTED, THE CONTRACTOR IS RESPONSIBLE FOR ALL DIMENSIONS.
3. THE GENERAL CONTRACTOR'S SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR, AND ANY REQUIREMENTS DEEMED NECESSARY TO COMPLETE INSTALLATION AS DESCRIBED IN THE DRAWINGS AND AS DISCUSSED ON THE SITE WALK.
4. PRIOR TO THE SUBMISSION OF BIDS, CONTRACTORS INVOLVED SHALL VISIT THE JOB SITE TO FAMILIARIZE THEMSELVES WITH ALL CONDITIONS AFFECTING THE PROPOSED PROJECT. CONTRACTORS SHALL VISIT THE CONSTRUCTION SITE WITH THE CONSTRUCTION DOCUMENTS TO VERIFY FIELD CONDITIONS AND CONFIRM THAT THE PROJECT WILL BE ACCOMPLISHED AS SHOWN. PRIOR TO PROCEEDING WITH CONSTRUCTION, ANY ERRORS, OMISSIONS, OR DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF T-MOBILE VERBALLY AND IN WRITING.
5. THE GENERAL CONTRACTOR SHALL RECEIVE WRITTEN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS.
6. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO MANUFACTURER'S/SAVENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. ALL WORK PERFORMED ON THE PROJECT AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK.
9. GENERAL CONTRACTOR SHALL PROVIDE, AT THE PROJECT SITE, A FULL SET OF CONSTRUCTION DOCUMENTS UPDATED WITH THE LATEST REVISIONS AND ADDENDA OR CLARIFICATIONS FOR USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
10. THE STRUCTURAL COMPONENTS OF ADJACENT CONSTRUCTION OR FACILITIES ARE NOT TO BE ALTERED BY THIS CONSTRUCTION PROJECT UNLESS NOTED OTHERWISE.
11. CONTRACTOR TO SEAL ALL PENETRATIONS THROUGH FIRE-RATED AREAS WITH UL LISTED OR FIRE MARSHALL APPROVED MATERIALS IF APPLICABLE TO THIS FACILITY AND OR PROJECT SITE.

12. CONTRACTOR TO PROVIDE A PORTABLE FIRE EXTINGUISHER WITH A RATING OF NOT LESS THAN 2-A OR 2-A10BC, WITHIN 75 FEET TRAVEL DISTANCE TO ALL PORTIONS OF PROJECT AREA DURING CONSTRUCTION.
13. CONTRACTOR SHALL MEET ALL OSHA REQUIREMENTS FOR ALL INSTALLATIONS.
14. CONTRACTOR TO VERIFY LOCATION OF ALL BURIED UTILITIES PRIOR TO EXCAVATION.
15. CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
16. CONTRACTOR SHALL KEEP GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, AND RUBBISH. CONTRACTOR SHALL REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY OR PREMISES. SITE SHALL BE LEFT IN CLEAN CONDITION DAILY AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
17. THE ARCHITECTS/ENGINEERS HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. CONTRACTORS BIDDING THE JOB ARE NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS. THE BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) T-MOBILE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO SUBMISSION OF CONTRACTOR'S PROPOSAL. IN THE EVENT OF DISCREPANCIES THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED OTHERWISE.
18. THE CONTRACTOR SHALL PERFORM WORK DURING OWNER'S PREFERRED HOURS TO AVOID DISTURBING NORMAL BUSINESS.
19. THE CONTRACTOR SHALL PROVIDE T-MOBILE CORPORATION PROPER INSURANCE CERTIFICATES NAMING T-MOBILE WEST, LLC AS ADDITIONAL INSURED, AND T-MOBILE WEST, LLC PROOF OF LICENSE(S) AND PL & PD INSURANCE.

**CODE COMPLIANCE**

- ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT CONDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.
- A. UTAH UNIFORM BUILDING STANDARD ACT RULES
  - B. 2006 NATIONAL ELECTRIC CODE (NEC)
  - C. 2009 INTERNATIONAL BUILDING CODE (IBC)
  - D. 2006 NATIONAL FIRE PROTECTION ASSOCIATION (NFPA 101)
  - E. 2009 INTERNATIONAL MECHANICAL CODE (IMC)
  - F. LOCAL BUILDING CODE
  - G. CITY OR COUNTY ORDINANCES

**IMPORTANT NOTICE**

THE EXISTING CONDITIONS REPRESENTED HEREIN ARE BASED ON VISUAL OBSERVATIONS AND INFORMATION PROVIDED BY OTHERS. STILLWATER MANAGEMENT CANNOT GUARANTEE THE CORRECTNESS NOR THE COMPLETENESS OF THE EXISTING CONDITIONS SHOWN AND ASSUMES NO RESPONSIBILITY THEREOF. THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY ALL EXISTING CONDITIONS AS REQUIRED FOR PROPER COMPLETION OF THE PROJECT.

•• 41 •• Mobile






DATE: 10-30-2012	
DRAWN BY: CJS (STILLWATER)	
CHECKED BY: ROCKY SCHUTER	
<b>REVISIONS</b>	
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10-31-12	FINAL 27% CJS
11-8-12	PRELIM CD% CJS
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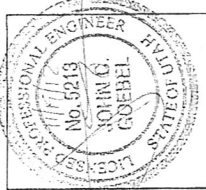
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	KWIK CITY
	MUFFLER
T-MOBILE SITE:	
	SLO1807A
	SPRINT KWIK CITY
SITE ADDRESS:	
	2419 WEST 4000 SOUTH
	ROY, UT 84067

DRAWING TITLE: GENERAL NOTES

DRAWING NO: N-1



••T-Mobile••



DATE: 10/30/2012  
DRAWN BY: CJS (STILLWATER)  
CHECKED BY: ROCKY SCHUTTER

DATE	DESCRIPTION	INT.
10/30/12	PRELIM ZDs	CJS
10/31/12	FINAL ZDs	CJS
11/08/12	PRELIM CDs	CJS
11/15/12	FINAL CDs	CJS

CROWN CASTLE SITE:  
880534  
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MUFFLER

T-MOBILE SITE:  
SL01807A  
SPRINT KWIK  
CITY

SITE ADDRESS:  
2449 WEST 4000 SOUTH  
ROY, UT 84067

DRAWING NO.:  
A-2

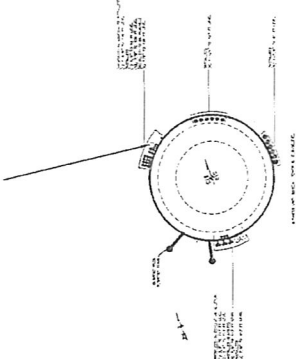
TITLE:  
EQUIPMENT  
SITE PLAN

### KEY NOTES

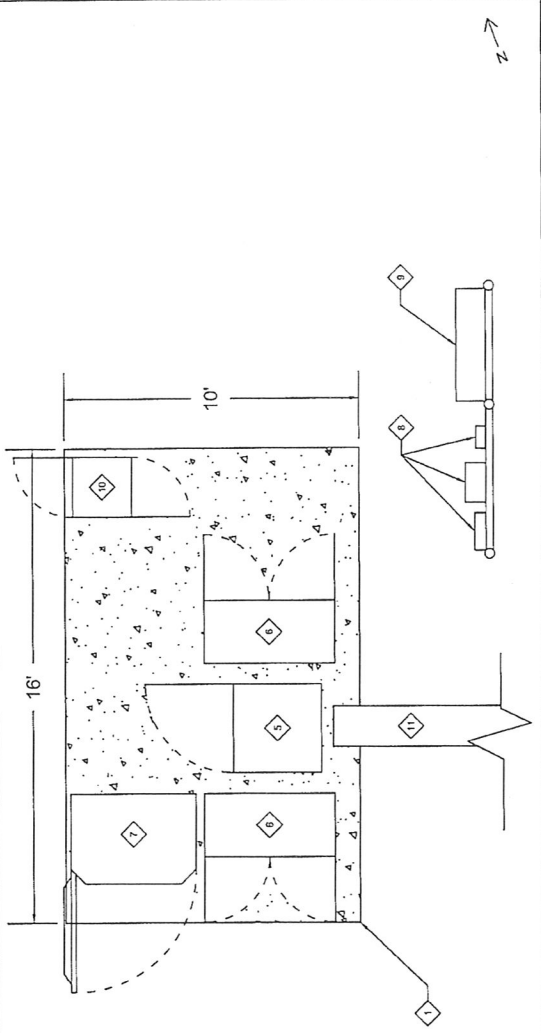
- 1 T-MOBILE LEASE AREA
- 2 EXISTING MONOPOLE
- 3 SIX (6) PROPOSED ERICSSON AIR 21 ANTENNAS
- 4 SIX (6) EXISTING ANDREW ANTENNAS (TO BE REMOVED)
- 5 DOGHOUSE
- 6 TWO (2) NORTEL 2G CABINETS
- 7 ERICSSON RBS 3106 CABINET
- 8 POWER EQUIPMENT MOUNTED ON H-FRAME
- 9 TELCO BOX MOUNTED ON H-FRAME
- 10 BATTERY CABINET
- 11 ICE BRIDGE
- 12 THREE (3) EXISTING ANDREW TMS (TO BE REMOVED)
- 13 THREE (3) PROPOSED ANDREW TMS

### SITE NOTES

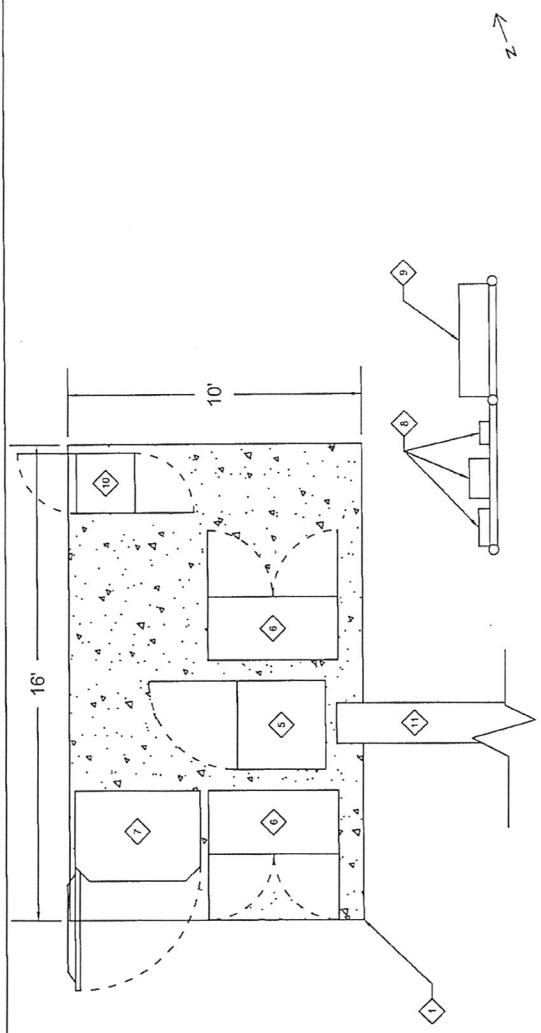
- 1. NEW FIBER CABLE TO BE RUN UP THE TOWER AT THE LOCATION SPECIFIED BELOW.



### EXISTING EQUIPMENT SITE PLAN



### PROPOSED EQUIPMENT SITE PLAN



DATE: 10-30-2012  
 DRAWN BY: CJS (STILLWATER)  
 CHECKED BY: ROCKY SCHLUTER

REVISIONS	DATE	DESCRIPTION	INT.
	10-30-12	PRELIM CD#	CJS
	10-31-12	FINAL CD#	CJS
	11-8-12	PRELIM CD#	CJS
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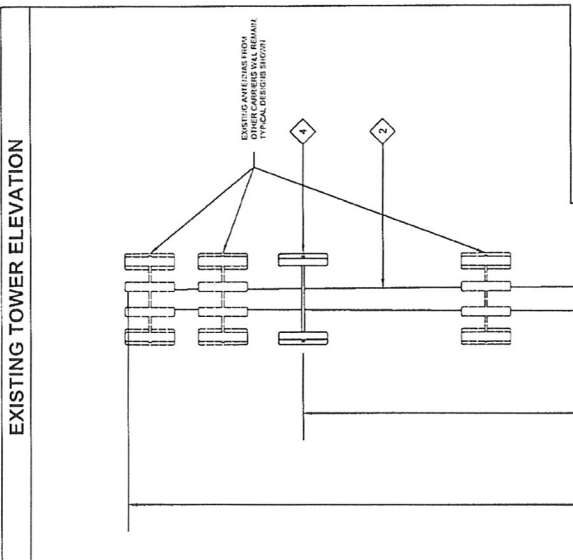
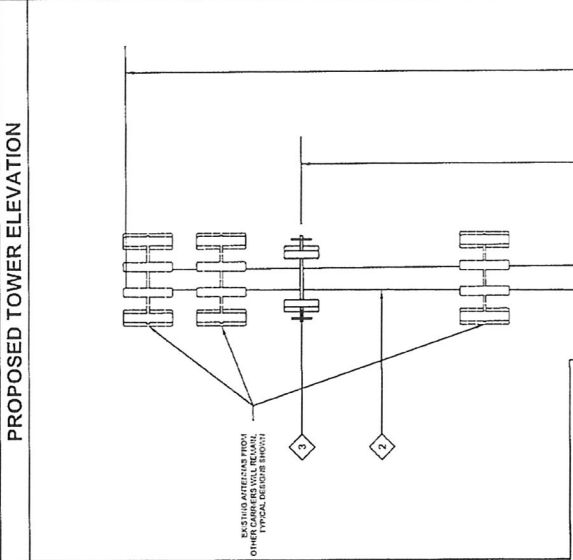
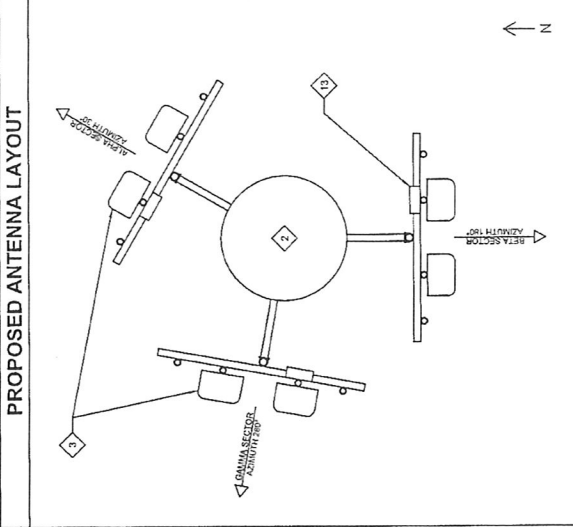
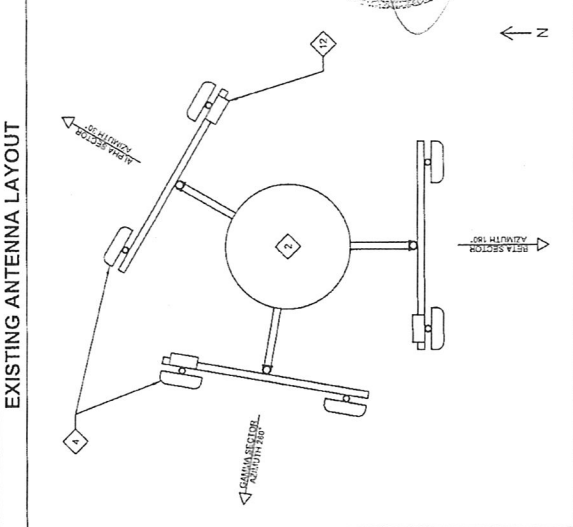
CROWN CASTLE SITE:  
 880534  
 KWIK CITY  
 MUFFLER

T-MOBILE SITE:  
 SL01807A  
 SPRINT KWIK  
 CITY

SITE ADDRESS:  
 2448 WEST 4000 SOUTH  
 ROY, UT 84067

DRAWING NO.:  
 A-3

TITLE:  
 TOWER  
 ELEVATION  
 AND PLAN



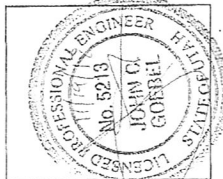
- KEY NOTES**
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  - 11 ICE BRIDGE
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  - 13 THREE (3) PROPOSED ANDREW TMAs

...p...Mobile

**CROWN CASTLE**

**RAGE**  
DEVELOPMENT LLC

stillwater  
**management**



DATE: 10-30-2012  
DRAWN BY: CJS (STILLWATER)  
CHECKED BY: ROCKY SCHUELER

REVISIONS	
DATE	DESCRIPTION
10-30-12	PRELIM CDS
10-31-12	FINAL CDS
11-8-12	PRELIM CDS
11-15-12	FINAL CDS

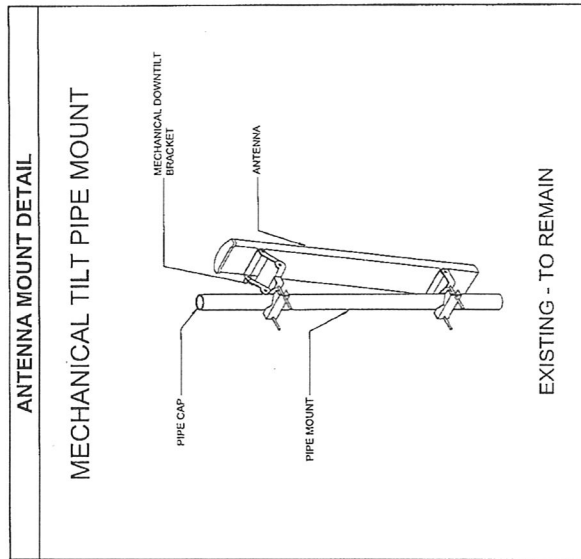
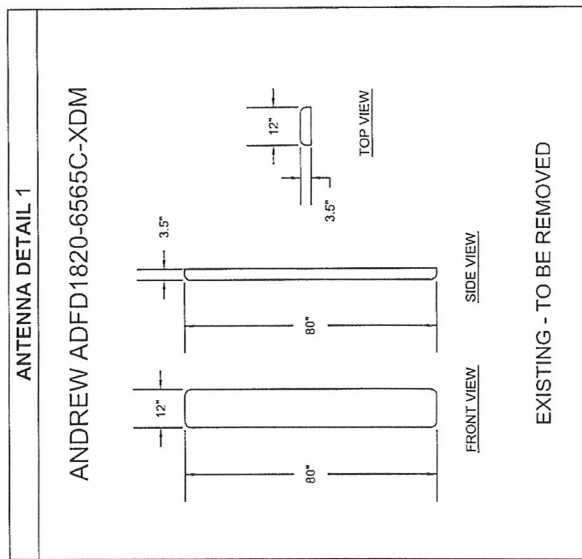
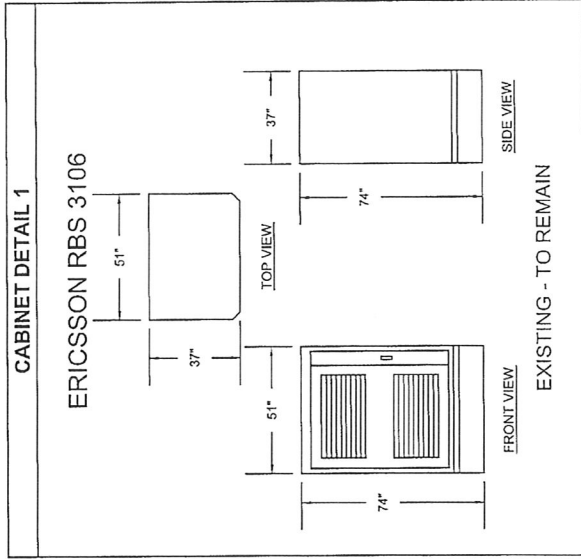
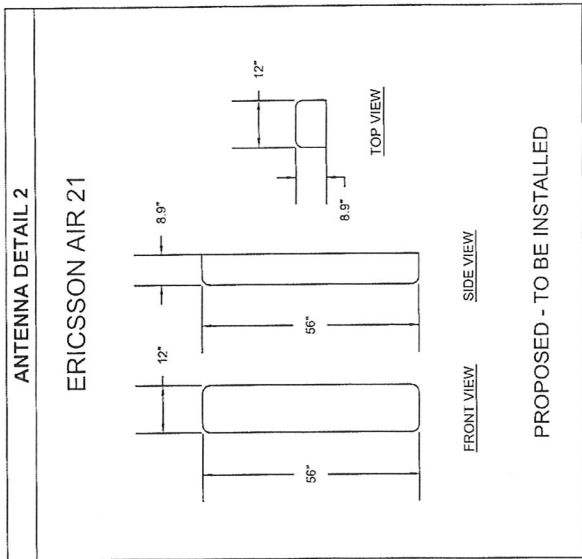
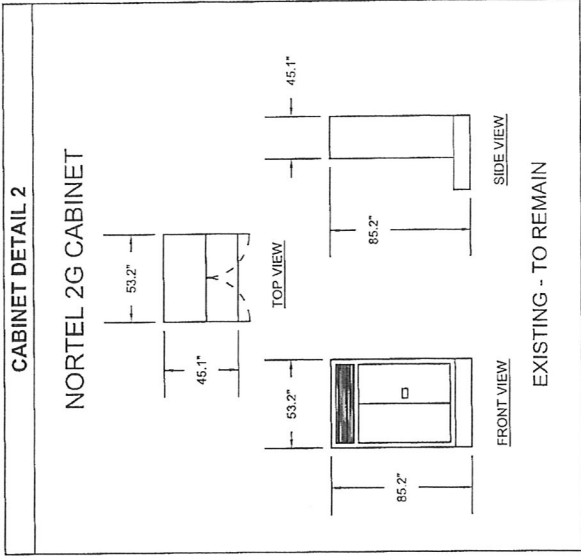
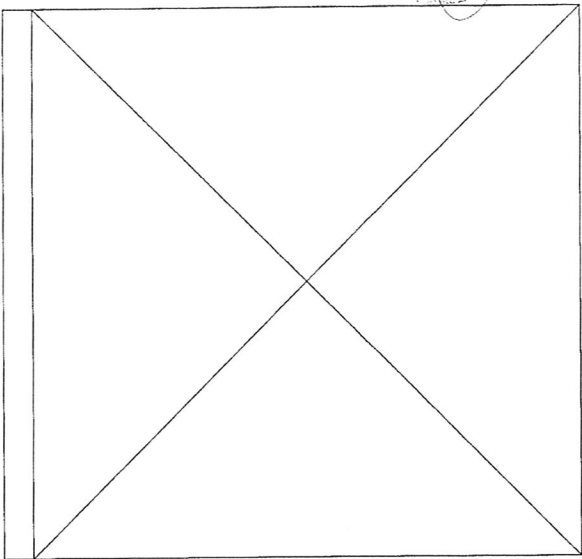
CROWN CASTLE SITE:  
880534  
KWIK CITY  
MUFFLER

T-MOBILE SITE:  
SLO1807A  
SPRINT KWIK  
CITY

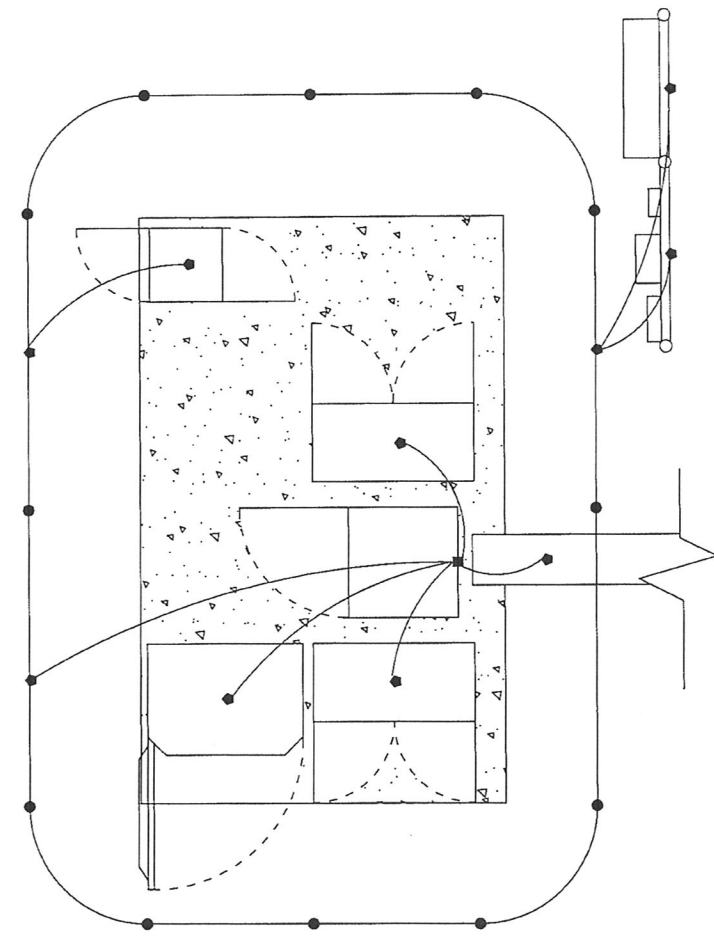
SITE ADDRESS:  
2449 WEST 4000 SOUTH  
ROY, UT 84067

DRAWING NO.:  
E-1

DRAWING TITLE:  
EQUIPMENT  
DETAIL



**GROUNDING PLAN**



NOTE: TYPICAL GROUNDING PLAN SHOWN. CONTRACTOR TO TIE ANY NEW EQUIPMENT INTO EXISTING GROUNDING PLAN

**GROUNDING NOTES**

1. ALL SAFETY GROUNDING OF THE ELECTRICAL EQUIPMENT SHALL BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT REVISION OF NEC.
2. ALL DETAILS ARE SHOWN IN GENERAL TERMS. ACTUAL INSTALLATION AND SITE CONSTRUCTION MAY VARY DUE TO SITE SPECIFIC CONDITIONS. IF SITE SOIL CONDITIONS ARE CORROSIVE, USE OF A LARGER MAIN GROUND RING CONDUCTOR MAY BE NECESSARY.
3. GROUND ALL ANTENNA BASES, FRAMES, CABLE RUNS, AND OTHER METALLIC COMPONENTS USING GROUND WIRES AND CONNECT TO SURFACE MOUNTED BUS BARS. FOLLOW ANTENNA AND B/S MANUFACTURERS PRACTICES FOR GROUNDING REQUIREMENTS. GROUND COAX SHIELD AT BOTH ENDS AND EXIT FROM TOWER OR MONOPOLE USING MANUFACTURERS PRACTICES.
4. ALL GROUND CONNECTIONS SHALL BE CADWELDED. ALL WIRES SHALL BE COPPER THINWALL. ALL GROUND WIRE SHALL BE SOLID COPPER WITH GREEN INSULATED WIRE ABOVE GROUND.
5. CONTRACTOR TO VERIFY AND TEST GROUND TO SOURCE TO A MAXIMUM OF 5 OHMS. IF GROUND TEST DID NOT ACHIEVE THE MAXIMUM 5 OHMS, CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ADDITIONAL GROUNDING TO OHM MAX REQUIREMENT. GROUNDING AND OTHER OPERATIONAL TESTING WILL BE WITNESSED BY A T-MOBILE REPRESENTATIVE.
6. ELECTRICAL CONTRACTOR TO PROVIDE DETAILED DESIGN OF GROUNDING SYSTEM, AND RECEIVE APPROVAL OF DESIGN BY AN AUTHORIZED T-MOBILE REPRESENTATIVE. PRIOR TO INSTALLATION OF GROUNDING SYSTEM.
7. NOTIFY T-MOBILE IF THERE ARE ANY DIFFICULTIES INSTALLING GROUND SYSTEM DUE TO SITE SOIL CONDITIONS.
8. IF SURGE SUPPRESSOR IS AN EXTERIOR MOUNT, RUN A #2 THIN GROUND WIRE IN A 1" SCHED. 40 PVC CONDUIT TO SIDE SPLICE CADWELDED AT GROUND RING. HEAT RADIUS CONDUIT TO PRODUCE LARGE RADIUS BENDS. STRAP TO SLAB AT A MINIMUM OF TWO POINTS.
9. ALL GROUNDING WIRE RUNS AND CONNECTIONS, BOTH ABOVE AND BELOW GRADE, SHALL BE LOCATED INSIDE OF THE LEASE AREA.
10. TIE NEW GROUNDING INTO EXISTING GROUND GRID IN AT LEAST TWO LOCATIONS.
11. THE INFORMATION CONTAINED IN THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO T-MOBILE SERVICES IS STRICTLY PROHIBITED.

- SYMBOL KEY**
- MECHANICAL CONNECTION
  - COPPER GROUND ROD
  - ▲ CADWELDED CONNECTION
  - GROUND BAR

DATE: 10-30-2012

DRAWN BY: CJS (STILLWATER)

CHECKED BY: ROCKY SCHUTLER

DATE	DESCRIPTION	INT.
10-30-12	PRELIM ZDS	CJS
10-31-12	FINAL ZDS	CJS
11-01-12	PRELIM CD#	CJS
11-15-12	FINAL CD#	CJS

GROWN CASTLE SITE:

880534

KWIK CITY

MUFFLER

T-MOBILE SITE:

SL01807A

SPRINT KWIK CITY

SITE ADDRESS:

2418 WEST 4000 SOUTH

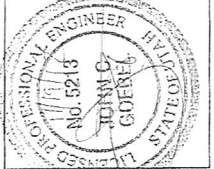
ROY, UT 84067

DRAWING NO.:

E-2







DATE: 10-30-2012	DESIGNED BY: CUS (STILLWATER)
CHECKED BY: ROCKY SCHUTER	
REVISIONS	
DATE	DESCRIPTION
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10-31-12	FINAL 2DS
11-8-12	PRELIM 02A
11-15-12	FINAL 02A

CROWN CASTLE SITE:	
880534	
KWIK CITY	
MUFFLER	
T-MOBILE SITE:	
SLO1807A	
SPRINT KWIK CITY	
SITE ADDRESS:	
2448 WEST 4000 SOUTH	
ROY, UT 84067	

DRAWING TITLE:	DRAWING NO.:
SITE NOTES:	E-4

**TYPICAL GROUNDING SYSTEM NOTES**

1. TOWER RADIAL GROUND:  
#2 SOLID COPPER WIRE CADWELDED (OR FASTENER APPROVED BY PROJECT MANAGER) TO TOWER BASE. EXTEND WIRE 30" MINIMUM IN SWEEPING CONFIGURATION AT A MINIMUM DEPTH OF 24". ALL GROUND RODS TO BE #8 COPPER OR COPPER CLAD. FIRST GROUND RODS FROM TOWER ARE TO BE PLACED 10' EQUAL DISTANCE (BETWEEN ROD CENTERS) AND A MINIMUM OF EVERY 10' ALONG TOTAL LENGTH. ALL BENDS MUST MAINTAIN A MINIMUM 12" RADIUS.
2. TOWER EQUIPMENT RING GROUND INTERCONNECT:  
ONLY ONE CONNECTION OF THIS TYPE FOR EACH TOWER. SAME CONSTRUCTION AS NOTE 1 ABOVE EXCEPT THE TERMINATION AT THE GROUNDING RING MUST BE THREE-WAY CONNECTED. ALL BENDS MUST MAINTAIN A MINIMUM 12" RADIUS.
3. EQUIPMENT BUILDING RING GROUND:  
ALWAYS OBSERVE THE TURN DIRECTIONS SHOWN WHEN PLACING BENDS OR CONNECTIONS. USE #2 SOLID COPPER WIRE PLACED WITHIN 2' (1/4" FROM EDGE OF BUILDING CONCRETE FOUNDATION AT A MINIMUM DEPTH OF 24". ALL CONNECTIONS TO GROUND RING ARE TO BE CADWELDED. ALL GROUND RODS TO BE 10' COPPER OR COPPER CLAD AND PLACED 10' EQUAL DISTANCE (BETWEEN ROD CENTERS) AND A MINIMUM OF EVERY 10' ALONG TOTAL LENGTH. ALL BENDS MUST MAINTAIN A MINIMUM 12" RADIUS.
4. SINGLE POINT GROUND BAR (COAX BULKHEAD):  
ALWAYS OBSERVE THE DIRECTIONS SHOWN WHEN PLACING BENDS OR CONNECTIONS TO GROUND RING. USE TWO #2 SOLID COPPER WIRE OR TWO 3" COPPER RIBBONS ATTACHED ON OPPOSITE ENDS OF BAR OR BULKHEAD EXTENDING DIRECTLY TO GROUND. ALL WIRE CONNECTIONS TO GROUND RING ARE TO BE CADWELDED. RIBBONS MAY BE ATTACHED TO GROUND RING WITH A "LISTED" PRESSURE CONNECTION WITH APPROVAL OF CONSTRUCTION MANAGER. ALL BENDS MUST MAINTAIN A MINIMUM 12" RADIUS.
5. EQUIPMENT SHELTER INNER BONDING RING:  
#2 SOLID COPPER WIRE CADWELDED (TO INNER BONDING RING AT A LOCATION EITHER ABOVE THE SOIL LINE OR JUST INSIDE INTERIOR OF BUILDING. ALWAYS USE PVC (NONMETALLIC) SLEEVES WHEN ENTERING THE STRUCTURE. THIS TYPE OF BOND IS REQUIRED AT EACH OUTSIDE CORNER AND AT DISTANCES NOT TO EXCEED 50' ALONG ANY STRAIGHT WALL. ALL BENDS MUST MAINTAIN A MINIMUM 12" RADIUS.
6. FENCE EQUALIZATION BOND:  
#2 SOLID COPPER WIRE CADWELDED TO BUILDING RING GROUND AND ATTACHED TO EACH INSIDE OR OUTSIDE CORNER FENCE POST AND/OR GATE POST WITH A "LISTED" WIRE CLAMP. PLACE AT A MINIMUM 12" DEPTH (SEE NOTE 11 BELOW FOR CROSSING CLEARANCES). IF METALLIC POST IS NOT SET IN CEMENT, PLACE AN ADDITIONAL #8 GROUND ROD AT POST LOCATION.
7. GATE EQUALIZATION BOND:  
#2 SOLID COPPER WIRE CADWELDED TO FENCE EQUALIZATION WIRE AND ATTACHED TO EACH GATE POST WITH A "LISTED" WIRE CLAMP. IF METALLIC POST IS NOT SET IN CEMENT, PLACE AN ADDITIONAL 10' GROUND ROD AT EACH POST LOCATION.
8. POWER/TELEPHONE TRENCH UTILITIES CAN EITHER BE PLACED IN SAME TRENCH (NEC RANDOM SEPARATION) OR IN SEPARATE TRENCH AT A 36" DEPTH. ALWAYS PLACE THESE FACILITIES BELOW WHILE MAINTAINING A 36" HORIZONTAL SEPARATION AND A 12" VERTICAL SEPARATION FROM ANY RADIAL OR RING GROUND SYSTEMS IN, ON, OR ADJACENT TO THE RADIO SITE.
9. POWER/TELEPHONE ENTRANCE:  
THE BUILDING RING GROUND MEETS OR EXCEEDS THE NEC ARTICLE 250 UTILITY PROTECTION GROUND. THEREFORE, INFORM LOCAL INSPECTOR THAT ADDITIONAL GROUND RODS ARE NOT REQUIRED. ALL UTILITY GROUNDS MAY BE ATTACHED TO THE #2 SOLID COPPER WIRE DETAILED IN NOTE 10 BELOW. IF LOCAL POWER COMPANY CODES REQUIRE AN ADDITIONAL GROUND ROD, BOND THE TWO FACILITIES TOGETHER AT THIS LOCATION.
10. UTILITY GROUNDING ELECTRODE BOND:  
USE #2 SOLID COPPER WIRE PLACED WITHIN 3" OF UTILITY ENTRANCE AT DEMARCATION CABINET ENTRY PORT. ALL CONNECTIONS TO GROUND RING ARE TO BE CADWELDED. CONNECTION TO DEMARCATION CABINET ENTRY PORT TO BE WITH A "LISTED" CONNECTION. ALL BENDS MUST MAINTAIN A MINIMUM 12" RADIUS.
11. RADIAL GROUND/FENCE BOND CROSSINGS:  
WHEREVER PRACTICAL, TO REDUCE MAGNETIC COUPLING, THESE FACILITIES MUST CROSS AT A 90 DEGREE ANGLE WHILE MAINTAINING 18" VERTICAL SEPARATION.
12. COAX GROUNDING KITS:  
USE INDIVIDUAL "LISTED" GROUNDING KITS FOR EACH COAX CABLE. BOND TO TOWER BONDING BUSS BAR WITH #2 THIN SOLID COPPER WIRE WITH 2 HOLE CRIMPED CONNECTIONS.
13. GROUNDING BUSS BAR KIT:  
THE GROUNDING BUSS BAR AND ATTACHMENT KIT MUST BE DIRECTLY BOLTED TO THE TOWER STRUCTURE WITHOUT ELECTRICAL INSULATORS.
14. ICE BRIDGE BONDING:  
THE ICE BRIDGE SHOULD NOT BE BONDED TO THE TOWER STRUCTURE. IT SHOULD ONLY BE BONDED AT ONE END TO THE ENTRANCE BULKHEAD (SINGLE POINT GROUND BAR). USE #2 THIN SOLID COPPER WIRE WITH 2 HOLE CRIMPED CONNECTIONS.
15. RADIO BAY TO COAX BULKHEAD BOND:  
THIS IS THE ONLY CABINET TO GROUND BOND WIRE ATTACHED TO THE RADIO BAY. USE #2 THIN SOLID COPPER WIRE WITH 2 HOLE CRIMPED CONNECTIONS OR A 3" COPPER STRAP.
16. RADIO BAY ISOLATION KIT:  
CONTACT RADIO EQUIPMENT SUPPLIER FOR SPECIFICATION AND INSTALLATION PROCEDURES.

**CABLING IDENTIFICATION**

- THE FOLLOWING DESCRIBES THE PROCEDURE FOR MARKING AND IDENTIFYING ANTENNA CABLING:
1. LOCATION: MARKINGS SHALL BE MADE BY USE OF 3M COLORED, TWO-INCH WIDE TAPE AFFIXED AT TYPICALLY FOUR PLACES ON THE CABLE RUN AS FOLLOWS:
    - A) ON THE COAX AT THE CONNECTOR NEAREST THE ANTENNA WHERE THE COAX AND JUMPER ARE CONNECTED
    - B) AT THE END OF THE TOWER STRUCTURE (FOR TOWERS ONLY)
    - C) AT A POINT OUTSIDE THE BAYS
    - D) AT CONNECTION POINT INSIDE THE BAYS
  2. SECTOR IDENTIFICATION: A SITE CAN HAVE MULTIPLE SECTORS. SECTORS SHALL BE DESIGNATED BY NUMBERING EACH IN A CLOCKWISE MANNER (THE FIRST SECTOR IS THE ONE CLOSEST TO ZERO DEGREES, OR NORTH).
    - A) SECTOR #1 COAX WILL HAVE ONE BAND OF RED COLORED TAPE.
    - B) SECTOR #2 COAX WILL HAVE ONE BAND OF WHITE COLORED TAPE.
    - C) SECTOR #3 COAX WILL HAVE ONE BAND OF BLUE COLORED TAPE.
  3. FOR MORE THAN ONE ANTENNA PER SITE THE FOLLOWING WILL BE ADHERED TO:
 

FACING THE BACK OF THE ANTENNA, STARTING FROM YOUR LEFT ANTENNA, MARK IT WITH ONE BAND, MOVING RIGHT ON THE SAME SECTOR TO THE NEXT ANTENNA, MARK IT WITH TWO BANDS OF COLORED TAPE. CONTINUE WITH THE SAME METHOD FOR AS MANY ANTENNAS YOU HAVE FOR EACH SECTOR. REPEAT THIS FOR EVERY SECTOR.

IN ADDITION TO THE COLORED TAPE APPLY PERMANENT MARKINGS AS FOLLOWS:

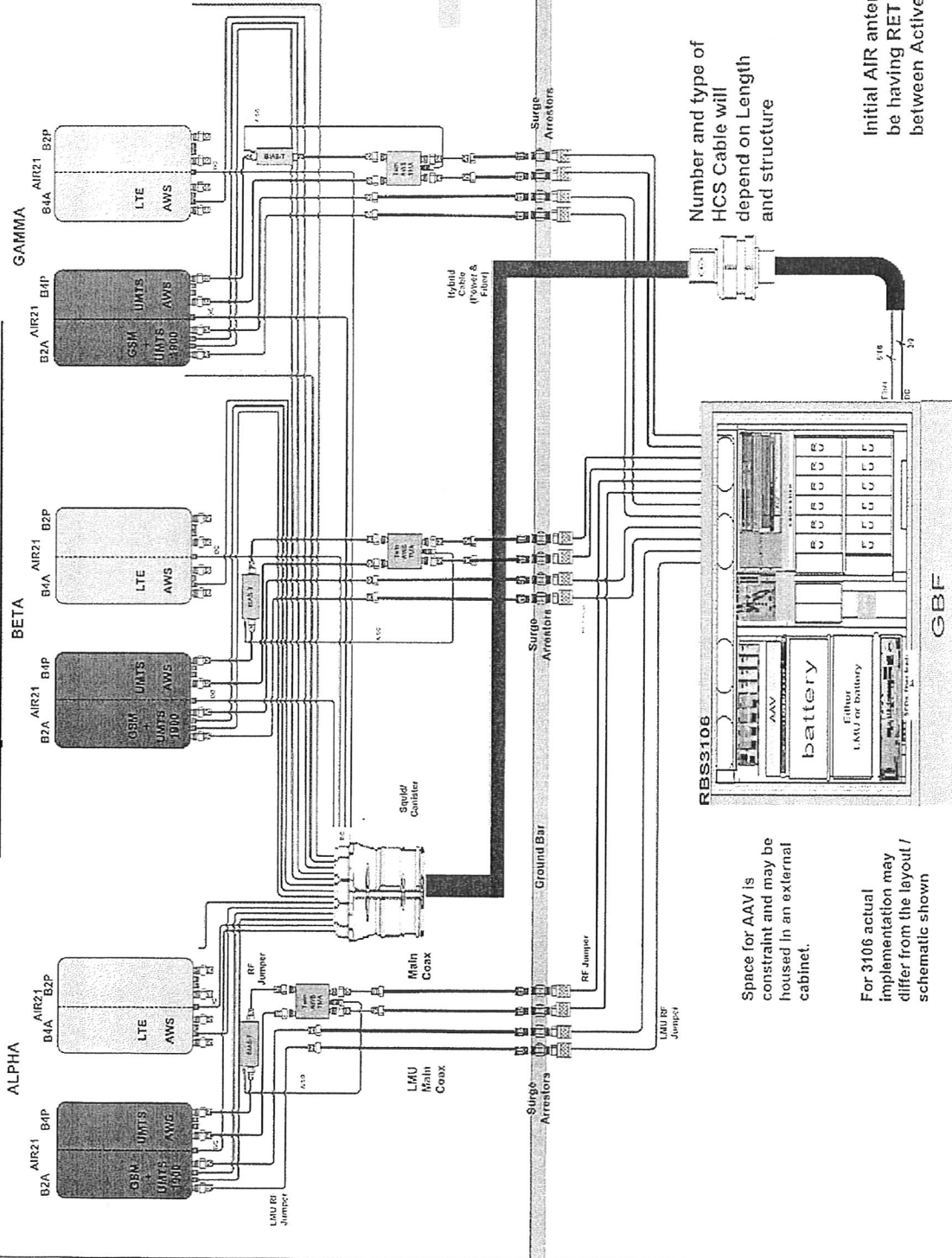
ONE INCH BRASS ROUND TAGS MARKED WITH PRINCIPAL (P1), PRINCIPAL 2 (P2), PRINCIPAL 3 (P3), DIVERSITY 1 (D1), DIVERSITY 2 (D2), AND DIVERSITY 3 (D3) TO BE ATTACHED BY A FOURTEEN (14) GAUGE BLACK ELECTRICAL WIRE.
  - 4.

**SWEEP TEST PROCEDURE**

- THE FOLLOWING DESCRIBES THE TEST AND FAULT FINDING PROCEDURE FOR ALL ANTENNAS:
1. TEST EQUIPMENT SHOULD CONSIST OF A SWEEP OSCILLATOR SET TO RUN BETWEEN 1800 AND 2000 MHZ. DIRECTIONAL COUPLER WITH AT LEAST 35 DB DIRECTIVITY AND SCALAR NETWORK ANALYZER WITH RESOLUTION OF BETTER THAN 0.2 DB. A MATCHED 50 OHM LOAD AND SHORT CIRCUIT TERMINATION ARE ALSO REQUIRED.
  2. SET UP THE RETURN LOSS MEASURING SET AS PER THE MANUFACTURERS' INSTRUCTIONS AND CALIBRATE WITH THE SHORT (ODB RETURN LOSS VSWR = INFINITY).
  3. INFORM T-MOBILE OPERATIONS PERSONNEL AT THE SWITCH THAT SWEEP TESTS ARE TO BEGIN AT THIS SITE SO THEY CAN DISABLE TRANSMISSION TO AVOID POTENTIAL TRX DAMAGE WITH THE ANTENNA PORT OPEN.
  4. COMPOSITE RETURN LOSS: DISCONNECT THE BOTTOM JUMPER AT THE BAYS AND CONNECT IT TO THE MAIN PORT OF THE BRIDGE. RETURN LOSS OF THE COMPOSITE JUMPERS, FEEDER AND ANTENNA SHOULD BE < 1.4DB (VSWR > 1.5:1) BETWEEN 1800 AND 2000 MHZ.
  5. FEEDER RETURN LOSS: TURN OFF THE SWEEP GENERATOR, DISCONNECT THE TOP JUMPER AT THE ANTENNA AND CONNECT A DUMMY LOAD TO THE END OF THE JUMPER AND FEEDER. MEASURE THE RETURN LOSS. LOOKING INTO THE BOTTOM JUMPER THE RETURN LOSS SHOULD NOT EXCEED 1.8DB (VSWR > 1.5:1) BETWEEN 1800 AND 2000 MHZ.
  6. FEEDER INSERTION LOSS: REPLACE THE LOAD WITH A SHORT CIRCUIT TERMINATION AND MEASURE THE MAXIMUM AND MINIMUM RETURN LOSS BETWEEN 1800 AND 2000 MHZ. ADD THESE TOGETHER AND DIVIDE BY 4 TO GIVE THE AVERAGE ONE-WAY INSERTION LOSS WHICH SHOULD BE < 3 DB.
  7. IF THE CONDITIONS IN 4, 5 AND 6 ARE MET, THE TEST IS COMPLETE. IF ITEM 4 FAILED BUT 5 AND 6 PASSED, REPLACE THE ANTENNA AND RETEST. IF ITEMS 5 OR 6 FAILED, MEASURE RETURN LOSS OF MAIN FEEDER ONLY. IF RETURN LOSS IMPROVES TO -20 OR BETTER OR INSERTION LOSS IMPROVES BY MORE THAN 2DB, REPLACE OR RETERMINATE THE FEEDER. OTHERWISE REPLACE THE MAIN FEEDER. NOTIFY T-MOBILE OF ANY FAULTY HARDWARE.
- ALL TEST RESULTS SHOULD BE CLEARLY MARKED WITH SITE, FEEDER NUMBER, DATE AND MEASUREMENT TIME.

ANTENNA DIAGRAM

Site Configuration 2C – AIR Based with RBS3106



HW or cables that will be added in 2013

Number and type of HCS Cable will depend on Length and structure

Initial AIR antenna delivery will not be having RET interconnectivity between Active and passive side

					DATE: 10-30-2012 DRAWN BY: CJS (STILWATER) CHECKED BY: ROCKY SQUILLIERE	<b>REVISIONS</b> <table border="1"> <tr> <th>DATE</th> <th>DESCRIPTION</th> <th>INTL.</th> </tr> <tr> <td>10-30-12</td> <td>PRELIM ZDS</td> <td>CJS</td> </tr> <tr> <td>10-31-12</td> <td>FINAL ZDS</td> <td>CJS</td> </tr> <tr> <td>11-8-12</td> <td>PRELIM CDS</td> <td>CJS</td> </tr> <tr> <td>11-15-12</td> <td>FINAL CDS</td> <td>CJS</td> </tr> </table>	DATE	DESCRIPTION	INTL.	10-30-12	PRELIM ZDS	CJS	10-31-12	FINAL ZDS	CJS	11-8-12	PRELIM CDS	CJS	11-15-12	FINAL CDS	CJS	CROWN CASTLE SITE: 880534 KWIK CITY MUFFLER	T-MOBILE SITE: SLOT1807A SPRINT KWIK CITY	SITE ADDRESS: 2449 WEST 4000 SOUTH ROY, UT 84067	DRAWING NO.: <b>E-5</b>
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11-15-12	FINAL CDS	CJS																							

Space for AAV is constraint and may be housed in an external cabinet.

For 3106 actual implementation may differ from the layout / schematic shown