

FIRST AMENDMENT TO
LICENSE AGREEMENT BETWEEN THE CITY OF ANN ARBOR AND
SPRINT SPECTRUM L.P., A DELAWARE LIMITED PARTNERSHIP
(Sprint Site ID #DE49XC513)

THIS FIRST AMENDMENT TO LICENSE AGREEMENT (“First Amendment”) is made as of the ___ day of _____, 2014, by and between the City of Ann Arbor, a Michigan municipal corporation, whose address is 301 East Huron Street, Ann Arbor, Michigan (“Licensor”) and Sprint Spectrum L.P., a Delaware limited partnership, (“Licensee”), whose address is 6391 Sprint Parkway, Overland Park, KS 66251.

WHEREAS, Licensor and Licensee entered into a License Agreement dated September 11, 2000, to permit Licensee to erect and use telecommunications equipment (“Equipment”) on the property located at 2011 Manchester Road, Ann Arbor, MI, more commonly known to Licensor as the Manchester Water Tower Site (“Site”), which License Agreement was modified by an Interim Addendum dated December 16, 2013 (“Interim Addendum”), to allow replacement of certain equipment to be covered by this amendment; and

WHEREAS, Licensor and Licensee desire to amend the Agreement to allow for the installation of additional antennas, associated cables and other communications instruments (“Additional Equipment”); and

WHEREAS, Licensor and Licensee agree that, as consideration for Licensee’s Additional Equipment, the current License Fee payable under the Agreement shall be increased as set forth herein; and

WHEREAS, Licensor and Licensee desire to amend the Agreement to add or modify provisions, including provisions related to notice; and

WHEREAS, Licensor and Licensee, in their mutual interest, wish to amend the Agreement as set forth below accordingly.

NOW THEREFORE, in consideration of the foregoing and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Licensor and Licensee agree to amend the License Agreement as follows:

1. **Section 5. Use of Site** is amended by adding “**and Licensee’s Access**” to the title, by numbering the existing provisions of Section 5 as Subsection (a), by adding paragraphs at the end of Subsection (a) to provide for Licensee’s addition of equipment and a new Subsection (b) to govern Licensee’s access to the Site, both as follows, and by adding new Exhibits #2A, #3A and #4, attached:

Additional Equipment. After execution of this First Amendment by both Licensee and Licensor and subject to its provisions, Licensee shall have the right to add antennas and other facilities and equipment, all as identified in attached Exhibit #2A and as shown and described on attached Exhibit #3A design drawings (“Additional Equipment”). Licensee

shall remove antennas and other existing Equipment identified and shown as equipment to be removed on the Exhibit #3A design drawings. Licensee's Additional Equipment shall be subject to all the terms and conditions of the Agreement, unless and except as specifically modified by this First Amendment.

Future Equipment. Licensee reserves the right to replace/upgrade once within 18 months from the date of this amendment any other "Legacy Equipment," including antennas, radios and supporting equipment, without further adjustment of fees other than the 4% escalation on July 1st. Legacy Equipment is defined as the equipment currently installed as of December 11, 2013. The right to replace/upgrade shall survive the decommissioning of the Legacy Equipment. Licensee shall be required to pay all normal review and inspection fees and seek all required approvals required by the City of Ann Arbor prior to any such replacement/upgrade. The replacement/upgraded equipment will be similar to the Additional Equipment, described herein. No additional footprint is anticipated nor will there be any additional penetrations or welding without Licensor's prior approval. Licensee's Future Equipment shall be subject to all the terms and conditions of the Agreement, unless and except as specifically modified by this First Amendment.

All reference in the License Agreement to Exhibit #2 shall be deemed to include reference to Exhibit #2A, all references in the License Agreement to Exhibit #3 shall be deemed to include reference to Exhibit #3A, and all rights and obligations contained in the License Agreement relative to the Equipment shall also apply to the Additional Equipment unless clear from the context that they apply only to the original Equipment.

b) **Licensee's Access.** Licensor agrees that, during the Term of this Agreement, and provided that Licensee is not in default under any of the terms and conditions of this Agreement beyond applicable notice and cure periods, that Licensee shall be permitted access to Licensee's Equipment and Additional Equipment at the Site in accordance with the procedures set forth in Exhibit #4 (Security and Access Procedures). Licensee agrees to comply with the Security and Access Procedures, understanding that they may be changed from time to time as provided in Exhibit #4. In no event shall any additional costs or charges be added to this Agreement by virtue of such modification.

2. **Section 4. Fees and Escalator** is amended as follows:

Licensee agrees to pay Licensor \$18,000 per year for the first 5 year term ("License Fee"). This rate shall increase 20% per 5-year term thereafter.

Starting December 12, 2013, the Licensee Fee shall be increased from \$25,920.00 to \$45,000.00 and the due date for the License Fee shall be changed from September 11 to July 1 of every year. The December 12, 2013, to June 30, 2014, portion of the License Fee that was due and paid by September 11, 2013 (\$14,273.75), is credited against the Licensee Fee due for the December 12, 2013, to June 30, 2014, period (\$24,780.82). Within thirty (30) days after execution of this First Amendment by Licensee and Licensor, Licensee shall pay Licensor an additional license fee amount of \$10,507.07 for the Additional Equipment for the period December 12, 2013, through June 30, 2014.

Effective July 1, 2014, the License Fee shall be subject to a 4% escalation every year, starting July 1, 2014, provided that the July 1, 2014, to September 10, 2014, portion of the License Fee that was due and paid by September 11, 2013 (\$5,112.99), shall be credited toward the adjusted Licensee Fee due for the July 1, 2014 to June 30, 2015, period (\$46,800.00) with the result that the License Fee amount due on or before July 1, 2014, shall be (\$41,687.01).

The License Fee shall not be prorated for any partial term during which this Agreement, as amended, is in effect except as may be explicitly provided in this Agreement. Timely payment is of the essence of this Agreement. There shall be a \$500 processing fee due for each payment received fourteen (14) days or more after the due date.

3. **Section 6. Submission of Plans and General Structural Requirements** is amended by adding the following at the end:

Additional Equipment. Licensee has provided to Licensor for review and approval complete plans and specifications for the Additional Equipment Licensee intends to install, construct, or otherwise place at the Site. With modifications, Licensor has approved the plans and specifications for installation, construction and placement of Licensee's Equipment at the Site, as shown more specifically on Exhibit #3A. Licensor and Licensee agree that Licensee has fully reimbursed Licensor for all its reasonable costs for such review and approval.

If any changes are made by Licensee or its agents to the plans and specifications reviewed and approved by Licensor prior to completion of the installation, Licensee agrees to submit revised plans and specifications showing those changes to Licensor for review and approval and agrees to reimburse Licensor for all its reasonable costs for said review and approval. Licensee shall pay all amounts due prior to installation of the Additional Equipment according to these changes.

Following review and approval of changes by Licensor, Licensee will submit a revised Exhibit #3A showing the changes and clearly showing the date of the approved changes within one (1) week.

Within fourteen (14) days of completion of installation of the Additional Equipment, Licensor or its contracted agent will perform a final inspection of such installation and submit a final inspection report to Licensee. Licensee shall be responsible for correcting all punch list items reasonably determined by Licensor or its agent during their final inspection within fourteen (14) days of receipt of notice of correction. Licensee shall provide digital photos documenting correction of all punch list items within this (14) fourteen day period. If digital photos do not adequately document that all punch list items have been completed as determined by Licensor or its agent, Licensee shall be required to reimburse Licensor for it or its agent's cost to re-inspect and confirm that all punch list items have been addressed. Licensor and Licensee agree that the reasonable costs of these inspection services, including re-inspections, will be solely the responsibility of Licensee.

All construction, installation, placement or relocation of the Additional Equipment shall be coordinated with Licensor in advance of the activity to minimize any disruption of Licensor's day-to-day activities. All removal or relocation of the existing Equipment shall be coordinated with Licensor in advance of the activity to minimize any disruption of Licensor's day-to-day activities. In no case may Licensee's activity jeopardize the safety or security of Licensor's activities.

complete plans and specifications for the Additional Equipment Licensee intends to install, construct, or otherwise place at the Site. With modifications, Licensor has approved the plans and specifications for installation, construction and placement of Licensee's Equipment at the Site, as shown more specifically on Exhibit #3A. Licensor and Licensee agree that Licensee has fully reimbursed Licensor for all its reasonable costs for such review and approval.

If any changes are made by Licensee or its agents to the plans and specifications reviewed and approved by Licensor prior to completion of the installation, Licensee agrees to submit revised plans and specifications showing those changes to Licensor for review and approval and agrees to reimburse Licensor for all its reasonable costs for said review and approval. Licensee shall pay all amounts due prior to installation of the Additional Equipment according to these changes.

Following review and approval of changes by Licensor, Licensee will submit a revised Exhibit #3A showing the changes and clearly showing the date of the approved changes within one (1) week.

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All construction, installation, placement or relocation of the Additional Equipment shall be coordinated with Licensor in advance of the activity to minimize any disruption of Licensor's day-to-day activities. All removal or relocation of the existing Equipment shall be coordinated with Licensor in advance of the activity to minimize any disruption of Licensor's day-to-day activities. In no case may Licensee's activity jeopardize the safety or security of Licensor's activities.

Licensee agrees to contract with Dixon Engineering, Inc. to design and provide approved plans to Licensor to depict the installation of the Additional Equipment stated in Section

5 above, as amended. Upon completion of installation of the Additional Equipment, Dixon Engineering will perform a final inspection of such installation, and submit a final inspection report to the Licensor and Licensee. All costs of these engineering design and inspection services, will be solely the Licensee's responsibility.

4. **Section 29. Environmental** is amended by adding a new Subsection (d) as follows:

d) Licensee will comply with all applicable environmental statutes, regulations and rules regarding its use of the Site, including but not limited to statutes, regulations and rules regarding radiofrequency radiation. Without limiting or modifying the foregoing, Licensee shall measure baseline radiofrequency radiation before any installation work is started, and shall measure radiofrequency radiation after installation of the Equipment.

5. **Section 9. Emergency Contact** is amended as follows:

9. Emergency Contact.

Each party shall identify one or more contacts as 24 hour, 7 days per week, 365 days per year, as an emergency contact. The contact information of either party must be updated immediately if it changes. Licensee also must send Licensor, to the attention of Water Treatment Plant Manager, written notice of its emergency contact information annually between July 1 and July 10. The current emergency contact information is:

For Licensor:

Water Treatment Plant Manager or On Site Person in Charge
919 Sunset Road
Ann Arbor, MI 48103
24 hour emergency number
(734) 994-2840

For Licensee:

Sprint PCS Network Operations Control Center
15620 West 113th Street
Lenexa, KS 66219
888-850-1400

6. **Section 21. Notices and Payments** is amended as follows:

21. Notices and Payments.

All notices, demands, and payments required by this Agreement shall be delivered personally by overnight delivery service with receipt, or by United States mail, first class, postage pre-paid, and addressed to the appropriate party, with the respective address for each as indicated below. Any party to this agreement may change their addresses for

notice by giving written notice of the change to the others in the manner prescribed by this Paragraph.

For Licensor:

City of Ann Arbor
Manager Water Treatment Plant
PO Box 8647
Ann Arbor, Michigan 48107

With copies to:

City of Ann Arbor
Public Services Area Administrator
PO Box 8647
Ann Arbor, Michigan 48107-8647

and

City Attorney
City of Ann Arbor
PO Box 8647
Ann Arbor, Michigan 48107-8647

For Licensee:

Sprint National Lease Management
6391 Sprint Parkway
Mailstop KSOPHT0101-Z2650
Overland Park, KS 66251-2650

With a copy to:

Sprint Law Department
6391 Sprint Parkway
Mailstop KSOPHT0101-Z2020
Overland Park, KS 66251-2020
Attn: Real Estate Attorney

Notice to Licensee shall reference Sprint Site ID #DE49XC513.

7. **Section 17. Licensor's Representations** is deleted and Section 17 is reserved.
8. The terms and conditions of the License Agreement and the Interim Addendum are incorporated herein by this reference, and capitalized terms used in this First Amendment shall have the same meanings such terms are given in the License Agreement. Except as specifically

set forth herein, this First Amendment shall in no way modify, alter or amend the remaining terms of the License Agreement, all of which are ratified by both Licensor and Licensee and shall remain in full force and effect. To the extent there is any conflict or inconsistency between the terms and conditions of the License Agreement or the Interim Addendum and this First Amendment, the terms and conditions of this First Amendment will govern and control.

9. This First Amendment to the License Agreement between the parties shall be binding on the heirs, successors and assigns of the parties.

10. **Signatures.**

LICENSOR

John Hieftje, its Mayor

THE CITY OF ANN ARBOR

By: _____

By: _____
Jacqueline Beaudry, its City Clerk

Approved as to form:

Stephen K. Postema, City Attorney

Approved as to substance:

Steven D. Powers, City Administrator

Craig Hupy, Public Services Area
Administrator

LICENSEE

**SPRINT SPECTRUM L.P.,
a Delaware Limited Partnership**

By: _____

EXHIBIT #2A

LIST OF EQUIPMENT

The Additional Equipment covered by this First Amendment to License Agreement are identified on various pages of the Construction Drawings prepared by Powder River Development Services, LLC, dated December 10, 2013, and attached as Exhibit #3A to this First Amendment to License Agreement.

EXHIBIT #3A

SITE PLAN AND SPECIFICATIONS

See the Construction Drawings attached hereto, prepared by Powder River Development Services, LLC, dated December 10, 2013.

EXHIBIT #4

SECURITY AND ACCESS PROCEDURES

These procedures are applicable for the following City facilities: Plymouth and Manchester Water Towers, and the Water Treatment Plant.

You shall contact the Water Treatment Plant Manager at the City's Water Treatment Plant at (734) 994-2840 a minimum of twenty-four (24) hours prior to access to the foregoing City facilities for non-emergency maintenance and repairs. During non-business hours or if the Plant Manager is unavailable, you shall contact the Supervisor-in-Charge at the Water Treatment Plant. You must provide us the names and photographs of your personnel who will be visiting these sites for this work. That information must be provided to the Manager at the Water Treatment Plant as soon as possible. Your personnel not on this list will not be allowed access. It is your responsibility to ensure that this information stays current with us. Personnel who are not on the list will not be allowed access unless the City has been provided their names and photographs at least forty-eight (48) hours before they seek access.

The City of Ann Arbor will not escort or provide maps or direction to Licensee equipment locations at the Water Treatment Plant. It is the responsibility of the Licensee to provide sufficient direction to its personnel. Personnel who arrive on site without this information will not be permitted entry.

In case access is for one of the water towers, your personnel will sign out a key from the Water Treatment Plant located at 919 Sunset Road. The person who signs out the key must provide the names of all persons who will be accessing the water tower. All such persons must already be on the list with the Water Treatment Plant Manager. The person who signs out the key must return the key to the Water Treatment Plant upon completion of work at the water tower site each day. The key must be returned at the end of each day work is performed. You are not permitted to keep the key overnight. You are not permitted to make copies of the key to the water towers. In all circumstances, including emergencies, you shall contact the Water Plant prior to arriving on the site to request a key.

In case of an emergency, your personnel will be allowed access without a 24-hour advance notice. However, prior notice is still required before arrival at the Water Treatment Plant to pick up a key. Access will be limited to persons on the list with the Manager of the Water Treatment Plant.

Access to the Site shall be in accordance with the Security and Access Procedures stated in this Exhibit 4. Provided Licensee complies with these Security and Access Procedures, Licensee shall be permitted continuous twenty-four (24) hour access to Licensee's Antenna Facility and Additional Equipment at the Site for the purpose of maintenance and repairs or for any other purposes permitted under this Agreement, except in situations where access to the Site by Licensee shall impair Licensor's response to any situation potentially compromising the security of the Site or the protection of the water supply of the City. During "potentially compromising

situations," access, if any at all is granted, shall be at the sole discretion and under the terms dictated by the City On Site Person in Charge.

Licensor may from time to time and in Licensor's sole discretion, revise these Security and Access Procedures. A copy of each such revision will be sent to Licensee at the addresses identified in this Agreement.

If access by Licensee requires Licensor to visit the water tower, the Licensee will be responsible for the time and travel expense associated with the staff person visiting the Site. The Licensee shall promptly reimburse these expenses to Licensor upon presentation of an itemized invoice.



Know what's below.
Call before you dig.



THIS IS AN EXISTING SPRINT WIRELESS TELECOMMUNICATION FACILITY NETWORK VISION EQUIPMENT UPGRADE

NEWTORK VISION MMBS LAUNCH

CITY WATER TOWER

DE49XC513

2011 MANCHESTER ROAD

ANN ARBOR, MI 48104

WASHTENAW COUNTY

LATITUDE: 42.257778 / 42° 15' 28.13" (NAD 83)

LONGITUDE: -83.71000 / -83° 42' 37.74" (NAD 83)

146' WATER TOWER

MICHIGAN MARKET



GENERAL DYNAMICS
WIRELESS SERVICES



POWDER RIVER
Development Services, LLC
100 E. SHENANGO STREET
SHARPSVILLE, PA 16150
724.962.5999
www.powderriverdev.com

PROJECT INFORMATION:

NETWORK VISION MMBS LAUNCH
CITY WATER

TOWER

DE49XC513

2011 MANCHESTER ROAD
ANN ARBOR, MI 48104
WASHTENAW COUNTY

ISSUE DATE: 12-10-2013

ISSUED FOR: CONSTRUCTION DWGS

REVISIONS

REV.	DATE	DESCRIPTION	INITIALS
A	5/21/12	ISSUED FOR CDs 90%	CCM
B	03/01/13	ISSUED FOR CDs 100%	CCM
C	06/18/13	ISSUED FOR CDs FINALS	CCM
D	12/10/13	ISSUED FOR REVISED FINALS	JED

NOT FOR CONSTRUCTION UNLESS
LABELED AS CONSTRUCTION SET

LICENSURE:



SHEET TITLE:

TITLE SHEET

SHEET NUMBER:

T-1

REVISION:

D

PRDS PROJ.NO.
2249-052112

MICHIGAN STATE CODE COMPLIANCE:

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

- 2009 IBC, STANDARDS AND AMENDMENTS-WAC 51-50;
- 2009 IMC, STANDARDS AND AMENDMENTS-WAC 51-52;
- 2009 IFC, STANDARDS AND AMENDMENTS-WAC 51-54;
- 2009 IPC, STANDARDS AND AMENDMENTS-WAC 51-56; 51-57
- MIOSHA MICHIGAN OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

ACCESSIBILITY REQUIREMENTS:

FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH THE 2009 IBC BUILDING CODE.

CODE BLOCK

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY

- REMOVE (6) EXISTING PANEL ANTENNAS (2 PER SECTOR)
- INSTALL (3) NEW PANEL ANTENNAS (1 PER SECTOR)
- REMOVE (2) POWER AND BATTERY CABINET
- REMOVE (2) MODCELL CABINETS
- INSTALL (1) NEW MMBS CABINET
- INSTALL (1) NEW BBU CABINET
- INSTALL (1) NEW FIBER JUNCTION BOX
- REMOVE ALL EXISTING SPRINT ANTENNA COAXIAL CABLES
- INSTALL (3) NEW HYBRIFLEX FIBER OPTIC CABLES USING EXISTING COAX ROUTE (1 PER SECTOR)
- INSTALL (3) NEW RRU BOX

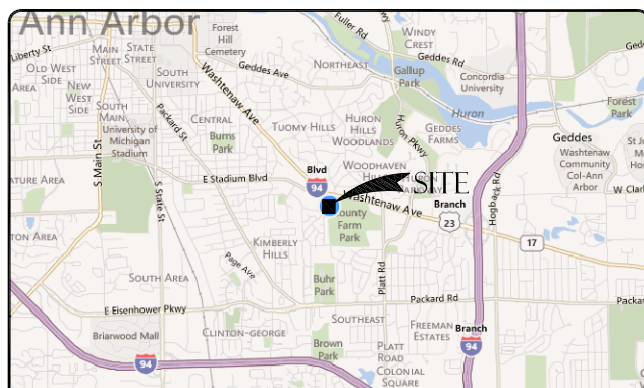
PROJECT DESCRIPTION

APPROVAL	SIGNATURE	DATE
SITE ACQUISITION MANAGER		
CONSTRUCTION MANAGER		
A&E MANAGER		
PLANNING CONSULTANT		
RF MANAGER		
RF ENGINEER		
PROPERTY OWNER		
SPRINT REPRESENTATIVE		
AAV MANAGER		

SIGNATURE BLOCK



AREA MAP



VICINITY MAP

FROM DETROIT METROPOLITAN WAYNE COUNTY AIRPORT--WILLIAM ROGELL DR, DETROIT, MI

DEPART JOHN D DINGELL DR 1.4 MI, TAKE RAMP RIGHT AND FOLLOW SIGNS FOR EUREKA RD WEST 1.2 MI, TAKE RAMP RIGHT FOR I-275 NORTH TOWARD FLINT 2.0 MI, AT EXIT 17, TAKE RAMP RIGHT FOR I-94 WEST TOWARD CHICAGO / ANN ARBOR 15.0 MI, AT EXIT 180B, TAKE RAMP RIGHT FOR US-23 NORTH / I-94-BR TOWARD ANN ARBOR 2.1 MI, KEEP STRAIGHT ONTO US-23 N 0.3 MI, AT EXIT 37B, TAKE RAMP RIGHT FOR US-23-BR / I-94-BR TOWARD ANN ARBOR 0.7 MI, KEEP STRAIGHT ONTO I-94 BLVD / US-23 BRANCH / WASHTENAW AVE 0.9 MI, TURN LEFT ONTO MANCHESTER RD 0.1 MI, ARRIVE AT 42.257778, -83.71 ON THE LEFT

DRIVING DIRECTIONS

SHEET	DESCRIPTION
T-1	TITLE SHEET
N-1	GENERAL NOTES
N-2	GENERAL NOTES
A-1	OVERALL SITE PLAN
A-2	ENLARGED SITE PLAN
A-3	ENLARGED EQUIPMENT PLANS
A-4	ANTENNA PLANS AND SCHEDULES
A-5	NEW SOUTH & EAST ELEVATIONS
A-6	EQUIPMENT DETAILS
A-7	EQUIPMENT DETAILS (OUTDOOR SPECIFICATIONS)
A-8	EQUIPMENT DETAILS
A-9	EQUIPMENT DETAILS
RF-1	ANTENNA AND CABLE COLOR CODING DETAILS
E-1	ONE-LINE DIAGRAM & POWER PANEL SCHEDULE
E-2	DC POWER ONE-LINE DIAGRAM
E-3	ELECTRICAL DETAILS (OUTDOOR SPECIFICATIONS)
E-4	CONDUIT ROUTING
E-5	GROUNDING PLAN
E-6	GROUNDING DETAILS
E-7	GROUNDING DETAILS

SHEET INDEX

APPLICANT:

GENERAL DYNAMICS ON BEHALF OF SPRINT
27007 HILLS TECH CT.
FARMINGTON HILLS, MI 48331
CONTACT: GREG BRUETT
PH: 781.726.0174

PROPERTY INFORMATION:

PROPERTY OWNER: THE CITY OF ANN ARBOR
ADDRESS: P.O. BOX 8647
ANN ARBOR, MI 48107
CONTACT: MOLLY ROBINSON
ADDRESS: 919 SUNSET ROAD
ANN ARBOR, MI 48103
(734) 794-6426
PH: PH: 794-6426
TOWER OWNER: CITY OF ANN ARBOR
SITE ID: DE49XC513

ZONING CLASSIFICATION: PL
CONSTRUCTION TYPE: 2B
OCCUPANCY: U
JURISDICTION: CITY OF ANN ARBOR
CURRENT USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
NEW USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

PARCEL NUMBER(S):

09-12-03-100-004

LEASE AREA:

20' X 20' (400 SQ.FT.)

PROJECT SUMMARY

ARCHITECT & ELECTRICAL ENGINEER:

POWDER RIVER DEVELOPMENT SERVICES, LLC
100 EAST SHENANGO STREET
SHARPSVILLE, PA 16150
CONTACT: JASON DOCTER
PHONE: 724-977-2317
EMAIL: jason.docter@powderriverdev.com

STRUCTURAL ENGINEER:

TBD

SITE ACQ. PROJECT MANAGER:

GENERAL DYNAMICS
27007 HILLS TECH CT.
FARMINGTON HILLS, MI 48331
CONTACT: ANDREW JEWELL
PH: 305.747.0532
EMAIL: andrew.jewell@gdit.com

CONSTRUCTION MANAGER:

GENERAL DYNAMICS
27007 HILLS TECH CT.
FARMINGTON HILLS, MI 48331
CONTACT: JAMES SHIREY
PH: 810.618.0803
EMAIL: james.shirey@gdwireless.com

BUILDING DEPARTMENT:

CITY OF ANN ARBOR
301 HURON STREET
ANN ARBOR, MI 48107
CONTACT: LISHA TURNER-TOLBERT
PHONE: 734-794-6267

ELECTRICAL COMPANY:

DTE ENERGY
ONE ENERGY PLAZA
DETROIT, MI 48226
CONTACT: AVAILABLE REP.
PH: 734.302.4800

TELCO COMPANY:

VERIZON
3365 WASHINGTON AVE, SUITE E
ANN ARBOR MI
CONTACT: AVAILABLE REP
PH: 734-973-8336

AAV MANAGER:

GENERAL DYNAMICS WIRELESS SERVICES
27007 HILLS TECH CT.
FARMINGTON HILLS, MI 48331
CONTACT: DENNIS SIKES
PH: 248.991.1502
EMAIL: dennis.sikes@gdit.com

RF ENGINEER:

STA NETWORKS SERVICES
27007 HILLS TECH CT.
FARMINGTON HILLS, MI 48331
CONTACT: RINA PATEL
PH: 248.996.4971
EMAIL: r.patel@sta.samsung.com

PROJECT TEAM

SURVEYOR'S NOTE

THE BOUNDARY OF THIS SURVEY IS ILLUSTRATED FROM RECORD INFORMATION AND IS APPROXIMATE. THE TOPOGRAPHICAL SURVEY FOR THIS MAP WAS PERFORMED ON MARCH 3, 2000. NOT TO BE USED AS CONSTRUCTION DRAWINGS.

ELEVATION DATUM

CONTOURS ARE SHOWN AT 1.0' INTERVALS. ALL ELEVATIONS ARE BASED ON NAVD DATUM. B.M. = FOUND CONCRETE MONUMENT ELEVATION = 874.20'

BASIS OF BEARINGS

BEARINGS BASED UPON CLIENT PROVIDED LEGAL DESCRIPTION

FLOODPLAIN INFORMATION

WE HAVE CONSULTED THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) NATIONAL FLOOD INSURANCE MAP AS PREPARED FOR THE CITY OF ANN ARBOR, MICHIGAN. COUNTY: MICHIGAN. COMMUNITY PANEL NUMBER: 26013-0000-D. DATED: JAN. 2, 1982. AND FIND THAT THE PROJECT SITE IS NOT LOCATED WITHIN THE DESIGNATED 100 YEAR FLOODPLAIN.

LATITUDE & LONGITUDE

LATITUDE AND LONGITUDE OF SITE REFERENCE POINT ARE BASED ON GEODETIC OBSERVATIONS.

FAA CERTIFICATION

RE: AERONAUTICAL STUDY FOR AERONAUTICAL STUDY NO. _____ I HEREBY CERTIFY TO: SPRINT PCS FOR SITE NO. DE49XC5130 (CITY OF ANN ARBOR WATER TOWER) 2011 MANCHESTER RD. ANN ARBOR, MI THAT THE LATITUDE 42°15'28.56"N AND LONGITUDE 83°42'32.29"W ARE WITHIN 250' HORIZONTALLY AND THE SITE ELEVATION 873' AMSL, PLANNED STRUCTURE HEIGHT, 162' ADL AND PLANNED OVERALL HEIGHT, 1035' AMSL, ARE WITHIN 250' VERTICALLY. THE HORIZONTAL DATUM (COORDINATES) ARE IN TERMS OF THE NORTH AMERICAN DATUM OF 1983 (NAD 83) AND EXPRESSED AS DEGREES, MINUTES AND SECONDS. THE VERTICAL DATUM (HEIGHTS) ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1929 (NAV D 29) AND ARE DETERMINED TO THE NEAREST FOOT. ATWELL-HICKS, INC.

DATE: _____ RICHARD G. TIMMONS PROFESSIONAL SURVEYOR NO. 23319

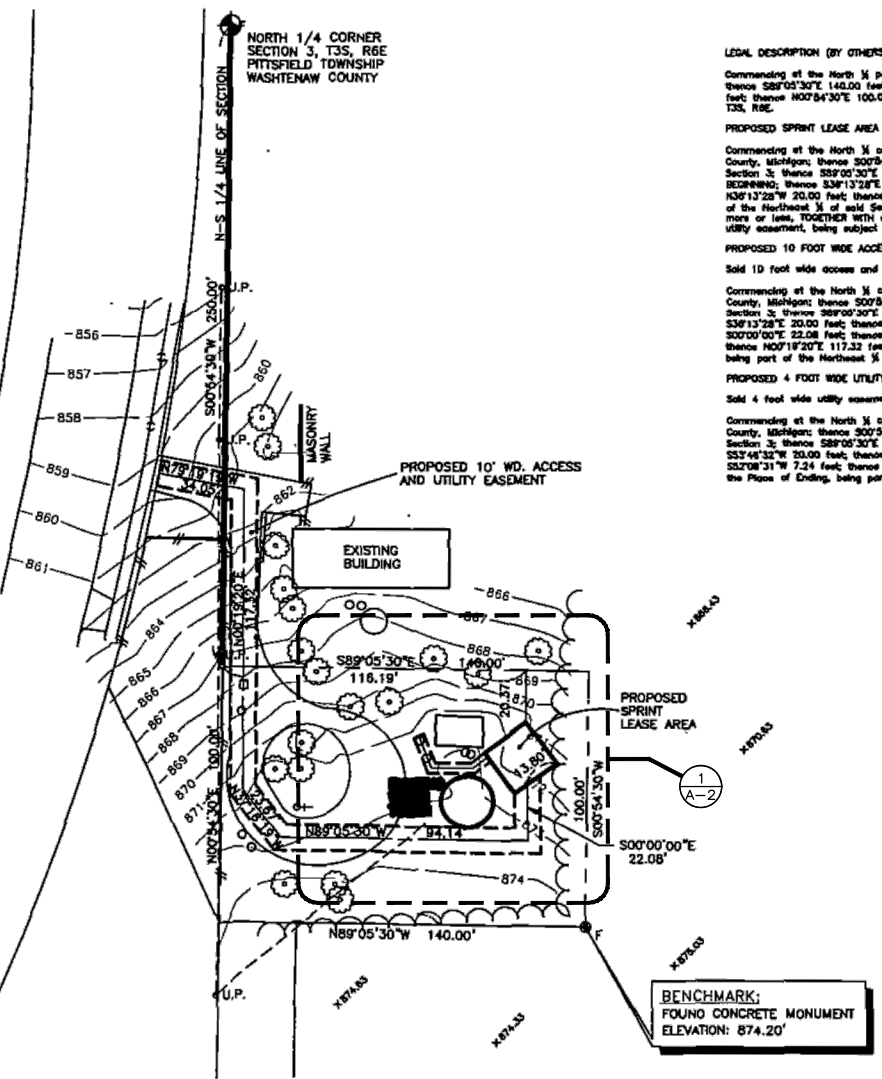
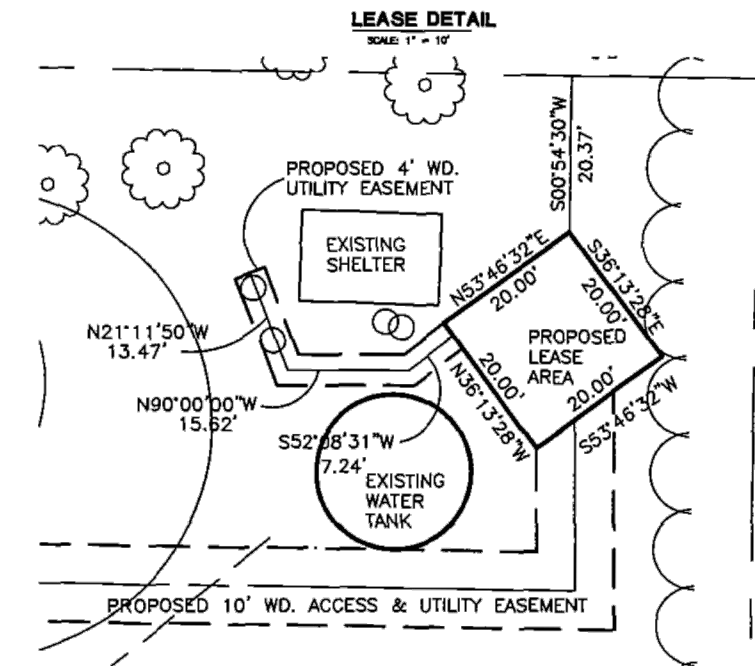
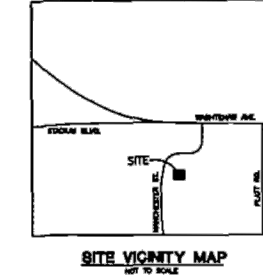
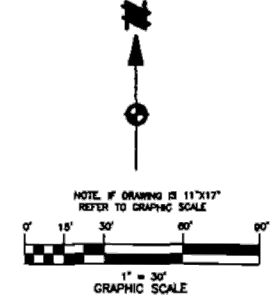
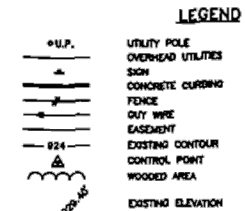
SITE INFORMATION

SITE ID: DE49XC5130
SITE ADDRESS: 2011 MANCHESTER RD. ANN ARBOR, MI
PARCEL IDENTIFICATION NUMBER: 09-12-03-100-004
APPLICANT: SPRINT PCS
OWNER: CITY OF ANN ARBOR
CONTACT: KIRSTEN LARCOM (734) 994-2670
TOTAL SITE AREA: 0.32± ACRES
LEASE SITE AREA: 300 SF.

LATITUDE: 42°15'28.56"N
LONGITUDE: 83°42'32.29"W
NO WATER OR SANITARY FACILITIES REQUIRED.
NOT A MAINTENANCE SITE. SPRINT PERSONNEL TO VISIT SITE AS REQUIRED.
TRASH RECEPTACLE - NOT PROPOSED.
LEASE HOLDER WILL PICK UP DEBRIS WITHIN LEASE AREA WEEKLY OR AS NEEDED.
NO OUTDOOR STORAGE IS PROPOSED.
NO UNDERGROUND UTILITIES HAVE BEEN LOCATED AS PART OF THIS SURVEY.

GENERAL NOTES

THIS IS NOT A SITE SURVEY. ALL PROPERTY BOUNDARIES, ORIENTATION OF TRUE NORTH AND STREET HALF-WIDTHS HAVE BEEN OBTAINED FROM A TAX PARCEL MAP AND ARE APPROXIMATE.



LEGAL DESCRIPTION (BY OTHERS)

Commencing at the North 1/4 post Section 3, T35, R6E, Pittsfield Township, Washtenaw County, Michigan; thence S00°54'30"W 250.00 feet to a POB; thence S89°05'30"E 140.00 feet; thence S00°54'30"W 100.00 feet; thence N89°05'30"W 140.00 feet; thence N00°54'30"E 100.00 feet to the POB, part of the Northeast 1/4 of Section 3, T35, R6E.

PROPOSED SPRINT LEASE AREA

Commencing at the North 1/4 corner of Section 3, T35, R6E, Pittsfield Township, Washtenaw County, Michigan; thence S00°54'30"W 250.00 feet along the North-South 1/4 line of said Section 3; thence S89°05'30"E 116.19 feet; thence S00°54'30"W 20.37 feet for a PLACE OF BEGINNING; thence S33°46'32"W 20.00 feet; thence N37°13'28"E 20.00 feet; thence N53°46'32"E 20.00 feet to the Place of Beginning, being part of the Northeast 1/4 of said Section 3, containing 0.009 acres of land (400 square feet) more or less, TOGETHER WITH a 10 foot wide access and utility easement and a 4 foot wide utility easement, being subject to easements and restrictions of record, if any.

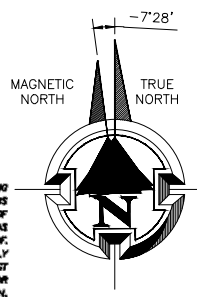
PROPOSED 10 FOOT WIDE ACCESS AND UTILITY EASEMENT

Said 10 foot wide access and utility easement having a centerline described as follows: Commencing at the North 1/4 corner of Section 3, T35, R6E, Pittsfield Township, Washtenaw County, Michigan; thence S00°54'30"W 250.00 feet along the North-South 1/4 line of said Section 3; thence S89°05'30"E 116.19 feet; thence S00°54'30"W 20.37 feet; thence S33°46'32"E 20.00 feet; thence N37°13'28"E 20.00 feet; thence N53°46'32"E 20.00 feet for a PLACE OF BEGINNING; thence S00°00'00"E 22.08 feet; thence N89°05'30"W 84.14 feet; thence N37°13'28"E 23.87 feet; thence N07°13'28"E 117.22 feet; thence N79°13'28"E 24.05 feet to the Place of Ending, being part of the Northeast 1/4 and Northwest 1/4 of said Section 3.

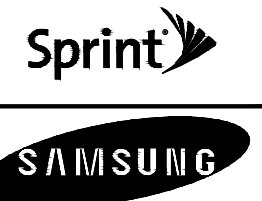
PROPOSED 4 FOOT WIDE UTILITY EASEMENT

Said 4 foot wide utility easement having a centerline described as follows: Commencing at the North 1/4 corner of Section 3, T35, R6E, Pittsfield Township, Washtenaw County, Michigan; thence S00°54'30"W 250.00 feet along the North-South 1/4 line of said Section 3; thence S89°05'30"E 116.19 feet; thence S00°54'30"W 20.37 feet; thence S33°46'32"E 20.00 feet; thence N37°13'28"E 2.00 feet for a PLACE OF BEGINNING; thence S02°08'31"W 7.24 feet; thence N89°05'30"W 15.02 feet; thence N21°11'50"W 13.47 feet to the Place of Ending, being part of the Northeast 1/4 of said Section 3.

CAUTION!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO TYPE OF GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF ANY CONSTRUCTION.



22"x34" SCALE: 1" = 50'-0"
11"x17" SCALE: 1" = 100'-0"



GENERAL DYNAMICS
WIRELESS SERVICES

POWDER RIVER
Development Services, LLC
100 E. SHENANGO STREET
SHARPSVILLE, PA 16150
724.962.5999
www.powderriverdev.com

PROJECT INFORMATION:
NETWORK VISION MMBS LAUNCH
CITY WATER
TOWER
DE49XC513
2011 MANCHESTER ROAD
ANN ARBOR, MI 48104
WASHTENAW COUNTY

ISSUE DATE: 06-18-2013

ISSUED FOR: CONSTRUCTION DWGS

REVISIONS

REV.	DATE	DESCRIPTION	INITIALS
A	5/21/12	ISSUED FOR CDs 90%	CCM
B	03/01/13	ISSUED FOR CDs 100%	CCM
C	06/18/13	ISSUED FOR CDs FINALS	CCM

NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET



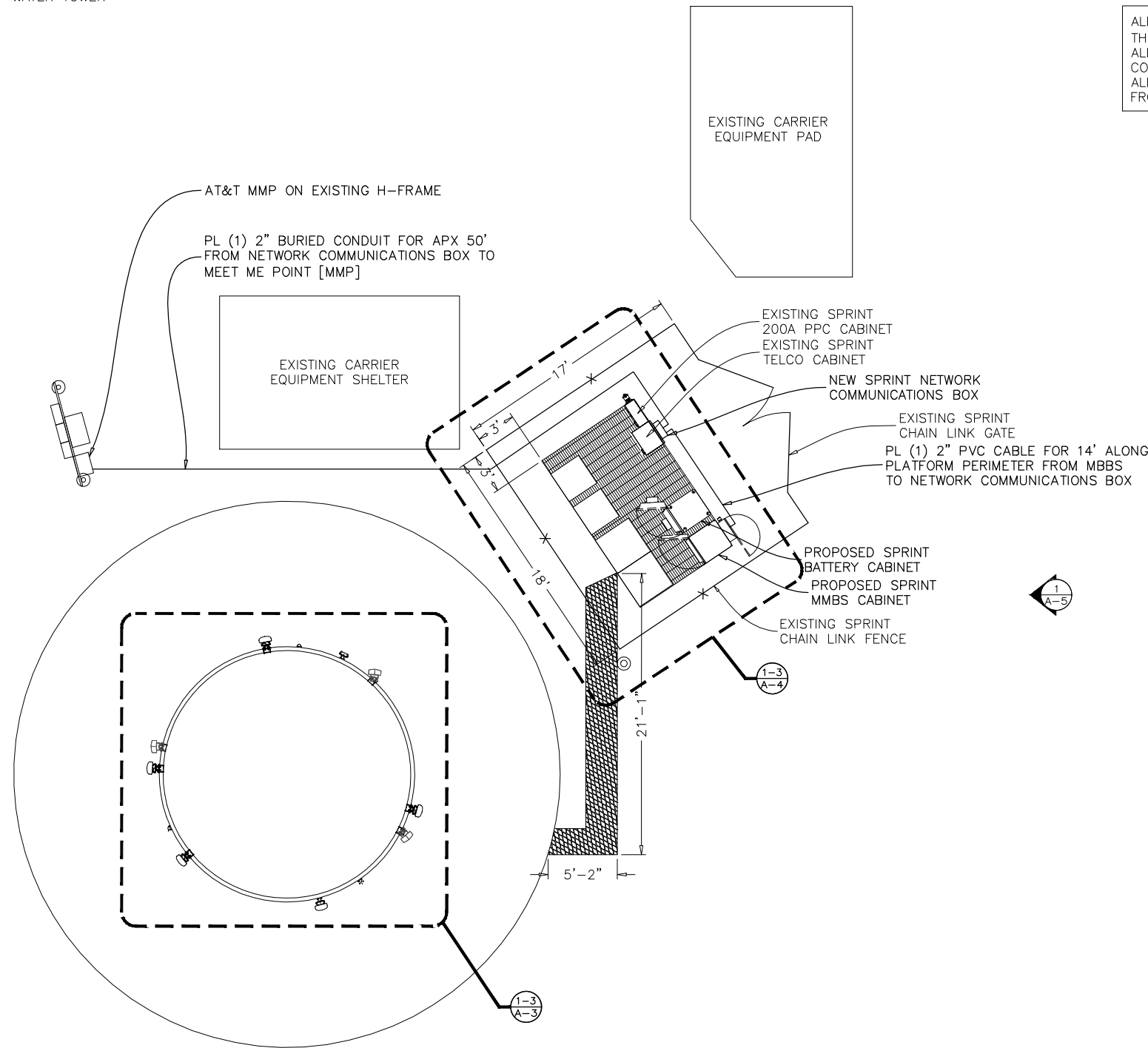
SHEET TITLE:
OVERALL SITE PLAN

SHEET NUMBER: **A-1**
REVISION: **C**
PRDS PROJ. NO. 2249-052112

NOTE:
ALL CONDUIT RUNS ARE CONSIDERED TO BE
INSIDE COMPOUND AT BASE OF WATER TOWER

NOTE: STRUCTURAL ANALYSIS MUST BE
PERFORMED ON ALL ROOFTOPS, FLAGPOLES
AND TOWER SITES BEFORE INSTALLATION OF NEW ANTENNAS,
NEW RRUS, & NEW CABINETS/TEMPORARY PLATFORMS.
STRUCTURAL ANALYSIS PROVIDED BY GENERAL DYNAMICS.

ALL WORK PERFORMED SHALL CONFORM TO THE CODE(S) OF
THE GOVERNING JURISDICTION(S).
ALL TRENCHING WILL BE PROPERLY BACKFILLED AND
COMPACTED.
ALL CONSTRUCTION DEBRIS AND TRASH WILL BE REMOVED
FROM SITE AT COMPLETION OF WORK BY CONTRACTOR.



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C	06/18/13	ISSUED FOR CDs FINALS	CCM

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LABELED AS CONSTRUCTION SET

LICENSURE:

GARY W. CLOWER
ENGINEER
No. 6201057585
LICENSED PROFESSIONAL ENGINEER

SHEET TITLE:
ENLARGED SITE PLAN

SHEET NUMBER: **A-2** REVISION: **C**

PRDS PROJ. NO.
2249-052112

22"x34" SCALE: 3/16" = 1'-0"
11"x17" SCALE: 3/32" = 1'-0"
4' 2' 0" 4'

ENLARGED SITE PLAN 1



GENERAL DYNAMICS
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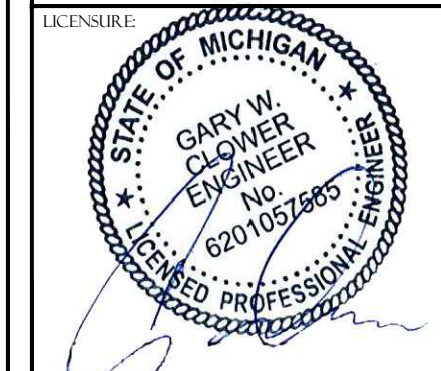
PROJECT INFORMATION:
NETWORK VISION MMBS LAUNCH
**CITY WATER
TOWER**
DE49XC513
2011 MANCHESTER ROAD
ANN ARBOR, MI 48104
WASHTENAW COUNTY

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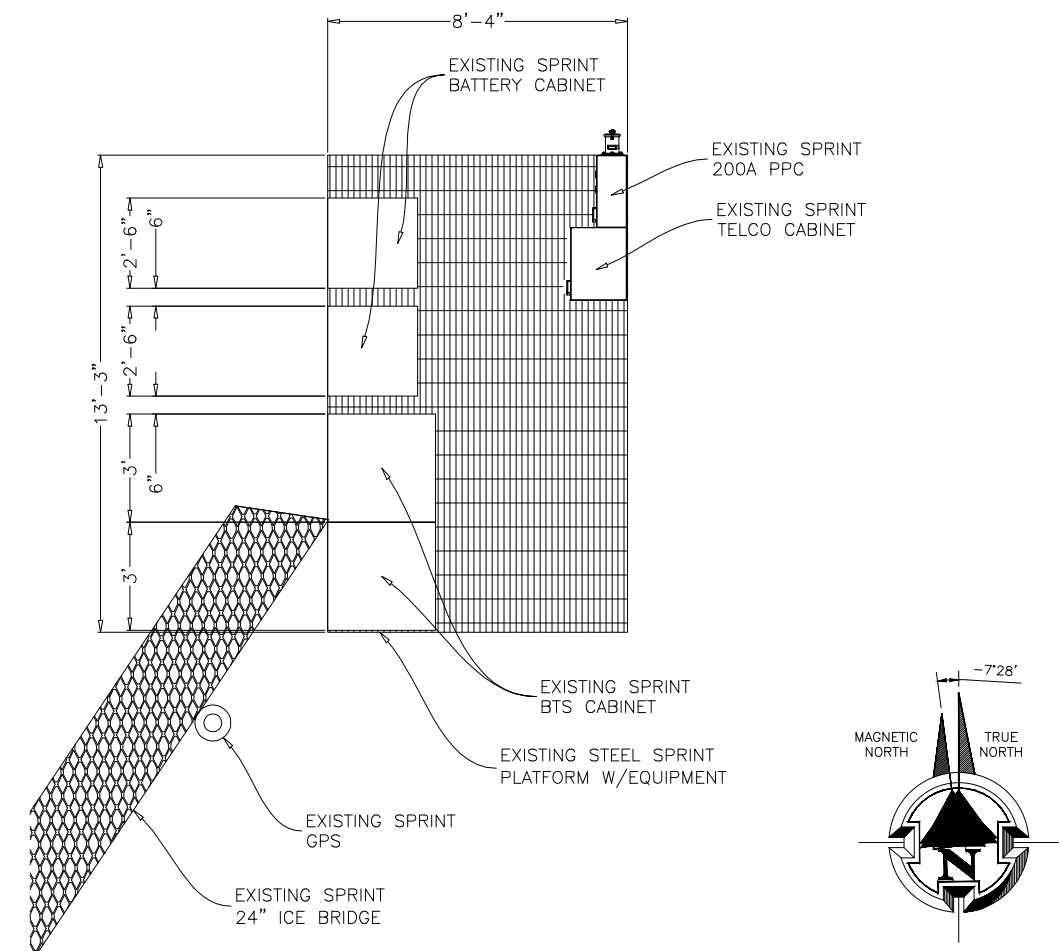
NOT FOR CONSTRUCTION UNLESS
LABELED AS CONSTRUCTION SET



SHEET TITLE:
**ENLARGED
EQUIPMENT PLANS**

SHEET NUMBER:
A-3

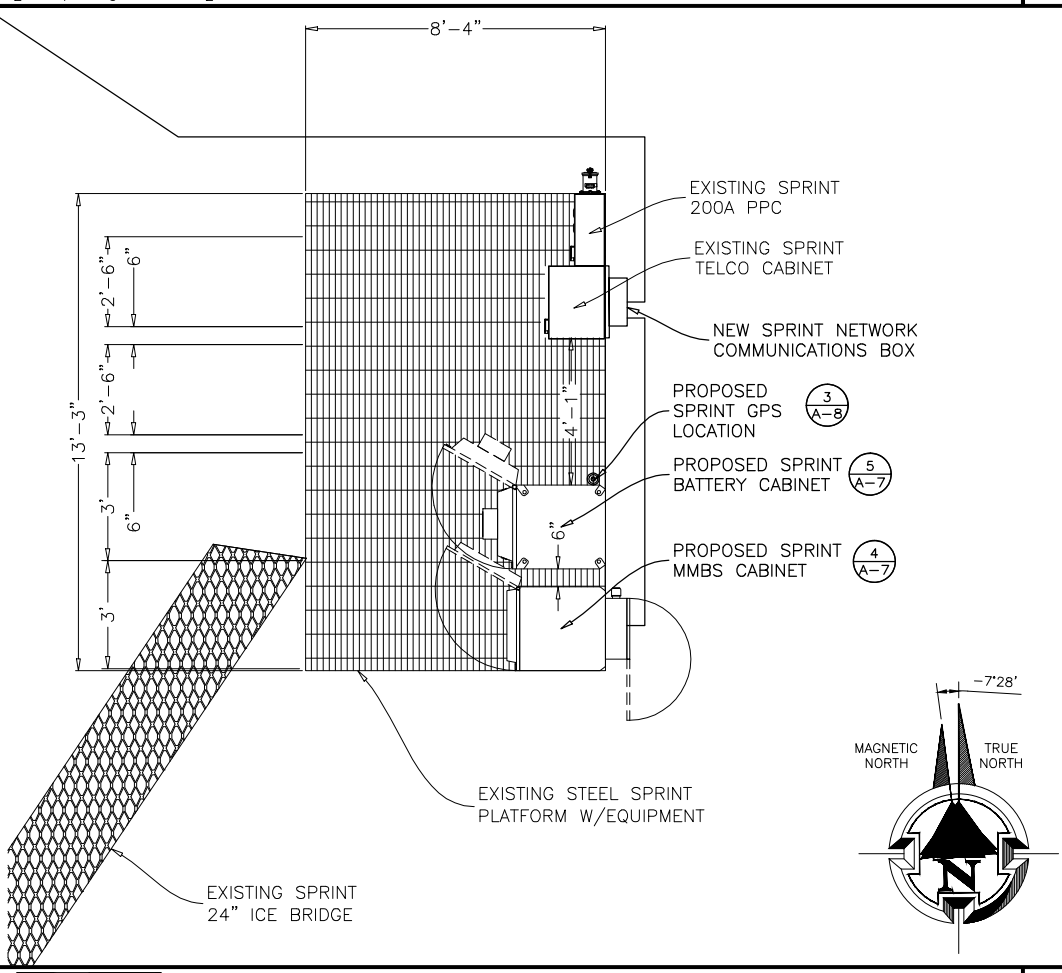
REVISION:
C
PRDS PROJ. NO.
2249-052112



22"x34" SCALE: 1/2" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0" **EXISTING OUTDOOR EQUIPMENT PLAN 1**



22"x34" SCALE: 1/2" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0" **NOT USED 2**



22"x34" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0" **NEW OUTDOOR EQUIPMENT PLAN (FINAL) 3**

NOTE: STRUCTURAL ANALYSIS MUST BE PERFORMED ON ALL ROOFTOPS, FLAGPOLES AND TOWER SITES BEFORE INSTALLATION OF NEW ANTENNAS, NEW RRUS, & NEW CABINETS/TEMPORARY PLATFORMS. STRUCTURAL ANALYSIS PROVIDED BY GENERAL DYNAMICS.

HYBRIFLEX TO FOLLOW EXISTING CABLE ROUTE, AND USE EXISTING CABLE MOUNTS.

EXISTING ITEMS TO BE REMOVED	
CDMA ANTENNA	(6 TOTAL, 2 PER SECTOR)
CDMA CABINET	2
BBU CABINET	2
MICROWAVE CABINET	0
COAX CABLE	(6 TOTAL, 2 PER SECTOR)

22"x34" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0" **NOT USED 4**



GENERAL DYNAMICS
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REVISIONS				
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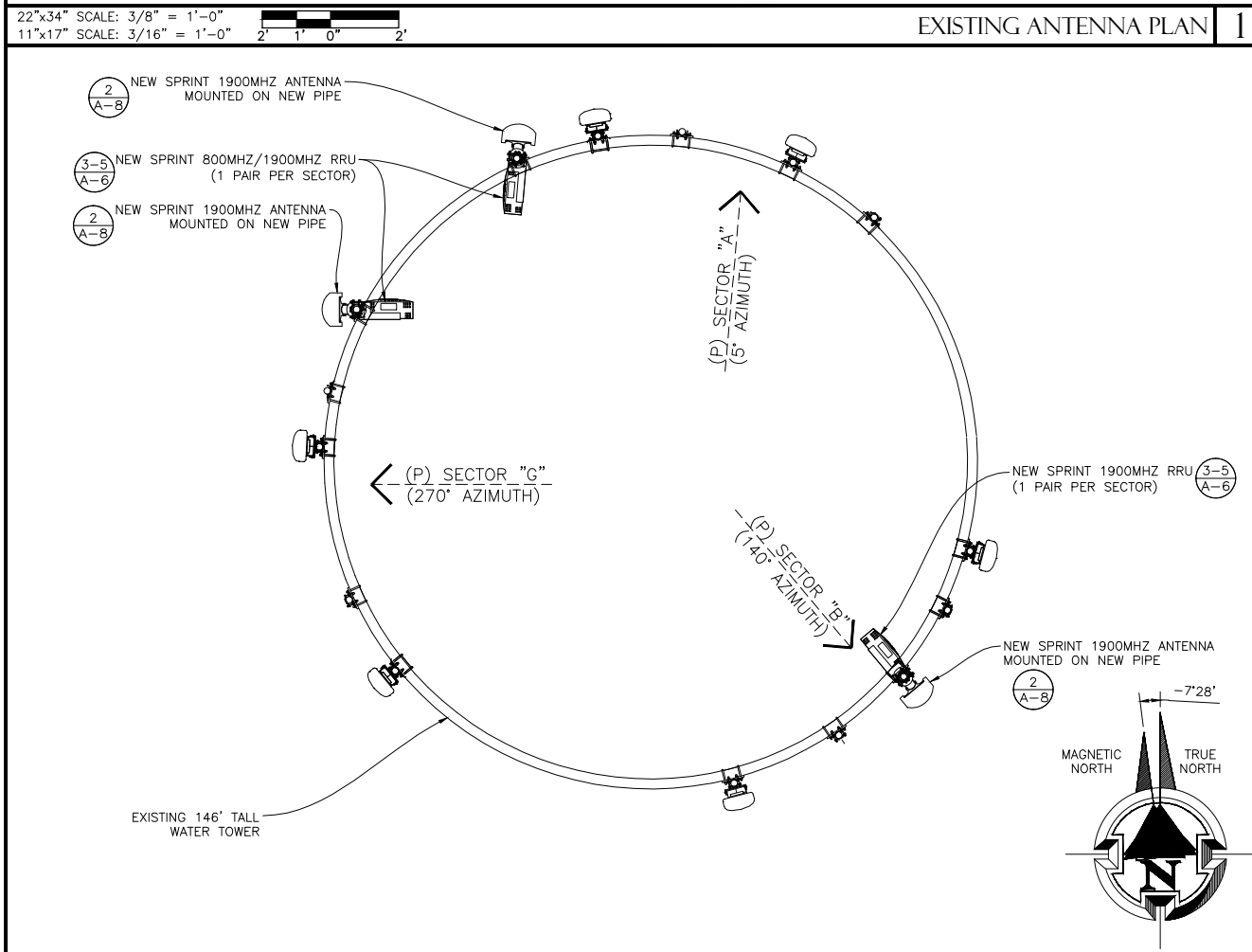
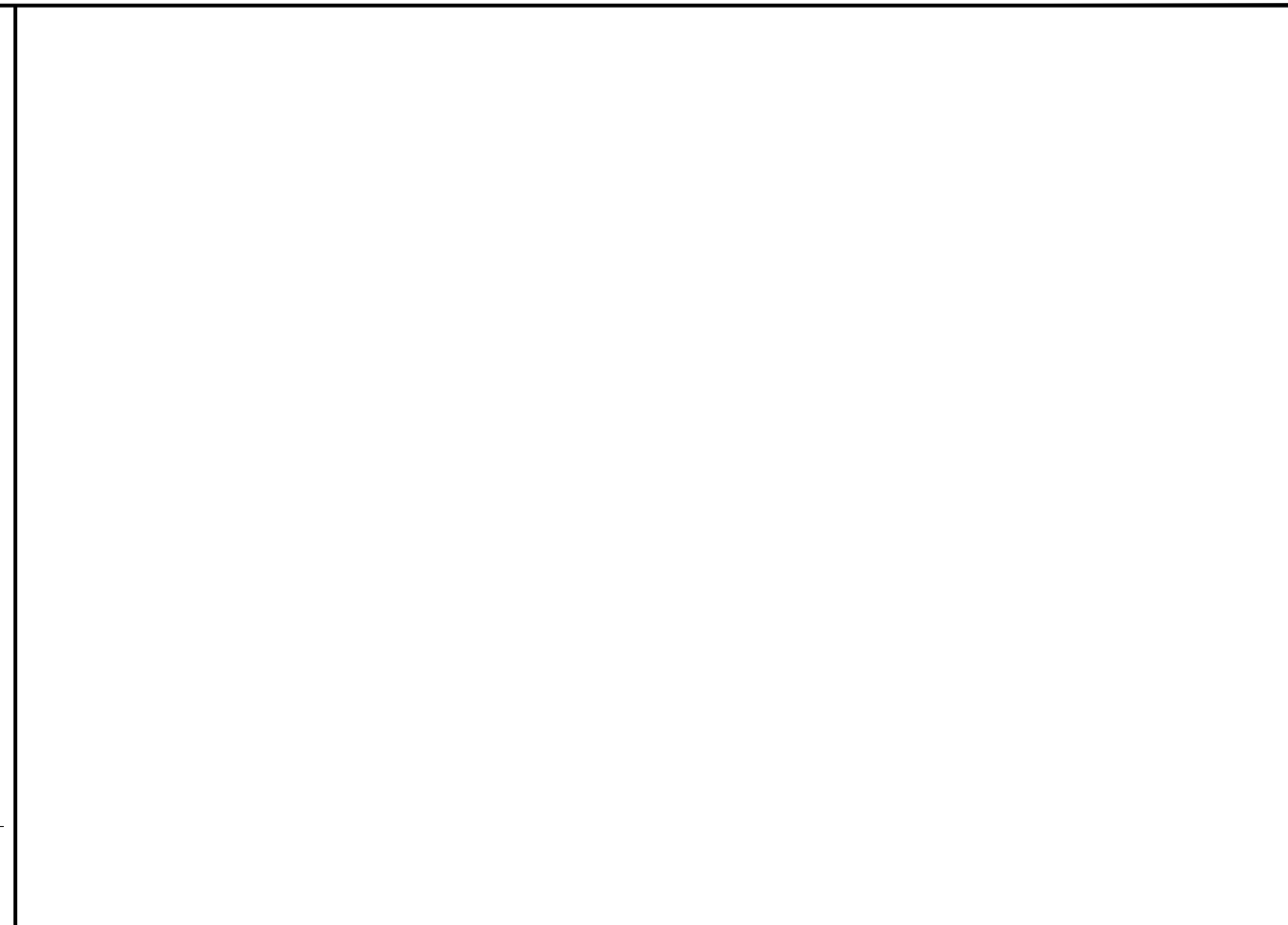
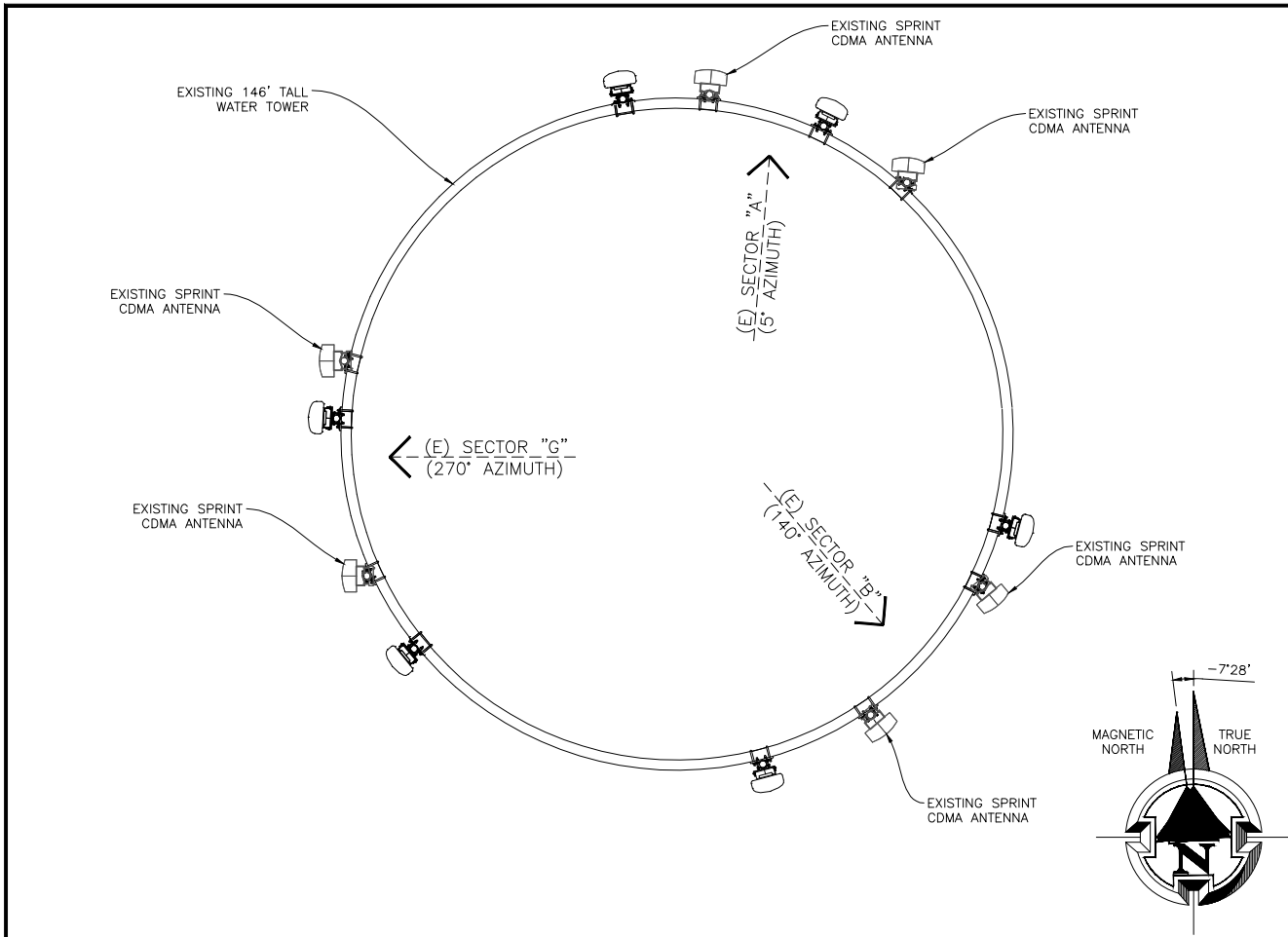
NOT FOR CONSTRUCTION UNLESS
LABELED AS CONSTRUCTION SET



SHEET TITLE:
**ANTENNA PLANS &
SCHEDULES**

SHEET NUMBER:
A-4

REVISION:
C
PRDS PROJ. NO.
2249-052112



NOTE:
STRUCTURAL ANALYSIS MUST BE PERFORMED ON ALL ROOFTOPS, FLAGPOLES AND TOWER SITES BEFORE INSTALLATION OF NEW ANTENNAS, NEW RRU'S, & NEW CABINETS/TEMPORARY PLATFORM. STRUCTURAL ANALYSIS PROVIDED BY GENERAL DYNAMICS.

NOTE:
EXISTING ANTENNAS ARE CDMA UNLESS NOTED OTHERWISE.

NEW SPRINT ANTENNAS INCLUDE RESPECTIVE RRU'S WHICH SHALL BE MOUNTED ON THE PIPE BEHIND THE ANTENNA SIMILAR TO THAT SHOWN ON DETAIL 1, SHEET A-6.

FIELD VERIFY EXISTING AZIMUTH BEFORE RELOCATING THE ANTENNA, IF REQUIRED. PRIOR APPROVAL FROM SPRINT TO BE GRANTED BEFORE RELOCATION OF ANTENNAS.

NOTES:
ALL AZIMUTHS ARE TO BE ESTABLISHED CLOCKWISE FROM THE TRUE NORTH HEADING. CONTRACTOR SHALL VERIFY NEW ANTENNA RAD CENTER AND ORIENTATIONS WITH SPRINT PCS PRIOR TO INSTALLATION OF ANTENNAS. PRIOR TO ATTACHING ANTENNAS AND MOUNTING SECTIONS, EXISTING TOWER AND TOWER FOUNDATION MUST BE ANALYZED BY A LICENSED STRUCTURAL ENGINEER TO VERIFY TOWER IS CAPABLE OF SUPPORTING THE NEW LOADS. REFER TO STRUCTURAL ANALYSIS BY OTHERS. CONTRACTOR SHALL REFER TO TOWER STRUCTURAL CALCULATIONS FOR ADDITIONAL LOADS. NO ERECTION OF MODIFICATION OF TOWER SHALL BE MADE WITHOUT APPROVAL OF STRUCTURAL ENGINEER.

1900 EQUIPMENT ONLY

RRU / HYBRID CABLE SCHEDULE									
SECTOR	RRU MODEL	RRU FREQUENCY	HYBRID CABLE LENGTH	HYBRID CABLE DIAMETER	JUMPER SIZE	JUMPER LENGTH	RET LENGTH	RET CABLE MANUFACTURER	RET CABLE MODEL NUMBER
ALPHA	RRH-P4	(1)1900MHz	285'	N/A	1/2"	6'	9.8'	COMMSCOPE	IRET AISGv1.1
BETA	RRH-P4	(1)1900MHz	285'	N/A	1/2"	6'	9.8'	COMMSCOPE	IRET AISGv1.1
GAMMA	RRH-P4	(1)1900MHz	285'	N/A	1/2"	6'	9.8'	COMMSCOPE	IRET AISGv1.1

ANTENNA SCHEDULE									
SECTOR	ANTENNA FREQUENCY	ANTENNA MFR.	ANTENNA MODEL	ANTENNA QUANTITY	AZIMUTH	RAD CENTER	ANT. SIZE	ELECT TILT	MECH TILT
ALPHA	1900 MHz	RFS	APXVRR13-C-A20	1 (PER SECTOR)	5°	150'-0"	4'-3"	6°	0°
BETA	1900 MHz	RFS	APXVRR13-C-A20	1 (PER SECTOR)	140°	150'-0"	4'-3"	4°	0°
GAMMA	1900 MHz	RFS	APXVRR13-C-A20	1 (PER SECTOR)	270°	150'-0"	4'-3"	5°	0°

NOTES & ANTENNA SCHEDULE 4



GENERAL DYNAMICS
WIRELESS SERVICES



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PROJECT INFORMATION:
NETWORK VISION MMBS LAUNCH
CITY WATER TOWER
DE49XC513
2011 MANCHESTER ROAD
ANN ARBOR, MI 48104
WASHTENAW COUNTY

ISSUE DATE: 06-18-2013

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C	06/18/13	ISSUED FOR CDs FINALS	CCM

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SHEET TITLE:
NEW ELEVATION

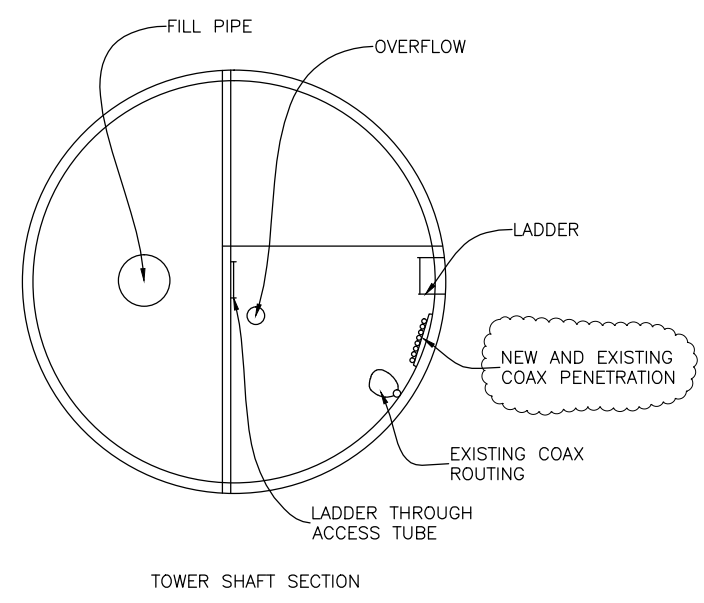
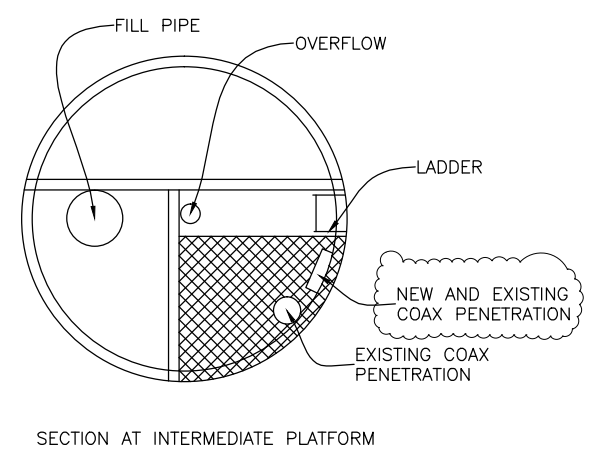
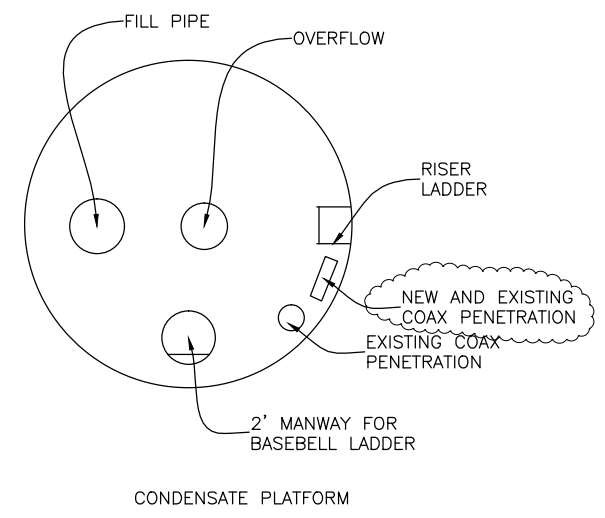
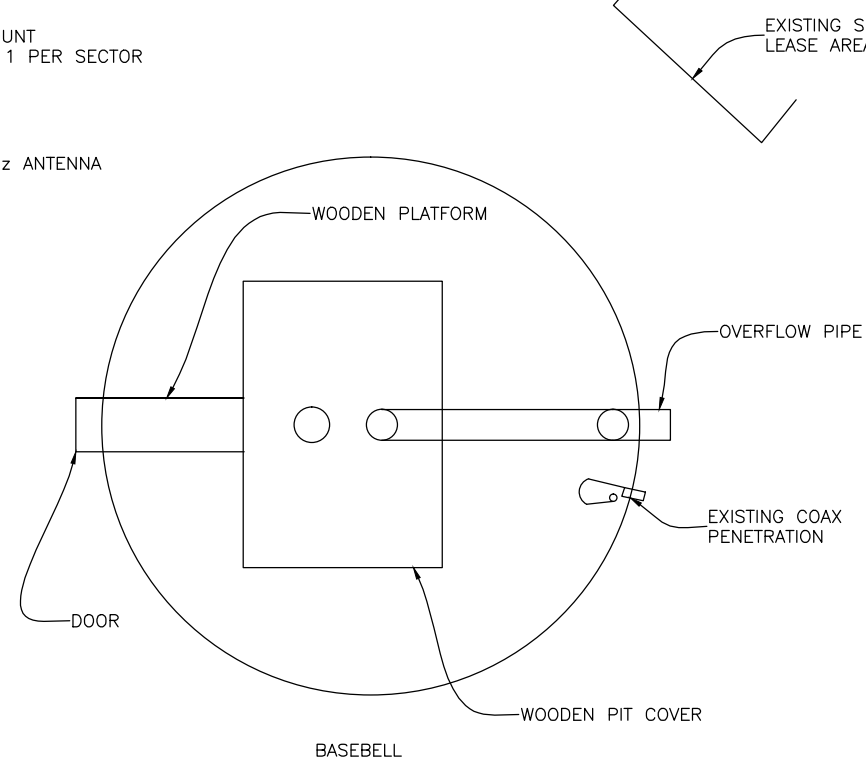
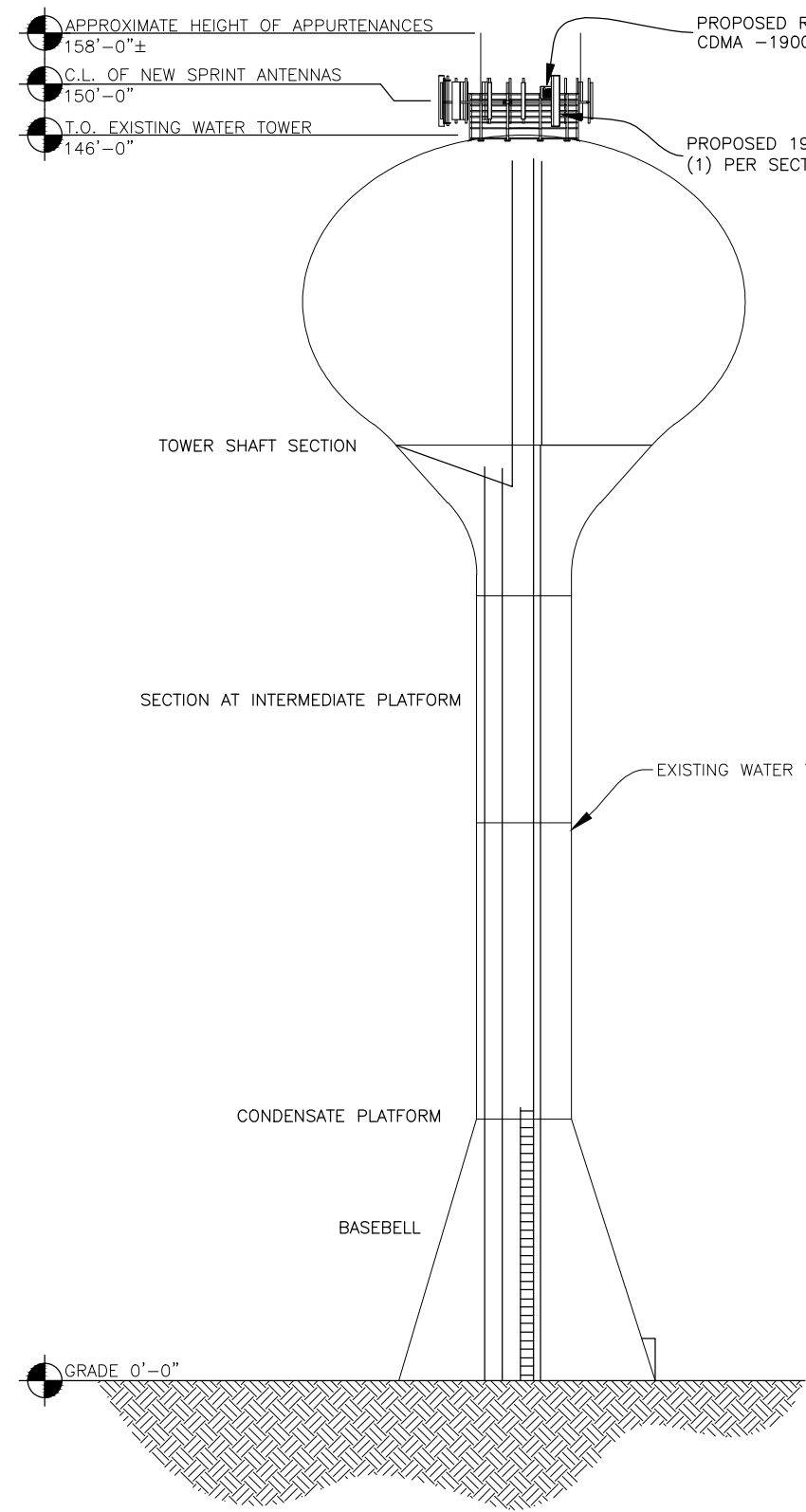
SHEET NUMBER: A-5	REVISION: C
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NOTE: STRUCTURAL ANALYSIS MUST BE PERFORMED ON ALL ROOFTOPS, FLAGPOLES AND TOWER SITES BEFORE INSTALLATION OF NEW ANTENNAS, NEW RRUS, & NEW CABINETS/TEMPORARY PLATFORMS. STRUCTURAL ANALYSIS PROVIDED BY GENERAL DYNAMICS.

APPROXIMATE HEIGHT OF APPURTENANCES
158'-0"±
C.L. OF NEW SPRINT ANTENNAS
150'-0"
I.O. EXISTING WATER TOWER
146'-0"

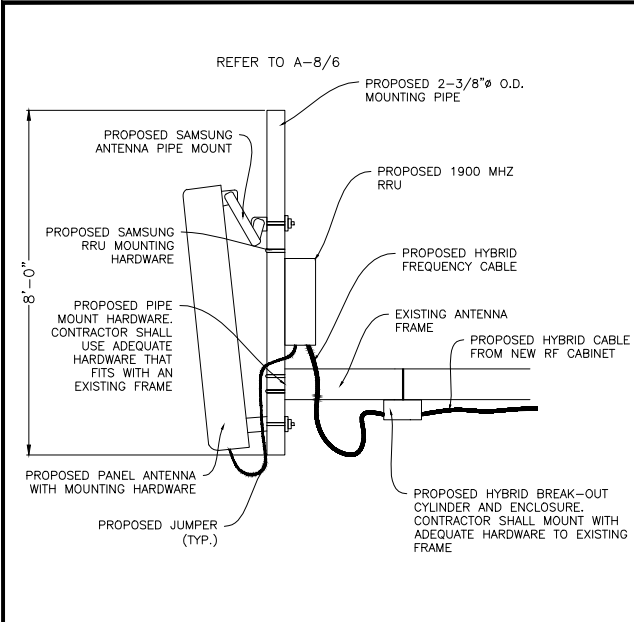
PROPOSED RRU COUNT
CDMA -1900MHz- 1 PER SECTOR

PROPOSED 1900 MHz ANTENNA
(1) PER SECTOR



NEW HYBRIFLEX CABLES SHALL BE ROUTED USING EXISTING CABLE LADDERS

22"x34" SCALE: 1/8" = 1'-0"
11"x17" SCALE: 1/16" = 1'-0"
8' 6' 4' 2' 0' 8'

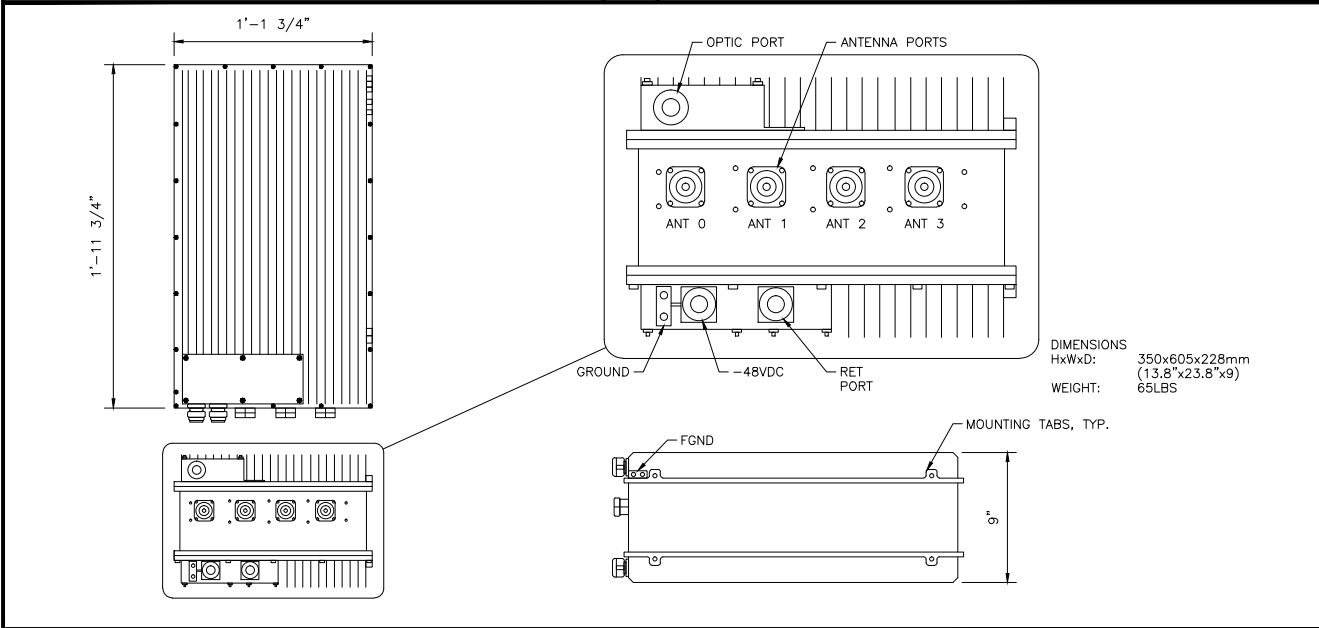


22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

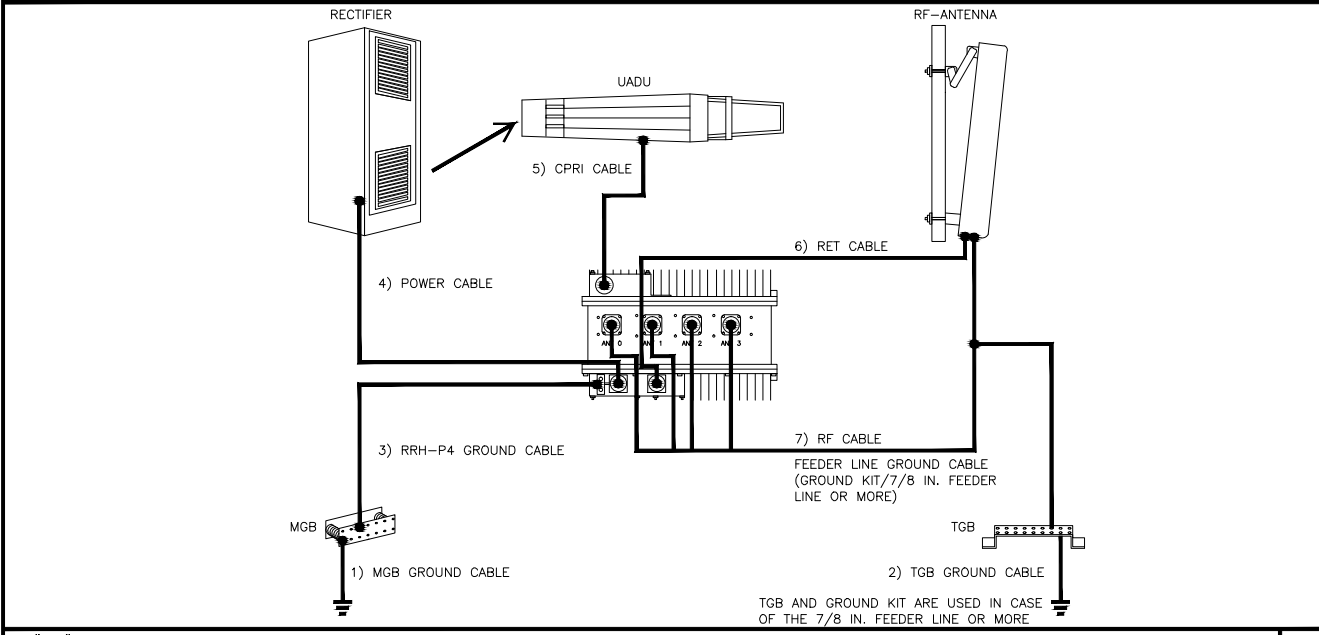
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11"x17" SCALE: NOT TO SCALE

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

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11"x17" SCALE: NOT TO SCALE



22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



GENERAL DYNAMICS
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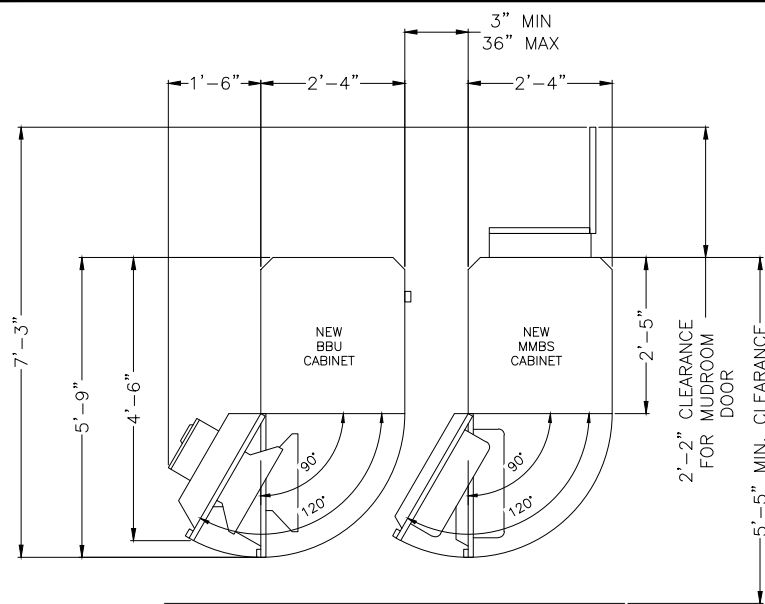
REVISIONS			
REV.	DATE	DESCRIPTION	INITIALS
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C	06/18/13	ISSUED FOR CDs FINALS	CCM

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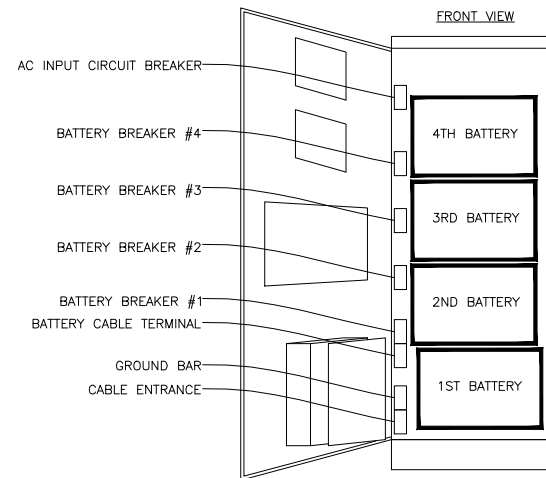


SHEET TITLE:
EQUIPMENT DETAILS

SHEET NUMBER: **A-6**
REVISION: **C**
PRDS PROJ. NO. 2249-052112



ITEM	SPECIFICATIONS
CAPACITY	MAX. 4 BATTERY STRINGS
COOLING	AIR-CONDITIONER/COOLING WITH FAN FOR EMERGENCY MODE (MCLEAN T20 HVAC)
SOUND LEVEL	65BA @1.5m
SIZE	71(H) x 41.25(D) x 27.6(W) INCH 1800(H) x 1048(D) x 700(W) mm
CABINET WEIGHT	370 LBS
PER BATTERY STRING WEIGHT	529 LBS
BATTERY	NARADA 190AH (12NDT190) AGM TYPE (VRLA)
AC POWER	220VAC, 3.5AMP TYP. 14.4AMP STARTING
DC POWER	10A MAX @48DVC

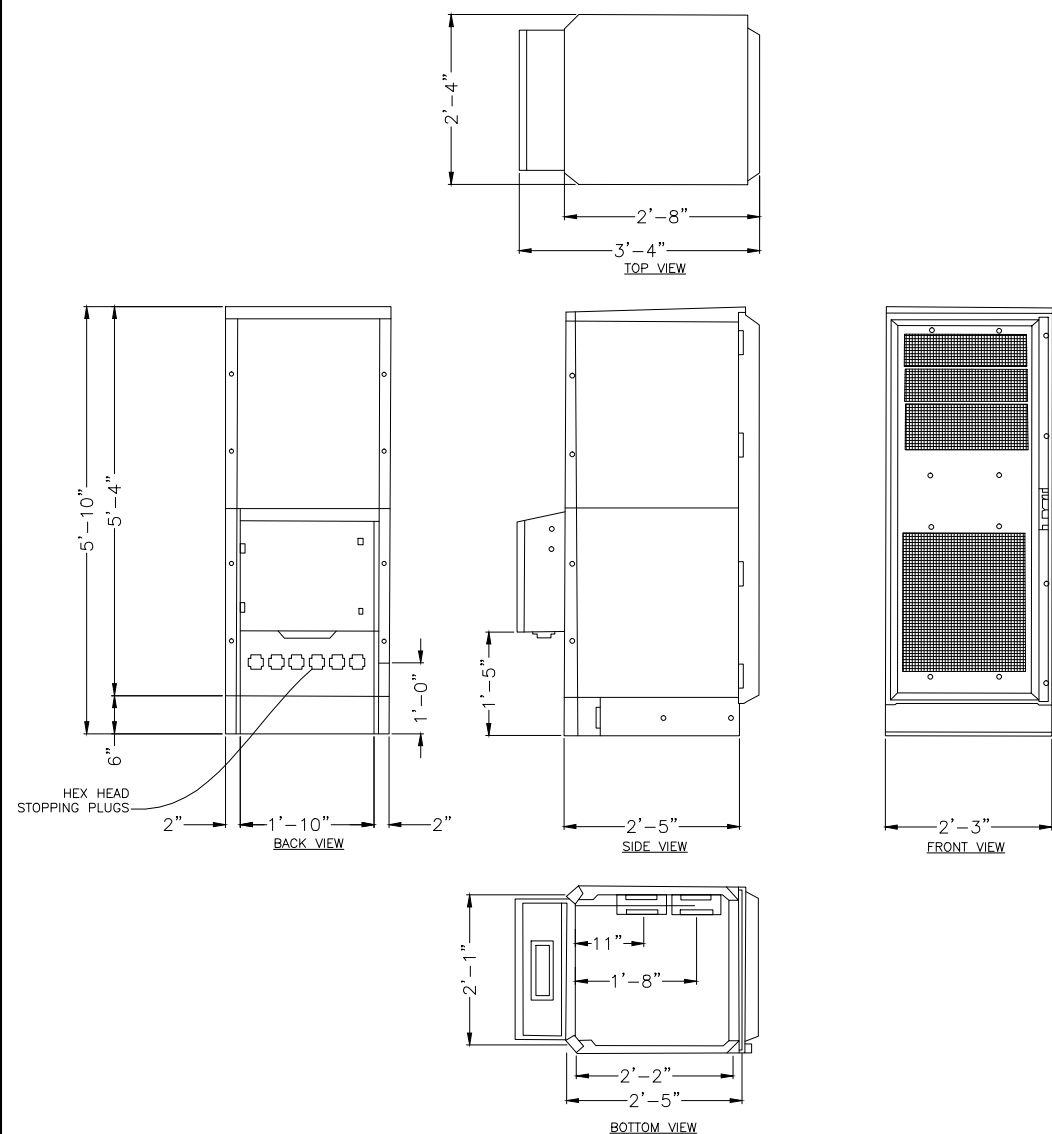


22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

MMBS & BBU TYPICAL LAYOUT 1

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

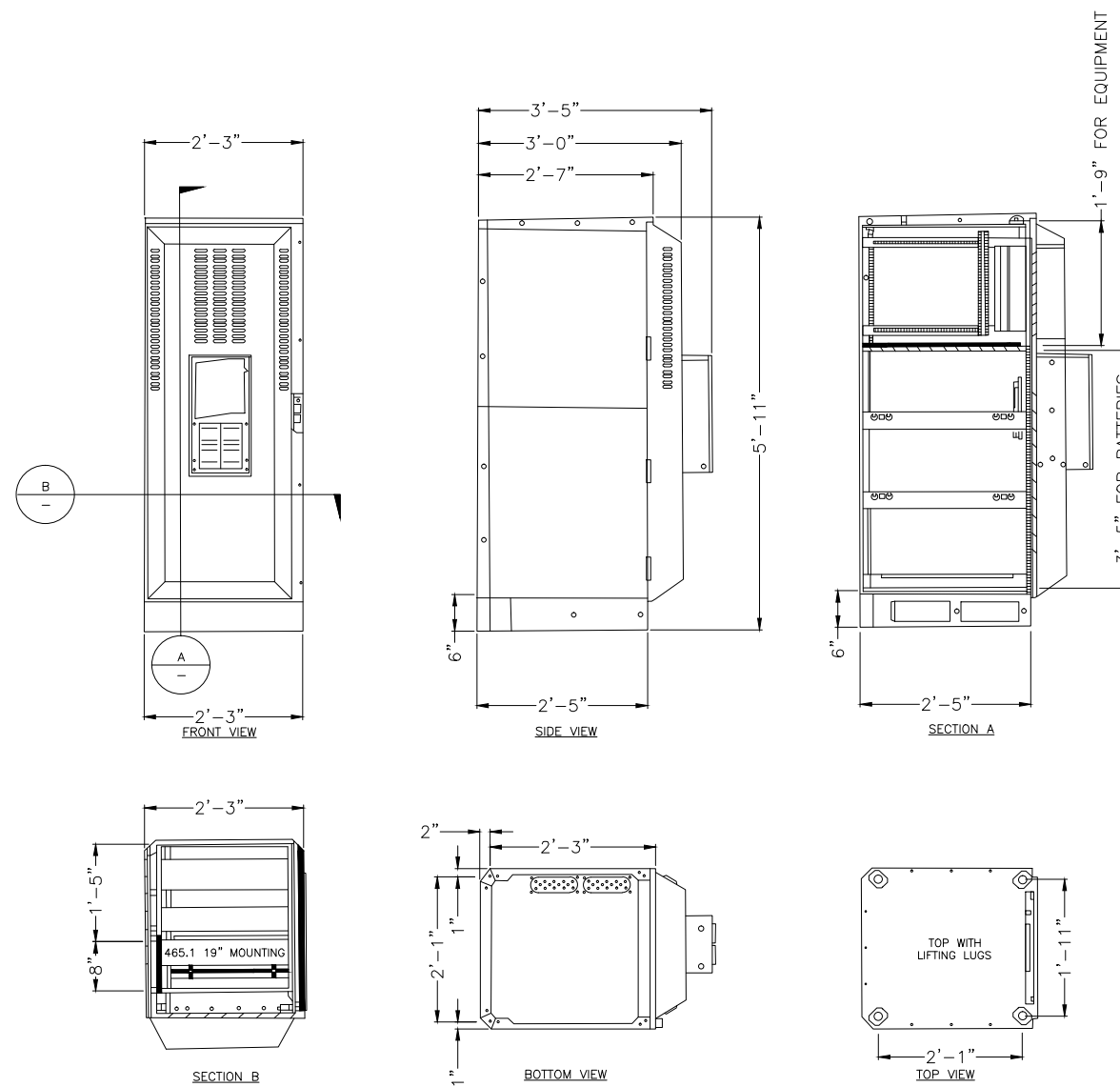
BBU CABINET 2



MMBS EQUIPMENT WEIGHT & DIMENSIONS			
MMBS CABINET	1800x700x1018(820)mm/70.8in x 29.5in x 40.1(37.0)in		
MMBS CABINET	251kg (553lbs) W/O DU SHELF	300kg W/4 DU SHELF	

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

OUTDOOR MMBS MECHANICAL SPECIFICATIONS 3



BBU EQUIPMENT WEIGHT & DIMENSIONS			
BBU CABINET	1800x700x1018(820)mm/70.8in x 29.5in x 40.1(37.0)in		
BBU CABINET	168kg (370lbs) W/O BATTERY	1136kg WITH BATTERY	

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

OUTDOOR BBU MECHANICAL SPECIFICATIONS 4



GENERAL DYNAMICS
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PROJECT INFORMATION:

NETWORK VISION MMBS LAUNCH

CITY WATER

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LICENSURE:



SHEET TITLE:

EQUIPMENT DETAILS
OUTDOOR SPECIFICATIONS

SHEET NUMBER:

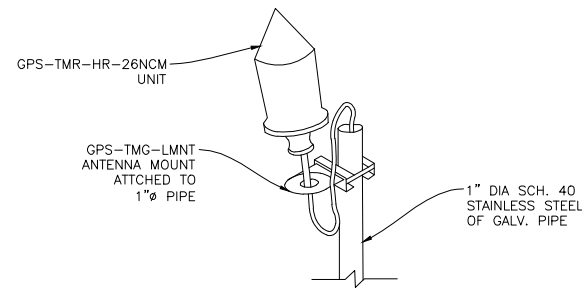
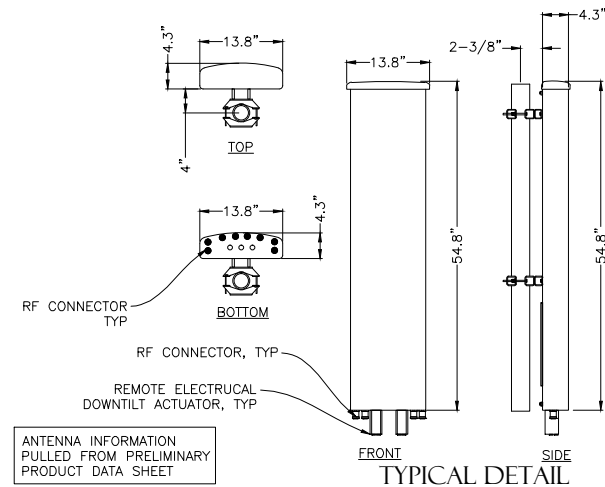
A-7

REVISION:

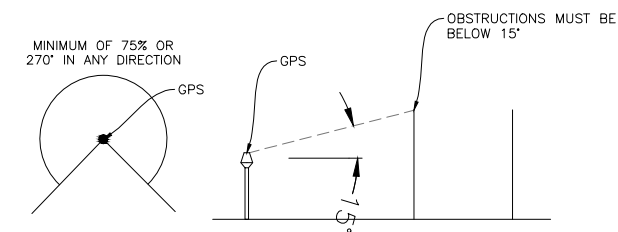
C

PRDS PROJ.NO.
2249-052112

MANUFACTURER: RFS
 MODEL: APXVRR13-A20
 WEIGHT: 32.0 LBS
 DIMENSIONS: 54.8" X 13.8" X 4.3"
 FREQUENCY: REFER TO RF DATA SHEET



- NOTES
1. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 1", SCH. 40, GALVANIZED STEEL OF STAINLESS STEEL PIPE. THE PIPE MUST NOT BETHREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MIN. OF 18", 8'-0" IF MOUNTING TO NEW MMBS-BBU) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED.
 2. IT IS CRITICAL THAT THE GPS ANTENNA IS MOUNTED SUCH THAT IT IS WITHIN 2 DEGREES OF VERTICAL AND THE BASE OF THE ANTENNA IS WITHIN 2" OF LEVEL.
 3. DO NOT SWEEP TEST GPS ANTENNA
 4. ATTACH GPS MOUNTING PIPE TO NEW MMBS-BBU USING (4) 8MMx15MM SS BOLTS AND (4) 1" PIPE STRAPS. GPS TO BE MOUNTED A MIN. OF 2'-0" ABOVE MMBS-BBU CABINET.



22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE

NOT USED 1

22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE

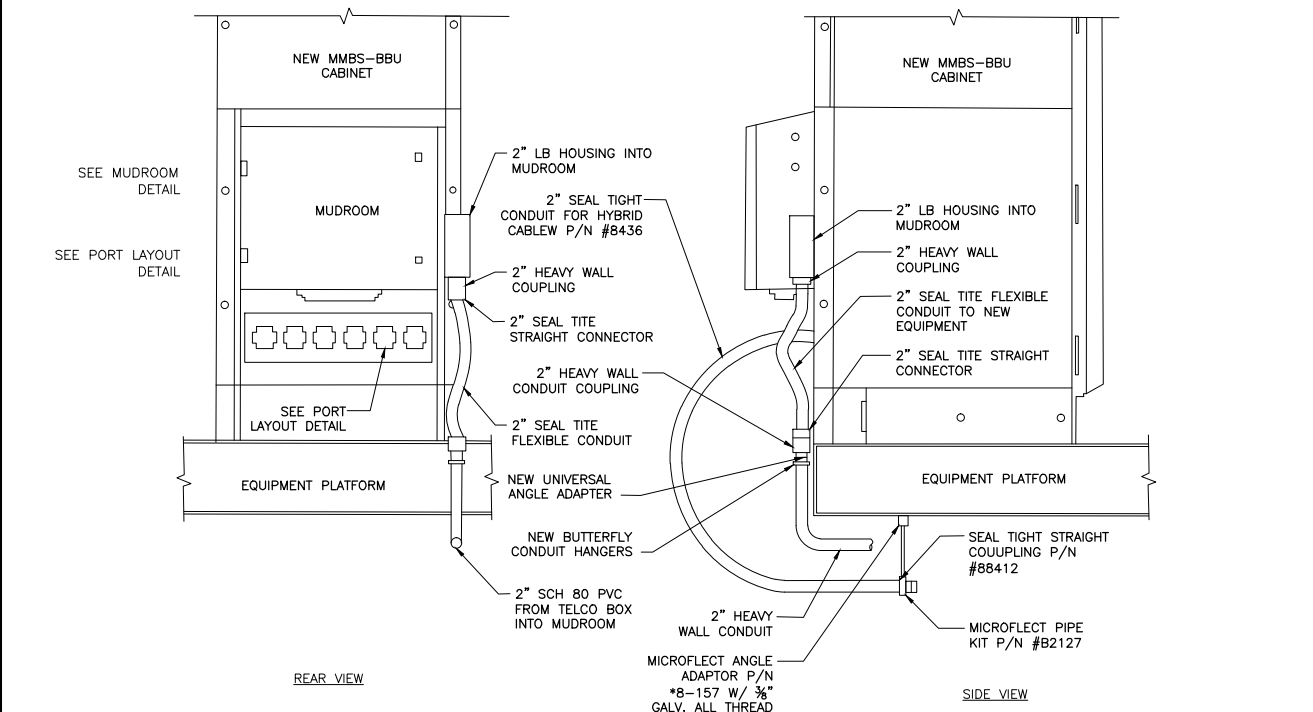
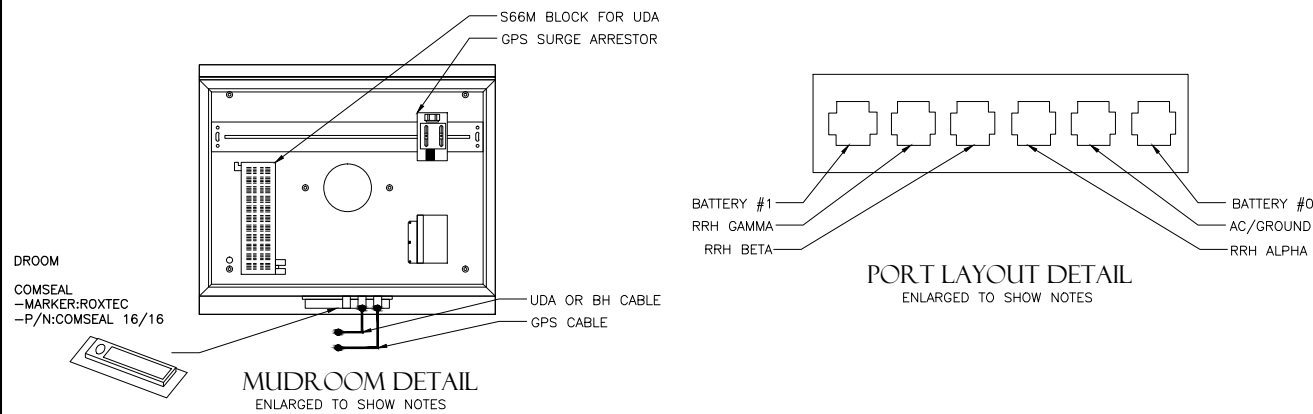
800/1900 ANTENNA DETAIL 2

22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE

GPS UNIT PIPE MOUNT 3

22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE

GPS REQUIREMENTS 4

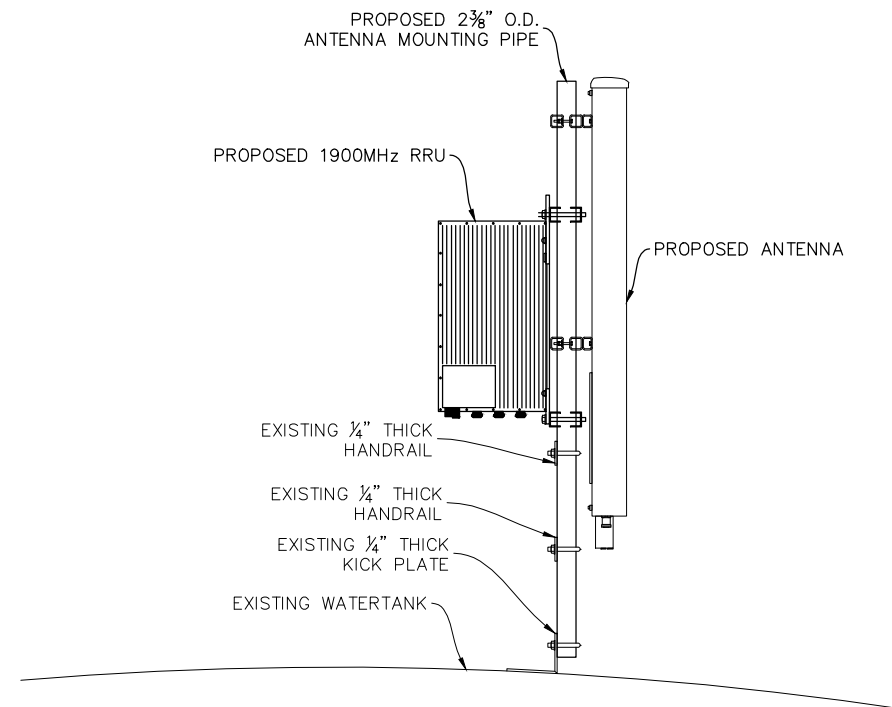


22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE

HYBRID AND TELCO LINE SUPPORT DETAIL 5

22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE

TYPICAL BOOM & STAND-OFF DETAIL 800/1900 ANTENNA DETAIL 6



Sprint

SAMSUNG

GENERAL DYNAMICS WIRELESS SERVICES



POWDER RIVER
 Development Services, LLC
 100 E. SHENANGO STREET
 SHARPSVILLE, PA 16150
 724.962.5999
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PROJECT INFORMATION:

NETWORK VISION MMBS LAUNCH

CITY WATER TOWER

DE49XC513

2011 MANCHESTER ROAD
 ANN ARBOR, MI 48104
 WASHTENAW COUNTY

ISSUE DATE: 06-18-2013

ISSUED FOR: CONSTRUCTION DWGS

REVISIONS

REV.	DATE	DESCRIPTION	INITIALS
A	5/21/12	ISSUED FOR CDs 90%	CCM
B	03/01/13	ISSUED FOR CDs 100%	CCM
C	06/18/13	ISSUED FOR CDs FINALS	CCM

NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

LICENSURE:



SHEET TITLE:

EQUIPMENT DETAILS

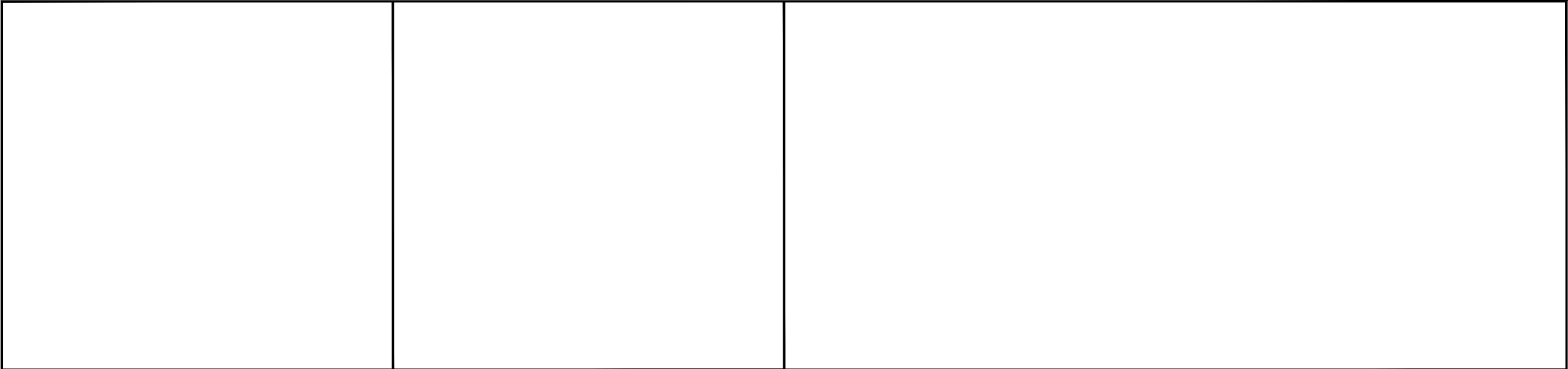
SHEET NUMBER:

A-8

REVISION:

C

PRDS PROJ.NO. 2249-052112



22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

NOT USED

1

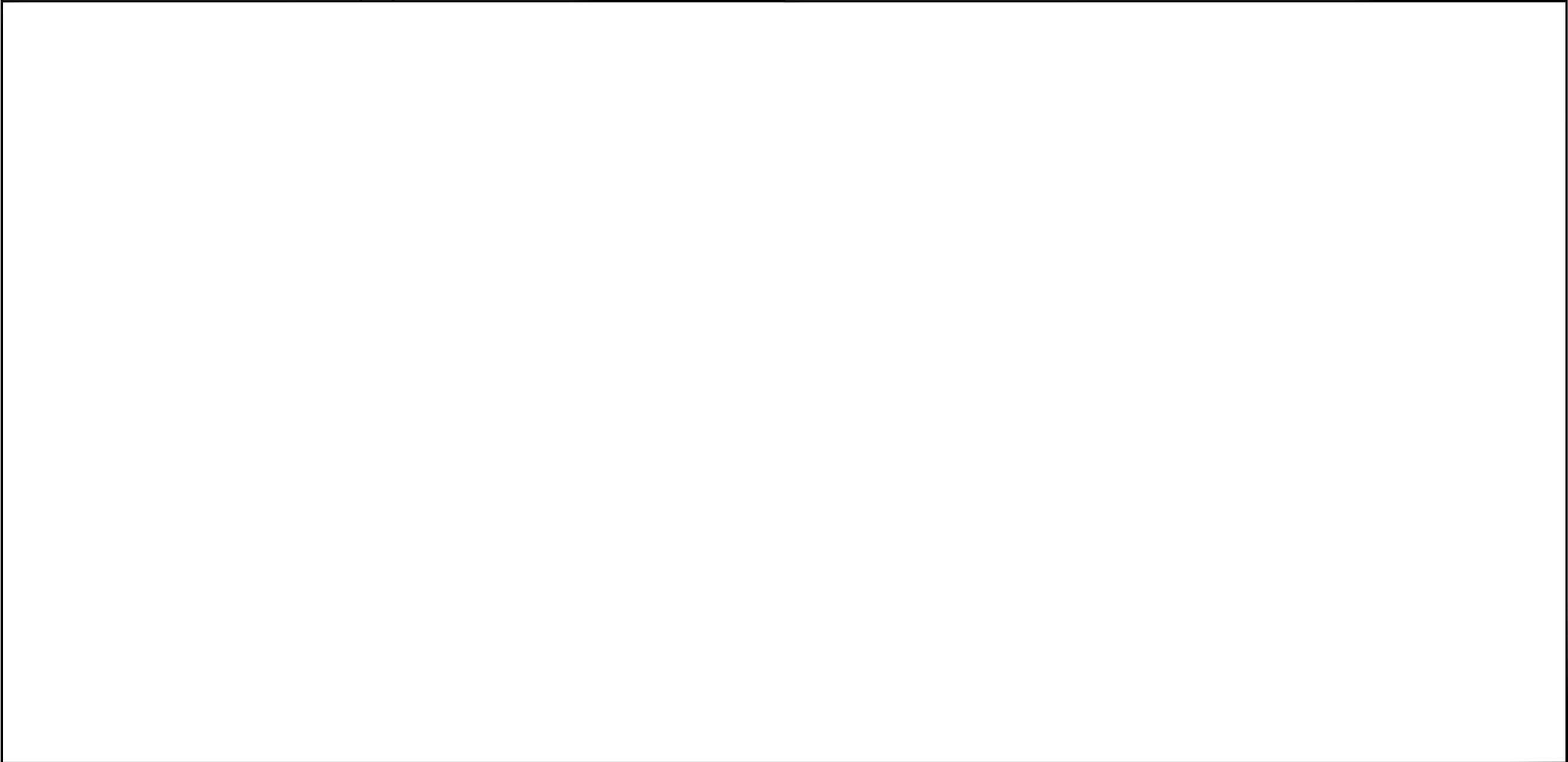
NOT USED

2

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

NOT USED

3



22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

NOT USED

4



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SHEET TITLE:

EQUIPMENT DETAILS

SHEET NUMBER:

A-9

REVISION:

C

PRDS PROJ.NO.
2249-052112

TYPICAL HYBRID CABLE COLOR CODE			
SECTOR	FIRST RING	SECOND RING	THIRD RING
A	GREEN	NO TAPE	NO TAPE
B	GREEN	GREEN	NO TAPE
G	GREEN	GREEN	GREEN

FREQUENCY COLOR CODE FOR PAIRS AND FIBER CABLES OF HYBRID CABLE		
FREQUENCY COLOR CODE	FIRST RING	SECOND RING
1900 MHz	YELLOW	RED

TYPICAL JUMPER CABLE COLOR CODE			
FREQUENCY	ANTENNA PORT	RRU PORT	CABLE COLOR
1900 MHz	PCS1 -45°	ANT 0	BLUE
	PCS1 +45°	ANT 1	WHITE
	PCS2 -45°	ANT 2	GREEN
	PCS2 +45°	ANT 3	BROWN
	RET	RET	RED

NOTES:
ON HIGH CAPACITY SITES OR ON FOUR-SECTOR SITES NEEDING AN ADDITIONAL LINE AND RRU CONTACT GDOT SITE SUPERVISOR FOR COLOR CODE INFORMATION ON ADDITIONAL LINES.

SUPPLIER	SAMSUNG FIBEROPTICS					ASIA TAI		
	LENGTH (FT)	TOTAL WEIGHT (KG)	TOTAL WEIGHT (LBS)	WEIGHT/LF (KG)	WEIGHT/LF (LBS)	TOTAL WEIGHT (KG)	TOTAL WEIGHT (LBS)	WEIGHT/LF (KG)
TYPE 1	60	13	28	0.2	0.5	19	41	0.3
	75	16	35	0.2	0.5	22	49	0.3
	90	19	42	0.2	0.5	26	57	0.3
	105	30	66	0.3	0.6	29	65	0.3
TYPE 2	120	34	75	0.3	0.6	33	73	0.3
	135	38	85	0.3	0.6	46	101	0.3
	150	43	94	0.3	0.6	51	112	0.3
	165	47	104	0.3	0.6	55	122	0.3
TYPE 3	180	69	151	0.4	0.8	72	160	0.3
	195	75	164	0.4	0.8	78	173	0.3
	210	80	177	0.4	0.8	85	187	0.3
	225	89	196	0.4	0.9	102	224	0.3
TYPE 4	240	95	209	0.4	0.9	109	239	0.3
	255	101	222	0.4	0.9	115	254	0.3
	270	133	293	0.5	1.1	122	270	0.3
	285	141	310	0.5	1.1	152	335	0.3
TYPE 5	300	148	326	0.5	1.1	160	353	0.3
	315	155	342	0.5	1.1	168	371	0.3
	330	163	359	0.5	1.1	176	388	0.3

	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7
TOTAL LENGTH	~114'-9.95"	~180'-5.35"	~213'-3.05"	~262'-5.60"	~328'-1"	~420'-0"	~550'-0"
HYBRID POWER CABLE CONFIGURATION	AWG 10 1 PAIR, AWG 12 3 PAIR	AWG 8 1 PAIR, AWG 10 3 PAIR	AWG 6 1 PAIR, AWG 8 1 PAIR, AWG 10 2 PAIR	AWG 6 1 PAIR, AWG 8 3 PAIR	AWG 4 1 PAIR, AWG 6 1 PAIR, AWG 8 2 PAIR	AWG 4 1 PAIR, AWG 6 3 PAIR	AWG 2 1 PAIR, AWG 4 3 PAIR
CABLE DIAMETER	0.98"	1.06"	1.18"	1.18"/1.25"	1.25"	1.56"	1.69"
BENDING RADIUS	11.81"	12.99"	15.35"	17.71"	17.71"	18.00"/30.00"	21.00"/35.00"
OPTIC CABLE	LC/PC-to-LC/PC, SINGLE MODE						
DU CABINET (POWER CABLE TERMINAL MAX SIZE AWG 4)	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE						
RRU POWER CABLE SPEC	AWG 8, 0.57"-0.60" AWG 10, 0.45"-0.48"					8 AWG CABLES 4 PAIRS	
NON USE POWER AND OPTIC CABLE PROTECTION	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE

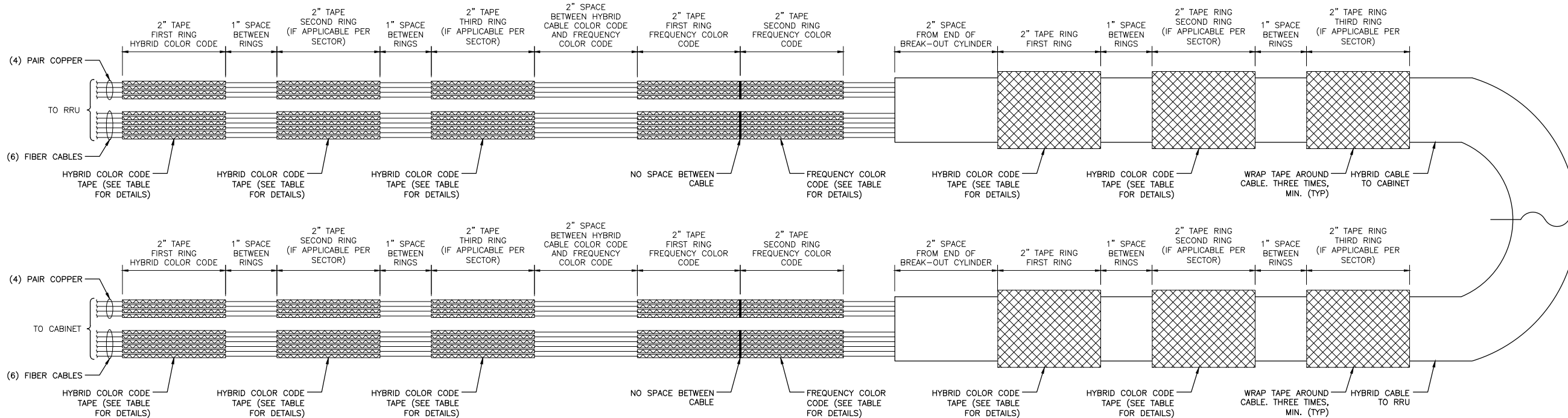
SUPPLIER	TESSCO	
TYPE	LENGTH (FT)	TOTAL WEIGHT (KG) (LBS)
TYPE 6	1000	732 1613
	420	402 887
TYPE 7	1000	1006 2218
	550	553 1220

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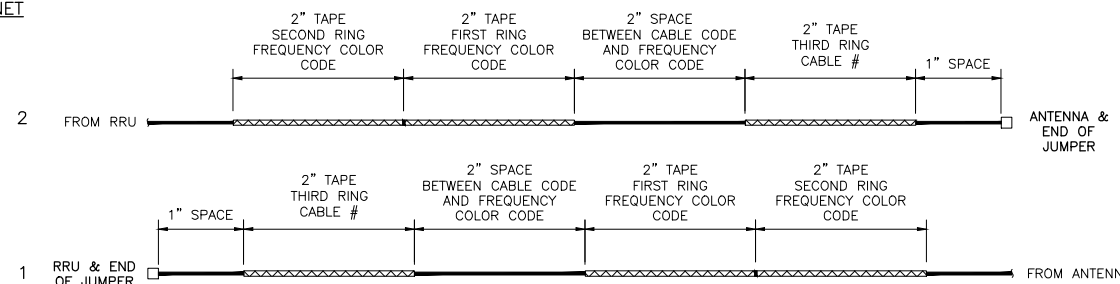
HYBRID AND JUMPER CABLES COLOR CODING 1

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

HYBRID CABLE TYPES 2



HYBRID CABLE CONNECTION AT CABINET



JUMPER CABLE CONNECTION AT RRU AND ANTENNA

NOTE:

- ALL CABLES SHALL BE MARKED AT THE TOP AND BOTTOM WITH 2" COLORED TAPE OR STENCIL TAG. COLOR TAPE SHALL BE OBTAINED FROM GRAYBAR ELECTRIC.
- THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM AN END CONNECTOR, WEATHERPROOFING, OR BREAK-OUT CYLINDER, WITH 1" SPACE BETWEEN EACH RING.
- THE HYBRID CABLE COLOR SHALL BE APPLIED IN ACCORDANCE WITH THE "TYPICAL HYBRID CABLE COLOR CODE" TABLE ABOVE FOR THE RESPECTIVE SECTOR.
- INDIVIDUAL POWER PAIRS AND FIBER CABLES SHALL BE LABELED WITH BOTH THE HYBRID CABLE COLOR FOR THE RESPECTIVE SECTOR AND A FREQUENCY COLOR CODE IN ACCORDANCE WITH THE "FREQUENCY COLOR CODE FOR PAIRS AND FIBER CABLES OF HYBRID CABLE" TABLE ABOVE.
- A 2" GAP SHALL SEPARATE THE HYBRID CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE.
- THE 2" GAP SHALL SEPARATE THE HYBRID CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE.
- THE 2" COLORED TAPE(S) SHALL EACH BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE HYBRID CABLE OR INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
- COLOR BAND ON JUMPERS SHALL BE 2" WIDE WITH A 2" SPACE.

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

HYBRID CABLE COLOR SCHEME DETAIL 3



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WIRELESS SERVICES



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PROJECT INFORMATION:

NETWORK VISION MMBS LAUNCH

CITY WATER

TOWER

DE49XC513

2011 MANCHESTER ROAD
ANN ARBOR, MI 48104
WASHTENAW COUNTY

ISSUE DATE: 06-18-2013

ISSUED FOR: CONSTRUCTION DWGS

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C	06/18/13	ISSUED FOR CDs FINALS	CCM

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LICENSURE:



SHEET TITLE:

ANTENNA AND CABLE
COLOR CODING DETAILS

SHEET NUMBER:

RF-1

REVISION:

C

PRDS PROJ. NO.
2249-052112

ELECTRICAL NOTES

- ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL ELECTRICAL CODES AND ALL LOCAL AND STATE CODE, LAWS, AND ORDINANCES. PROVIDE ALL COMPONENTS AND WIRING SIZES AS REQUIRED TO MEET NEC STANDARDS.
- CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY FOR REQUIREMENTS OF POWER SERVICE LINE TO THE METER BASE, WHEN REQUIRED. POWER SERVICE REQUIREMENT IS COMMERCIAL. AC NOMINAL 120/208 VOLT OR 120/240 VOLT, SINGLE PHASE WITH 200 AMP RATING.
- CONTRACTOR SHALL COORDINATE WITH LOCAL TELEPHONE COMPANY FOR SERVICE LINE REQUIREMENTS TO TERMINATE AT THE PPC CABINET.
- CONTRACTOR SHALL FURNISH AND INSTALL ELECTRIC METER BASE AND 200A DISCONNECT SWITCH PER SITE PLAN DETAIL DRAWINGS AND PER LOCAL UTILITY COMPANIES SPECIFICATION, WHEN REQUIRED. THE METER BASE SHOULD BE LOCATED IN A MANNER WHERE ACCESSIBLE BY THE LOCAL POWER COMPANY.
- LOCAL POWER COMPANY SHALL PROVIDE 200 AMP ELECTRIC METER. CONTRACTOR SHALL COORDINATE INSTALLATION OF METER WITH LOCAL POWER COMPANY.
- UNDERGROUND POWER AND TELCO SERVICE LINES SHALL BE ROUTED IN A COMMON TRENCH. ALL UNDERGROUND CONDUIT SHALL BE PVC SCHEDULE 40 AND CONDUIT EXPOSED ABOVE GROUND SHALL BE GALVANIZED RIGID STEEL TUBING UNLESS OTHERWISE INDICATED.
- ALL TELCO CONDUIT LINES SHALL BE 4" SCH. 40 PVC CONDUIT UNLESS OTHERWISE INDICATED. THE TELCO CONDUIT FROM THE PPC SHALL BE ROUTED AND TERMINATED AT DESIGNATED TELCO DEMARCATION OR 2-FEET OUTSIDE FENCED AREA, NEAR UTILITY POLE (IN FENCED AREA), OR END CAP OFF AND PROVIDE MARKER STAKE PAINTED BRIGHT ORANGE WITH DESIGNATION FOR TELCO SERVICE.
- CONDUITS INSTALLED AT PCS EQUIPMENT ENDS PRIOR TO THE EQUIPMENT INSTALLATION SHALL BE STUBBED AND CAPPED AT 6" ABOVE GRADE OR PLATFORM. IF SERVICE LINES CAN'T BE INSTALLED INITIALLY, PROVIDE NYLON PULL CORD IN CONDUITS.
- THE SPRINT CABINET, INCLUDING 200 AMP LOAD PANEL AND TELCO PANEL, SHALL BE PROVIDED BY OWNER AND INSTALLED BY THE CONTRACTOR. CONTRACTOR IS TO INSTALL BREAKER(S) NOT PROVIDED BY MANUFACTURER. SEE PANEL SCHEDULE ON THIS SHEET FOR BREAKER REQUIREMENTS.
- LOCATION OF ELECTRIC METER AND DISCONNECT SWITCH TO BE PROVIDED BY GENERAL CONTRACTOR.
- CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTOR'S FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.
- LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO ROUGH-IN.
- THE CONDUIT RUNS AS SHOWN ON THE PLANS ARE APPROXIMATE. EXACT LOCATION AND ROUTING SHALL BE PER EXISTING FIELD CONDITIONS.
- PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.

ELECTRICAL NOTES (CON'T)

- ALL CONDUITS SHALL BE MET WITH BENDS MADE IN ACCORDANCE WITH NEC TABLE 346-10. NO RIGHT ANGLE DEVICE OTHER THAN STANDARD CONDUIT ELBOWS WITH 12" MINIMUM INSIDE SWEEPS FOR ALL CONDUITS 2" OR LARGER.
- ALL CONDUIT TERMINATIONS SHALL BE PROVIDED WITH PLASTIC THROAT INSULATING GROUNDING BUSHINGS.
- ALL WIRE SHALL BE "TYPE THWN, SOLID, ANNEALED COPPER UP TO SIZE 1/10 AWG (18 AND LARGER SHALL BE CONCENTRIC STRANDED) 75 DEGREE C, (167 DEGREES F), 98" CONDUCTIVITY. MINIMUM #12.
- ALL WIRES SHALL BE TAGGED AT ALL PULL BOXES, J-BOXES, EQUIPMENT BOXES AND CABINETS WITH APPROVED PLASTIC TAGS, ACTION CRAFT, BRADY, OR APPROVED EQUAL.
- ALL NEW MATERIAL SHALL HAVE A U.L. LABEL.
- CONDUIT ROUGH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION TO CONFLICTS. VERIFY WITH MECHANICAL CONTRACTOR AND COMPLY AS REQUIRED.
- ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN NOT HAND WRITTEN.
- INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS PER THE SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, AND ALL DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.
- THE CONTRACTOR SHALL PREPARE AS-BUILT DRAWINGS. DOCUMENT ANY AND ALL WIRING AND EQUIPMENT CONDITIONS AND CHANGES WHILE COMPLETING THIS CONTRACT. SUBMIT AT SUBSTANTIAL COMPLETION.
- ALL DISCONNECT SWITCHES AND OTHER CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED PHENOLIC NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS INSTALLED ON, AND PANEL FIELD LOCATIONS FED FROM (NO EXCEPTIONS.) PROVIDE SAMPLE FOR CONSTRUCTION MANAGER'S APPROVAL.
- ALL ELECTRICAL DEVICES AND INSTALLATIONS OF THE DEVICES SHALL COMPLY WITH (ADA) AMERICANS WITH DISABILITIES ACT AS ADOPTED BY THE APPLICABLE STATE.
- PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS OR RISERS THROUGH BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS WITHOUT CONSTRUCTION MANAGERS AND THE PROPERTY OWNER'S APPROVAL. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE PACKED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FILL FOR FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.
- ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT (NEW AND EXISTING) SHALL BE FIELD VERIFIED WITH THE OWNER'S REPRESENTATIVE AND EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN OF CONDUIT AND WIRE. ALL EQUIPMENT SHALL BE PROPERLY CONNECTED ACCORDING TO THE NAMEPLATE DATA FURNISHED ON THE EQUIPMENT (THE DESIGN OF THESE PLANS ARE BASED UPON BEST AVAILABLE INFORMATION AT THE TIME OF DESIGN AND SOME EQUIPMENT CHARACTERISTICS MAY VARY FROM DESIGN AS SHOWN ON THESE DRAWINGS).
- LOCATION OF ALL OUTLET, BOXES, ETC., AND THE TYPE OF CONNECTION (PLUG OR DIRECT) SHALL BE CONFIRMED WITH THE OWNER'S REPRESENTATIVE PRIOR TO ROUGH-IN.

SITE NUMBER:	T.B.D.	MODEL NUMBER:	TBD	WIRE:	3
VOLTAGE:	240V/120	PHASE:	1	A/C:	YES
MAIN BREAKER:	200 AMP	BUSS RATING:	200 AMPS	GROUND BAR:	FIELD VERIFY
MOUNT:	SURFACE	NEUTRAL BAR:	YES		
ENCLOSURE TYPE:	NEMA 3R	N to GROUND BOND:	FIELD VERIFY		
PANEL STATUS:	EXISTING	INTERNAL TVSS:	YES		

CKT	LOAD DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	LOAD DESCRIPTION	CKT
1	BTS	100	2	ON	2	60	SURGE PROTECTION	2
3	--	--	--	ON	--	--	--	4
5	BLANK	--	--	N/A	1	10	TELCO FAN	6
7	SAMSUNG MMBS CABINET	100	2	NEW	ON	1	20	GFCI
9	--	--	--	NEW	ON	1	20	LIGHT
11	SAMSUNG BBU CABINET	15	1	NEW	N/A	--	--	12
13	BLANK	--	--	N/A	N/A	--	--	14
15	BLANK	--	--	N/A	N/A	--	--	16
17	BLANK	--	--	N/A	N/A	--	--	18
19	BLANK	--	--	N/A	N/A	--	--	20
21	BLANK	--	--	N/A	N/A	--	--	22
23	BLANK	--	--	N/A	N/A	--	--	24

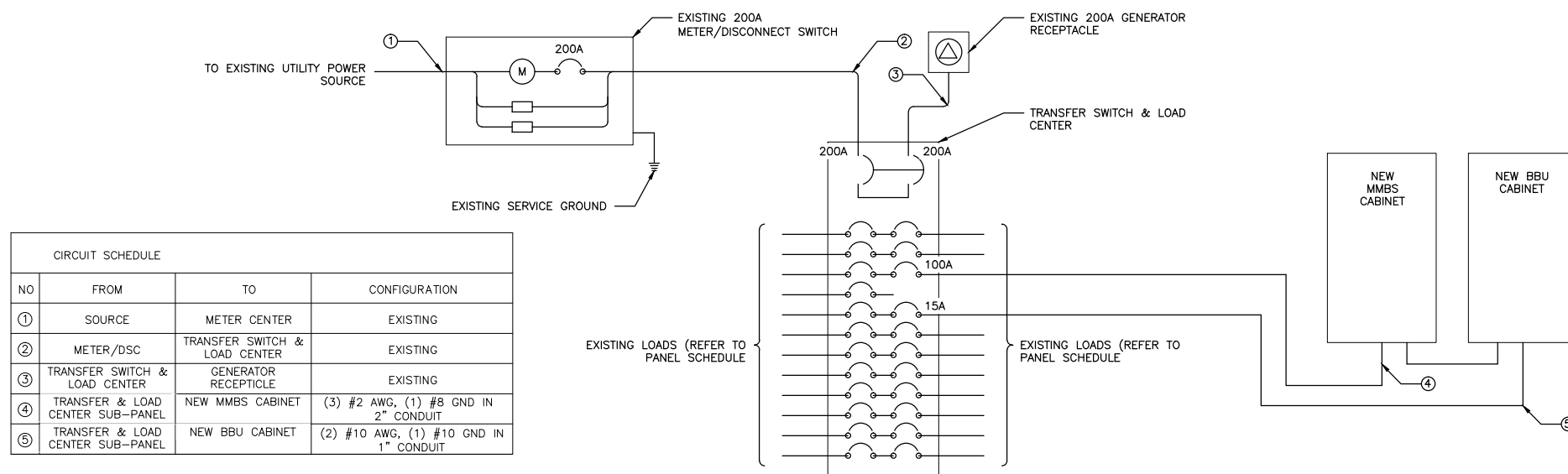
NOTES

GENERAL CONTRACTOR TO CHECK REQUIREMENTS WITH LOCAL POWER COMPANY AND JURISDICTION. ADDITIONAL SUB PANEL OFF THE PPC CABINET MIGHT BE REQUIRED TO FEED NEW NETWORK VISION EQUIPMENT.

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

ELECTRICAL NOTES 1

ELECTRICAL PANEL SCHEDULE 2



22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

ELECTRICAL ONE-LINE DIAGRAM 3



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LICENSURE:



SHEET TITLE:

ONE-LINE DIAGRAM & POWER PANEL SCHED.

SHEET NUMBER:

E-1

REVISION:

C

PRDS PROJ. NO. 2249-052112



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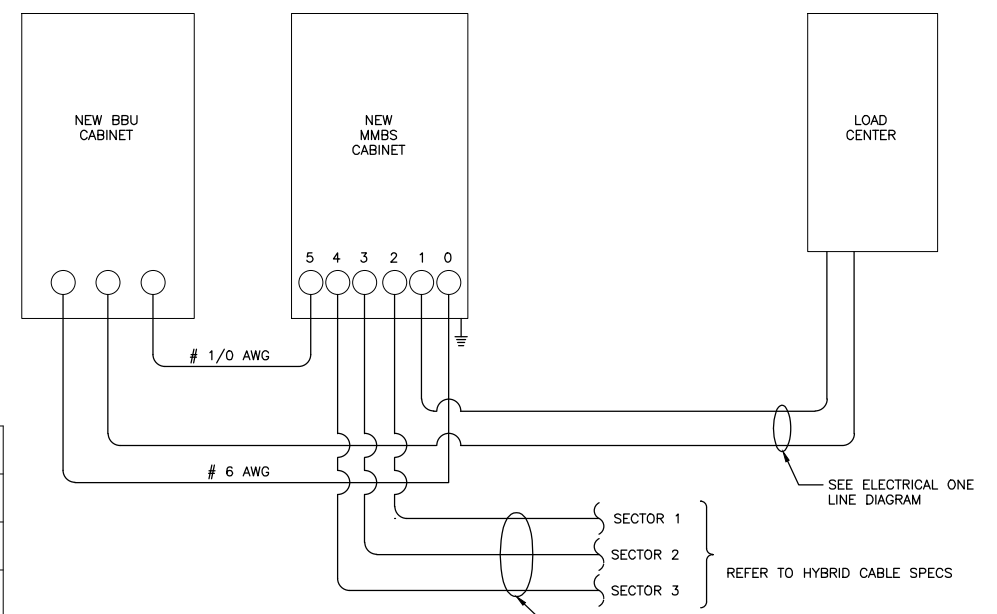
REVISIONS			
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LABELED AS CONSTRUCTION SET



SHEET TITLE:
**DC POWER ONE-LINE
DIAGRAM**

SHEET NUMBER: **E-2** REVISION: **C**
PRDS PROJ NO. 2249-052112



MMBS PORT LAYOUT	
CONDUIT NO.	USAGE
0	BATTERY
1	AC/GROUND
2	RRU SECTOR 1
3	RRU SECTOR 2
4	RRU SECTOR 3
5	BATTERY

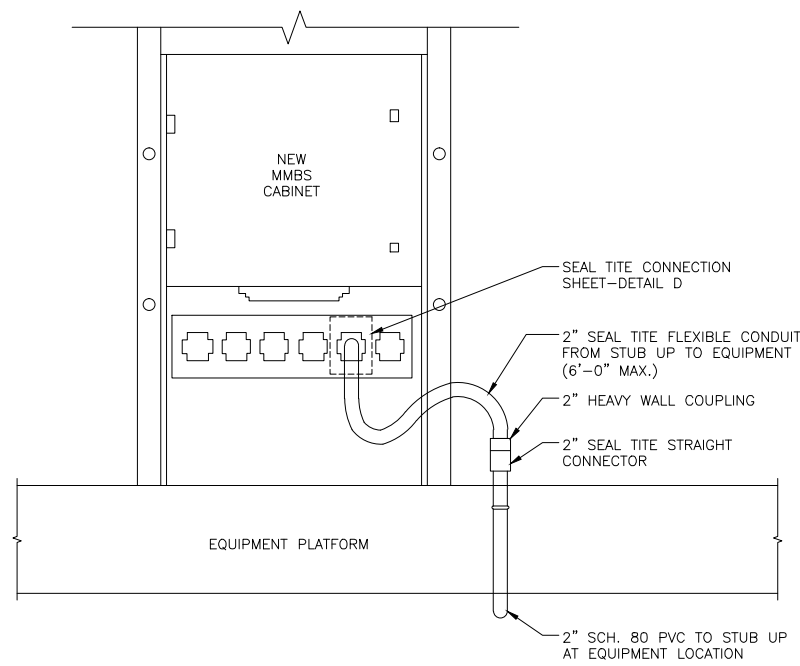
- DC POWER ELECTRICAL NOTES:** DC CABLING WITHIN PRE MANUFACTURED HYBRID CABLES
1. MINIMUM CABLE LENGTH BETWEEN THE OU AND BATTERY IS 70MM (2.75 in)
 2. MAXIMUM CABLE LENGTH DISTANCE IS 900mm (35.43 in). WEATHER PROOFING SHALL INCORPORATE PPC WEATHERPROOFING TAPE KIT, COLD SHRINK SHALL NOT BE USED.
 3. ROUTE DC CONDUCTORS IN CONDUITS TO NEW MMBS CABINET 48VDC POWER DISTRIBUTION PANEL TO AND FROM NEW BBU CABINET.
 4. -48 VDC CABLES BETWEEN NEW MMBS CABINET & RRU'S ARE FACTORY ASSEMBLED AND EQUIPED WITH ONE PRE-TERMINATED END.
 5. ALL FIELD INSTALLED DC CABLING SHALL BE TYPE RHH/RHW AND SHALL BE UL THERMOSET INSULATED.

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

DC POWER DIAGRAM 1

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

NOT USED 2



22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

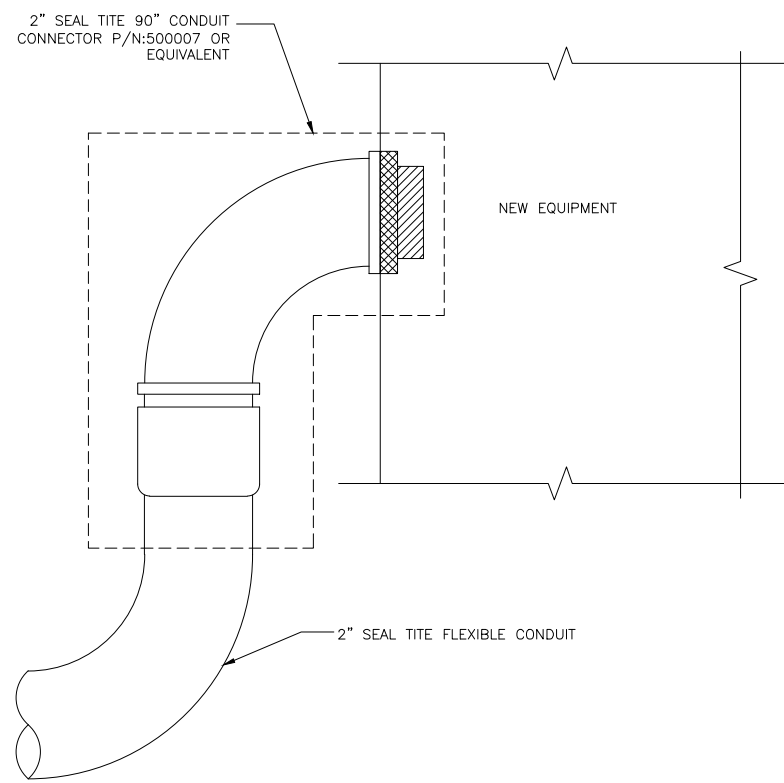
EQUIP. POWER CONDUIT CONNECTIONS 3

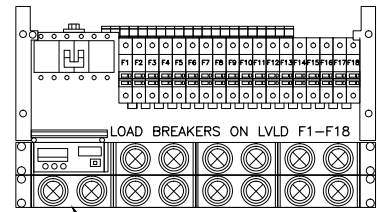
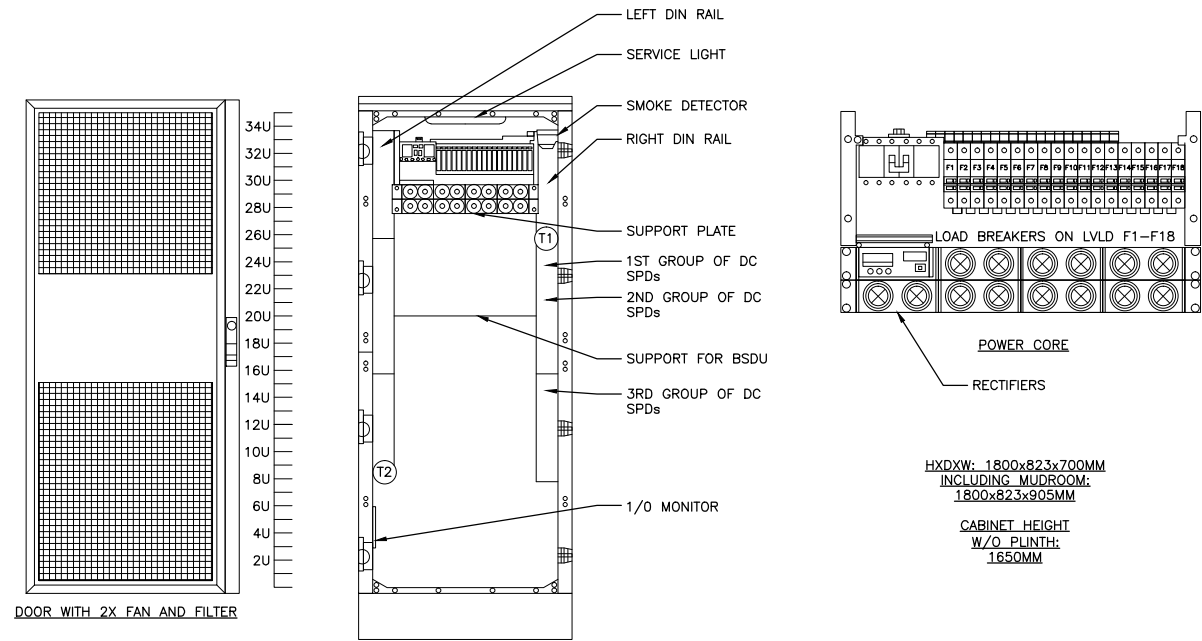
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11"x17" SCALE: NOT TO SCALE

SEAL TITE POWER CONDUIT CONNECTION 4

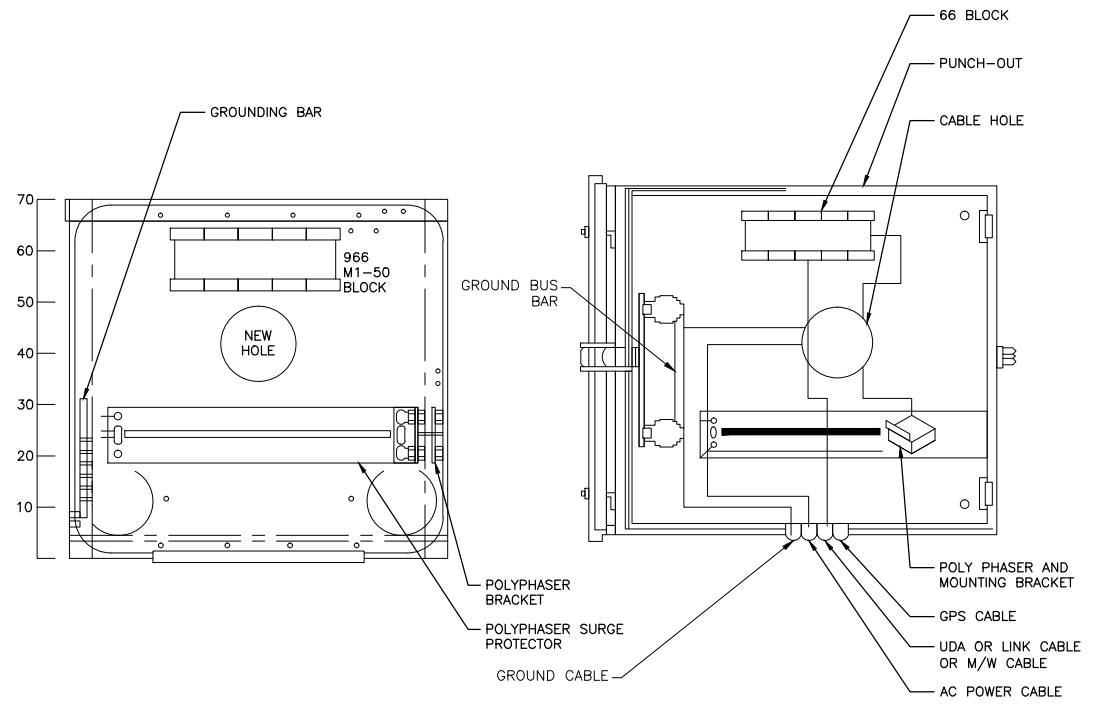
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11"x17" SCALE: NOT TO SCALE

NOT USED 5



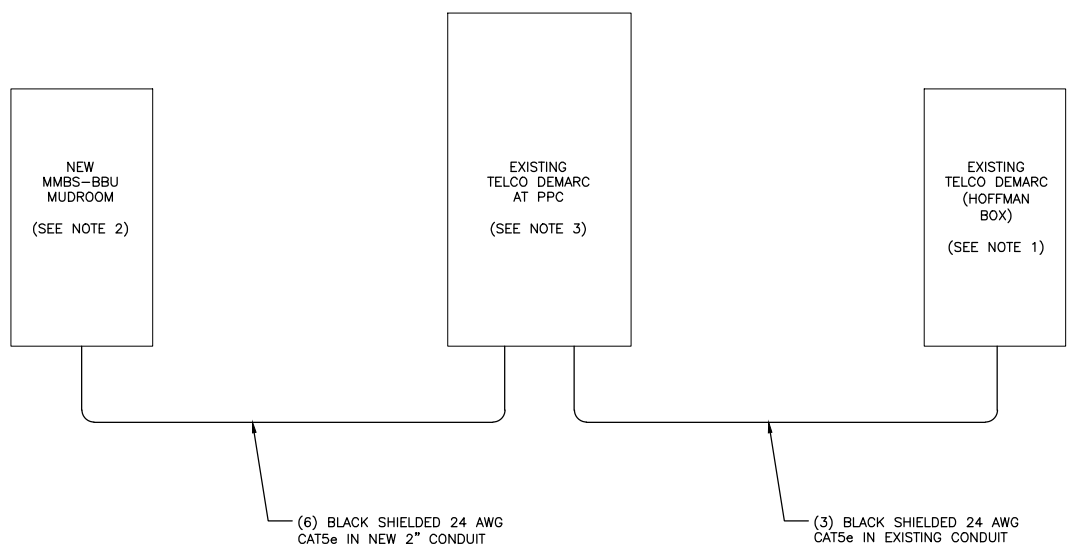


HXDW: 1800x823x700MM
 INCLUDING MUDROOM:
 1800x823x905MM
 CABINET HEIGHT
 W/O PUNTH:
 1650MM

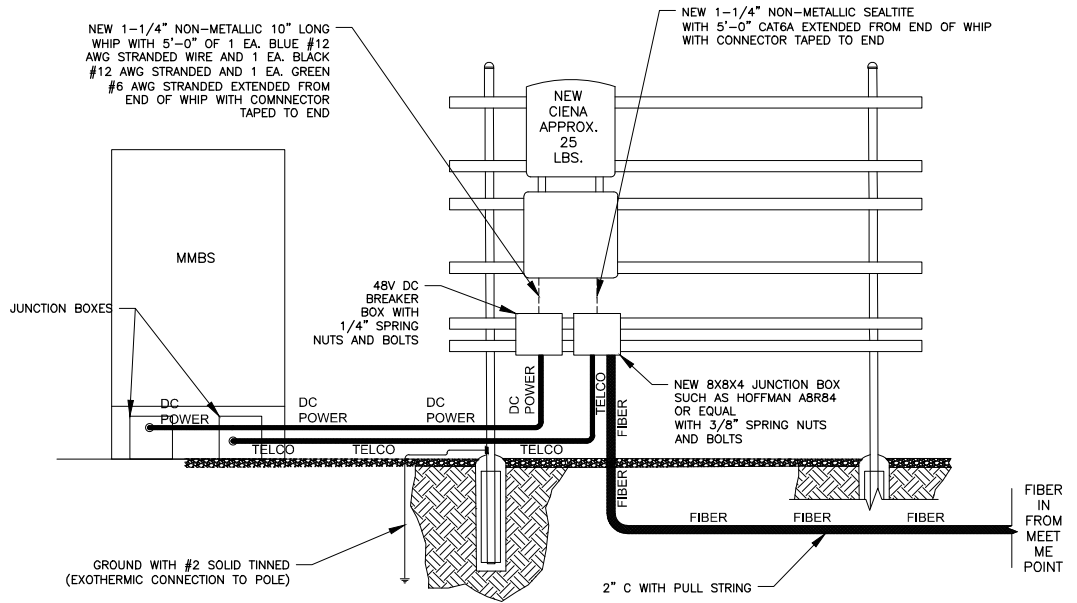


22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE
 OUTDOOR MMBS-BBU ELECTRICAL DETAILS 1

22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE
 MUDROOM ELECTRICAL DETAIL 2



- NOTES:
- CONTRACTOR TO INSTALL NEW 66 BLOCK IN EXISTING HOFFMAN BOX AT SITES MAIN TELCO DEMARC.
 - CONTRACTOR SHALL INSTALL RJ-45 ENDS ON ALL (6) RUNS OF CAT5e INTO MMBS-BBU MUDROOM.
 - CONTRACTOR TO INSTALL NEW 66 BLOCK IN EXISTING TELCO BOX NEXT TO EXISTING PPC CABINET.



22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE
 TELCO RISER DETAIL 3

22"x34" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE
 AAV MOUNTING EXAMPLE 4



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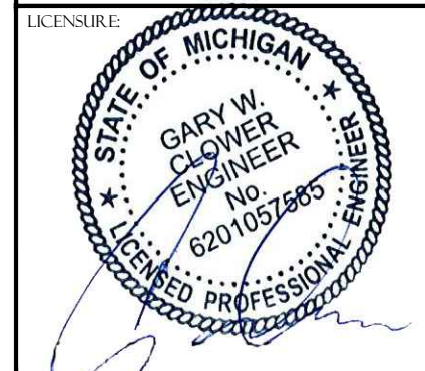
PROJECT INFORMATION:
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CITY WATER TOWER
 DE49XC513
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 ANN ARBOR, MI 48104
 WASHTENAW COUNTY

ISSUE DATE: 06-18-2013

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 LABELED AS CONSTRUCTION SET



SHEET TITLE:
**ELECTRICAL DETAILS
 OUTDOOR SPECIFICATIONS**

SHEET NUMBER: **E-3**
 REVISION: **C**
 PRDS PROJ NO.
 2249-052112



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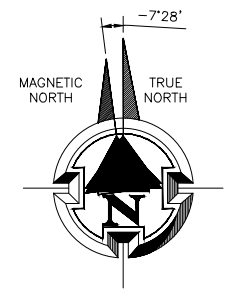
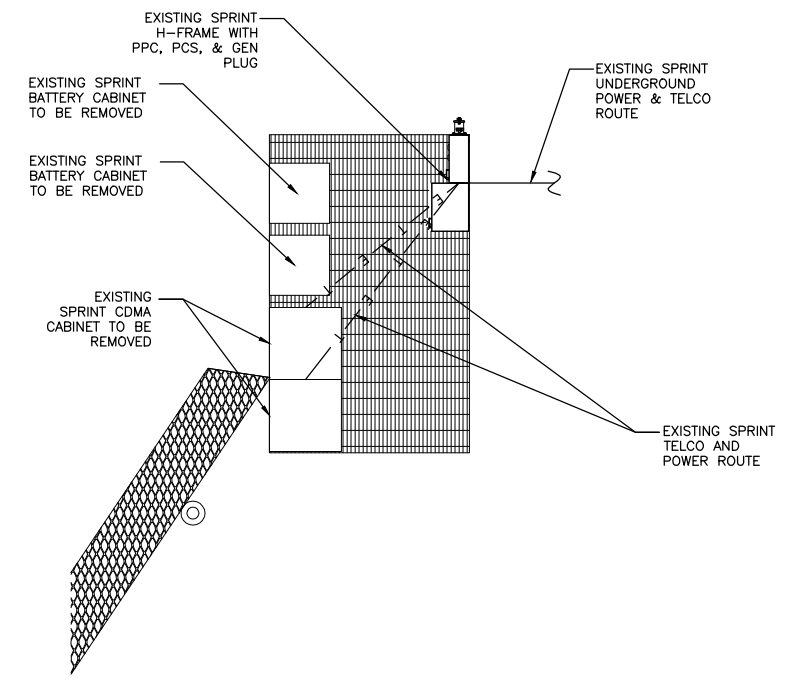
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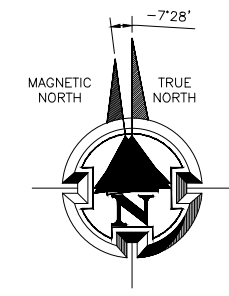


SHEET TITLE:
CONDUIT ROUTING

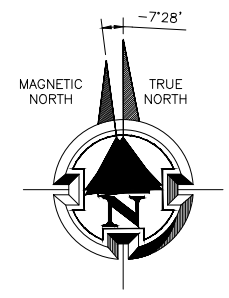
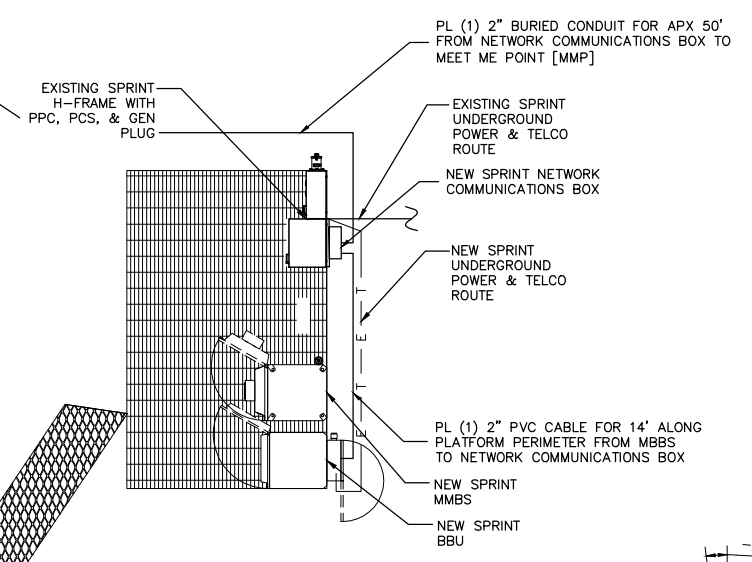
SHEET NUMBER: **E-4** REVISION: **C**
PRDS PROJ. NO. 2249-052112



22"x34" SCALE: 1/4" = 1'-0"
11"x17" SCALE: 1/8" = 1'-0"
EXISTING ROUTING PLAN 1



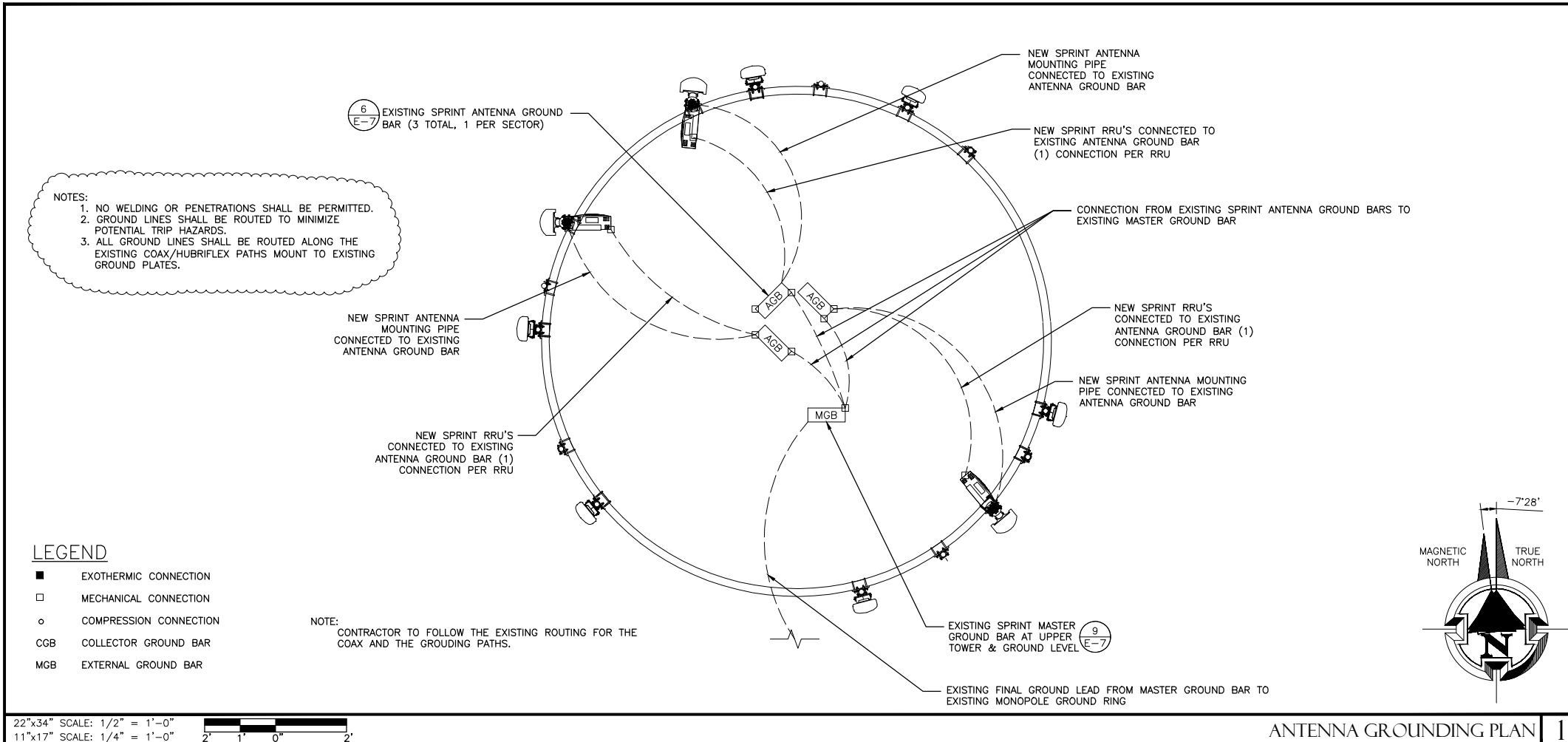
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11"x17" SCALE: 1/8" = 1'-0"
NOT USED 2



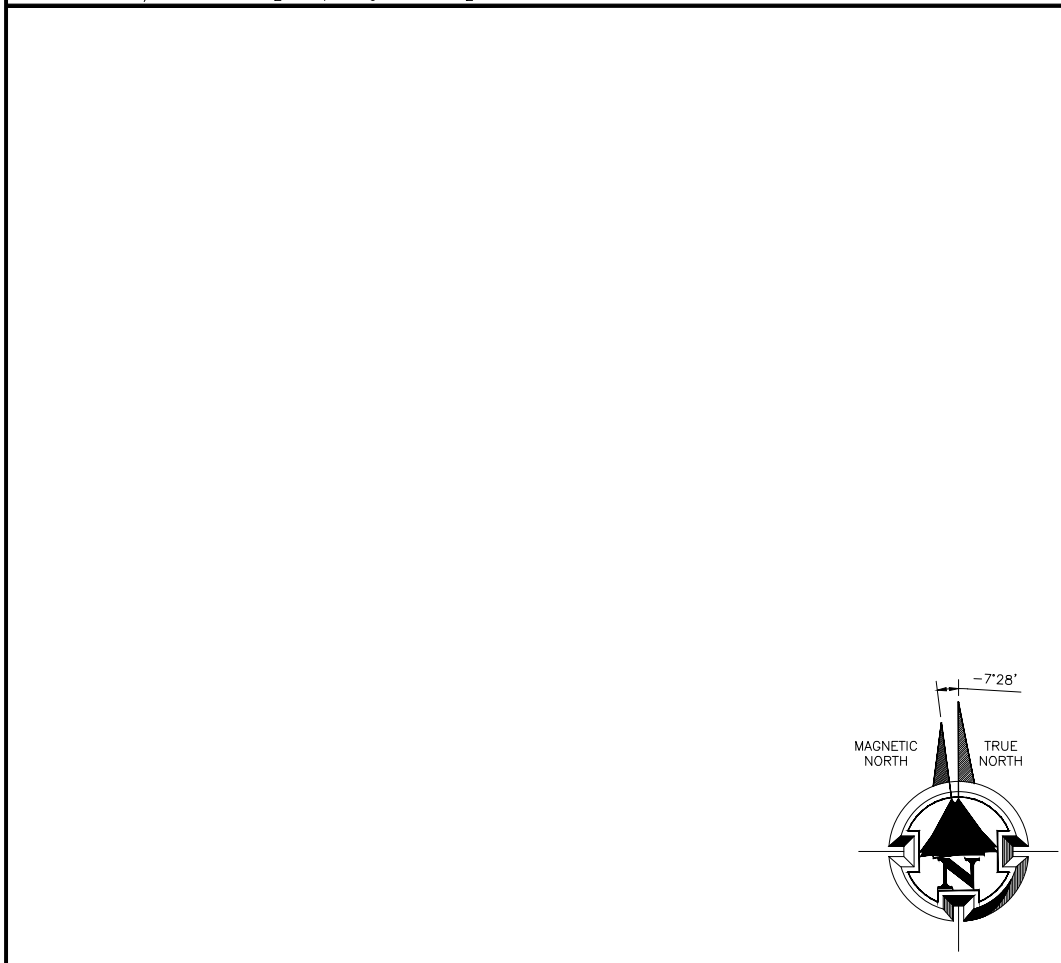
22"x34" SCALE: 1/4" = 1'-0"
11"x17" SCALE: 1/8" = 1'-0"
NEW ROUTING PLAN (FINAL) 3

NOTE: STRUCTURAL ANALYSIS MUST BE PERFORMED ON ALL ROOFTOPS, FLAGPOLES AND TOWER SITES BEFORE INSTALLATION OF NEW ANTENNAS, NEW RRUS, & NEW CABINETS/TEMPORARY PLATFORMS. STRUCTURAL ANALYSIS PROVIDED BY GENERAL DYNAMICS.

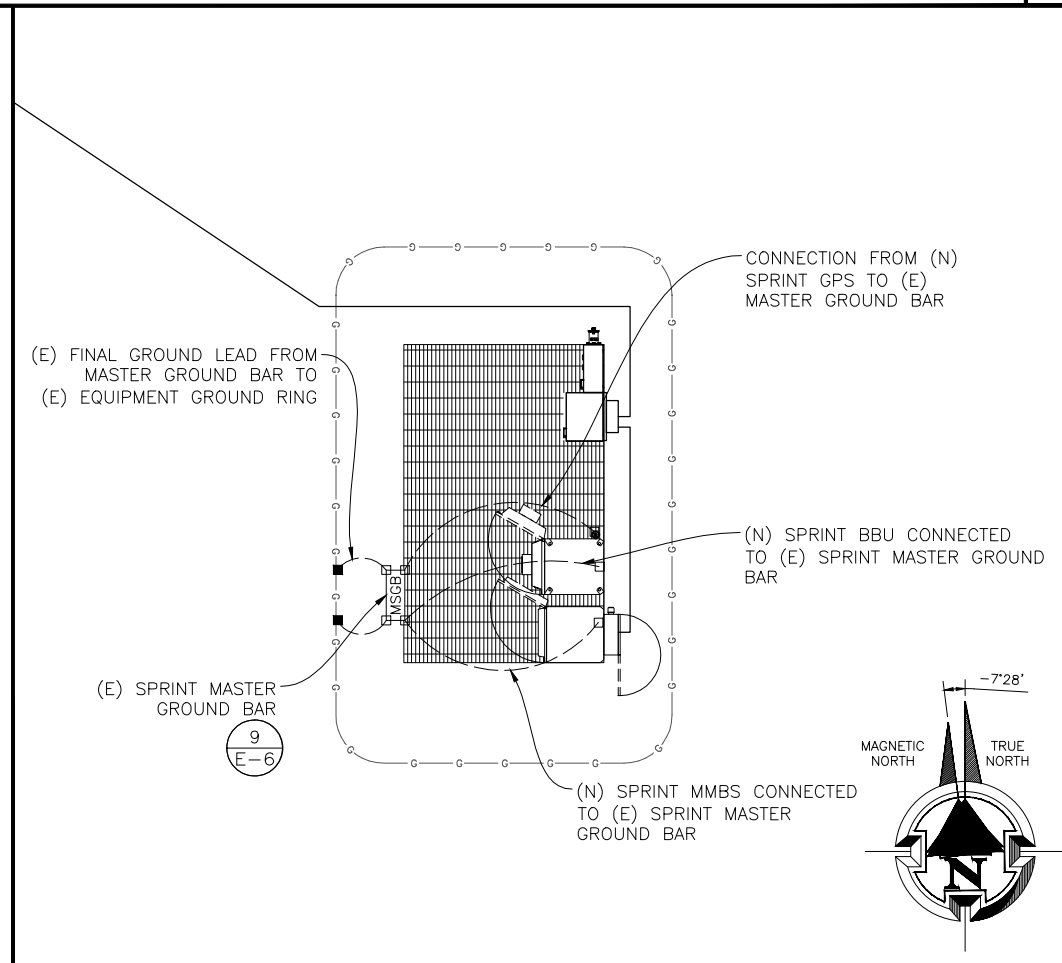
22"x34" SCALE: 1/4" = 1'-0"
11"x17" SCALE: 1/8" = 1'-0"
NOT USED 4



ANTENNA GROUNDING PLAN 1



NOT USED 2



EQUIPMENT GROUNDING PLAN (FINAL) 3

1. ALL DETAILS ARE SHOWN IN GENERAL TERMS. ACTUAL INSTALLATION AND CONSTRUCTION MAY VARY DUE TO SITE SPECIFIC CONDITIONS.
2. GROUND ALL ANTENNA BASES, FRAMES, CABLE RUNS, AND OTHER METALLIC COMPONENTS USING GROUND WIRES AND CONNECT TO SURFACE MOUNTED BUS BARS. FOLLOW ANTENNA AND BTS MANUFACTURERS PRACTICES FOR GROUNDING REQUIREMENTS. GROUND COAX SHIELD AT BOTH ENDS AND EXIT FROM TOWER OR POLE USING MFR'S PRACTICES.
3. ALL GROUND CONNECTIONS SHALL BE EXOTHERMIC. ALL WIRES SHALL BE COPPER THHN/THWN. ALL GROUND WIRE SHALL BE GREEN INSULATED WIRE ABOVE GROUND.
4. CONTRACTOR TO VERIFY AND TEST GROUND TO SOURCE. GROUNDING AND OTHER OPERATIONAL TESTING WILL BE WITNESSED BY SPRINT WIRELESS, LLC. REPRESENTATIVE.
5. REFER TO DIVISION 16 GENERAL ELECTRIC; GENERAL ELECTRICAL PROVISION AND COMPLY WITH ALL REQUIREMENTS OF GROUNDING STANDARDS.
6. ELECTRICAL CONTRACTOR TO PROVIDE DETAILED DESIGN OF GROUNDING SYSTEM PER SPRINT STANDARD GROUNDING METHOD, AND RECEIVE APPROVAL OF DESIGN BY AUTHORIZED SPRINT MOBILITY REPRESENTATIVE, PRIOR TO INSTALLATION OF GROUNDING SYSTEM. PHOTO DOCUMENT ALL EXOTHERMIC AND GROUND RING.
7. NOTIFY CONSTRUCTION MANAGER IF THERE ARE ANY DIFFICULTIES INSTALLING GROUNDING SYSTEM DUE TO SITE SOIL CONDITIONS.
8. ALL EXISTING GROUND BARS, WIRES & CONNECTIONS SHALL BE FIELD VERIFIED. ANY DEFICIENT ITEMS SHALL BE REPLACED AS REQUIRED TO ACHIEVE ADEQUATE GROUNDING REQUIRED BY SPRINT.

GENERAL GROUNDING NOTES

GROUNDING NOTES

1. EXOTHERMIC WELDS (2). 2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. EC SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8 INCH DIAMETER OR LARGER.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
6. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
7. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
8. WEATHERPROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
9. SUPPLIED AND INSTALLED BY CONTRACTOR.
10. WHEN THE SCOPE OF WORK REQUIRES THE ADDITION OF A GROUNDING BAR TO AN EXISTING TOWER, THE SUBCONTRACTOR SHALL OBTAIN APPROVAL FROM THE TOWER OWNER PRIOR TO MOUNTING THE GROUNDING BAR TO THE TOWER.
11. EXTEND TWO (2) 2 AWG TINNED CU CONDUCTOR FROM BURIED GROUNDING RING AND CONNECT TO THE NEW TOWER. FOLLOW MANUFACTURERS RECOMMENDATIONS FOR GROUNDING CONNECTIONS TO THE TOWER. (APPLICABLE TO NEW TOWERS ONLY.)
12. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BARS AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
13. EXPOSED GROUND WIRES TO BE NON METALLIC LIQUID TIGHT.



GENERAL DYNAMICS WIRELESS SERVICES



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PROJECT INFORMATION:

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DE49XC513

2011 MANCHESTER ROAD
ANN ARBOR, MI 48104
WASHTENAW COUNTY

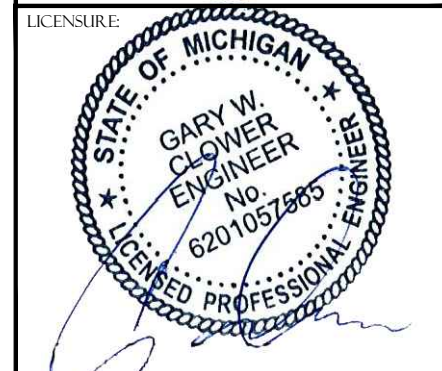
ISSUE DATE: 06-18-2013

ISSUED FOR: CONSTRUCTION DWGS

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C	06/18/13	ISSUED FOR CDs FINALS	CCM

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SHEET TITLE:

GROUNDING PLAN

SHEET NUMBER: E-5 REVISION: C

E-5

C

PRDS PROJ.NO. 2249-052112



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LICENSURE:



SHEET TITLE:

GROUNDING DETAILS

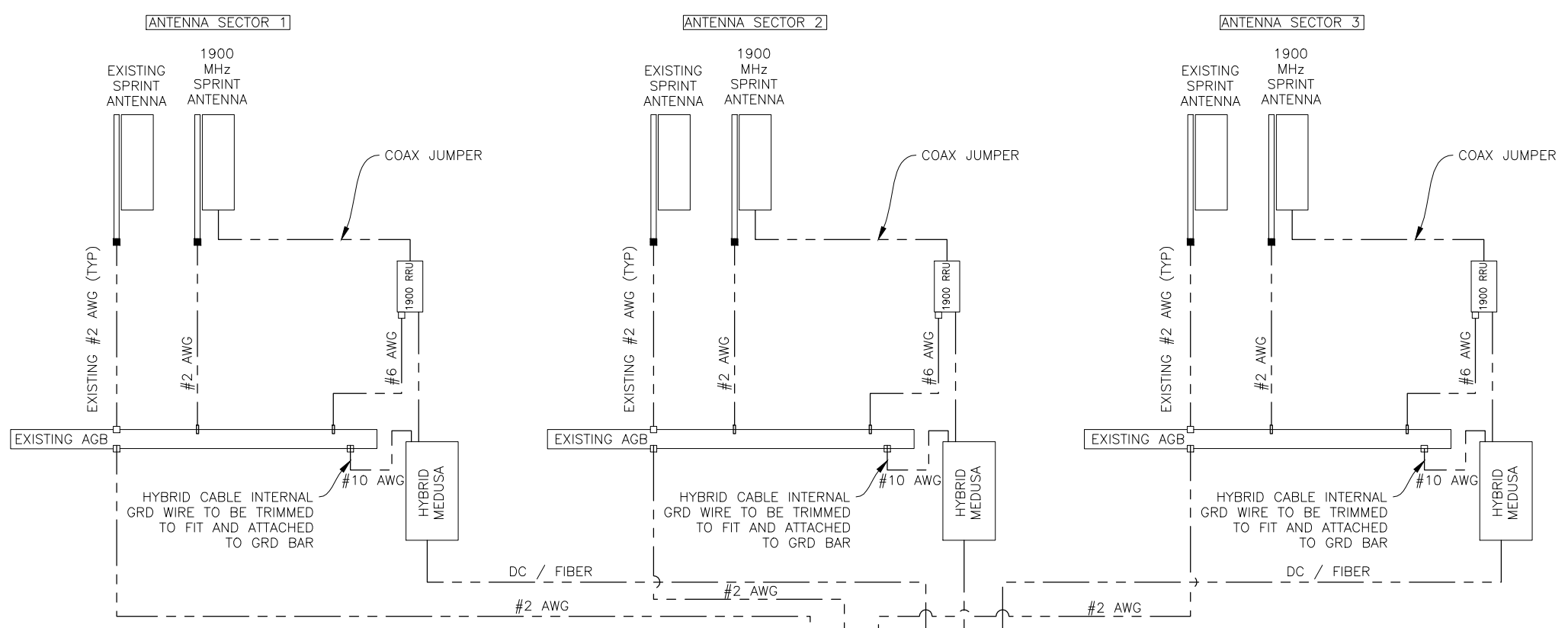
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E-6

REVISION:

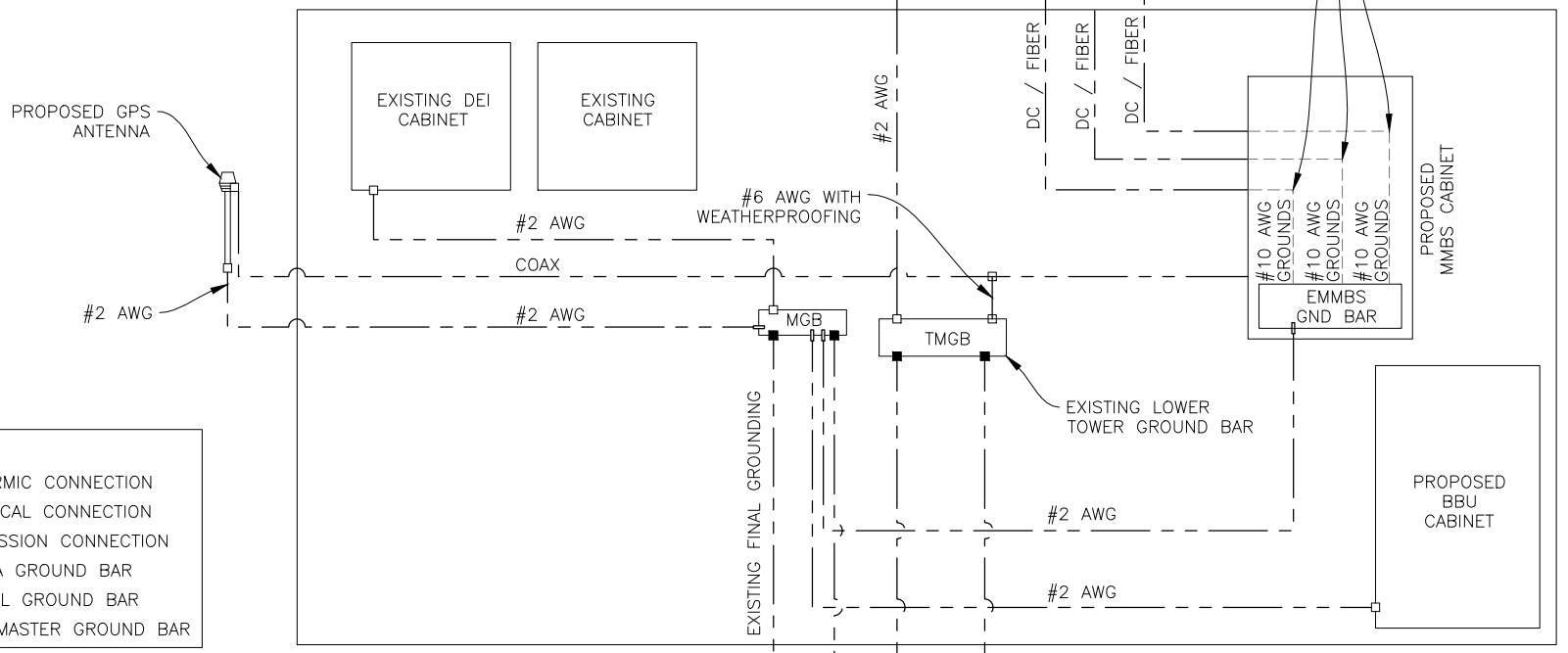
C

PRDS PROJ. NO. 2249-052112



GROUNDING NOTES

- ALL BELOW GRADE CONNECTIONS SHALL BE MADE BY EXOTHERMIC WELDS. EXOTHERMIC WELDS SHALL INCLUDE ALL CABLE TO CABLE, SPLICES, ETC. ALL CABLE TO GROUND RODS, GROUND RODS SPLICES AND LIGHTING PROTECTIONS SYSTEM AS INDICATED. GROUND FOUNDATION ONLY AS INDICATED BY PM. ALL MATERIALS USED (MOLDS, WELDING, METAL, TOOLS, ETC.) SHALL BE EXOTHERMIC WELDED AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND PROCEDURES. GROUND CONDUCTOR SHALL HAVE A MINIMUM 24" BENDING RADIUS.
- ALL EXOTHERMIC WELD CONNECTIONS ON GALVANIZED SURFACES SHALL BE CLEANED THOROUGHLY AND COLORED TO MATCH SURFACE WITH (2) TWO COATS OF GALVITE (WHITE) PAINT. OR SILVERBRITE (ALUMINUM).
- ALL ELECTRICAL & MECHANICAL GROUND CONNECTIONS SHALL HAVE ANTIOXIDANT COMPOUND APPLIED TO CONNECTION.
- GROUND TESTS SHALL BE PERFORMED AS REQUIRED BY SPRINT STANDARD PROCEDURES. GROUND GRID RESISTANCE SHALL NOT EXCEED 5-OHMS.
- CONTRACTOR SHALL SUBMIT THE GROUND RESISTANCE TEXT REPORT AS FOLLOW:
 - ONE (1) COPY TO OWNER REPRESENTATIVE
 - ONE (1) COPY TO ENGINEER
 - ONE (1) COPY TO KEEP INSIDE EQUIPMENT INCLOSURE
- ALL RADIO EQUIPMENT AND UTILITY CABINETS GROUNDS LEADS TO BE #2 AWG STRANDED GREEN JACKETED FROM BUSS TERMINAL.
- FOR ADDITIONAL GROUNDING NOTES SEE N-1 OR N-2.
- ALL ANTENNA MOUNT GROUNDS SHALL BE #2 AWG SOLID GREEN JACKETED CABLE GROUNDS SHALL BE BLACK FROM MFR.
- ALL GROUND WIRES FROM GROUND BARS TO GROUND SHALL BE #2 AWG SOLID BARE AS REQUIRED.
- ALL ABOVE GROUND WIRES SHALL BE GREEN JACKETED. ALL GROUND WIRES PENETRATING INTO GROUND AND BELOW SHALL BE SOLID BARE.



LEGEND

- EXOTHERMIC CONNECTION
- ⊔ MECHANICAL CONNECTION
- COMPRESSION CONNECTION
- AGB ANTENNA GROUND BAR
- MGB EXTERNAL GROUND BAR
- TMGB TOWER MASTER GROUND BAR

22"x34" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

GROUNDING RISER DIAGRAM 1



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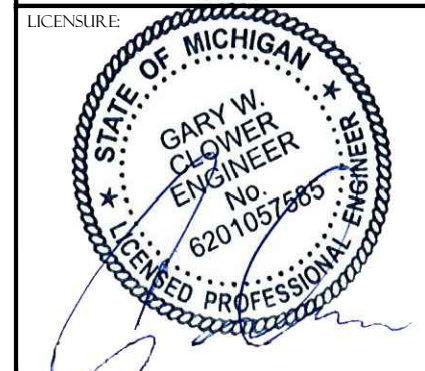
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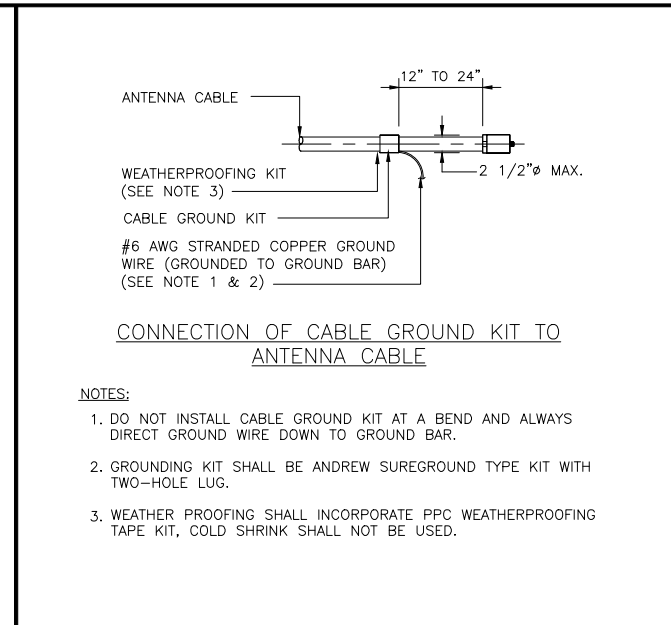
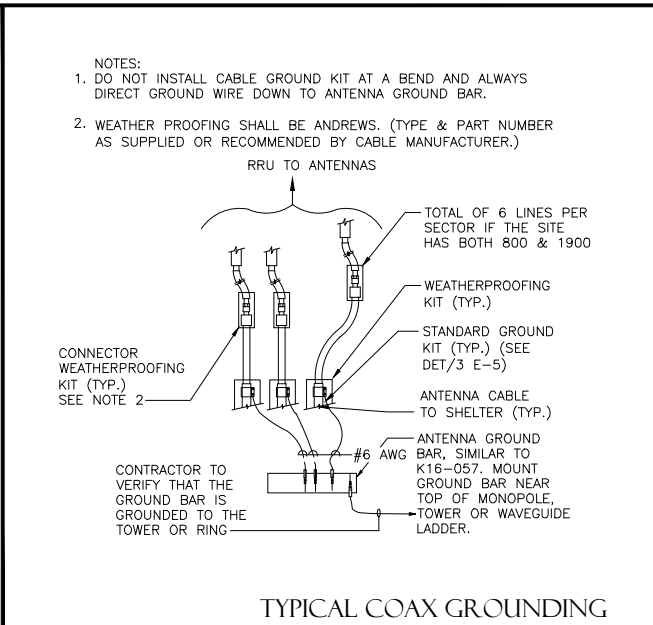
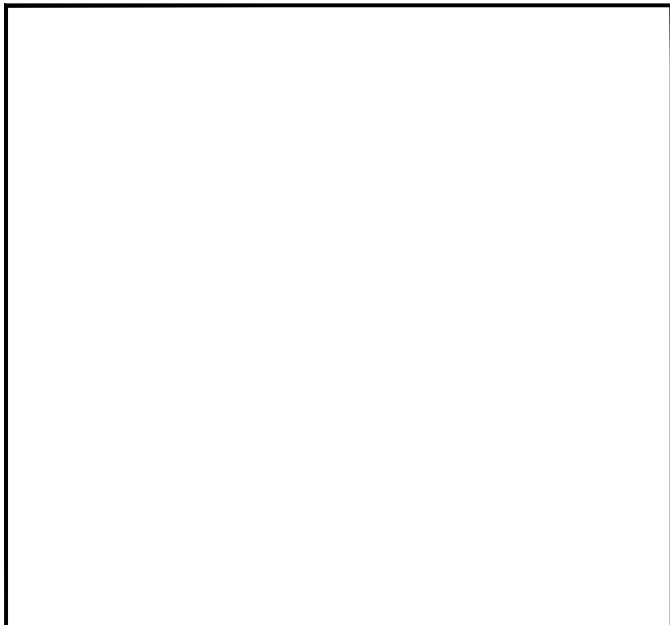
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SHEET TITLE: GROUNDING DETAILS

SHEET NUMBER: E-7

REVISION: C
PRDS PROJ. NO. 2249-052112

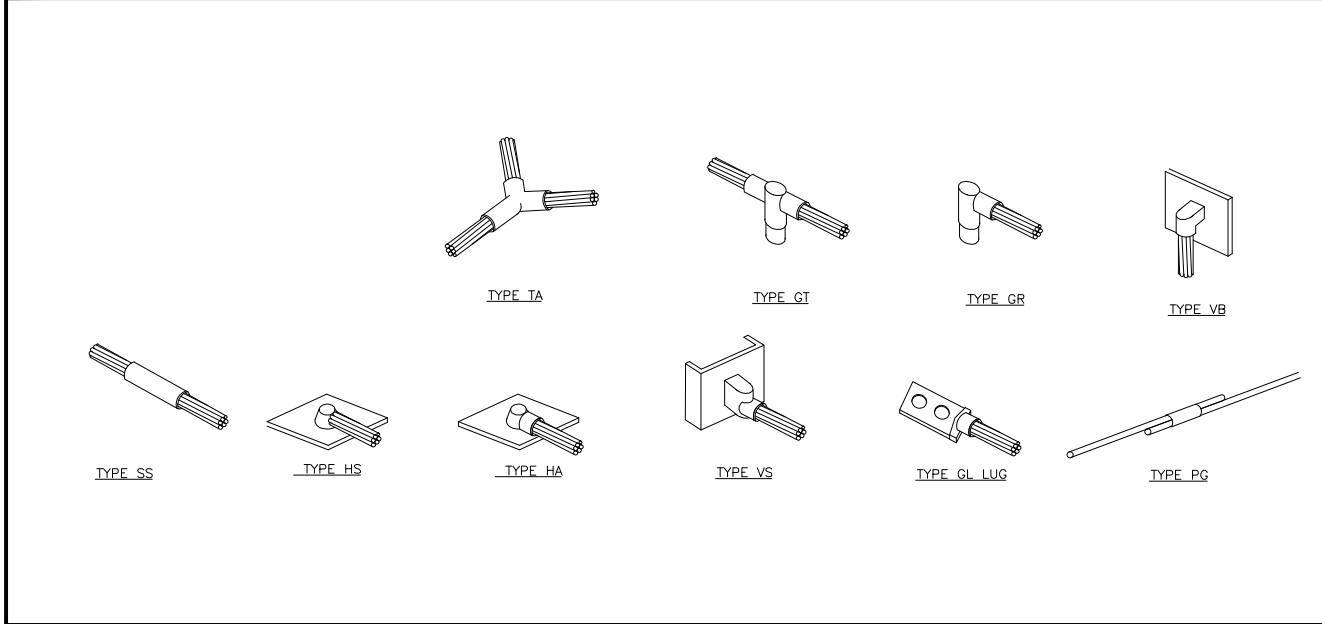


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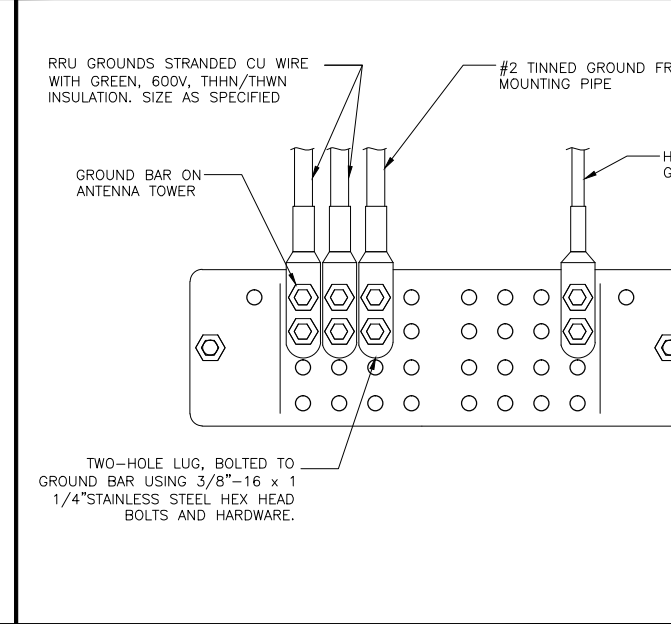
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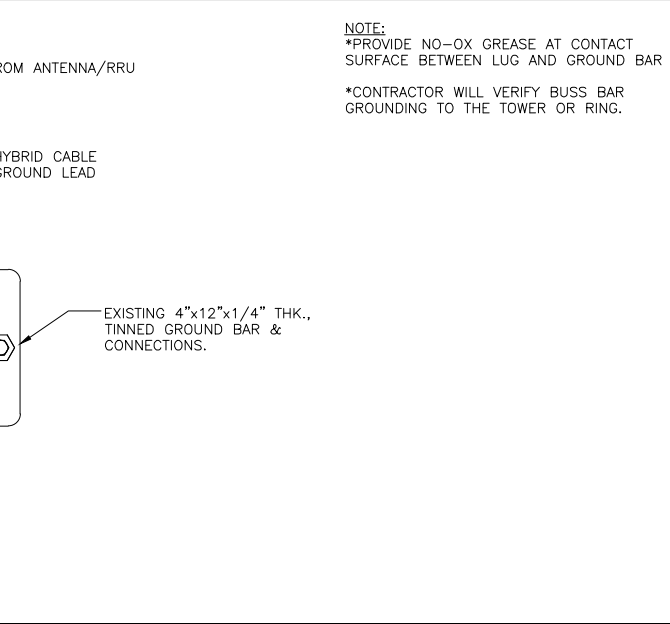


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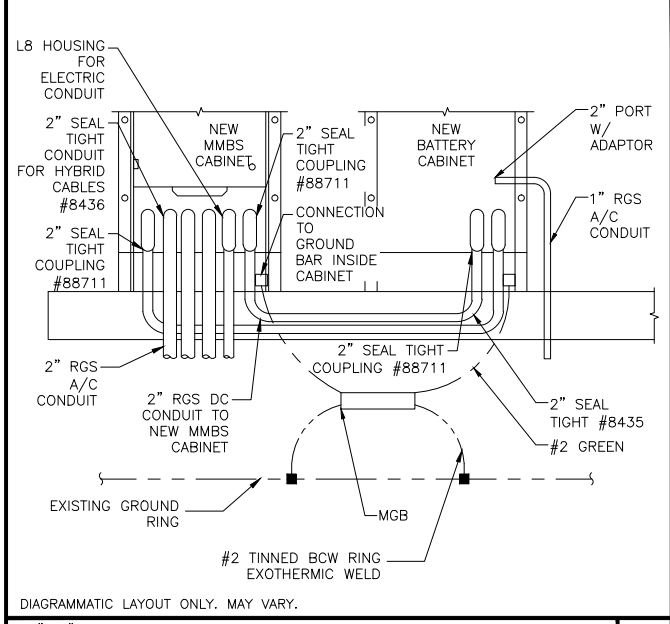
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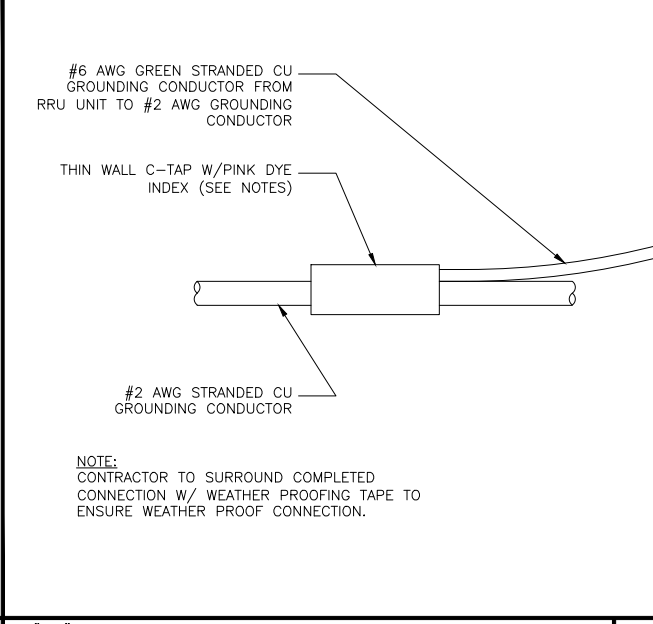
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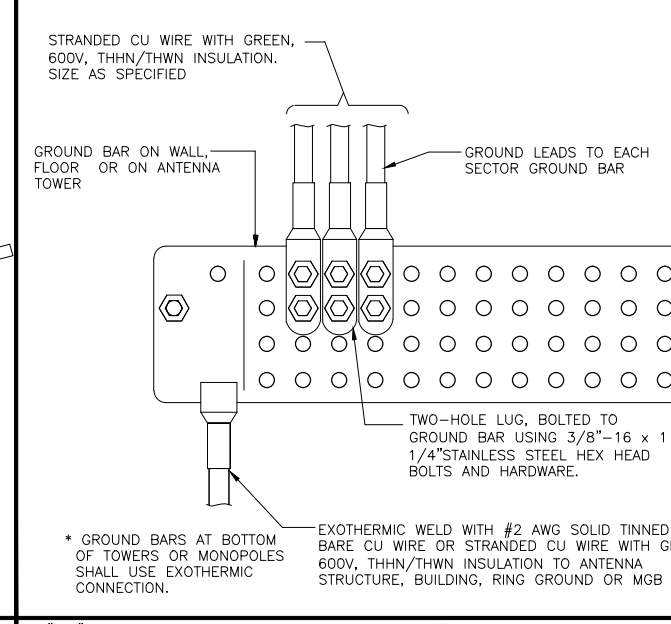
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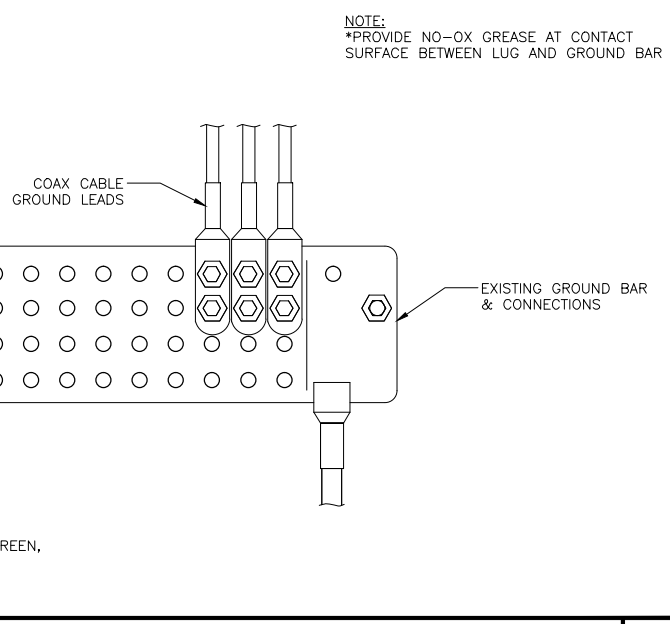
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