



**City of Duluth
Planning Division**

411 West First Street • Room 208 • Duluth, Minnesota 55802-1197
218-730-5580 • Fax: 218-730-5904 • www.duluthmn.gov

An Equal Opportunity Employer

ACTION OF THE CITY OF DULUTH PLANNING COMMISSION

Date: May 2, 2014

Applicant:

Robert Czarnik

LCC Law

(on behalf of Sprint)

10700 West Higgins Suite 240

Rosemont IL 60018

Location: 4628 Pitt Street

MS03NP420

Planning Commission File Number: PL 13-095

Proposal Requested: Add three antennas and equipment cabinets to current telecommunications site.

Per UDC 50-24.E.5.c, the land use supervisor may administratively approve an application to colocate on an existing tower or other structure or a modification at an existing site, as long as there is no proposed increase in the height of the tower or structure or attachments to the tower or structure.

Findings of Fact:

1. This application is for a modification to an existing telecommunications facility. The City adopted an ordinance in mid 2010 revising the regulation of telecommunication towers, but when the UDC was amended in 2011, one of the changes involved modification of telecommunication facilities. The change essentially streamlined replacement of antennas; applicants could replace existing antennas with new, more modern, antennas of a similar size, needing only to apply for a building permit. However, adding more antennas or cabinet equipment would still require a Special Use Permit.
2. The applicant wants to add 3 additional antennas, a microwave dish, equipment cabinets, and related accessory equipment to the site. There will be limited visual impact on adjacent properties, and there will be no change to the height of the existing facility.
3. The UDC encourages, wherever possible, the development of existing, legal, cellular telecommunications sties as well as the sharing and co-location of wireless telecommunications facilities among service providers.
4. No comments were received from other city departments, other utilities, or governmental agencies.
5. The City's telecommunications consultant provided significant guidance on reviewing this application. The consult has submitted suggestions for conditions of the projects approval.
6. Per UDC 50-37.1.N, an approved Special Use Permit will expire if the project or activity authorized by the permit is not begun within 1 year.

Conclusions:

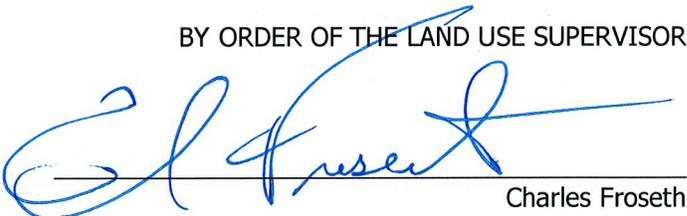
- A. The request is in harmony with the purposes and intent of the UDC.
- B. The request is consistent with the comprehensive plan.
- C. The request will allow reasonable use of the land.
- D. The request does not impact the health, safety, or welfare of the general public.

Decision:

Resolved: that the application PL 13-095 for a special use permit is approved by the Land Use Supervisor with the following conditions:

- 1. That the project be maintained according to the documents titled "4628 Pitt Street" date 10/15/13.
- 2. That the applicant secure all necessary permits required by Federal, State, County or City laws and regulations.
- 3. That the applicant comply with items identified in "CMS Application Review" for 4628 Pitt Street Road dated 4/25/14, including submission of items granted temporary relief.
- 4. By no later than June 5, 2014, the applicant provide information document the weight of the battery cabinets and the estimated difference in weight before and after the planned replacement project.

BY ORDER OF THE LAND USE SUPERVISOR



Charles Froseth

Attachments: schematics

Also sent via email: Robert Czarnik <RCzarnik@lcclaw.net>

Please note:

Special Use Permits approved by the Planning Commission shall lapse if the project or activity authorized by the review is not begun within 1 year of the permit date. The building official may extend this period one time for a period of up to 1 year if the property owner presents a written request showing the reasons for the delay was outside the owner's control (UDC Sec. 50-37.1.N).

NOTICE OF RIGHT TO APPEAL

Any person aggrieved by, or any department of the city affected by, any decision of the Commission may appeal the decision of the Commission to the Duluth City Council pursuant to Section 50-37.10(4) of the Duluth Legislative Code. The appeal must be filed with the city clerk within 10 days of the decision. The appeal should be addressed to the council and specify the grounds for the appeal. The fee for an appeal is \$350.00. The appeal fee must be tendered when the appeal is filed.

CMS Application Review Comments 4.25.14
Duluth MN Sprint 4638 Pitt Street

Prepared by: Bob Naumann – CMS

We have completed our review of the Application material received on March 24th, 2014 and May 22, 2014. **This application remains incomplete.**

This review used the comments from the applicants latest submittal and identifies in **Green** items that CMS considers as incomplete or needing additional information.

Section 50-20.4 E Major Utility or Wireless Telecommunications Facility

Other Standards and Requirements:

3.8 (3.12) Checklist: Applicants statement of compliance with the ordinance will include compliance with this checklist. See attached checklist.

Survey of site. This is required information. **This is a rooftop site and the equipment will be placed within our existing leased area. We request relief from this requirement. CMS recommends approval of relief for this item as all equipment is located within the existing building or on the rooftop.**

RF Emission checklist. Applicant has requested temporary relief from this requirement. Sprint will complete the RF Emissions Checklist once the antennas are installed. **Applicant has requested timing relief to complete this testing after construction but prior to the final inspection / C.O.C. CMS recommends approval of this timing relief request.**

Certified structural analysis. This is required information – **This is attached as Exhibit 11 The structural analysis did not provide any supporting calculations as required in the ordinance. In addition the analysis addressed only the antennas and not the equipment loading. A significant change in equipment loading is possible as the final configuration includes a battery cabinet along with additional cabinets. Please provide a comprehensive structural analysis with supporting calculations. I spoke with Sprint regarding this issue. They have agreed to do a hot swap of the equipment. The existing cabinets will be replaced at the same time that the new ones are installed. This should alleviate any concerns about additional weight. CMS and the City would like to see the weight of the equipment being removed and the weight of the cabinets being added. We are concerned as battery cabinets can be extremely heavy. Please provide this information as supporting information of your request.**



SITE NAME: DULUTH SAINT MICHAELS SCHOOL
SITE NUMBER: MS03NP420
SITE ADDRESS: 4628 PITT STREET
 DULUTH, MN 55804
SITE TYPE: EXISTING 57' ROOFTOP

6540 GREAT PARKWAY
 OVERLAND PARK, KANSAS 66251

1311 50TH LANDOUR BLVD
 RICHMOND, VA 23262

1761 NORTHPOINT BLVD, SUITE 130
 RICHMOND, VA 23260
 TEL: 424-843-5500
 FAX: 424-843-5509

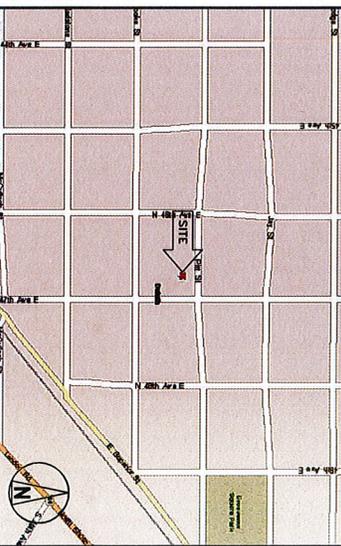
SITE INFORMATION

SITE ADDRESS:
 4628 PITT STREET
 DULUTH, MN 55804
PROPERTY OWNER:
 SAINT MICHAELS CHURCH
 4601 EAST SUPERIOR STREET
 OUL HAWES
 OUL, MN 55804
 (925) 242-4860
EQUIPMENT SUPPLIER:
 SPECTRUM TECHNOLOGIES AMERICA (STA)
 1201 EAST LOCKOUT DRIVE
 RICHMOND, TX 75082-4124
 (972) 761-7000
FIBER PROVIDER:
 AW - CENTURLINK
 DONOR - N/A
POWER COMPANY:
 CENTURLINK
TELCO COMPANY:
 SBC COMMUNICATIONS
 (800) 244-1111
COUNTY:
 ST. LOUIS
ZONING JURISDICTION:
 DULUTH
ZONING DISTRICT:
 N/A
LATITUDE (NAD83):
 46° 49' 55.29" N
 46.832025
LONGITUDE (NAD83):
 92° 1' 47.01" W
 -92.029725
CONTACT ENGINEER:
 STEPHEN HUNT
 (423) 843-8500
 STEPHEN.HUNT@TELECAD.COM

AREA MAP



LOCATION MAP



APPLICABLE CODES

ALL WORK SHALL COMPLY WITH THE FOLLOWING APPLICABLE CODES:
 IRC 2006 (2007 MINNESOTA STATE BUILDING CODE)
 IMC 2006 MINNESOTA PLUMBING CODE
 IMC 2006 WITH AMENDMENTS
 NEC 2008 ELECTRICAL CODE
 IN THE EVENT OF CONFLICT, THE MOST RESTRICTIVE CODE SHALL PREVAIL

PROJECT DESCRIPTION

- REMOVE EXISTING ROCKS AND ANTENNAS
- INSTALL (1) MMS-BBU CABINET IN EXISTING LEASE SPACE
- INSTALL (1) MMS-BATTERY CABINET IN EXISTING LEASE SPACE
- INSTALL (3) PANEL ANTENNAS
- INSTALL (6) RRU'S ON CHIMNEY
- INSTALL (18) JUMPEFS
- INSTALL (1) ROOFTOP MOUNTED GPS ANTENNA
- INSTALL (3) HYBRID COBLES
- INSTALL (1) ANTENNA MOUNT

DRAWING INDEX

SHEET NO:	SHEET TITLE
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GN-2	GENERAL NOTES 2
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A-2	EQUIPMENT LAYOUTS
A-3	SITE ELEVATION
A-3.1	ANTENNA & RRU MOUNTING DETAILS
A-4	ANTENNA SCHEDULE & LAYOUTS
A-5	EQUIPMENT DETAILS
A-6	EQUIPMENT DETAILS
RF-1	ANTENNA/RRU JUMPER SCHEDULE
RF-2	SINGLE LINE DIAGRAM & POWER PANEL SCHEDULE
E-1	DC POWER ONE-LINE & DETAILS
E-2	POWER & TELCO DETAILS
E-3	POST-MIGRATION PANEL SCHEDULE
E-4	GROUNDING PLAN & NOTES
G-1	INSTALLATION AND GROUNDING DETAILS
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS
S-1	STRUCTURAL DETAILS

DRIVING DIRECTIONS FROM DULUTH INTERNATIONAL AIRPORT

DEPART 4301 GARDNER DR, DULUTH, MN 55811 ON LOCAL ROAD, TURN LEFT (WEST) ONTO LOCAL ROAD(S), TURN LEFT (EAST) ONTO GRANDEN DR, TURN RIGHT (SOUTH) ONTO COUNTY ROAD 37 (LEARN DULUTH 80), TURN LEFT (EAST) ONTO COUNTY ROAD 10 (MARTIN RD), TURN RIGHT (SOUTH) ONTO COUNTY ROAD 37 (LEARN DULUTH 80), TURN LEFT (EAST) ONTO CLEWOOD ST, TURN RIGHT (SOUTH) ONTO N 43RD AVE E, TURN LEFT (EAST) ONTO PITT ST, ARRIVE 4628 PITT ST, DULUTH, MN 55804

PROJECT NO: _____
DESIGN BY: JHE
CHECKED BY: JSB

DATE: 10/15/13 **USER:** 4188

I, THE UNDERSIGNED, AS A LICENSED PROFESSIONAL ENGINEER, DO HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT AUTHORITY UNDER THE LAWS OF THE STATE OF MINNESOTA.

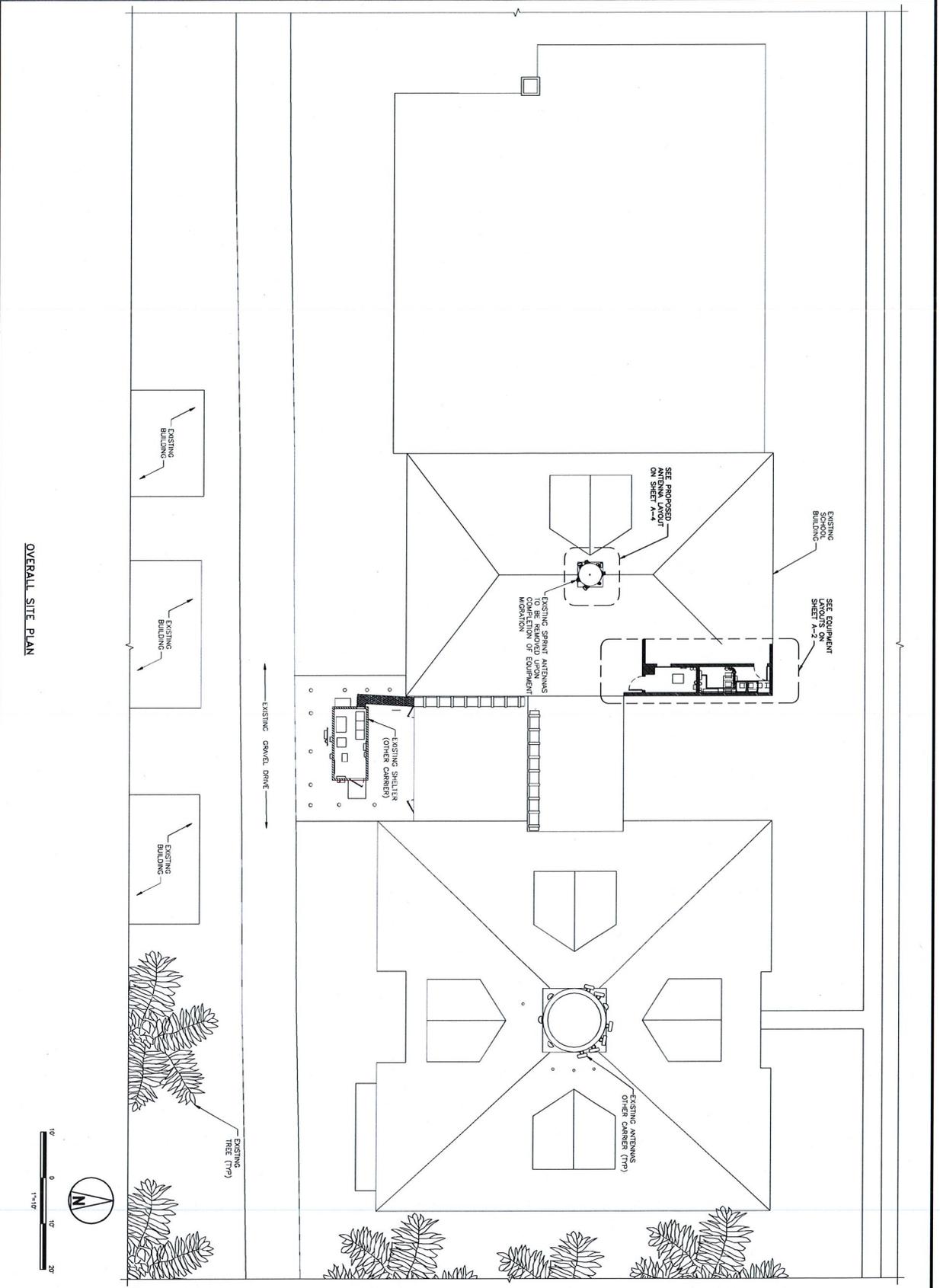
SIGNATURE: *[Signature]*
 PRINT NAME: STEPHEN HUNT

MS03NP420
DULUTH SAINT MICHAELS SCHOOL
4628 PITT STREET
DULUTH, MN 55804

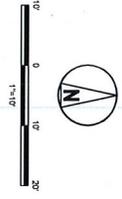
SHEET TITLE
TITLE SHEET & PROJECT DATA

SHEET NUMBER
T-1





OVERALL SITE PLAN



Sprint

6360 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

SAMSUNG

1301 EAST LOOKOUT DRIVE
RICHMOND, TX 75282

teleCD

1961 NORTHPOINT BLVD, SUITE 130
DALLAS, TX 75244-3500
PH: 214-344-3500
FAX: 214-344-3500

PROJECT NO: _____
DRAWN BY: **JAE**
CHECKED BY: **SEH**

REV	DATE	DESCRIPTION
0	10/15/13	ISSUED FOR CONSTRUCTION

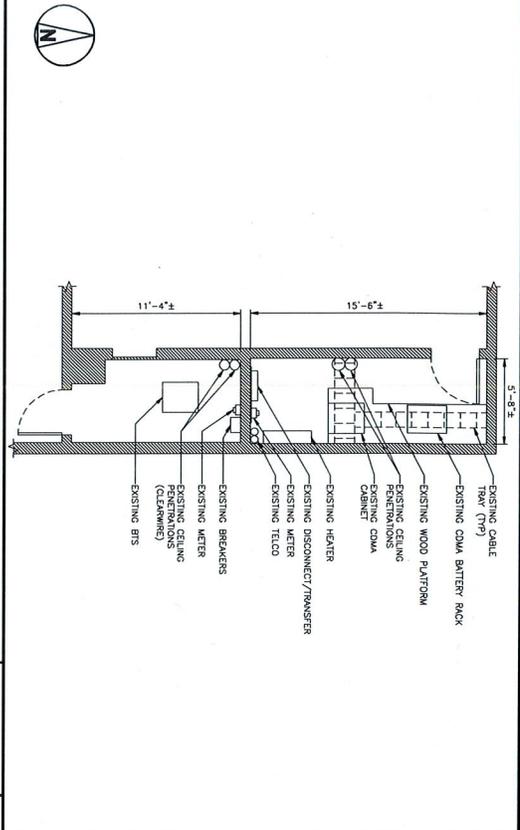
I HEREBY CERTIFY THAT THE PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A QUALIFIED ENGINEER AS REQUIRED BY THE LAW OF THE STATE OF MINNESOTA.

SIGNATURE: *Jos. L. A.*
PRINT NAME: JESSE LAUREN
DATE: 10/15/13 JESSE LAUREN

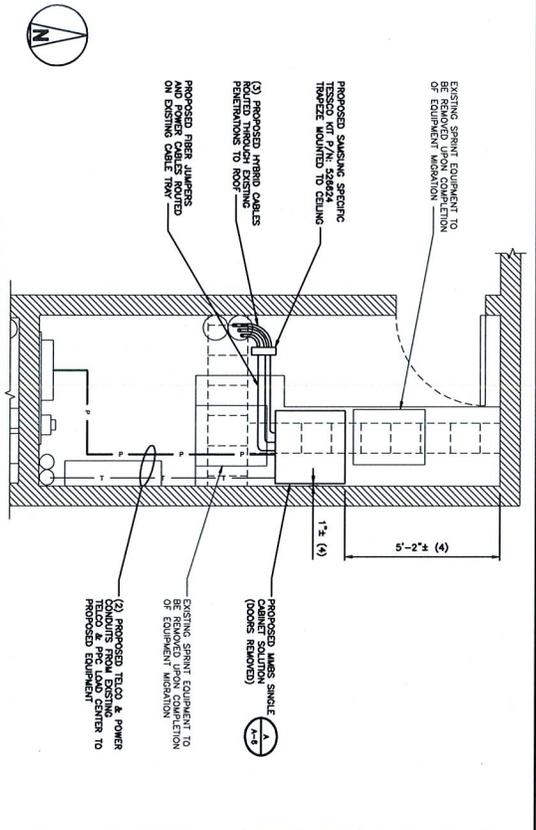
MSO3NP420
DULUTH SAINT MICHAELS SCHOOL
4628 PITT STREET
DULUTH, MN 55804

SHEET TITLE
OVERALL SITE PLAN

SHEET NUMBER
A-1



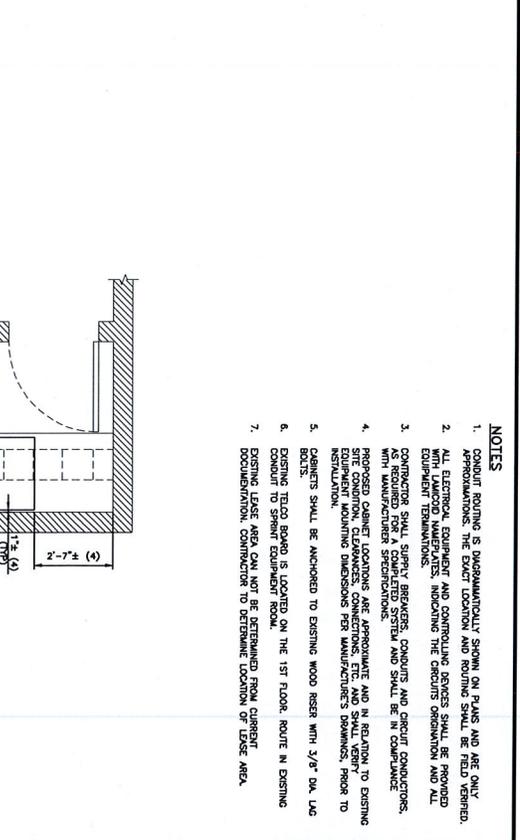
SCALE: 1/4"=1'-0"



SCALE: 1/2"=1'-0"

GRAPHICS LEGEND

FENCE:	WOOD/IRON FENCE:	ICE BRIDGE:
LEASE AREA:		CABLE TRAY:



SCALE: AS NOTED

ACRONYM LEGEND

BBU:	BASEBAND UNIT
CDMX:	CODE DIVISION MULTIPLE ACCESS
GPS:	GLOBAL POSITIONING SYSTEM
HVAC:	HEATING VENTILATION AIR CONDITIONING
MMS:	MULTI MEDIA MESSAGE SERVICE
PPF:	POWER PROTECTION UNIT
REI:	REMOTE ELECTRICAL INTERLOCK
RRU:	REMOTE RADIO UNIT

- NOTES**
- CONDUIT ROUTING IS DIMENSIONALLY SHOWN ON PLANS AND ARE ONLY APPROXIMATIONS. THE EXACT LOCATION AND ROUTING SHALL BE FIELD VERIFIED.
 - ALL ELECTRICAL EQUIPMENT AND CONTROLLING DEVICES SHALL BE PROVIDED EQUIPMENT TERMINATIONS.
 - CONTRACTOR SHALL VERIFY BREAKERS, CONDUITS AND CIRCUIT CONDUITS WITH MANUFACTURER SPECIFICATIONS.
 - PROPOSED CABINET LOCATIONS ARE APPROXIMATE AND IN RELATION TO EXISTING EQUIPMENT. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND SIZE OF EQUIPMENT INCLUDING DIMENSIONS PER MANUFACTURER'S DRAWINGS PRIOR TO INSTALLATION.
 - CABINETS SHALL BE ANCHORED TO EXISTING WOOD RISER WITH 3/8" DIA. LAG BOLTS.
 - EXISTING TELCO BOARD IS LOCATED ON THE 1ST FLOOR. ROUTE IN EXISTING CONDUIT TO SPRINT EQUIPMENT ROOM.
 - EXISTING LEASE AREA CAN NOT BE DETERMINED FROM CURRENT DOCUMENTATION. CONTRACTOR TO DETERMINE LOCATION OF LEASE AREA.

6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

1301 EAST LONGHORN DRIVE
RICHARDSON, TX 75082

1941 WASHINGTON
MINN. 55328
P.O. BOX 4550
MINN. 55349-0550

PROJECT NO. _____
DRAWN BY: JME
CHECKED BY: SBH

REV	DATE	DESCRIPTION
0	10/19/13	ISSUE FOR CONSTRUCTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT ARCHITECTURE UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: *[Signature]*
PRINT NAME: ASSEMBLE LINT
DATE: 10/15/13 USING: 4588

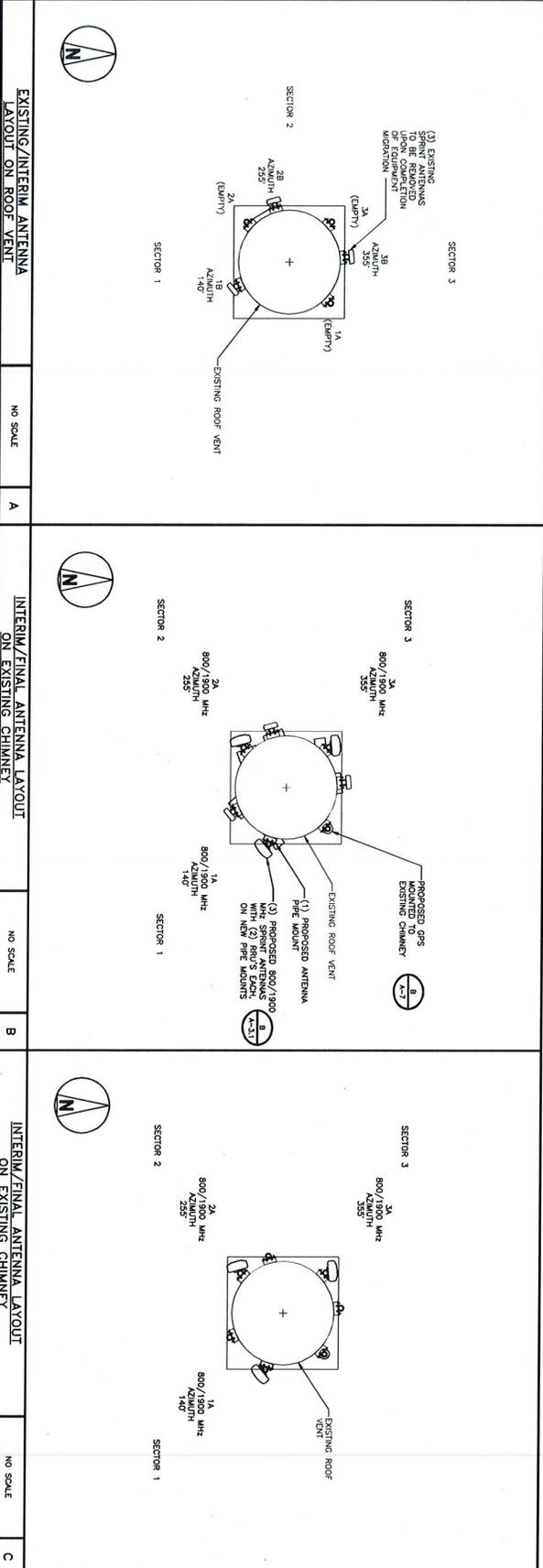
MSO3NP420
DULUTH SAINT MICHAELS SCHOOL
4628 PITT STREET
DULUTH, MN 55804

SHEET TITLE: EQUIPMENT LAYOUTS
SHEET NUMBER: A-2

PROPOSED ANTENNA SCHEDULE																		
SECTOR	ANTENNA NUMBER	ANTENNA MANUFACTURER	ANTENNA MODEL	NUMBER OF HYBRID CABLES	AZIMUTH	RAD CENTER	ANTENNA GAIN	ELECT D-TILT	MECH TILT	EFF D-TILT	RRU MODEL	RRU FILTER	HYBRID CABLE LENGTH	JUMPER SIZE	JUMPER LENGTH	RET LENGTH	RET MANUFACTURER	RET CABLE MODEL NUMBER
1A	800/1900 MHz	RF3	APMFR12X-C-120	SAMSUNG HFC 1 (PER SECTOR)	140°	45°	13.4/15.9	0/-6	0/0	0/-6	RRH-C2A & RRH-P4	(1) 800 MHz FILTER	240'	7/8"	20'	25'	COMSCOPE	ATCB-801-003
2A	800/1900 MHz	RF3	APMFR12X-C-120	SAMSUNG HFC 1 (PER SECTOR)	295°	45°	13.4/15.9	-3/-3	0/0	-3/-3	RRH-C2A & RRH-P4	(1) 800 MHz FILTER	240'	7/8"	20'	25'	COMSCOPE	ATCB-801-003
3A	800/1900 MHz	RF3	APMFR12X-C-120	SAMSUNG HFC 1 (PER SECTOR)	355°	45°	13.4/15.9	-5/-3	0/0	-5/-3	RRH-C2A & RRH-P4	(1) 800 MHz FILTER	240'	7/8"	20'	25'	COMSCOPE	ATCB-801-003
-	GPS	PCTEL	GPS-1MG-HR-250VCA	1	-	-	-	-	-	-	-	-	1/2" (PCTEL MFR-400)	50'	-	-	-	-

- NOTES**
- EXISTING ANTENNAS ARE DIMA UNLESS NOTED OTHERWISE.
 - DIMENSIONS OF EXISTING ANTENNAS SPACING OR PLATFORMS ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY PRIOR TO START OF CONSTRUCTION (SEE GENERAL NOTES, SHEETS 04-1 AND 04-2).
 - FIELD TO VERIFY EXISTING AZIMUTH BEFORE RELOCATING THE ANTENNA. IF EXISTING AZIMUTH FROM SHEET IS TO BE OVERTAKEN BEFORE RELOCATION OF ANTENNAS.
 - FOR HYBRID CABLE DIMETERS REFER TO HYBRID CABLE TYPE DETAIL ON SHEET E-2. DETAIL C SIZE WILL VARY BASED ON LENGTH OF RUN.
 - PRIOR TO CONSTRUCTION, CONTRACTOR TO REFERENCE RF LETTER FOR ANTENNA/PLATFORM EVALUATION.
 - CONTRACTOR SHALL PAINT ANTENNAS, PILES, MOUNTS, CABLES, RRU SOLAR SHIELDS, CABLE TRAY AND ALL ASSOCIATED HARDWARE TO MATCH.

ANTENNA SCHEDULE



6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

1301 EAST LOOKOUT DRIVE
RICHARDSON, TX 75082

1981 NORTHPOINT BLVD SUITE 130
MINNETONKA, MN 55345
FAX: 952-834-9509

PROJECT NO: _____

DRAWN BY: JAE

CHECKED BY: SBH

DATE: 10/13/13

ISSUED FOR CONSTRUCTION:

REV:

SIGNATURE: *[Signature]*

PRINT NAME: JEROME CLINT

DATE: 10/13/13

LICENSE #: 43488

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER, TO REPRODUCE OR ALTER THIS DOCUMENT.

MSC3P420

DULUTH SAINT MICHAELS SCHOOL

DULUTH, MN 55804

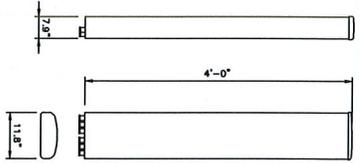
SHEET TITLE:

ANTENNA SCHEDULE & LAYOUTS

SHEET NUMBER:

A-4

RFS ANTENNA APXFR12X-C-120
 DIMENSIONS: HxWxD: 48"x11.8"x7.9"
 WEIGHT: W/O CABLE: 43 lbs
 CONNECTOR: (9) 7/16 DIN FEMALE



PROPOSED ANTENNA SPECIFICATIONS

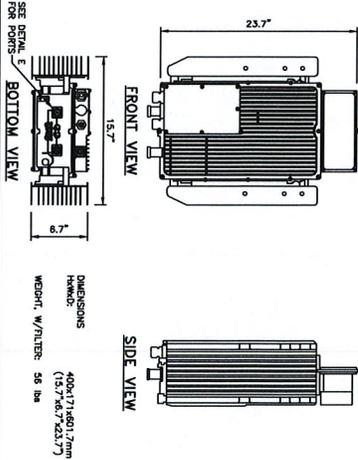
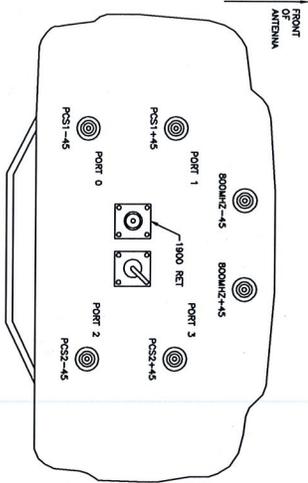
NO SCALE

DETAIL NOT USED

NO SCALE

800/1900 MHz K1W ANTENNA PORT CONFIGURATION

NO SCALE



DIMENSIONS
 HxWxD: 48"x11.8"x7.9"
 WEIGHT: W/FILTER: 56 lbs

800 MHz RRU MECHANICAL SPECIFICATIONS

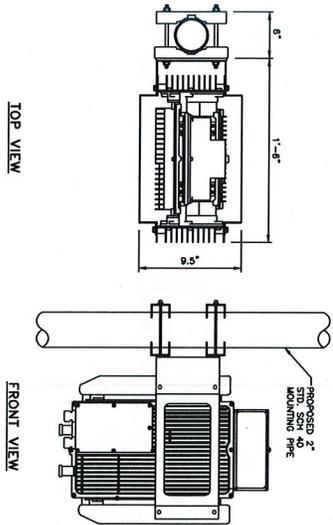
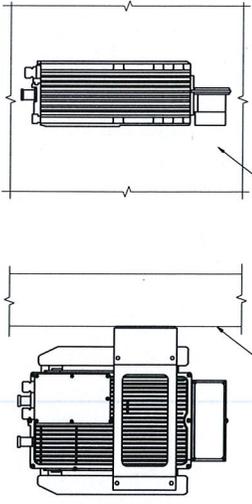
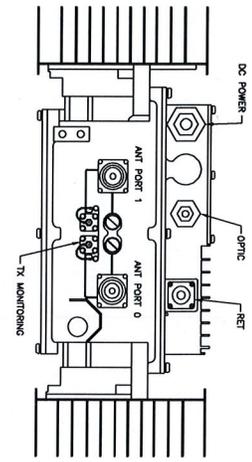
NO SCALE

800 MHz RRU BOTTOM VIEW

NO SCALE

800 MHz RRU WALL MOUNT INSTALLATION DETAIL

NO SCALE



800 MHz RRU POLE MOUNT INSTALLATION DETAIL

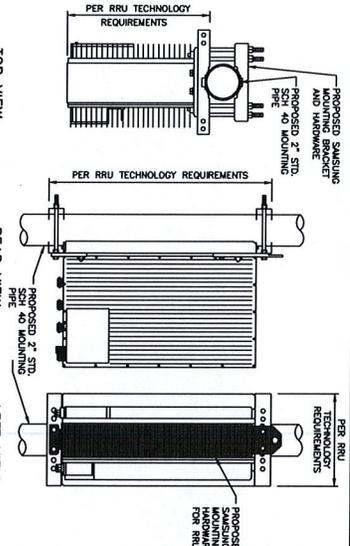
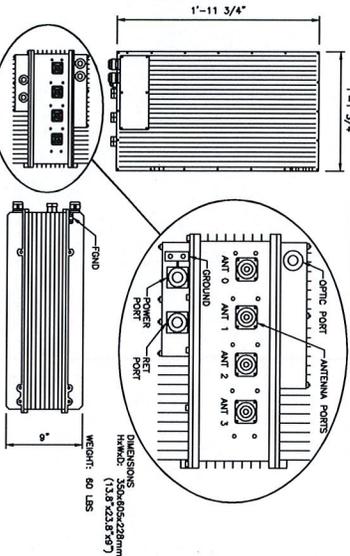
NO SCALE

1900 MHz RRU MECHANICAL SPECIFICATIONS

NO SCALE

1900 MHz RRU POLE MOUNT INSTALLATION DETAIL

NO SCALE



Sprint
 6840 SPRINT PARKWAY
 OVERLAND PARK, KANSAS 66251

SAWSUNG
 1301 EAST LOCKPORT DRIVE
 RICHMOND, VA 23262

teleCAP Wireless
 1901 NORTHBURY AVENUE
 MINNAPOLIS, MN 55424
 PH: 612-343-5500
 FAX: 612-343-5509

PROJECT NO: _____
 DRAWN BY: JAE
 CHECKED BY: SBI

REV	DATE	DESCRIPTION
0	10/19/13	ISSUED FOR CONSTRUCTION
1	10/15/13	UNDER ASSEMBLY

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

DATE: 10/15/13 UNDER ASSEMBLY
 PROJECT NAME: 44288
 SHEET: 10/15/13 UNDER ASSEMBLY

MSO3NP420
 DULUTH SAINT MICHAELS SCHOOL
 4628 PITT STREET
 DULUTH, MN 55804

SHEET TITLE: EQUIPMENT DETAILS
 SHEET NUMBER: A-5



6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251



1301 EAST LOOKOUT DRIVE
RICHARDSON, TX 75082



1961 NORTHERN AVENUE, SUITE 130
MINNAPOLIS, MN 55224
PH: 612-843-5500
FAX: 612-843-2500

PROJECT NO: _____
DRAWN BY: JLE
CHECKED BY: SBI

REV	DATE	DESCRIPTION
0	10/19/13	ISSUED FOR CONSTRUCTION

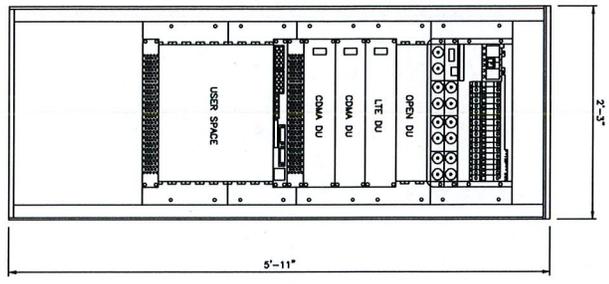
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE: 10/15/13
PROJECT NAME: ASPENHILL
DRAWN BY: JLE
CHECKED BY: SBI

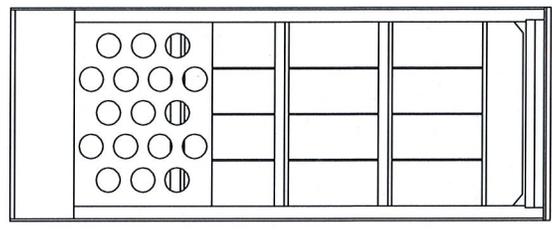
MSO3NP420
DULUTH SAINT MICHAELS SCHOOL
4628 PITT STREET
DULUTH, MN 55804

SHEET TITLE
EQUIPMENT DETAILS

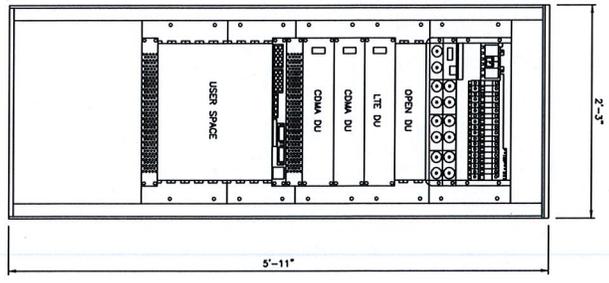
SHEET NUMBER
A-6



SINGLE CABINET SOLUTION



MMBS-BATTERY CABINET



MMBS-RRU CABINET

INTERIM INDOOR MMBS MAIN SINGLE CABINET SOLUTION

NO SCALE

A

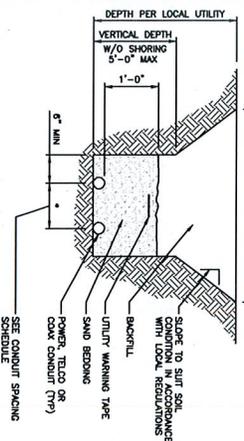
FINAL INDOOR MMBS-RRU AND BATTERY CABINET MECHANICAL SPECIFICATIONS

NO SCALE

B

CONDUIT SPACING SCHEDULE	
CONDUIT #1	MINIMUM CONDUIT SEPARATION
POWER	6 INCHES
TELECOM	12 INCHES
COMMUNICATIONS & CONTROL CIRCUITS	6 INCHES

- NOTES**
- MULTIPLE CONDUITS CAN BE PLACED IN THE SAME TRENCH AS LONG AS A MINIMUM SEPARATION PER THE LOCAL CITY COMPANIES IS MAINTAINED.
 - CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITION IN ACCORDANCE WITH LOCAL REGULATIONS.

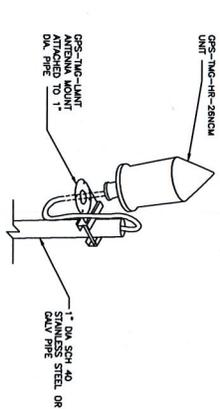


"ONE CALL" SERVICE SHALL BE CALLED PRIOR TO EXCAVATION

TYPICAL UTILITY TRENCH DETAIL

NO SCALE

A

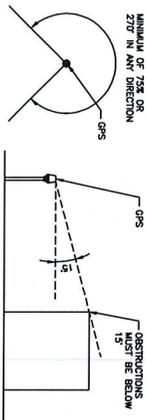


- NOTES**
- THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 1" QUARTER PIPE. THE PIPE MUST NOT BE THICKER AT THE ANTENNA MOUNT END.
 - THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 18 INCHES) USING A HAND SAW OR PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED.
 - IT IS CRITICAL THAT THE GPS ANTENNA IS MOUNTED SUCH THAT IT IS WITHIN 2 DEGREES OF VERTICAL AND THE BASE OF THE ANTENNA IS WITHIN 2 DEGREES OF HORIZONTAL.
 - DO NOT SWEEP TEST GPS ANTENNA.
 - WHEN GPS MOUNTING PIPE TO EXISTING EMERY MUST USING ADEQUATE FASTENING HARDWARE.

GPS UNIT PIPE MOUNT

NO SCALE

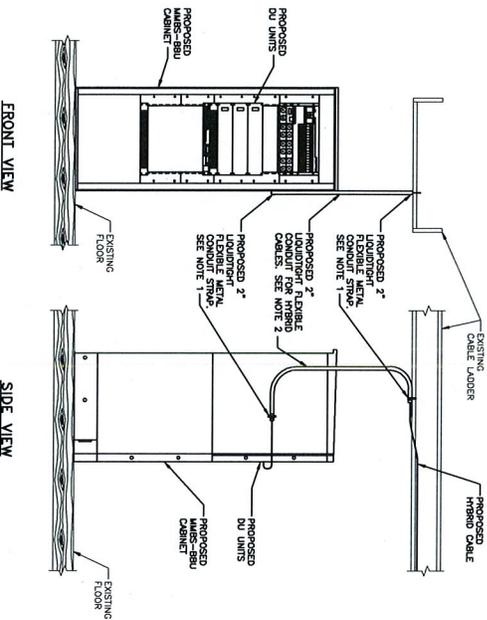
B



GPS MINIMUM SKY VIEW REQUIREMENTS

NO SCALE

C



FRONT VIEW

SIDE VIEW

- NOTES**
- LIQUIDTIGHT FLEXIBLE METAL CONDUIT FROM CABLE LADDER TO EQUIPMENT CABINET SHALL BE SPACED AT 18" AND BEHIND A MINIMUM OF 3'-0" FROM THE EXISTING FLOOR.
 - LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE ROUTED FROM CABLE TRAY TO EQUIPMENT CABINET TO SUPPORT HYBRID CABLES.

HYBRID AND TELCO LINE SUPPORT DETAIL

NO SCALE

D

DETAIL NOT USED

NO SCALE

E

6590 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

1301 EAST LONDOND PIPE
ROCKFORD, IL 60087

1941 WASHINGTON AVENUE SUITE 130
MINNEAPOLIS, MN 55404
TEL: 612-344-3500
FAX: 612-344-3509

PROJECT NO. _____
DRAWN BY: JME
CHECKED BY: SPH

REV	DATE	DESCRIPTION
0	10/19/13	ISSUED FOR CONSTRUCTION

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

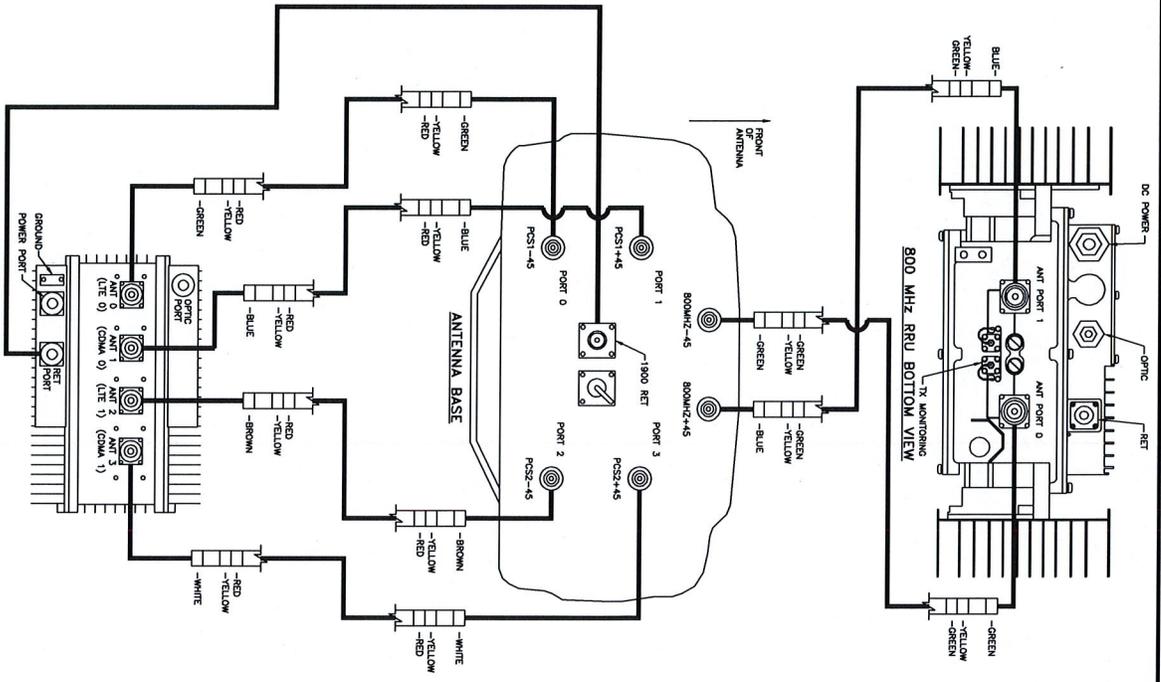
SIGNATURE: *JOS. U.*
PRINT NAME: JEROME ULLMANN
DATE: 10/15/13 USING 4289

IF AS A VENDOR OR LAW FIRM FOR ANY PERSON, FIRM OR CORPORATION, YOU ARE PROVIDING THESE SERVICES TO A LICENSED PROFESSIONAL ENGINEER, YOU AGREE TO BE BOUND BY THE BOARD'S RULES.

M503NP420
DULUTH SAINT MICHAELS SCHOOL
4628 PITT STREET
DULUTH, MN 55804

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-7



SECTOR 1 - KWW ANTENNA/RRU JUMPER SCHEMATIC

NO SCALE

A

SHEET NUMBER
RF-2

SHEET TITLE
**ANTENNA/RRU
 JUMPER SCHEMATIC**

MSO3INPA20
 DULUTH SAINT MICHAELS SCHOOL
 4628 PITT STREET
 DULUTH, MN 55804

DATE **10/15/13** LICENSE #4288
 SIGNATURE: *[Signature]*
 PRINT NAME: **STEPHEN LEWIS**

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THAT PERSON HAS BEEN GRANTED THE PERMISSION OF A LICENSEE TO SIGN THIS DOCUMENT.

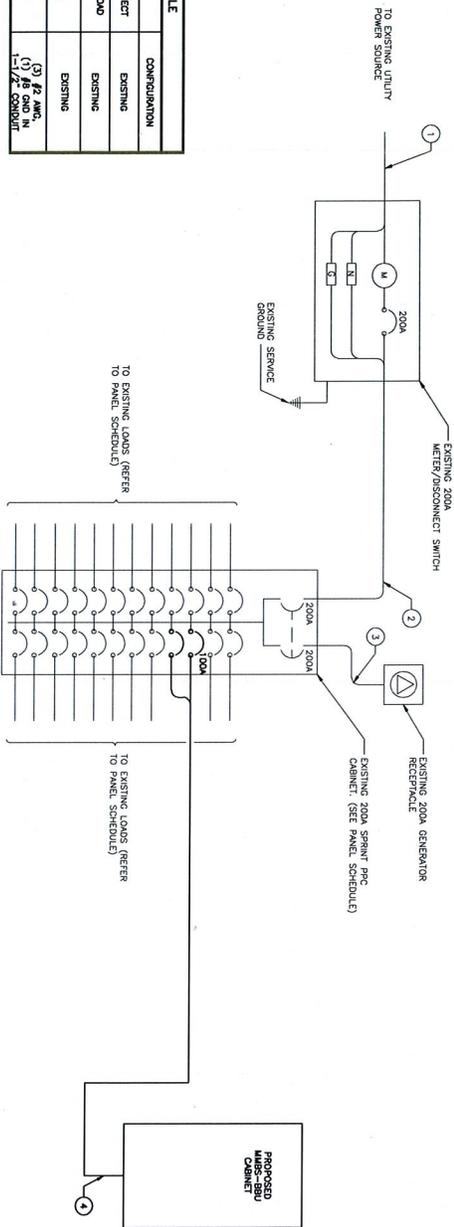
PROJECT NO. _____
 DRAWN BY: **JAC**
 CHECKED BY: **SEH**

teleCAD
 1561 NORTHPOINT BLVD SUITE 130
 IRVING, TX 75038
 FAX: 972-254-3509

SAMSUNG
 1301 EAST LOOKOUT DRIVE
 RICHARDSON, TX 75082

Sprint
 6580 SPRINT PARKWAY
 OVERLAND PARK, KANSAS 66231

CIRCUIT SCHEDULE			
NO	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	PROPOSED 200 AMP CABINET	(2) #2 AWG, (1) #4 AWG IN 1-1/2" X 2" SERVICE



ELECTRICAL ONE-LINE DIAGRAM

NO SCALE
A

ELECTRICAL NOTES (CON'T)

- CONTRACTOR SHALL VERIFY THE EXISTING CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO 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 RUSH-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.
- ALL CONDUITS SHALL BE MET WITH BONES MORE IN ACCORDANCE WITH NEC TABLE 344-10. NO RIGHT ANGLE DEVICE OTHER THAN STANDARD CONDUIT ELBOW WITH 1/2" MIN. RADIUS PER THE SPECIFICATIONS OR EXCEPTED.
- ALL WIRE SHALL BE TYPE THHN, SOLID, ANNEALED COPPER UP TO SIZE #10 AWG (#8 AND LARGER SHALL BE CONCENTRIC STRANDED) 75 DEGREE C, (187 DEGREE F), 90% CONDUCTIVITY, MINIMUM #12.
- ALL WIRES SHALL BE TAPPED AT ALL PULL BOXES, J-BOXES, EQUIPMENT BOXES AND CABINETS WITH APPROVED PLASTIC TAPS, ACTION CRAFT BRAND, OR APPROVED EQUAL.
- ALL NEW WIRE/TYPE SHALL HAVE A UL LABEL.
- CONDUIT RUSH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION TO CONFLICTS, VERIFY WITH MECHANICAL CONTRACTOR AND OWNER 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 BUNDLED AT ALL JUNCTION BOXES, PULL BOXES, 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. SIGN AT SUBSTANTIAL COMPLETION.
- ALL DISCONNECT SWITCHES AND OTHER CONTROLLING DEVICES SHALL BE PROVIDED WITH EXHAUST FRENCHIC WAVEPAPER INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS INSTALLED ON, AND PANEL FIELD LOCATIONS FED FROM (NO EXCEPTIONS).
- ALL ELECTRICAL DEVICES AND INSTALLATIONS OF THE DEVICES SHALL COMPLY WITH (OAV) MARKINGS WITH DISABILITIES ACT AS ADOPTED BY THE APPLICABLE STATE.
- PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS OR ACCESS THROUGH BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS WITHOUT CONSTRUCTION PERMITS. THE HOLE OR PENETRATION SHALL BE REPAIR TO THE ORIGINAL CONDITION. THE REPAIR SHALL BE APPROVED BY THE ARCHITECT. ALL WATERTIGHT 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. EQUIPMENT CHARACTERISTICS SHALL BE FIELD VERIFIED WITH THE ARCHITECT AND OWNER'S REPRESENTATIVE. THE WAVEPAPER DATA FURNISHED ON THE EQUIPMENT (THE SECTION 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 COORDINATED WITH THE OWNER'S REPRESENTATIVE PRIOR TO RUSH-IN.
- SPUT BREAKERS SHALL BE USED ON 120V LOADS IN THE EVENT THAT ADDITIONAL CIRCUIT SPACE IS REQUIRED FOR PROPOSED EQUIPMENT.
- PANEL, SCHEDULE LOADING AND CIRCUIT ARRANGEMENT ON E-1 PRELIMS REGARDING PERMO EQUIPMENTS. REFER TO E-4 FOR POST-ADDITION PANEL SCHEDULE LOADING AND CIRCUIT ARRANGEMENT IN WHICH EXISTING EQUIPMENT HAS BEEN REMOVED.

EQUIPMENT	VOLTAGE	AMPERAGE	SERVICES	NEC CODE		WIRING	GROUNDING	TOTAL	REMARKS
				TYPE	TYPE				
LOAD DESCRIPTION									
1 WINDOW	20	2	OH	240	180	240	0	0	0
2 LIGHTING	30	2	OH	240	180	240	0	0	0
3 SHEDDING WATER CABINET	400	2	OH	240	180	240	0	0	0
4									
5									
6									
7									
8									
9									
10									
11									
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22									
23									
24									
25									
26									
27									
28									
29									
30									
TOTAL									



6500 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251



1301 EAST LOOKOUT DRIVE
ROCKWATER, TX 75082



1941 VERTON BLVD SUITE 130
MINNAPOLIS, MN 55424
TEL: 612-344-3500
FAX: 612-344-3500

PROJECT NO: _____
DRAWN BY: JME
CHECKED BY: SSM

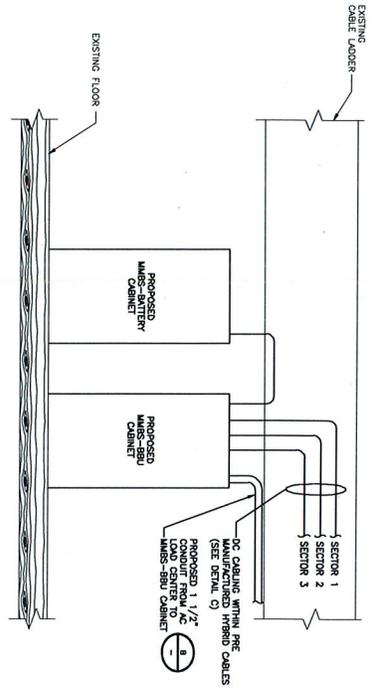
NO	DATE	DESCRIPTION
1	10/15/13	ISSUE FOR CONSTRUCTION

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

SIGNATURE: *[Signature]*
PRINT NAME: ASHLEY BURT
DATE: 10/15/13
LICENSE: 4438

IT IS A VIOLATION OF LAW FOR ANY PERSON TO REPRODUCE OR TRANSMIT THIS DOCUMENT IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER.
MISO3P420
DULUTH SAINT MICHAELS SCHOOL
4628 PITT STREET
DULUTH, MN 55804

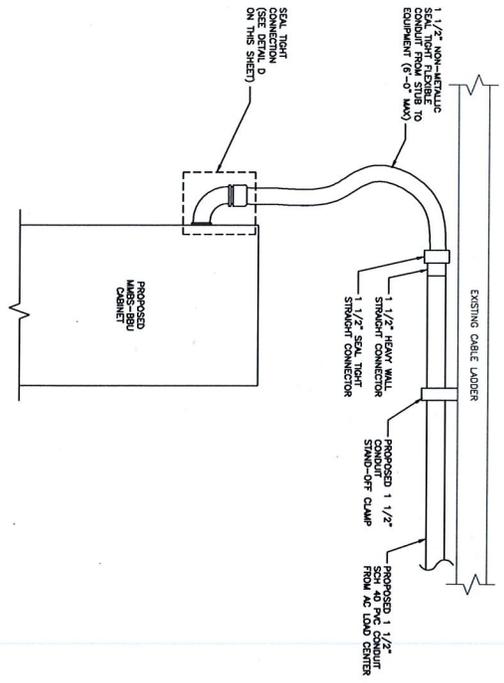
SHEET TITLE
SINGLE LINE DIAGRAM &
POWER PANEL SCHEDULE
SHEET NUMBER
E-1



- DC POWER ELECTRICAL NOTES**
1. MINIMUM CABLE LENGTH BETWEEN THE DU AND BATTERY IS 70MM (2.75 in).
 2. MAXIMUM CABLE LENGTH DISTANCE IS 800MM (35.43 in).
 3. ROUTE DC CONDUITS IN CONDUITS TO PROPOSED MMS-BBU CABINET ABOVE POWER DISTRIBUTION PANEL, TO AND FROM PROPOSED MMS-BATTERY CABINET.
 4. -48 VDC CABLES BETWEEN PROPOSED MMS-BBU CABINET & RRU'S ARE FACTORY ASSEMBLED AND EQUIPPED WITH ONE PRE-TERMINATED ENO.
 5. ALL FIELD INSTALLED DC CABLES SHALL BE TYPE RHH/RHW AND SHALL BE UL THERMOSET INSULATED.

DC POWER DIAGRAM

NO SCALE A



EQUIPMENT POWER CONDUIT CONNECTIONS

NO SCALE B

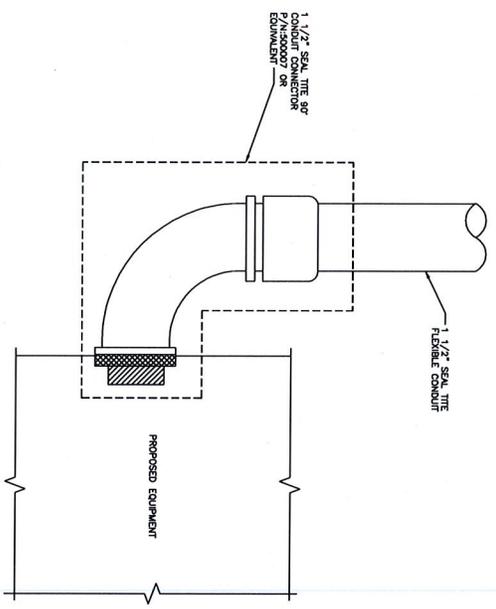
	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5
TOTAL LENGTH	~35m (~114.8')	~55m (~180.4')	~65m (~213.3')	~80m (~262.5')	~100m (~328')
HYBRID POWER CABLE CONFIGURATION	AWG 10, 1 PAIR AWG 12, 3 PAIR	AWG 8, 1 PAIR AWG 10, 3 PAIR	AWG 8, 1 PAIR AWG 10, 2 PAIR	AWG 8, 1 PAIR AWG 8, 3 PAIR	AWG 4, 1 PAIR AWG 8, 2 PAIR AWG 8, 2 PAIR
CABLE DIAMETER	25mm (0.98")	27mm (1.06")	30mm (1.18")	30/32mm (1.26")	32mm (1.26")
BENDING RADIUS	300mm (11.81')	320mm (12.99')	360mm (15.35')	450mm (17.72')	450mm (17.72')
OPTIC CABLE					
MMS-BBU CABINET (POWER CABLE TERMINAL MAX SIZE AWG 4)		2 PAIR POWER AND OPTIC CABLE WITH PE PIPE			
RRU POWER CABLE SPEC		AWG 8, 15.7mm (0.62") AWG 10, 12.2mm (0.48")			
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

HYBRID CABLE TYPE

NO SCALE

SEAL TITE POWER CONDUIT CONNECTION TO PROPOSED EQUIPMENT DETAIL

NO SCALE



Sprint
6340 SPRINT PARKWAY
OVERLAND PARK, MISSOURI 66251

SAMSUNG
1301 EAST LOOKOUT DRIVE
RICHMOND, TX 75282

teleCAD
1961 KORTHROCK BLVD. SUITE 130
MINNETONKA, MN 55345
TEL: 952-892-7720
FAX: 952-892-7720

PROJECT NO: _____
DRAWN BY: JAE
CHECKED BY: SPH

REV	DATE	DESCRIPTION
0	10/16/13	START FOR CONSTRUCTION

I HEREBY CERTIFY THAT THE PLAN, SPECIFICATION OR REPORT HAS BEEN PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MINNESOTA.
SIGNATURE: *[Signature]*
PRINT NAME: JESSICA LEWIS
DATE: 10/15/13 LICENSE # 42481

MSO3NP420
DULUTH SAINT MICHAEL'S SCHOOL
4828 PITT STREET
DULUTH, MN 55804

SHEET TITLE
DC POWER ONE-LINE & DETAILS
SHEET NUMBER
E-2



6540 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251



1301 EAST LOOKOUT DRIVE
RICHARDSON, TX 75082



1961 NORTHPOINT BLVD. SUITE 130
MINNAPOLIS, MN 55420
PH: 612-343-3550
FAX: 612-343-3550

PROJECT NO: _____
DRAWN BY: JAE
CHECKED BY: SPJ

REV	DATE	DESCRIPTION
0 <td>10/11/13 <td>ISSUED FOR CONSTRUCTION</td> </td>	10/11/13 <td>ISSUED FOR CONSTRUCTION</td>	ISSUED FOR CONSTRUCTION

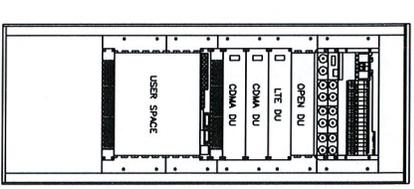
I HEREBY CERTIFY THAT THE PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SIGNATURE: *Joe U*
PRINT NAME: JOSEPH UJENIE
DATE: 10/15/13 ENGINE #42488

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

M503NP420
DULUTH SAINT MICHAEL'S SCHOOL
4828 PITT STREET
DULUTH, MN 55804

SHEET TITLE
POWER & TELCO DETAILS

SHEET NUMBER
E-3

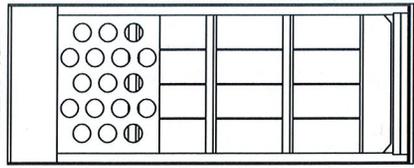


ITEM	SPECIFICATION
OPERATING TEMPERATURE	0 ~ 40°C (NATURAL CONVECTION)
RATINGS	• 5ESSIC ZONE 4 • FCC PART 15 CLASS A
AC POWER	SINGLE PHASE 208-240 VAC
DC POWER	14 RW @ -48 VDC (7 RECTIFIERS, 96% EFFICIENCY)
CABINET SIZE (W x D x H)	600mm x 600mm x 2300mm FRONT DOOR W/O SENSOR
CABINET WEIGHT	SINGLE CABINET: 1 T.O.D. W/O EQUIPMENT
CABINET USER SPACE (19")	• 8 RU FOR RS DU • 8 RU FOR AUX • 2 RU FOR RESERVED • 8 RU FOR BATTERY 1 STRING
BATTERY TRAY	ZONE 1 BATTERY SHEET 16x 8 BATTERY STRING

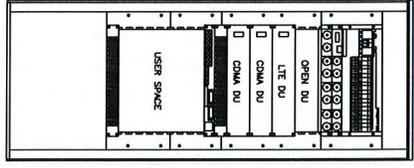
SINGLE CABINET SOLUTION

INDOOR MAIN SINGLE CABINET SOLUTION - MAIN WITH BATTERY STRING IN CABINET

NO SCALE A



MMBS-BATTERY CABINET

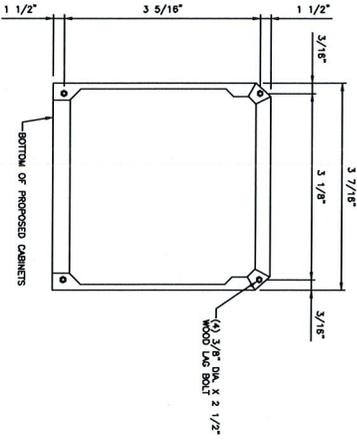


MMBS-BBU CABINET

ITEM	SPECIFICATION
OPERATING TEMPERATURE	0 ~ 40°C (NATURAL CONVECTION)
RATINGS	• 5ESSIC ZONE 4 • FCC PART 15 CLASS A
AC POWER	SINGLE PHASE 208-240 VAC
DC POWER	14 RW @ -48 VDC (7 RECTIFIERS, 96% EFFICIENCY)
CABINET SIZE (W x D x H)	600mm x 600mm x 2300mm FRONT DOOR W/O SENSOR
CABINET WEIGHT	POWER CABINET: 1 T.O.D. W/O EQUIPMENT BATTERY CABINET: 1 T.O.D. W/O EQUIPMENT
CABINET USER SPACE	• 8 RU FOR RS DU • 8 RU FOR RESERVED • 2 RU FOR RESERVED • 8 RU FOR BATTERY 1 STRING (FOR SINGLE)
BATTERY CABINET	• 4 x BATTERY BREAKERS AND MONITORS

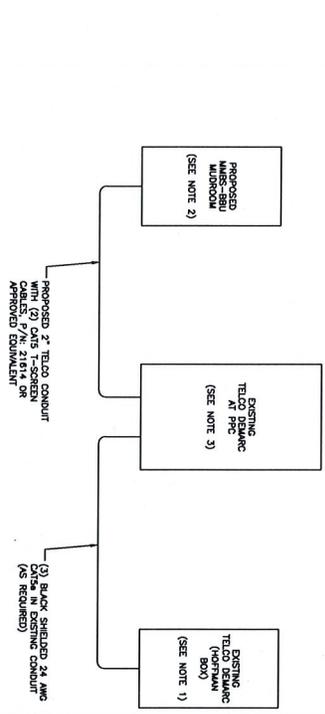
INDOOR MAIN WITH RECTIFIERS AND BATTERY CABINET

NO SCALE A



MMBS CABINET ANCHOR BOLT PATTERN DETAIL

NO SCALE C



TELCO RISER DETAIL

NO SCALE D

- NOTES
- CONTRACTOR TO INSTALL NEW 66 BLOCK IN EXISTING HOFFMAN BOX AT SITES MAIN TELCO RISER.
 - CONTRACTOR SHALL INSTALL BU-45 ENDS ON ALL RUNS OF CABLES INTO MMBS-BBU MICROROOM.
 - CONTRACTOR TO INSTALL NEW 66 BLOCK IN EXISTING TELCO BOX NEXT TO EXISTING PVC CABINET.



6590 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251



1301 EAST LOPKOUT DRIVE
RICHARDSON, TX 75082



1961 NORTHPOINT DRIVE, SUITE 100
HIXSON, IN 47343
PH: 317-443-5500
FAX: 317-443-9500

PROJECT NO: _____
DRAWN BY: JUE
CHECKED BY: SPH

NO	DATE	DESCRIPTION
0	10/19/13	ISSUED FOR CONSTRUCTION
1		
2		
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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR SCHEDULE WAS PREPARED BY ME OR UNDER MY DIRECT AND IMMEDIATE SUPERVISION AND THAT I AM AN ARCHITECT UNDER THE LAWS OF THE STATE OF IOWA.

DATE: 10/15/13
LICENSE: 44288

PRINT NAME: STEPHEN HUNT
SIGNATURE: *[Signature]*

MSO3NP420
DULUTH SAINT MICHAELS SCHOOL
4628 PITT STREET
DULUTH, MN 55804

SHEET TITLE
POST-MIGRATION
PANEL SCHEDULE

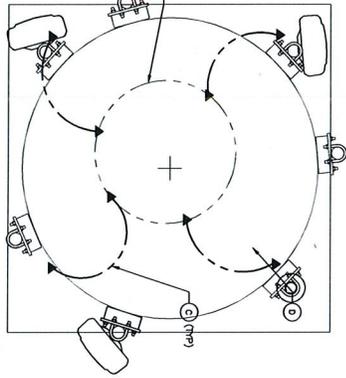
SHEET NUMBER
E-4

ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	MODEL NUMBER	TYPE	WIRE	2	3	4
1	BRKWRN	20	PCS	200 AMP	VA	AC	2200	YES	
2	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
3	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
4	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
5	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
6	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
7	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
8	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
9	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
10	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
11	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
12	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
13	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
14	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
15	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
16	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
17	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
18	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
19	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
20	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
21	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
22	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
23	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
24	BRKWRN	2	PCS	200 AMP	VA	AC	2200	YES	
POST-MIGRATION PERIOD LOADS									
TOTAL VA 23,41									
TOTAL AMP 98.80									

POST-MIGRATION PANEL SCHEDULE

NO SCALE

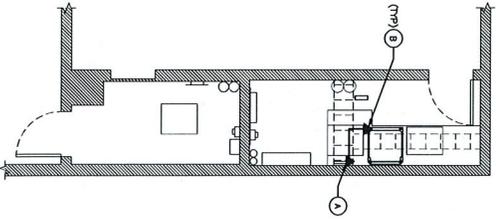
A



ANTENNA GROUNDING PLAN

SCALE: 1"=1'-0"

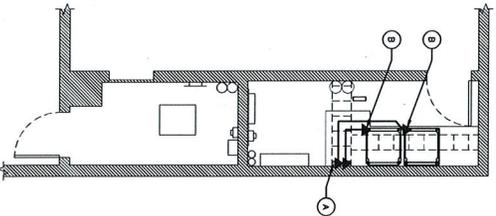
A



INTERIM GROUNDING PLAN

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

B



FINAL GROUNDING PLAN

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

C

GROUNDING NOTES

1. ALL ELECTRICAL AND GROUNDING AT THE CELL SITE SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC), NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70B (LATEST EDITION), AND MANUFACTURER'S SPECIFICATIONS.
2. THE AC PANEL IN THE POWER CABINET IS WIRED AS SERVICE ENTRANCE. THE AC SERVICE GROUND CONDUCTORS SHALL BE CONNECTED TO THE AC SERVICE GROUNDING BUS AND SHALL BE INSTALLED IN THE AC POWER CONDUIT. THE INSTALLATION SHALL BE PER LOCAL AND NATIONAL ELECTRICAL CODE (NEC-70).
3. EXPLOSIVE WELDING IS RECOMMENDED FOR GROUNDING CONNECTION WHERE PARALLEL, OTHERWISE THE CONNECTION SHALL BE MADE USING AN APPROVED COPPER SLEEVE. BEFORE MAKING THE CONNECTIONS, THE MANUFACTURER'S TORQUE RECOMMENDATIONS ON THE BOLT ASSEMBLY SHOULD BE FOLLOWED.
4. THE ANTENNA CABLES SHALL BE GROUNDING AT THE TOP AND BOTTOM OF THE ANTENNA RING FOR LIGHTNING PROTECTION. THE ANTENNA CABLE TOWARD THE HORIZONTAL PLANE WIRE RUNS TO GROUND SHALL BE KEPT AS STRAIGHT AND SHORT AS POSSIBLE. ANTENNA CABLE SHIELD SHALL BE GROUNDING AT MID-POINT.
5. ALL GROUNDING CONDUCTORS INSIDE THE BUILDING SHALL BE RUN IN CONDUIT BACKWAY SYSTEM AND SHALL BE INSTALLED AS STRAIGHT AS PRACTICAL, WITH MINOR BENDS TO AVOID OBSTRUCTIONS. THE BENDING RADIUS OF ANY #2 GROUNDING CONDUCTOR IS 2". THE BACKWAY MAY BE INSTALLED IN THE FIELD CONDITIONS. GROUNDING CONDUCTORS SHALL NOT MAKE CONTACT WITH ANY METALLIC CONDUITS, SURFACES OR EQUIPMENT.
6. PROVIDE PVC SLEEVES WHERE GROUNDING CONDUCTORS PASS THROUGH THE BUILDING WALLS AND /OR CEILINGS.
7. INSTALL GROUND BUSHINGS ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BARS IN THE PANEL BOARD.
8. GROUND ANTENNA BASES, FRAMES, CABLE CABINETS AND OTHER METALLIC COMPONENTS WITH #2 GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
9. ALL PROPOSED GROUNDING CONDUCTORS SHALL BE ROUTED AND CONNECTED TO THE MAIN GROUND BAR OR EXISTING GROUND HALO THROUGH EXISTING OR PROPOSED CABLE LADDER SUPPORT.

GROUNDING LEGEND

- ① EXISTING GROUND RING OR EXISTING HALO GROUNDING.
- ② FIELD DETERMINE EXACT LOCATION.
- ③ SPRINT EQUIPMENT CABINET GROUNDING.
- ④ SEE DETAIL C / SHEET G-3
- ⑤ ANTENNA GROUNDING, SEE DETAIL E / SHEET G-3
- ⑥ GPS GROUNDING, SEE DETAIL D / SHEET G-3
- ⑦ CABLE LADDER SUPPORT GROUNDING
- ⑧ PROPOSED GROUND RING, FIELD DETERMINE EXACT LOCATION
- EXISTING GROUND RING
- - - - - PROPOSED GROUND RING
- DOWNWELD CONNECTION (ISOTHERMIC WELD)
- ▲ MECHANICAL CONNECTION
- ⊗ GROUND ROD

CADWELD CONNECTIONS OR APPROVED EQUIV.		BIRDWELD CONNECTIONS OR APPROVED EQUIV.	
	PARALLEL HORIZONTAL CONDUCTORS THROUGH CABLE TO GROUND ROD TYPE 1B		HORIZONTAL STEEL SURFACE OF HORIZONTAL PIPE TYPE 1B
	VERTICAL PIPE CABLE DOWN TO GROOVE OF VERTICAL PIPE TYPE 1B		COOPER LUGS WITH TWO HOLES AND GROUND ROD TYPE 2-V-2

TYPICAL CADWELD TYPE CONNECTIONS



6530 SPRING PARKWAY
OVERLAND PARK, KANSAS 66251



1301 EAST LOOKOUT DRIVE
RICHMOND, TX 75082



1961 NORTHPOINT BLVD, SUITE 130
MINNAPOLIS, MN 55425
TEL: 612-344-3333
FAX: 612-344-3509

PROJECT NO: _____
DRAWN BY: JME
CHECKED BY: SBN

REV	DATE	DESCRIPTION
0	10/15/13	ISSUED FOR CONSTRUCTION

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

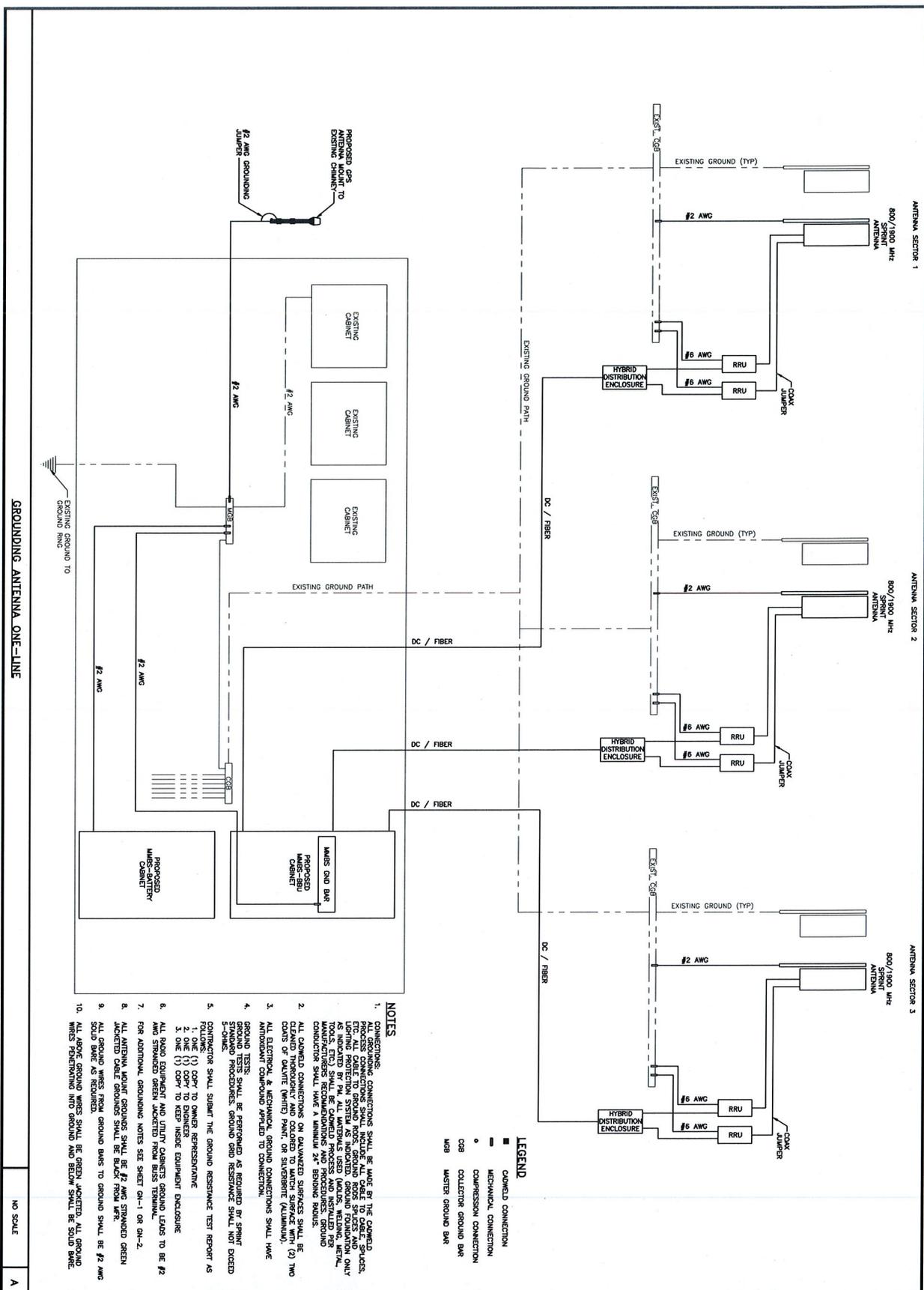
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SIGNATURE: [Signature]

PROJECT NAME: STEENSBUILD
PROJECT ADDRESS: 4528 PITT STREET
CITY: DULUTH, MN 55804

MSO3NP420
DULUTH SAINT MICHAELS SCHOOL
4528 PITT STREET
DULUTH, MN 55804

SHEET TITLE
GROUNDING PLAN & NOTES

SHEET NUMBER
G-1



ANTENNA SECTOR 1
800/1800 MHz
SPRINT
ANTENNA

ANTENNA SECTOR 2
800/1800 MHz
SPRINT
ANTENNA

ANTENNA SECTOR 3
800/1800 MHz
SPRINT
ANTENNA

EXIST. TOP
EXISTING GROUND (TYP)
#2 AWG
#6 AWG
RRU
COAX JUMPER
HYBRID DISTRIBUTION ENCLOSURE
DC / FIBER
EXIST. TOP
EXISTING GROUND (TYP)
#2 AWG
#6 AWG
RRU
COAX JUMPER
HYBRID DISTRIBUTION ENCLOSURE
DC / FIBER
EXIST. TOP
EXISTING GROUND (TYP)
#2 AWG
#6 AWG
RRU
COAX JUMPER
HYBRID DISTRIBUTION ENCLOSURE
DC / FIBER

EXISTING GROUND TO
EXISTING GROUND RING

GROUNDING ANTENNA ONE-LINE

NO SCALE

A

LEGEND
 ■ COMBINED CONNECTION
 — MECHANICAL CONNECTION
 ○ COMPRESSION CONNECTION
 ○ COB COLLECTOR GROUND BAR
 ○ MOB MASTER GROUND BAR

NOTES
 1. ALL CONNECTIONS:
 ALL GROUNDING CONNECTIONS SHALL BE MADE BY THE COMBINED PROCESS CONNECTIONS SHALL INCLUDE ALL CABLE TO CASE, SPACERS, LIGHTNING PROTECTION SYSTEMS AS INDICATED, GROUND FOUNDATION ONLY AS INDICATED BY P.M.I. ALL WIREBULBS USED (WOLVES, WELDING, METAL, MANUFACTURERS' RECOMMENDATIONS AND PROCEDURES, GROUND CONDUCTOR SHALL HAVE A MINIMUM 24" BENDING RADIUS.
 2. ALL COMBINED CONNECTIONS ON GALVANIZED SURFACES SHALL BE CLEANED THOROUGHLY AND COLORED TO MATCH SURFACE WITH (2) TWO COATS OF ZINC RICH PAINT (GALVAPRINT) OR SUPERBOND (KUMHAWK).
 3. ALL MECHANICAL CONNECTIONS SHALL BE MADE TO THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS AND PROCEDURES.
 4. GROUND TESTS:
 GROUND TESTS SHALL BE PERFORMED AS REQUIRED BY SPRINT STANDARD PROCEDURES. GROUND GRID RESISTANCE SHALL NOT EXCEED 5 OHMS.
 5. CHANGES:
 CHANGES SHALL SUBMIT THE GROUND RESISTANCE TEST REPORT AS FOLLOWS:
 1. ONE (1) COPY TO OWNER REPRESENTATIVE
 2. ONE (1) COPY TO KEEP IN RESERVE EQUIPMENT ENCLOSURE
 6. ALL GROUND STRAP AND TIE-UP CABLES SHALL BE #2 AWG STANWAD GREEN JACKETS FROM BISS TERMINAL AND STANWAD GREEN JACKETS FROM BISS TERMINAL.
 7. FOR ADDITIONAL GROUNDING NOTES SEE SHEET GH-1 OR GH-2.
 8. ALL ANTENNA MOUNTING GROUNDING SHALL BE #2 AWG STANWAD GREEN JACKETS FROM GROUND BARS TO GROUND SHALL BE #2 AWG STANWAD GREEN JACKETS.
 9. ALL GROUNDING WIRE SHALL BE GERRY JACKETS. ALL GROUND WIRE SHALL BE #2 AWG STANWAD GREEN JACKETS.
 10. ALL GROUNDING WIRE SHALL BE GERRY JACKETS. ALL GROUND WIRE SHALL BE #2 AWG STANWAD GREEN JACKETS.

PROJECT NO: _____
DRAWN BY: JAE
CHECKED BY: SSK

1961 KENNESAW BLVD SUITE 130
 RICHMOND, TX 75282
 TEL: 409-483-5500
 FAX: 409-483-5509

Sprint
 6340 SPRINT PARKWAY
 OVERLAND PARK, KANSAS 66251

SAIWSUNG
 1301 EAST LOOKOUT DRIVE
 RICHMOND, TX 75282

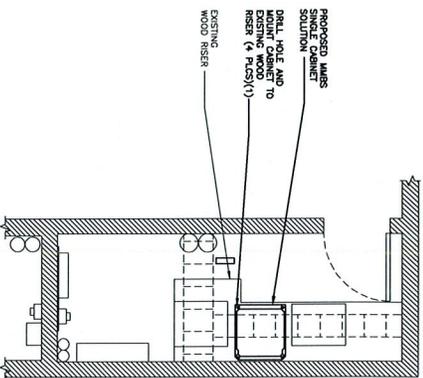
MCS03NP420
 DULUTH SAINT MICHAELS SCHOOL
 4628 PITT STREET
 DULUTH, MN 55804

SHEET TITLE
 INSTALLATION AND
 GROUNDING DETAILS

SHEET NUMBER
 G-2

DATE: 10/15/13
DESIGNER: JAE
DATE: 10/15/13
REVISION: 01

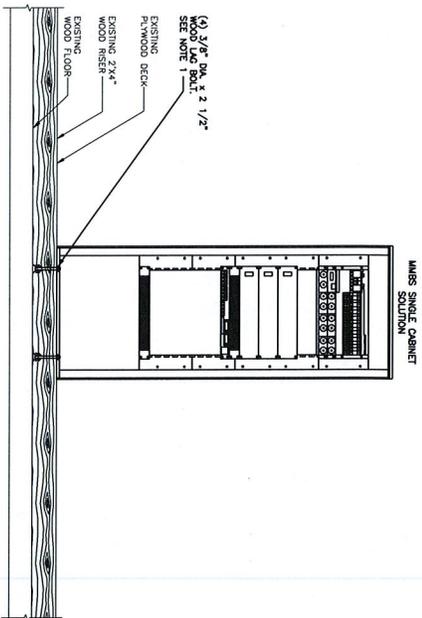
DATE: 10/15/13
DESCRIPTION:



INTERIM PLAN VIEW SINGLE CABINET SOLUTION

NO SCALE

A



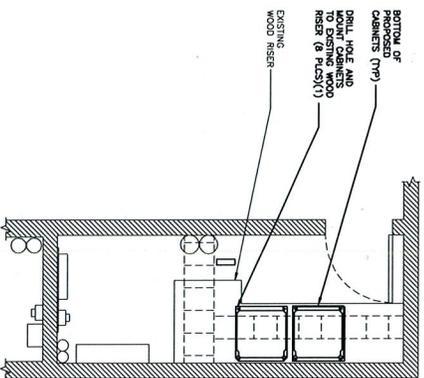
NOTES

1. PLEASE SEE SHEET 04-1 FOR CONSTRUCTION MOUNTING NOTES.

INTERIM ELEVATION SINGLE CABINET SOLUTION

NO SCALE

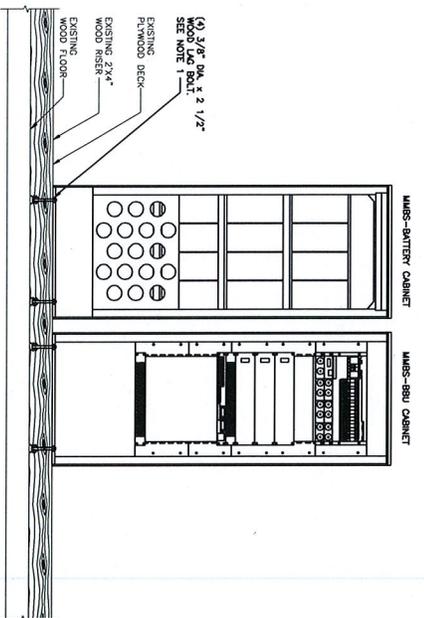
B



FINAL PLAN VIEW CONCRETE FLOOR

NO SCALE

C



NOTES

1. PLEASE SEE SHEET 04-1 FOR CONSTRUCTION MOUNTING NOTES.

FINAL ELEVATION CONCRETE FLOOR

NO SCALE

D



PROJECT NO: _____
DRAWN BY: JAE
CHECKED BY: SHH

REV	DATE	DESCRIPTION
0	10/19/13	ISSUED FOR CONSTRUCTION

DATE: 10/15/13, ISSUE 0289

PRINT NAME: STEPHEN ENANT

SIGNATURE: *[Signature]*

IF IS A VIOLATION OF LAW FOR ANY PERSON, OR ANY ENTITY, TO REPRODUCE OR TRANSMIT IN ANY MANNER OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, ANY PART OF THIS DOCUMENT, WITHOUT THE WRITTEN PERMISSION OF THE STATE OF MINNESOTA.

MDS03NF420
DULUTH SAINT MICHAELS SCHOOL
4628 PITT STREET
DULUTH, MN 55904

SHEET TITLE
STRUCTURAL DETAILS
SHEET NUMBER
S-1