SITE NAME: OVERHILLS ELEM. - CLASSROOM ADDITION

PROJECT: EMERGENCY RESPONDER COMMUNICATION ENHANCEMENT SYSTEM (ERCES)

BUILDING ADDRESS: 2626 RAY ROAD, SPRING LAKE, NC 28390

BUILDING

PROJECT LOCATION

PROJECT DESCRIPTION

DESIGN AND INSTALLATION OF AN EMERGENCY RESPONDER COMMUNICATION ENHANCEMENT SYSTEM (ERCES). THIS SYSTEM WILL PROVIDE ADEQUATE TWO-WAY RADIO COVERAGE THROUGHOUT THE PROJECT SPACE (CLASSROOM ADDITION ONLY). ERCES WILL BE SCABLABLE FOR FUTURE EXPANSION.

THE ERCES WILL HAVE AN EXTERIOR DIRECTIONAL ANTENNA POINTED AT PUBLIC SAFETY NETWORK PSN COMMUNICATIONS TOWER. THIS SIGNAL WILL BE AMPLIFIED BY THE BI-DIRECTIONAL AMPLIFIER (BDA) AND DISTRIBUTED THROUGHOUT THE FACILITY VIA PASSIVE NETWORK OF SPLITTERS, DIRECTIONAL COUPLERS, AND ANTENNAS TO PROVIDE COVERAGE THROUGHOUT THE PROJECT SPACE.

THIS SYSTEM WILL HAVE AUTOMATIC SUPERVISORY SIGNALS THAT WILL BE MONITORED AND ANNUNCIATED AT THE FACP.

THE PRIMARY POWER SOURCE FOR THE SYSTEM WILL BE A DEDICATED BRANCH CIRCUIT DERIVED FROM AN EM PANEL, IF AVAILABLE. SECONDARY POWER WILL BE PROVIDED BY THE BATTERY BACKUP UNIT (BBU). KNOX GATE KEY SWITCH WILL BE PROVIDED FOR EMERGENCY POWER OFF (EPO)

ACCEPTANCE TESTING WILL BE DONE IN ACCORDANCE WITH APPLICALBLE FIRE CODE AND/OR AHJ PROVIDED RADIO POLICY.

WALLS LEGEND

- 1 HOUR RATED FIRE BARRIER
- 2HR HOUR RATED FIRE BARRIER

NOTE: WALL TYPES SHOWN IN THESE DRAWINGS ARE BASED ON ARCHITECT PROVIDED G-, LS-, OR A-SHEETS AND INCLUDED HEREIN FOR REFERENCE ONLY. ONLY WALLS THAT HAVE RELEVANCE TO ROUTING OF ERRCS CABLES ARE SHOWN.

CABLES LEGEND

- 1/2" PLENUM COAX
- 1/2" COAX
- COAX JUMPER
- 1/2" RADIATING COAX
- 1/2" 2HR PLENUM COAX - UL2196
- 1/2" PLENUM COAX W/ METAL CLAD
- CATEGORY- TWISTED PAIR
- FIBER OPTIC CABLE - PLENUM ARMORED

DEVICE NAMING CONVENTION

[LAYOUT PLAN] . [LEVEL] . [DEVICE TYPE & ID]

R1.01.AO4

DEVICE TYPE ABBREVIATION	DEVICE TYPE
AO	ANTENNA - OMNI
AD	ANTENNA - DIRECTIONAL
SP	SPLITTER / DIRECTIONAL COUPLER
RA	RADIO AMPLIFIER (BDA)
MU	MASTER RADIO UNIT
RU	REMOTE RADIO UNIT
BU	BATTERY BACKUP UNIT
LS	LIGHTNING SUPRESSOR
FO	FIBER DISTRIBUTION PANEL (FDP)
EO	EMERGENCY POWER OFF (EPO)
AN	REMOTE ANNUNCIATOR
OE	OPTICAL EXPANSION UNIT (OEU)

SYMBOL LEGEND

- 1 1/4"Ø EMT CONDUIT
- 2"Ø EMT CONDUIT
- 1 1/4"Ø / 2"Ø VERTICAL SLEEVE
- 1 1/4"Ø / 2"Ø SLEEVE W/ FIRESTOP
- BALLAST MOUNT
- 18"X18"X6" J-BOX - U.N.O.
- 12"X12"X6" J-BOX W/ OMNI ANTENNA
- OMNI ANTENNA
- DIRECTIONAL ANTENNA
- YAGI ANTENNA
- DIRECTIONAL COUPLER
- 2-WAY SPLITTER
- 3-WAY SPLITTER
- 4-WAY SPLITTER
- BI-DIRECTIONAL AMPLIFIER (BDA)
- BATTERY BACKUP UNIT (BBU)
- LIGHTNING SUPPRESSOR
- REMOTE ANNUNCIATOR
- FIBER DISTRIBUTION PANEL (FDP)
- EMERGENCY POWER OFF (EPO)
- KNOX GATE AND KEY SWITCH

GENERAL NOTES

1. PLANS ARE TO BE A DIAGRAMMATIC OUTLINE ONLY, UNLESS NOTED OTHERWISE. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
2. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
3. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH U.L. LISTED AND FIRE CODE APPROVED MATERIALS TO MAINTAIN EXISTING FIRE RATING. SEE ARCHITECTURALS OR LIFE SAFETY PLANS FOR LOCATIONS.
4. DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION.
6. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
7. IF SLAB IS POST TENSION CONSTRUCTION, LOCATE AND AVOID ANY REINFORCEMENT PRIOR TO DRILLING. SEE ARCHITECTURALS.
8. COORDINATE WITH THE MECHANICAL, ELECTRICAL & PLUMBING DRAWINGS FOR EQUIPMENT INSTALLED UNDER OTHER DIVISIONS OF THE DOCUMENTS.
9. COORDINATE LOCATION OF CEILING-MOUNTED EQUIPMENT WITH THE MECHANICAL AND ELECTRICAL DEVICES INSTALLED IN OR ON THE CEILING.
10. ALL CABLING ROUTED IN PLENUM SPACE AND RISERS SHALL BE PLENUM-RATED.
11. ALL COAX TO BE INSTALLED PER MANUFACTURE SPECIFICATIONS, SUPPORTED AT A MINIMUM OF EVERY 4'-0" IN PROPERLY SIZED BLOCKS OR OTHER COAX SUPPORTS U.N.O
12. MAINTAIN MINIMUM BEND RADIUS AND SUPPORT CABLE AS NEEDED TO PROTECT CABLES FROM SAGGING, KINKING OR BEING CAUGHT.
13. WATERPROOF ALL EXTERIOR CONNECTIONS AND ANY OTHER CONNECTIONS EXPOSED TO MOISTURE OR CONDENSING ENVIRONMENTS WITH SELF AMALGAMATING BUYTAL TAPE WITH MINIMUM 1/2" OVERLAP.

ELECTRICAL CONTRACTOR NOTES

1. AC POWER SHALL BE LANDED WITHIN BBU (BATTERY BACKUP UNIT) CABINET LOCATED IN CLOSE PROXIMITY TO THE BDA (BI-DIRECTIONAL AMPLIFIER AKA HEADEND) AND, IF APPLCIABLE, REMOTE BDA LOCATIONS.
2. AC POWER SHALL BE DEDICATED 120V 20A CIRCUIT WITH LOCKING BREAKER CONNECTED TO EMERGENCY POWER WHEN AVAILABLE. RECEPTACLE TYPE SHALL BE SINGLE NEMA 5-20R WITH LOCKING END USE COVER.
3. DRY CONTACT CONNECTIONS TO BE MONITORED BY FACP ARE LOCATED WITHIN THE BBU CABINET.
4. ALL CONDUIT PENETRATIONS INTO THE BBU CABINET SHALL HAVE R/T FITTINGS.
5. ACCEPTABLE GROUNDING SOURCE SHALL BE PROVIDED FOR BDA AT HEADEND AND, IF APPLICABLE, REMOTE BDA LOCATIONS.
6. CONDUIT RACEWAY AND J-BOXES SHALL BE INSTALLED WHERE COAX PATHWAY AND SPLITTER JUNCTIONS ARE EXPOSED.
7. SPLITTER JUNCTIONS LOCATED ABOVE HARDLID CEILINGS SHALL REQUIRE A 12"X12" ACCESS PANEL.
8. MINIMUM SIZE CONDUIT 1-1/4"; SINGLE RUNS OF 1/2" COAX SHALL REQUIRE 1-1/4" CONDUIT AND 2 RUNS OF 1/2" COAX SHALL REQUIRE 2" CONDUIT.
9. ALL RACEWAYS SHALL BE TERMINATED WITH A PLASTIC ANTI-SHORT BUSHING.
10. ALL CONDUIT RUNS SHALL HAVE LESS THAN 270 DEGREES TOTAL BEND BETWEEN PULL POINTS, AND FURNISHED WITH PULL STRING.
11. IF REQUIRED, PULL POINT J-BOXES SHALL BE 18"X18"X6", IF CONDUIT ENTRANCE AND EXIT ARE ON OPPOSING SIDES FOR STRAIGHT THROUGH PULL, 6"X6"X24" WIRE TROUGH IS PREFERRED.
12. IF COAX RUNS ARE PLACED IN CONDUIT, SPLITTER JUNCTIONS SHALL REQUIRE AN 18"X18"X6" J-BOX. SEE LAYOUT PLANS FOR SPLITTER LOCATIONS. SPLITTER JUNCTIONS LOCATED WITHIN TELECOM ROOMS SHALL NOT REQUIRE A J-BOX.
13. ROOF PENETRATION REQUIRED FOR DONOR ANTENNA FEEDLINE SHALL BE 2" CONDUIT WITH WEATHERHEAD. (BY OTHERS)

DRAWING INDEX

SHEET	DESCRIPTION	SHEET	DESCRIPTION
R0.00	COVER SHEET	R2.00	FIRESTOPPING DETAILS
R0.01	ONE-LINE DIAGRAM	R2.01	INSTALLATION DETAILS
R0.02	CALCULATIONS	R2.02	GROUNDING DETAILS
R1.01	LEVEL 1		

ERCES SYSTEM SUMMARY

RADIO SYSTEM NAME:	NORTH CAROLINA VIPER		
SITE NAME:	SPOUT SPRINGS		
COORDINATES:	35.27722°	-79.07083°	
ADDRESS:	HP-1266, SPOUT SPRINGS 2305 NC87 SOUTH		
AZIMUTH:	290°		
DISTANCE(MI):	6.3		
FREQUENCIES:	851.5875 851.9000 852.3625 853.1250 853.5000 853.7500 **853.975c 854.2375c**		
NUMBER OF CH'S:	8		
BDA OEM:	COMBA		
BDA CLASS:	CLASS B		
BDA OUTPUT POWER:	GAIN RANGE(dB):	30	
	DOWNLINK (dBm):	27	
	UPLINK (dBm):	27	
BDA FREQUENCY RANGE (MHz):	BAND:	700	800
	DOWNLINK:	768 - 775	851 - 861
	UPLINK:	798 - 805	806 - 816
	FILTER BANDWIDTH:	OFF	10
SERVING ANTENNA QTY:	3		
FLOORS W/ ANTENNAS:	FIRST FLOOR		
STANDBY TIME:	24		
FACP SUPERVISORY SIGNALS:	POWER SUPPLY:	1. BDA - AC FAIL 2. BDA - BATTERY LOW 3. BDA - CHARGER FAIL	
	SYSTEM:	1. BDA - DONOR ANTENNA MALFUNCTION 2. BDA - SYSTEM COMPONENT FAIL 3. BDA - SIGNAL BOOSTER FAIL	

CODE ANALYSIS

JURISDICTION:	SPRING LAKE FIRE RESCUE	
RADIO POLICY:	NONE	
GOVERINING CODE:	IBC:	2018
	IFC:	2018
	NFPA 1225, CHAPTER 18:	2022
	NFPA 70 (NEC):	2019
	NFPA 780:	2020
CONSTRUCTION TYPE:		II-B
OCCUPANCY GROUP:		EDUCATIONAL
FULLY SPRINKLERED:		YES
BUILDING HEIGHT:		36' 6"
NUMBER OF STORIES IN BUILDING:	ABOVE:	1
	BELOW:	0
TOTAL FLOOR AREA (SF):		18,336

DESIGN CRITERIA

SIGNAL STRENGTH:		DAQ
DIGITAL AUDIO QUALITY (DAQ) AND/OR SIGNAL INTERFERENCE NOISE (SINR):	DAQ	3.0
	SINR	22dB
AREA COVERAGE REQUIRMENTS:	GENERAL	90%
	CRITICAL	99%
EMERGENCY GENERATOR:		NO
BATTERY BACKUP TIME:	GENERATOR:	2-HOURS
	NO GENERATOR:	12-HOURS
MONITORING BY FIRE ALARM CONTROL PANEL:	TYPE	SUPERVISIORY
	QTY	6
BACKBONE CABLING ENCLOSURE:	FIRE RATING (HRS):	0
CONDUIT REQUIREMENTS:	RISER:	NO
	FEEDER:	NO

PROJECT CONTACTS

ERRCS CONTRACTOR
ADT COMMERCIAL
CASEY MCKENNA
1501 YAMATO RD
BOCA RATON, FL 33431
PHONE: 732.921.6373

ADT Commercial

Revision history

Rev	Date	Author
0	11/18/2023	JD

SHOP DRAWINGS 100%

Project name
OVERHILLS ELEMENTARY - CLASSROOM ADDITION

Address
2626 RAY ROAD
SPRING LAKE NC
28390

Designer name
JD

R0.00

COVER SHEET

11/18/2023

ID: R1.01.AD1
987-70

RADIO SYSTEM NAME:	NORTH CAROLINA VIPER	
SITE NAME:	SPOUT SPRINGS	
COORDINATES:	35.27722°	-79.07083°
ADDRESS:	HP-1266, SPOUT SPRINGS 2305 NC87 SOUTH	
AZIMUTH:	290°	
DISTANCE(MI):	6.3	
FREQUENCIES:	851.5875 851.9000 852.3625 853.1250 853.5000 853.7500 **853.975c** **854.2375c**	

10.5 ft

ID: R1.01.LS1
IS-50NX-C2

131.5 ft

ID: R1.01.BU1
BBUV3-LFP48060

ID: R1.01.RA1
RX78V3-B2727P0-S1

ID: R1.01.EO2
3502

403.4 ft

ID: R1.01.SP1
DC-R06-ON300C(XH)

49.9 ft

ID: R1.01.SP2
PS-K2-ON50M(XH)

34.4 ft

31.3 ft

ID: R1.01.AO3
IX-MJN-V3U

96.2 ft

ID: R1.01.AO2
IX-MJN-V3U

ID: R1.01.AO4
IX-MJN-V3U

ADT Commercial

Revision history

Rev	Date	Author
0	11/18/2023	JD
SHOP DRAWINGS 100%		

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OVERHILLS ELEMENTARY - CLASSROOM ADDITION

Address

2626 RAY ROAD
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28390

Designer name

JD

R0.01

ONE-LINE DIAGRAM

11/18/2023

Battery Calculation for Radio Amplification

BDA Nominal Voltage	48	VDC		
Code-requried Backup	24	hours	Generator	No

Battery System (Main BDA)

Power Consumption

Equipment Make	Model	Description	Watts	Qty	Power (Watts)
Comba	RX78V3-B2727P0-XX	700/800MHz, Class B, 27dBm, XX=S1/S0/C0	85	1	85
			0		0
			0		0
			0		
Other 48V loads					10
				Total Power (Watts)	95
				Total Current (Amps)	1.98
				Battery Backup Required (Amp-Hours, nominal)	47.5
				Battery Backup Safety Factor	1.1
				Battery Backup Required (Amp-Hours, with safety factor)	**52.25**

Battery Suitability

Make	Model	Output Voltage	Max Continuous Load (Amps) for 12 hrs	Max Continuous Load (W) for 12 hrs	Max Continuous Load (Amps) for 24 hrs	Max Continuous Load (W) for 24 hrs
Comba	BBUV3-LFP48060	48	5.00	240	2.50	120
					Provides 60 Amp-Hrs	
					Provides 28 Hrs	

1 - BATTERY CALCULATIONS

Antennas Report

Project name: OVERHILLS ELEMENTARY - CLASSF **Design company:** ADT COMMERCIAL
Project creation date: 11/17/2023 **Designer:** JD

Antenna EiRP report

Antenna ID	Ant. Model	System ID	Antenna gain * (dBi)	Total loss/gain (dB)	Antenna EiRP (dBm) Power/channel	Composite power	RSCP/RSRP
ID: R1.01.A02	IX-MJN-V3U	800 MHz - SMR - P25 - Sector N/A	2.2	37.8	-11.7	-2.7	-
ID: R1.01.A03	IX-MJN-V3U	800 MHz - SMR - P25 - Sector N/A	2.2	39.7	-9.8	-0.8	-
ID: R1.01.A04	IX-MJN-V3U	800 MHz - SMR - P25 - Sector N/A	2.2	39.3	-10.2	-1.2	-

Antenna EiRP Statistics (Power / Channel)

System ID	Average (dBm)	Std. dev. (dB)	Minimum (dBm) Antenna ID	Minimum (dBm) EiRP	Maximum (dBm) Antenna ID	Maximum (dBm) EiRP
800 MHz - SMR - P25 - Sector N/A	-10.6	1.0	ID: R1.01.A02	-11.7	ID: R1.01.A03	-9.8

System legend

NCVIPER / P25 / 800 MHz - SMR / NPSPAC / Nb. of channels: 8 / Nb. of sources: 1

2 - ANTENNAS REPORT

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

General Radiotelephone Operator License

DOYLE, JACOB C
13457 MONROE ST
THORNTON, CO 80241

FCC Registration Number (FRN): 0030491484

Special Conditions / Endorsements

Ship Radar Endorsement.

Grant Date	Effective Date	Print Date	Expiration Date
01-27-2021	01-27-2021	01-28-2021	

File Number	Serial Number	Date of Birth
0009391695	PG00068340	05-28-1982

THIS LICENSE IS NOT TRANSFERABLE

(Licensee's Signature)

FCC 605-FRC - May 2007

3 - GENERAL RADIO OPERATORS LICENSE (GROL)

ADT Commercial

Public Safety Radio Enhancement System RF Link Budget

Performed by ADT Commercial — Friday, November 17, 2023

Venue address: Overhills Elementary - Classroom Addition

Radio Donor Site Parameters	
Base Station TX Power	51dBm
Base Station Feeder Line Loss	0dB
Base Station Antenna Gain	0dBi
Donor Site-to-Venue Distance	6.3miles
Frequency, UL	810MHz
Frequency, DL	850MHz
Qty of RF channels	8channels
Base Station UL Rx Target	-110dBm

RES System Parameters	
Donor Antenna Gain	14.1dBi
Donor Feeder Loss (from computer model)	-2dB
Donor Line Fixed Attenuation	0dB
BDA DL Power (max)	27dBm
BDA UL Power (max)	27dBm
BDA Gain (max)	65dB
BDA Gain (min)	35dB
Passive DAS Losses (from computer model)	-13dB
In-building Coverage Environment	Medium

Abbreviations:
BDA: Bi-directional Amplifier
DAS: Distributed Antenna System
DL: Downlink
EIRP: Effective Isotropic Radiated Power
RES: Radio Enhancement System
RSL: Received Signal Level
UL: Uplink

Portable Radio Parameters	
Portable Radio Transmit Power	34dBm
Mobile Distance Near	10feet
Mobile Distance Far	60feet
Mobile DL Rx Target	-100dBm

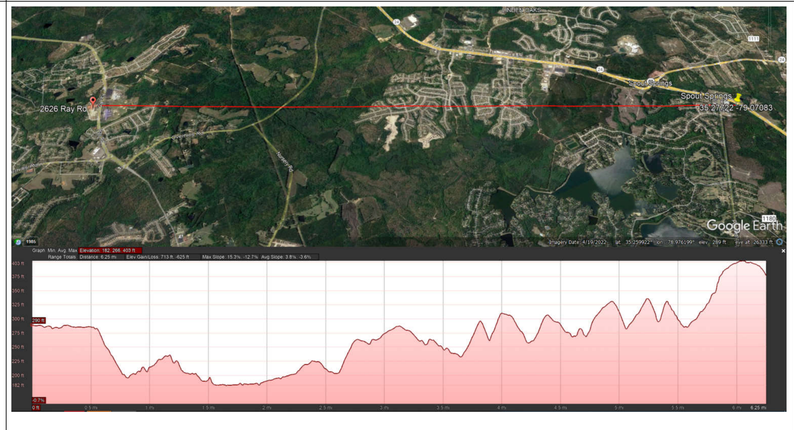
Uplink Budgets Near- and Far-field

	Uplink Link Budget - Near Field Calculation			Uplink Link Budget - Far Field Calculation		
1	34.0dBm	Portable Radio Transmit Power	1	34.0dBm	Portable Radio Transmit Power
2	-49.6dB	In-Building propagation losses @ Near	2	-67.8dB	In-Building propagation losses @ Far
3	-13.0dB	Passive DAS loss, includes antenna gain	3	-13.0dB	Passive DAS loss, includes antenna gain
4	-28.6dBm	Signal Strength input to BDA (1+2+3)	4	-46.8dBm	Signal Strength input to BDA (1+2+3)
5	50.0dB	BDA UL Gain	5	50.0dB	Adjusted BDA UL Gain
6	21.4dBm	BDA Max UL Output Power (4+5)	6	3.2dBm	BDA UL Output Power (4+5)
7	0.0dB	Donor Line Fixed Attenuation	8	0.0dB	Donor Line Fixed Attenuation
8	-2.0dB	Feedline loss to Donor Antenna	7	-2.0dB	Feedline loss to Donor Antenna
9	14.1dBi	Donor Antenna Gain	9	14.1dBi	Donor Antenna Gain
10	-110.8dB	Free Space Loss to Base Station	10	-110.8dB	Free Space Loss to Base Station
11	0.0dBi	Base Station Antenna Gain	11	0.0dBi	Base Station Antenna Gain
12	0.0dB	Base Station Feedline Loss	12	0.0dB	Base Station Feedline Loss
13	-77.2dBm	RSL at Base Station Receiver (add 6-12)	13	-95.4dBm	RSL at Base Station Receiver (add 6-12)

Downlink Budget

	Downlink - Link Budget	
1	51.0dBm	Donor Site Tx Power (EIRP)
2	-111.2dB	Free Space Loss to Venue
3	14.1dBi	Donor Antenna Gain
4	-2.0dB	Donor Feedline Loss
5	0.0dB	Donor Fixed Attenuation
6	9.0dB	Composite Power Factor (Channel Qty)
7	-39.1dBm	Composite Input Power to BDA (add 1-6)
8	50.0dB	BDA DL Gain
9	10.9dBm	BDA Max DL Output Power
10	-13.0dB	Passive DAS loss, includes antenna gain
11	-11.1dB	Serving Antenna EIRP, per channel
12	-67.8dB	In-Building propagation losses @ Far field
13	-78.8dBm	RSL into Mobile @ Far-field

4 - LINK BUDGET



5 - DONOR SITE/PATH 2D/3D

6 - OEM CERTIFICATION

Revision history

Rev	Date	Author
0	11/18/2023	JD

SHOP DRAWINGS 100%

Project name
OVERHILLS ELEMENTARY - CLASSROOM ADDITION

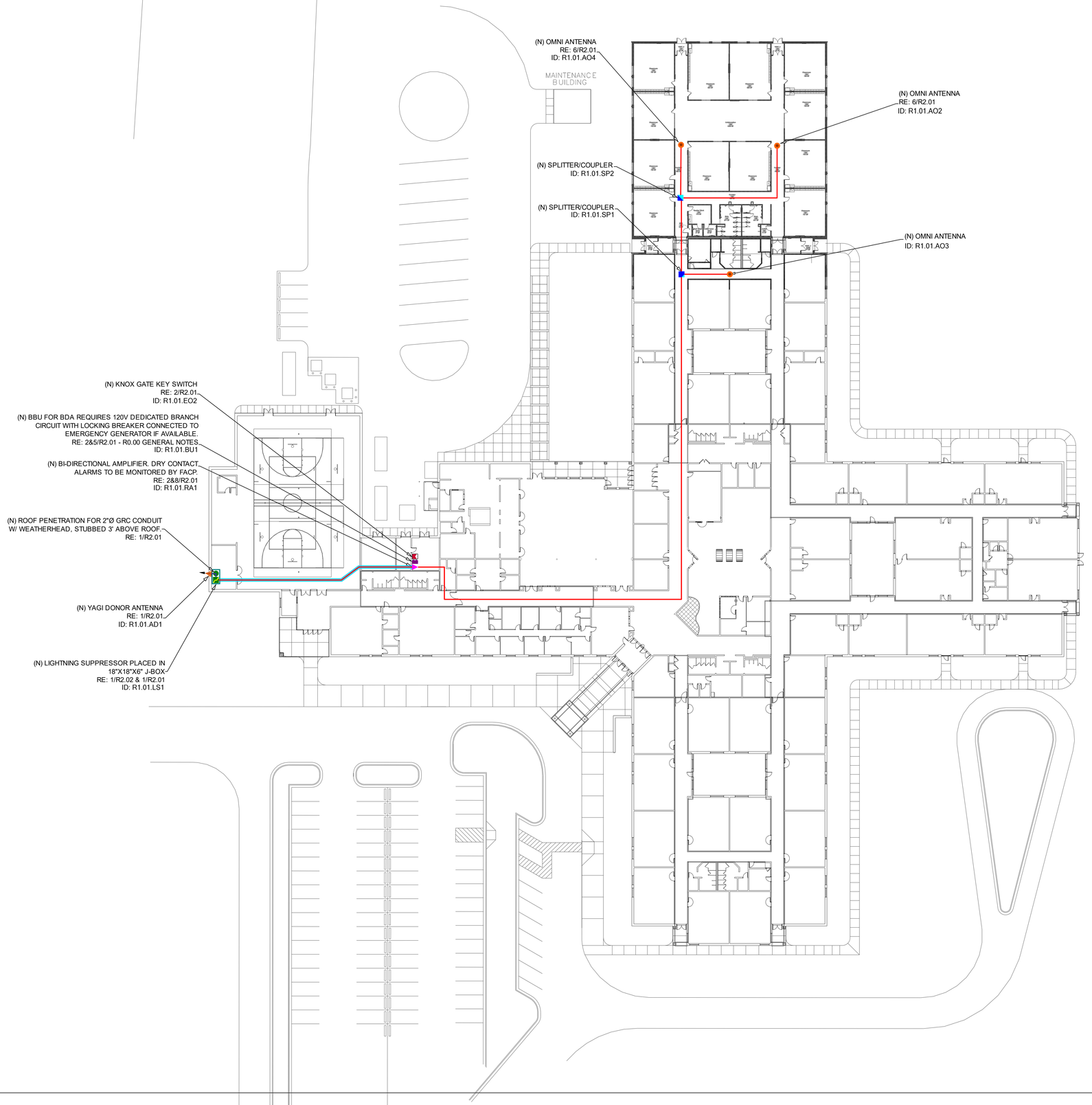
Address
2626 RAY ROAD
SPRING LAKE NC
28390

Designer name
JD

R0.02

CALCULATIONS

11/18/2023



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- KNOX GATE AND KEY SWITCH

64.0 ft

ADT Commercial

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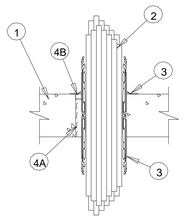
R1.01

11/18/2023

System No. C-AJ-3285

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F RATING — 3 HR	F RATING — 3 HR
T RATINGS — 1, 1-1/2 AND 3 HR (SEE ITEM 2)	FT RATINGS — 1, 1-1/2 AND 3 HR (SEE ITEM 2)
L RATING AT AMBIENT — LESS THAN 1 CFM (SEE ITEMS 2 AND 4)	FH RATING — 3 HR
L RATING AT 400 F — LESS THAN 1 CFM (SEE ITEMS 2 AND 4)	FTH RATINGS — 1, 1-1/2 AND 3 HR (SEE ITEM 2)
	L RATING AT AMBIENT — LESS THAN 1 CFM (SEE ITEMS 2 AND 4)
	L RATING AT 400 F — LESS THAN 1 CFM (SEE ITEMS 2 AND 4)



1. FLOOR OR WALL ASSEMBLY -- REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF OR 1600-2400 KG/M3) CONCRETE. MIN 4-1/2 IN. (114 MM) THICK FLOORS AND MIN 5 IN. (127 MM) THICK WALLS. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. FLOOR MAY ALSO BE CONSTRUCTED OF ANY MIN 6 IN. (152 MM) THICK UL CLASSIFIED HOLLOW-CORE PRECAST CONCRETE UNITS*. OPENING IN FLOOR OR WALL TO BE MAX 3 IN. (76 MM) DIAM FOR 2 IN. (51 MM) DEVICE AND MAX 5 IN. (127 MM) DIAM FOR 4 IN. (102 MM) DEVICE.

   SEE CONCRETE BLOCKS (CAZT) AND PRECAST CONCRETE UNITS (CFTV) CATEGORIES IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURES.

2. CABLES --- WITHIN THE LOADING AREA FOR EACH FIRESTOP DEVICE, THE CABELS MAY REPRESENT A 0 TO 100 PERCENT VISUAL FILL. CABLES TO BE TIGHTLY BUNDLED WITHIN THE DEVICE AND RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. ANY COMBINATION OF THE FOLLOWING TYPES OF CABLERS MAY BE USED:
   A. MAX 100 PAIR NO. 24 AWG (OR SMALLER) COPPER CONDUCTOR TELECOMMUNICATIONS CABLE WITH POLYVINYL CHLORIDE (PVC) JACKETING AND INSULATION.
   B. MAX 7/C NO. 12 AWG COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XPLE JACKET AND INSULATION.
   C. MAX 4/0 AWG TYPE RRH GROUND CABLE.
   D. MAX FOUR PAIR NO. 22 AWG CAT 6 COMPUTER CABLES.
   E. MAX RG 6/U COAXIAL CABLE WITH FLUORONATED ETHYLENE INSULATION AND JACKETING.
   F. FIBER OPTIC CABLE WITH POLYVINYL CHLORIDE (PVC) OR POLYETHYLENE (PE) JACKET AND INSULATION HAVING A MAX DIAM OF 1/2 IN. (13 MM)
   G. MAX 20/C NO.22 AWG SHIELDED PRINTER CABLE WITH PVC JACKET.
   H. THROUGH-PENETRATING PRODUCT*-TWO COPPER CONDUCTORS NO.18 AWG (OR SMALLER) POWER OR NON POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT A JACKET UNDER A METAL ARMOR. MAX 1/4 IN. (6 MM) DIAM S-VIDEO CABLE CONSISTING OF TWO MAX NO.24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET.
   THE HOURLY, FT, AND FTH RATINGS FOR BLANK OPENING (NO CABLES) ARE 3 HR. THE HOURLY, FT, AND FTH RATINGS FOR OPENING WITH CABLES ARE 1-1/2 HR EXCEPT THAT, WHEN CABLE TYPE 2A, 2B, 2C, 2E, OR 2H IS USED, THE T, FT, AND FTH RATINGS ARE 1 HR. SEE TABLE BELOW FOR L RATINGS.

3. FIRESTOP DEVICE*--- FIRESTOP DEVICE CONSISTS OF A CORRUGATED STEEL TUBE WITH AN INNER PLASTIC HOUSING, INTUMESCENT MATERIAL RINGS, TIGHTLY TWISTED INNER FABRIC SMOKE SEAL, FLANGES AND GASKET MATERIAL (NOT SHOWN). FIRESTOP DEVICE TO BE INSTALLED IN ACCORDANCE WITH THE ACCOMPANYING INSTALLATION INSTRUCTIONS. DEVICE SLID INTO FLOOR OR WALL SUCH THAT ENDS PROJECT AN EQUAL DISTANCE FROM THE APPROXIMATE MOTOROLA R56 OF THE ASSEMBLY. AS AN OPTION, IN FLOORS, STEEL SLEEVE OF DEVICE MAY BE INSTALLED FLUSH WITH THE BOTTOM OF FLOOR. THE ANNULAR SPACE BETWEEN THE DEVICE AND THE PERIPHERY OF THE OPENING SHALL BE MIN 0 IN. (POINT CONTACT). DEVICE PROVIDED WITH FLANGE(S) THAT ARE SPUN CLOCKWISE ONTO DEVICE THREADS, OVER GASKET MATERIAL BUTTING TIGHTLY TO TOP SIDE OF FLOOR OR BOTH SIDES OF FLOOR OR WALL. IN FLOORS, WHEN ONE DEVICE FLANGE IS USED, DEVICE FLANGE TO BE SECURED TO FLOOR WITH MIN TWO 1-1/4 IN. (32 MM) LONG MASONRY SCREWS OR ANCHORS. AS AN ALTERNATE TO GASKET MATERIAL, SEALANT (ITEM 4B) MAY BE USED.HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC ---- CP 653 2" SPEED SLEEVE AND CP 653 4" SPEED SLEEVE
4. FIRESTOP SYSTEM ---- THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
   A. PACKING MATERIAL ---- MIN 4 IN. (102 MM) THICKNESS OF MIN 4 PCF (64 KG/M3) MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO ANNULAR SPACE BETWEEN FIRESTOP DEVICE AND OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE INSTALLED FLUSH WITH BOTTOM OF FLOOR AND RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL TO ACCOMMODATE THE REQURED THICKNESS OF FILL MATERIAL.
   B. FILL, VOID OR CAVITY MATERIAL* --- SEALANT --- AS AN ALTERNATE TO GASKET MATERIAL (SEE ITEM 3), MIN 1/2 IN. (13 MM) THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL. FOR L RATINGS WHEN SEALANT IS USED, AN ADDITIONAL 1/4 IN. (6 MM) BEAD OF FILL MATERIAL IS REQUIRED AT THE DEVICE/FLOOR OR DEVICE/WALL INTERFACE ON TOP SIDE OF FLOOR OR BOTH SIDES OF WALL ASSEMBLY PRIOR TO INSTALLING FLANGE(S).

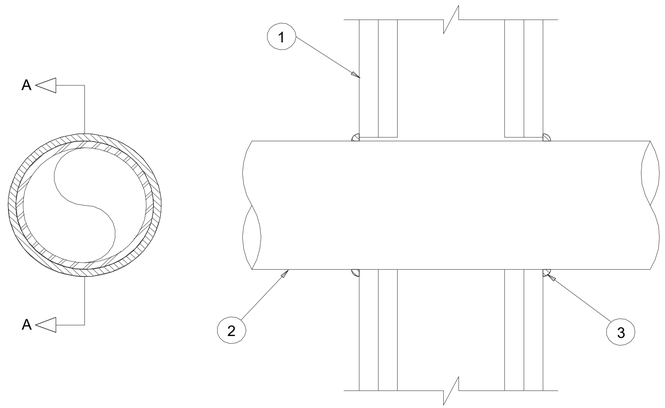
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC ---- CP601S SEALANT, CP604 SEALANT, CP 606 SEALANT, CFS-S SIL GG, CFS-S SIL SL (FLOORS ONLY), FS-ONE SEALANT OR FS-ONE MAX INTUMESCENT SEALANT.

   * INDICATES SUCH PRODUCTS SHALL BEAR THE UL OR CUL CERTIFICATION MARK FOR JURISDICTIONS EMPLOYING THE UL OR CUL CERTIFICATION (SUCH AS CANADA), RESPECTIVELY.

5 - FIRESTOPPING DETAIL @ FIBER

4 - NOT USED

System No. W-L-1304
F Ratings -- 1 and 2 Hr (See Item 1)
T Rating -- 0 Hr
L Rating at Ambient -- Less than 1 CFM/Sq Ft
L Rating at 400° F -- Less than 1 CFM/Sq Ft



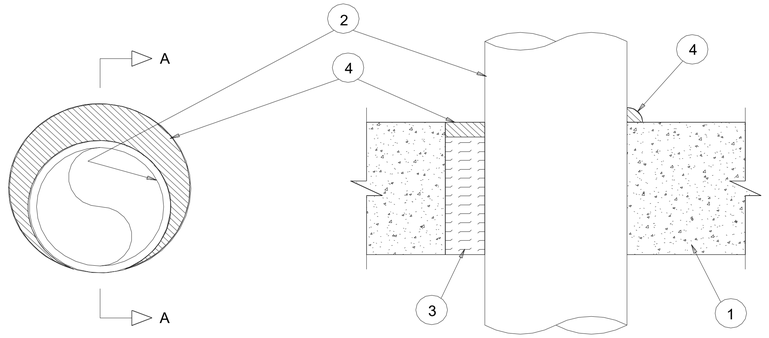
SECTION A-A

1. Wall Assembly -- The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features.
   A. Studs -- Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* -- Nom 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the Fire Resistance Directory. Max diam of opening is 5 in. The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Through Penetrant -- One metallic pipe, conduit or tubing installed concentrically or eccentrically within the firestop system. Pipe, conduit or tube to be rigidly supported on both sides of wall assembly. The annular space between the pipe or tube and periphery of the opening shall be min 0 in (point contact) to max 1/2 in. The following types and sizes of metallic pipes, conduit or tube may be used:
   A. Steel Pipe -- Nom 4 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.
   B. Iron Pipe -- Nom 4 in. diam (or smaller) cast or ductile iron pipe.
   C. Conduit -- Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT) or steel conduit.
3. Fill, Void or Cavity Material* - Sealant -- Min 1/2 in. thickness of fill material (not shown) applied within the annulus, flush with both surfaces of wall. At the point contact location, or when the annulus is 1/8 in. or less, between pipe and wall, a min 1/4 in.diam bead of fill material shall be applied at the pipe/wall interface.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- CP606 Flexible Firestop Sealant
   *Bearing the UL Classification Mark

   ALTERNATIVE: EZ PATH SERIES 22 FIRE RATED PATHWAY 2 HOUR RATED (UL1479) SUBMITTALS PROVIDED BY CONTRACTOR

3 - FIRESTOPPING DETAIL @ STUD WALL

System No. C-AJ-1149
F Rating -- 2 Hr
T Rating -- 0 Hr
L Rating At Ambient -- Less Than 1 CFM/sq ft
L Rating At 400 F -- 4 CFM/sq ft
W Rating -- Class I (See Item 4)



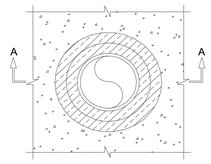
SECTION A-A

1. FLOOR OR WALL ASSEMBLY -- MIN 4-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS *. MAX DIAM OF OPENING IS 12 IN.
   SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
2. THROUGH PENETRANTS -- ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE ANNULAR SPACE SHALL BE 0 IN. (POINT CONTACT) TO MAX 1-1/4 IN. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED.
   A. STEEL PIPE -- NOM 10 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
   B. IRON PIPE -- NOM 10 IN. DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
   C. CONDUIT -- NOM 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR STEEL CONDUIT.
   D. COPPER TUBING -- NOM 4 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
   E. COPPER PIPE -- NOM 4 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
3. PACKING MATERIAL -- MIN 3 IN. THICKNESS OF MIN 4 PCF MINERAL WOOL BATT INSULATION FOR NOM 4 IN. DIAM (AND SMALLER) PIPES, CONDUITS OR TUBING'S AND A MIN 4 IN. THICKNESS OF MIN 4 PCF MINERAL WOOL BATT INSULATION FOR PIPE GREATER THAN NOM 4 IN. DIAM, FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
4. FILL, VOID OR CAVITY MATERIAL* -- SEALANT -- MIN 1/2 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH THE TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL. AT THE POINT OF CONTACT LOCATION BETWEEN PIPE AND CONCRETE, A MIN 1/2 IN. DIAM BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE CONCRETE/PIPE INTERFACE ON THE TOP SURFACE OF FLOOR AND ON BOTH SURFACES OF WALL. W RATING APPLIES ONLY WHEN CP601S OR CP604 SEALANT IS USED.
   HILTI CONSTRUCTION CHEMCALS, DIV OF HILTI INC -- CP601S, CP604, CP606 OR FS-ONE SEALANT
   *BEARING THE UL CLASSIFICATION MARK
   ALTERNATIVE: EZ PATH SERIES 22 FIRE RATED PATHWAY 2 HOUR RATED (UL1479) SUBMITTALS PROVIDED BY CONTRACTOR

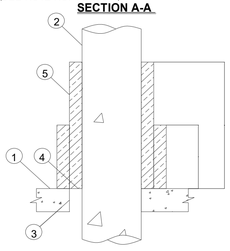
2- FIRESTOPPING DETAIL @ CONCRETE/CMU WALL

UL/cUL SYSTEM NO., F-A-1105
METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY
F-RATING - 2-HR.
T-RATING = 2-HR.
L-RATING AT AMBIENT = LESS THAN 1 CFM / SQ. FT
L-RATING AT 400° = 4 CFM/SQ FT.
W-RATING - CLASS I (SEE NOTE NO. 4 BELOW)

TOP VIEW



SECTION A-A



1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING):
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
   B. STEEL FLOOR UNIT/FLOOR ASSEMBLY (UL/cUL D700, D800, OR D900 SERIES) - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
   A. MAXIMUM 10" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
   B. MAXIMUM 109" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
   C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
   D. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 2" THICKNESS MINERAL WOOL (MINB. 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT, HILTI CFS-S SIL GG FIRESTOP SILICONE SEALANT, OR HILTI CFS-S SIL SL FIRESTOP SILICONE SEALANT (SEE NOTE NO. 3 BELOW)
5. DUCT WRAP (NOMINAL 1-1/2" OR 2" THICK FIREWRAP DUCT INSULATION OR FIREWRAP DUCT 1.5 INSULATION {MANUFACTURED BY THERMAL CERAMICS}) WRAPPED AROUND PENETRANT, EXTENDING 24" ABOVE THE FLOOR(FOR PENETRANTS OF MINIMAL 4' DIAMETER OR SMALLER) OR 36" ABOVE THE FLOOR (FOR PENETRANTS GREATER THAN A NOMINAL 4" DIAMETER). AN ADDITIONAL LAYER OF DUCT WRAP TIGHTLY WRAPPED AROUND THE FIRST LAYER OF DUCT WRAP, EXTENDING 12" ABOVE FLOOR. SEAMS TO OVERLAP MINIMUM 1"

NOTES :
1. 1. MAXIMUM DIAMTER OF OPENING = 12-3/4".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".
3. WHEN HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT, HILTICFS-S SIL GG FIRESTOP SILICONE FIRESTOP SEALANT, OR HILTI CFS-S SILF SL FIRESTOP SILICONE SEALANT IS USED, MINIMUM THICKNESS OF MINERAL WOOL IS 4" AND MINIMUM THICKNESS OF FLOOR IS 4-1/2".
4. W-RATING APPLIES ONLY WHEN HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT, HILTI CFS-S GG FIRESTOP SILICONE FIRESTOP SEALANT, OR HILTI CFS-S SIL SL FIRESTOP SILICONE SEALANT IS USED.

CONTRACTOR IS TO COORDINATE WITH DEN WITH REGARDS TO SCHEDULING THE X-RAYING OF FLOOR. LOCATE REBAR AND TENDONS AND ENSURE THAT THESE ITEMS WILL NOT BE DRILLED INTO, CUT, OR DAMAGED UNDER ANY CIRCUMSTANCES. PATCH AND REPAIR FLOOR AS REQUIRED PER DEN SPECIFICATIONS.

1 - FIRESTOPPING DETAIL @ CONCRETE

ADT Commercial

Revision history

Rev	Date	Author
0	11/18/2023	JD

SHOP DRAWINGS 100%

Project name
OVERHILLS ELEMENTARY - CLASSROOM ADDITION

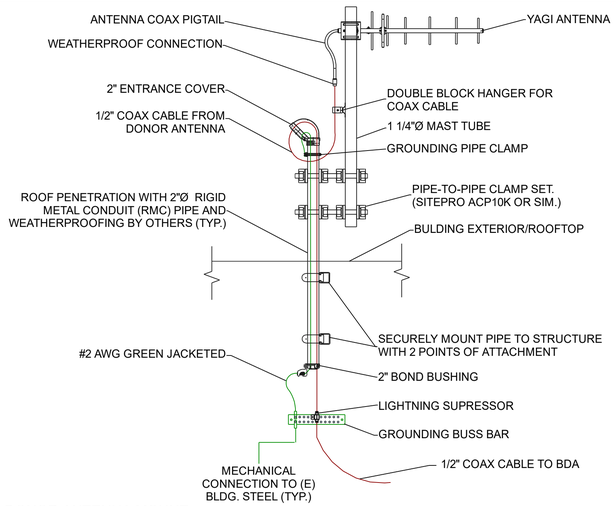
Address
2626 RAY ROAD
SPRING LAKE NC
28390

Designer name
JD

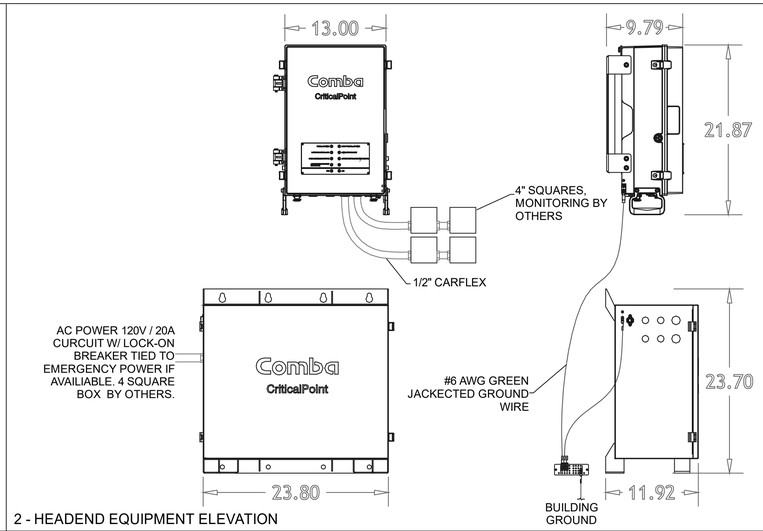
R2.00

FIRE-STOPPING DETAILS

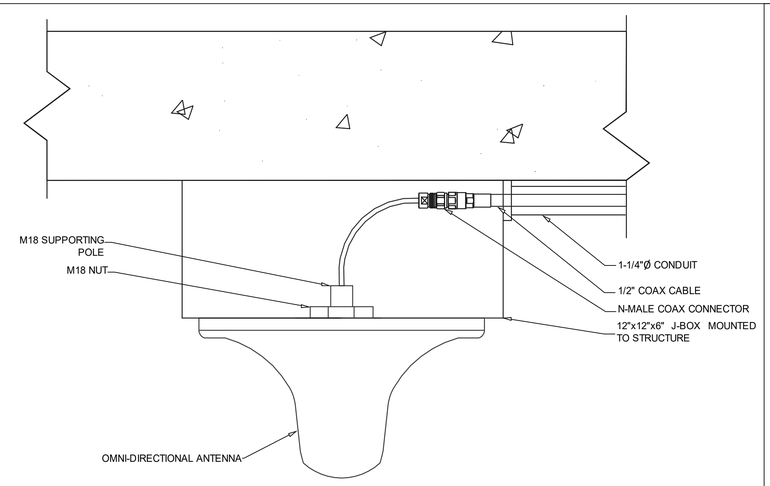
11/18/2023



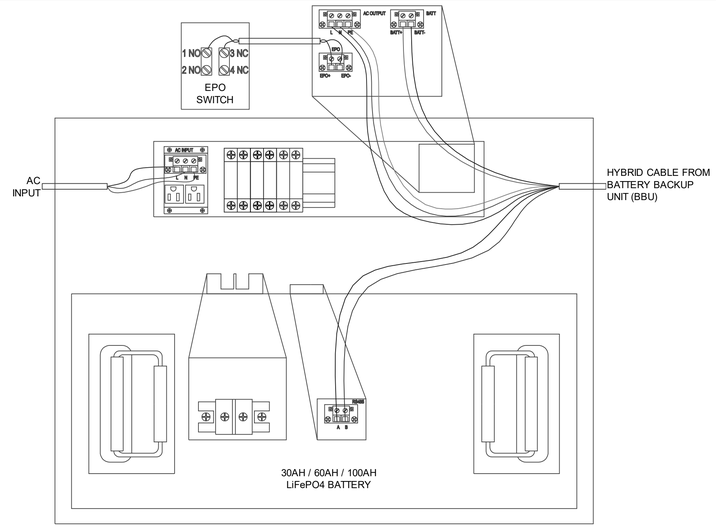
1 - DONOR ANTENNA MOUNT

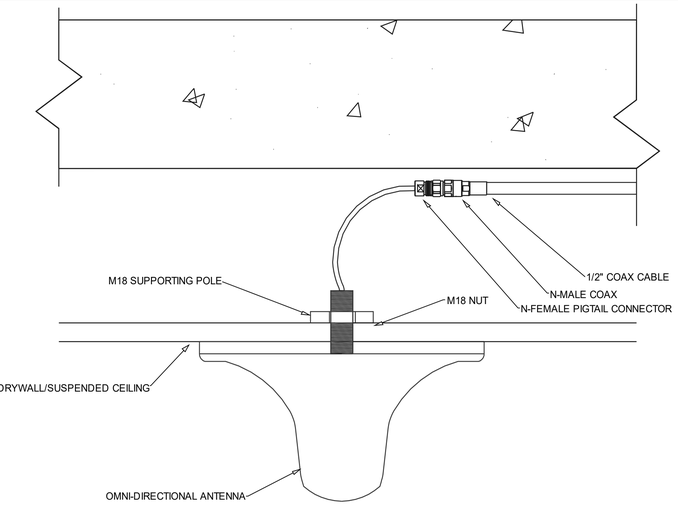


2 - HEADEND EQUIPMENT ELEVATION

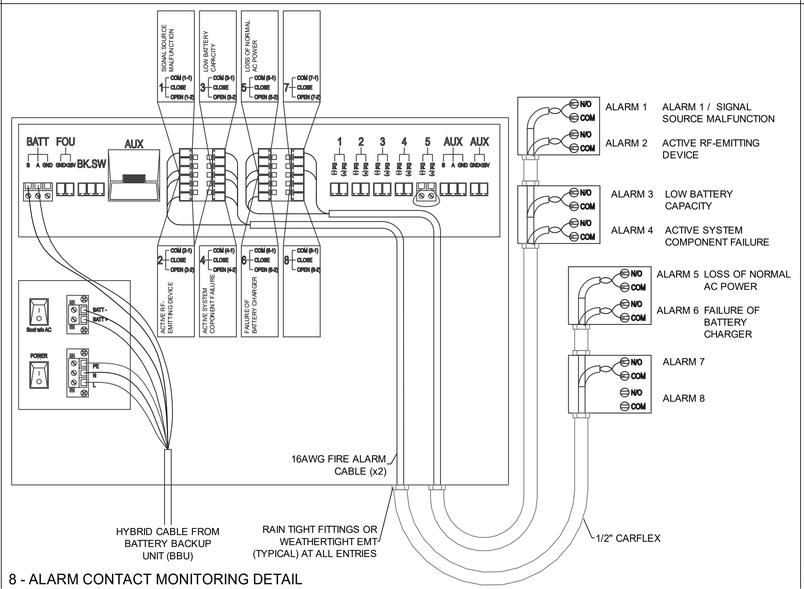


3 - OMNI ANTENNA MOUNTED TO CEILING J-BOX

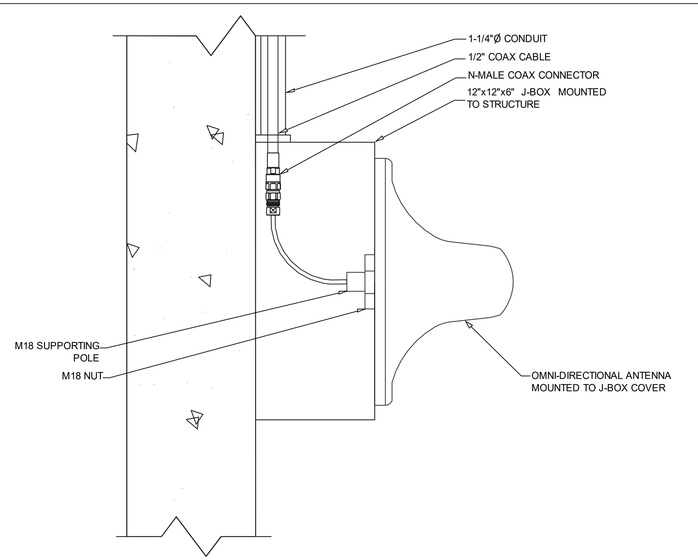




6 - ANTENNA DRYWALL/SUSPENDED CEILING MOUNTING DETAIL



8 - ALARM CONTACT MONITORING DETAIL



9 - OMNI ANTENNA WALL MOUNTED (STAIRWELL ONLY)

ADT Commercial

Revision history

Rev	Date	Author
0	11/18/2023	JD
SHOP DRAWINGS 100%		

Project name

OVERHILLS ELEMENTARY - CLASSROOM ADDITION

Address

2626 RAY ROAD
SPRING LAKE NC
28390

Designer name

JD

R2.01

MOUNTING DETAILS

11/18/2023

4 - NOT USED

3 - GROUNDING NOTES

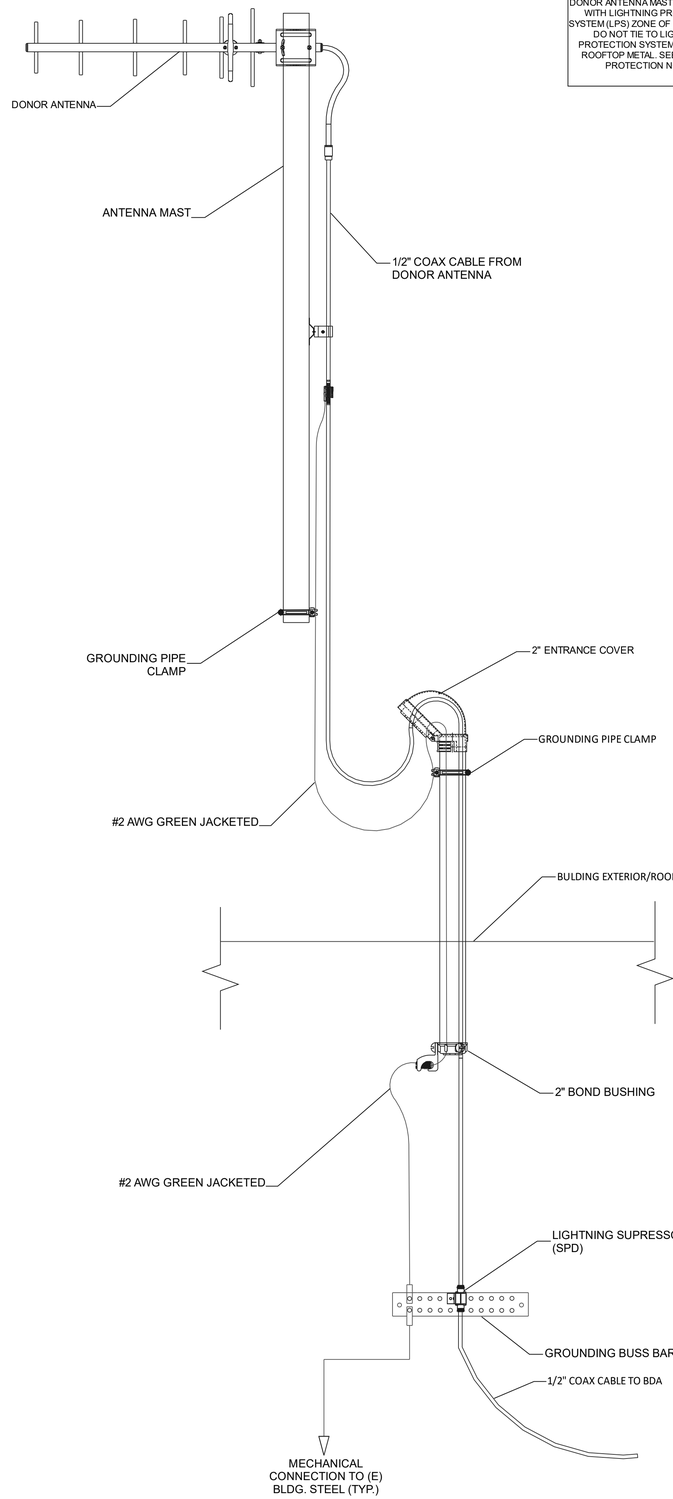
1. REFER TO NFPA 780 STANDARD FOR THE INSTALLATION OF LIGHTNING PROTECTION SYSTEMS (LPS) FOR ALL LPS REQUIREMENTS
2. ERCES DRAWINGS AND SPECIFICATIONS SHOULD BE REVIEWED BY THE LPS CONTRACTOR.
3. WHERE PRACTICABLE SYSTEM COMPONENTS LOCATED ON THE ROOF SHOULD BE INSTALLED IN THE ZONE OF PROTECTION AND ISOLATED FROM THE LPS.
4. WHERE PRACTICABLE SYSTEM COMPONENTS SHOULD NOT BE LOCATED WITHIN 6 FEET OF AN LPS STRIKE TERMINATION DEVICE.
5. IF ANY SYSTEM COMPONENT IS WITHIN 6' OF THE LPS OR OUTSIDE THE ZONE OF PROTECTION AREA THE LPS MAY REQUIRE MODIFICATONS, SUCH AS BONDING AND/OR ADDING A ZONE OF PROTECTION.
6. ANTENNA MASTS SHOULD NOT BE USED AS STRIKE TERMINATION DEVICES.
7. ANY MODIFICATION OR BONDING TO A LPS SYSTEM IS TO BE PERFORMED BY THE LPS CONTRACTOR.
8. SURGE PROTECTION DEVICES (SPD'S) SHALL BE INSTALLED AT THE COAX ENTRANCE INTO THE BUILDING AND SHALL NOT BE GROUNDED THROUGH A DOWN CONDUCTOR OF LPS.
9. ALL ACTIVE DEVICES SHALL BE GROUNDED PURSUANT TO NFPA 780 UNLESS OTHERWISE DIRECTED HEREIN.

2 - LIGHTNING PROTECTION

1. REFER TO MOTOROLA R56 GROUNDING SPECIFICATIONS FOR ALL GROUNDING REQUIREMENTS.
2. BOND AND GROUND ANY PROPOSED STRUCTURAL STEEL, CONCRETE REINFORCING AND OTHER METALLIC BUILDING ELEMENTS, REFER TO MOTOROLA R56 SPECIFICATIONS FOR EXACT REQUIREMENTS.
3. THE ELECTRICAL CONTRACTOR SHALL PERFORM ALL BONDING AND GROUNDING TO THE SITE'S OUTER GROUNDING SYSTEM DURING THE CONSTRUCTION PHASE OF THE BUILDING.
4. CONTRACTOR IS TO CONDUCT FREQUENT INSPECTIONS DURING THE CONSTRUCTION PHASE TO ENSURE THAT ALL GROUNDING ARRANGEMENTS ARE MADE ACCORDING TO THE GROUNDING DESIGN SPECIFICATIONS.
5. DO NOT RETROFIT (OR UPGRADE) ESTABLISHED SITES THAT DO NOT MEET ALL THE REQUIREMENTS OF MOTOROLA R56 GROUNDING STANDARD UNLESS THERE ARE DOCUMENTED OCCURRENCES OF EQUIPMENT DAMAGES AND/OR SERVICE AFFECTING CONDITIONS.
6. USE ONLY MOTOROLA R56-APPROVED MATERIALS SUCH AS COPPER FOR MOST ELECTRICAL WORK AND ALUMINUM FOR CERTAIN APPLICATIONS FOR SITE GROUNDING SYSTEM, ELECTRICAL PROTECTION COMPONENTS AND AC WIRING.
7. USE THE SAME METAL THROUGHOUT THE GROUND SYSTEM WHEN POSSIBLE
8. IF DIFFERENT METALS MUST BE CONNECTED, BOND THEM BY EXOTHERMICALLY WELDING THEM TOGETHER.
9. USE TINNED COPPER WHEN CONNECTING TO GALVANIZED STEEL.
10. DO NOT BOND COPPER AND ALUMINUM TOGETHER UNLESS USING SPECIFICALLY DESIGNED EXOTHERMIC MATERIALS DESIGNED FOR THIS APPLICATION ARE USED OR A BIMETALLIC TRANSITIONAL CONNECTION IS UTILIZED.
11. MAKE ALL BONDING ATTACHMENTS TO CLEAN, UNPAINTED METAL SURFACES OR USE APPROVED PAINT PIERCING WASHERS.
12. PAINTED SURFACES MUST BE SCRAPED, CLEANED, AND LIGHTLY COATED WITH THE APPLICABLE COMPOUND.
13. ALL INDOOR OR OUTDOOR POWER OR GROUNDING CONNECTIONS SHALL BE PROTECTED AGAINST CORROSION BY USE OF A THIN COATING OF ANTI-OXIDATION COMPOUND. A COPPER COSMOLINE GREASE BASED COMPOUND (NO OX-ID) SHALL BE USED ON ALL COPPER TO COPPER CONNECTIONS. A ZINC BASED (GREY COLORED) COMPOUND SHALL BE USED ON ALL COPPER TO STEEL CONNECTIONS. WHERE OTHER COMPOUNDS SUCH AS KOPPER-SHIELD ETC EXIST, THEY MAY BE 'GRANDFATHERED' IN PLACE. PENTROX GREASE OR AN APPROVED EQUAL SHALL BE USED ON ALUMINUM CONNECTIONS.
14. DO NOT WELD GROUNDING CONDUCTORS TO THE STRUCTURAL MEMBERS OF TOWERS, INCLUDING DOWN GUYS AND ANCHOR RODS.
15. BOND ALL METALLIC OBJECTS (SUCH AS WATER PIPES, CONDUITS, METAL FUEL TANKS WITHOUT CATHODIC PROTECTION, METAL FENCES, HVAC, ETC.) THAT ARE WITHIN 6 FEET (1.8 M) OF THE GROUND RING, OR FROM ANY OTHER GROUNDED CONDUCTOR, TO GROUND RING OR TO THE GROUNDED CONDUCTOR HARDWARE
16. ALL OUTDOOR HARDWARE (BOLTS, SCREWS, NUTS, WASHERS) SHALL BE 18-8 STAINLESS STEEL TYPE GRADE. INDOORS, GRADE 5 STEEL HARDWARE MAY BE USED. CHOOSE BOLT LENGTH TO ALLOW THE EXPOSURE OF AT LEAST TWO THREADS.
17. DO NOT WELD GROUNDING CONDUCTORS TO THE STRUCTURAL MEMBERS OF TOWERS, INCLUDING DOWN GUYS AND ANCHOR RODS.
18. BOND ALL METALLIC OBJECTS (SUCH AS WATER PIPES, CONDUITS, METAL FUEL TANKS WITHOUT CATHODIC PROTECTION, METAL FENCES, HVAC, ETC.) THAT ARE WITHIN 6 FEET (1.8 M) OF THE GROUND RING, OR FROM ANY OTHER GROUNDED CONDUCTOR, TO GROUND RING OR TO THE GROUNDED CONDUCTOR HARDWARE
19. ALL OUTDOOR HARDWARE (BOLTS, SCREWS, NUTS, WASHERS) SHALL BE 18-8 STAINLESS STEEL TYPE GRADE. INDOORS, GRADE 5 STEEL HARDWARE MAY BE USED. CHOOSE BOLT LENGTH TO ALLOW THE EXPOSURE OF AT LEAST TWO THREADS.
20. WHEN BONDING TO A METALLIC OBJECT WHERE ACCESS IS LIMITED TO ONLY ONE SURFACE, USE DRILLING & TAPPING OR SELF DRILLING SCREWS. DO NOT USE SHEET METAL SCREWS.
21. ALL GROUNDING CONDUCTORS SHOULD PRESERVE A DOWNWARD TO HORIZONTAL COURSE AND BE AS STRAIGHT AS POSSIBLE AND AVOID SHARP TURNS.
22. DO NOT USE U-SHAPED GROUNDING CONDUCTOR RUNS (U-TURNS IN THE WIRING) OR BONDING LAYOUTS TO REDUCE ARC-OVERS
23. ALL INTERIOR GROUNDING CONDUCTORS MUST BE RUN IN NONMETALLIC CONDUIT. ROUTE ALL CONDUCTORS THROUGH NONMETALLIC SLEEVES WHEN PENETRATING FLOORS, CEILINGS, AND WALLS.
24. IF THE USE OF METALLIC CONDUIT CANNOT BE AVOIDED, BOND BOTH ENDS OF THE CONDUIT TO THE GROUNDING CONDUCTOR BEING ROUTED THROUGH THE CONDUIT
25. KEEP LENGTHS OF CONDUCTORS TO A MINIMUM
26. THE MINIMUM INSIDE BENDING RADIUS IS:
    A. 6 INCHES (0.15M) FOR CONDUCTORS UP TO #6 GAUGE.
    B. 12 INCHES (0.3M) FOR CONDUCTORS #6 TO #4/0 GAUGE.
    C. 24 INCHES (0.6M) FOR CONDUCTORS #4/0 GAUGE AND LARGER.
27. GROUND CONDUCTORS MUST NEVER BE ENCIRCLED WITH FERROUS METAL CLAMPS, PLACED THROUGH METAL WALLS, METAL PLATES, OR SHORT SECTIONS OF METAL CONDUIT, AND MUST NEVER BE PLACE IN THE SAME CABLE RACK AS DC POWER CABLES, HIGH FREQUENCY CABLES, ETC.
28. WHEN ATTACHING PVC CONDUITS TO ANY SURFACE UTILIZE NONCONDUCTIVE FASTENERS OR NONFERROUS FASTENERS ONLY.
29. IF CONNECTIONS BETWEEN ALUMINUM CONDUCTORS AND STEEL OBJECTS MUST BE MADE, TINNED LUGS AND PENTROX SHALL BE USED. WHERE THERE ARE CONCERNS THAT THE PENTROX MAY NOT PROVIDE ADEQUATE INTERFACING, THEN A BIMETAL SPLICE BETWEEN THE ALUMINUM CONDUCTOR AND A SHORT LENGTH OF COPPER CONDUCTOR MAY BE USED.
30. ALL OF THE BONDING AND GROUNDING CONDUCTORS SPECIFIED FOR ROOFTOP CELL AND MICROWAVE SYSTEMS IS BARE WIRE. INSULATED WIRE SHALL NOT BE SPECIFIED OR SUBSTITUTED FOR THE BONDING AND GROUNDING CONDUCTORS OF ROOFTOP INSTALLATIONS.

1 - DONOR ANTENNA GROUNDING DETAIL

NOTE:
GROUNDING DETAIL ASSUMES THE DONOR ANTENNA MAST IS INSTALLED WITH LIGHTNING PROTECTION SYSTEM (LPS) ZONE OF PROTECTION. DO NOT TIE TO LIGHTNING PROTECTION SYSTEM OR OTHER ROOFTOP METAL. SEE LIGHTING PROTECTION NOTES



ADT Commercial

Revision history

Rev	Date	Author
0	11/18/2023	JD
SHOP DRAWINGS 100%		

Project name

OVERHILLS ELEMENTARY - CLASSROOM ADDITION

Address

2626 RAY ROAD
SPRING LAKE NC
28390

Designer name

JD

R2.02

GROUNDING DETAILS

11/18/2023