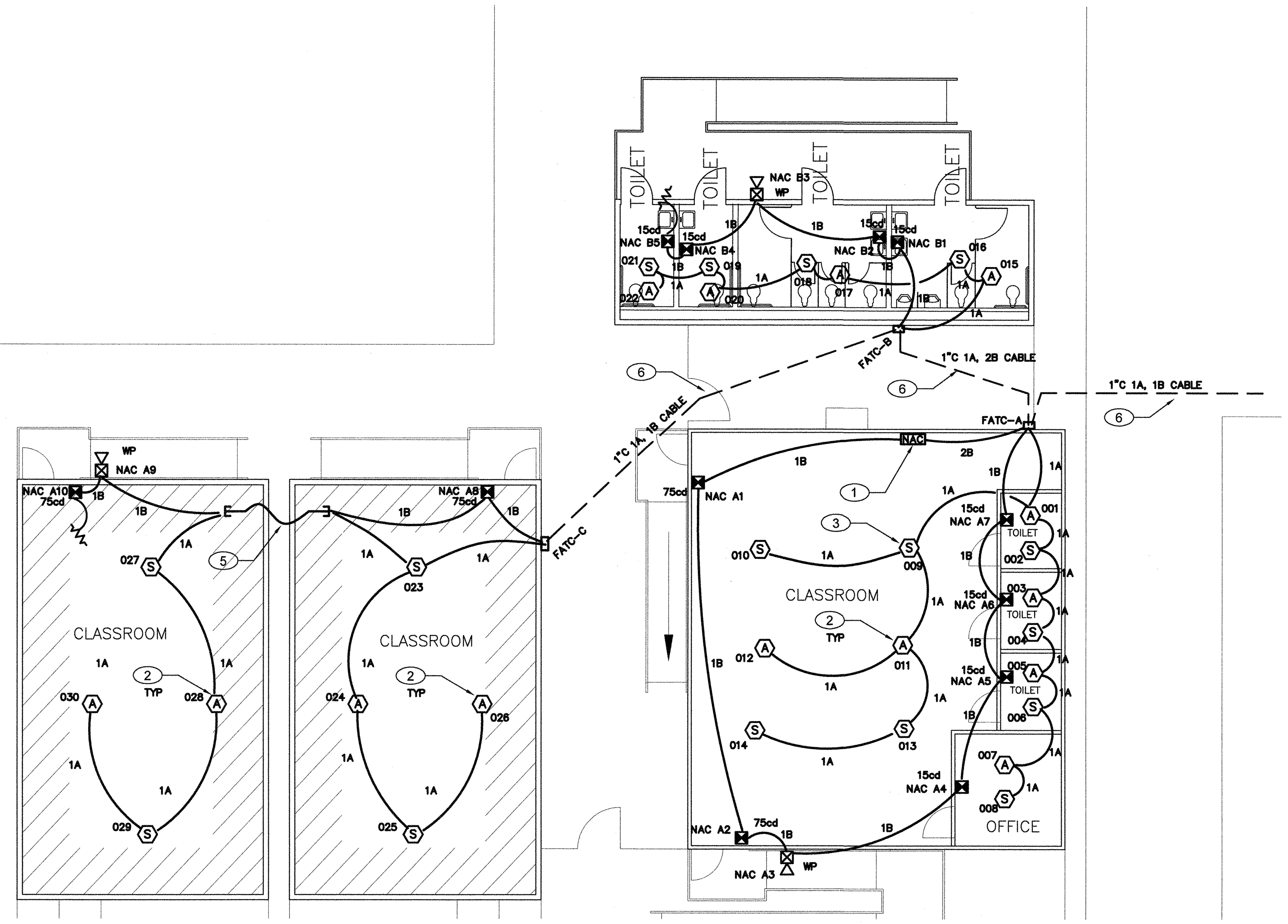


FIRE ALARM PLAN

3 RELOCATABLE CLASSROOMS

SCALE : 1/8" = 1' – 0"

BATTERY POWER CALCULATIONS

EXISTING FIRE ALARM CONTROL PANEL (FACP)

DEVICE	NO. OF DEVICE	CURRENT PER DEVICE STANDBY	CURRENT PER DEVICE LED	STANDBY CURRENT	LED CURRENT
EXISTING	FIELD MEASURE	0.175A	0.5A	0.175A	0.5A
SMOKE DETECTOR	16	0.0003A	0.0065A	0.0048A	0.104A
HEAT DETECTOR	14	0.0003A	0.0065A	0.0042A	0.091A
SUB-TOTAL				0.184A	0.695A

24 HOUR STANDBY CURRENT 4.416AH
15 MINUTE LED CURRENT (0.25 HR) 1.738AH
SUBTOTAL ---------- 6.154AH
20% SAFETY FACTOR ---------------------- 1.231AH
TOTAL NEW AMPS-HRS REQUIRED 7.385AH
REPLACE EXISTING FACP BATTERY WITH NEW (2)12AH BATTERY

BATTERY POWER CALCULATIONS

NEW NAC SIGNAL & AUDIO BOOSTER PANEL

DEVICE	NO. OF DEVICE	CURRENT PER DEVICE STANDBY	CURRENT PER DEVICE ALARM	STANDBY CURRENT	ALARM CURRENT
UNIT	1	0.120A	9A	0.120A	9A
OUTDOOR SPEAKER	3	--	0.050A	--	0.150A
MINI HORN	0	--	0.025A	--	0.000A
VISUAL 15cd	0	--	0.041A	--	0.000A
SPEAKER/STROBE 15cd	8	--	0.071A	--	0.568A
SPEAKER/STROBE 30cd	0	--	0.096A	--	0.000A
SPEAKER/STROBE 75cd	4	--	0.153A	--	0.612A
SPEAKER/STROBE 110cd	0	--	0.195A	--	0.000A
SYNC MODULES	1	--	0.035A	--	0.035A
SUB-TOTAL				0.120A	10.365A

24 HOUR STANDBY CURRENT 2.880AH
15 MINUTE ALARM CURRENT (0.25 HR) 0.961AH
SUBTOTAL ---------- 3.841AH
20% SAFETY FACTOR ---------------------- 0.768AH
TOTAL AMPS-HRS REQUIRED 4.609AH
PROVIDE (2)6AH NEW BATTERY

DURING THE FINAL TESTING, MEASURE EXACT STANDBY AND ALARM CURRENT, VOLTAGE DROP FOR EACH SIGNAL CIRCUITS. SEND OWNER AND ENGINEER ONE COPY RECORD FOR REVIEW, AND PLASTIC LAMINATED ONE COPY INSIDE CABINET DOOR.

FA CABLE SCHEDULE

TYPE	
A	INITIALING CIRCUIT CABLE 2#16 AWG SOLID COPPER PVC JACKET POWER LIMITED FPLR CABLE, FOR INDOOR VIA J-HOOK AND OUTDOOR VIA MIN. 3/4" CONDUIT INSTALLATION. WEST PENN #D990 OR EQUAL. CSFM# 7161-0859:0101
B	NAC SIGNAL CIRCUIT CABLE 2#12 AWG SOLID COPPER PVC JACKET POWER LIMITED FPLR CABLE, FOR INDOOR VIA J-HOOK AND OUTDOOR VIA MIN. 3/4" CONDUIT INSTALLATION. WEST PENN #AQ227 OR EQUAL. CSFM# 7161-0859:0101

SIGNAL CIRCUIT LOAD SUMMARY

	OUTDOOR HORN 0.050A	VISUAL 15cd 0.041A	SPEAKER/STROBE 15cd 0.071A	SPEAKER/STROBE 30cd 0.096A	SPEAKER/STROBE 75cd 0.153A	SPEAKER/STROBE 110cd 0.195A	MINI HORN 90dba 0.025A	SYNC MODULE 0.035A	TOTAL
CKT. #A	2	0	4	0	4	0	0	0	0.970A
CKT. #B	1	0	4	0	0	0	0	0	0.334A

VOLTAGE DROP CALCULATION

WORST CASE VOLTAGE DROP AT THE LAST DEVICE

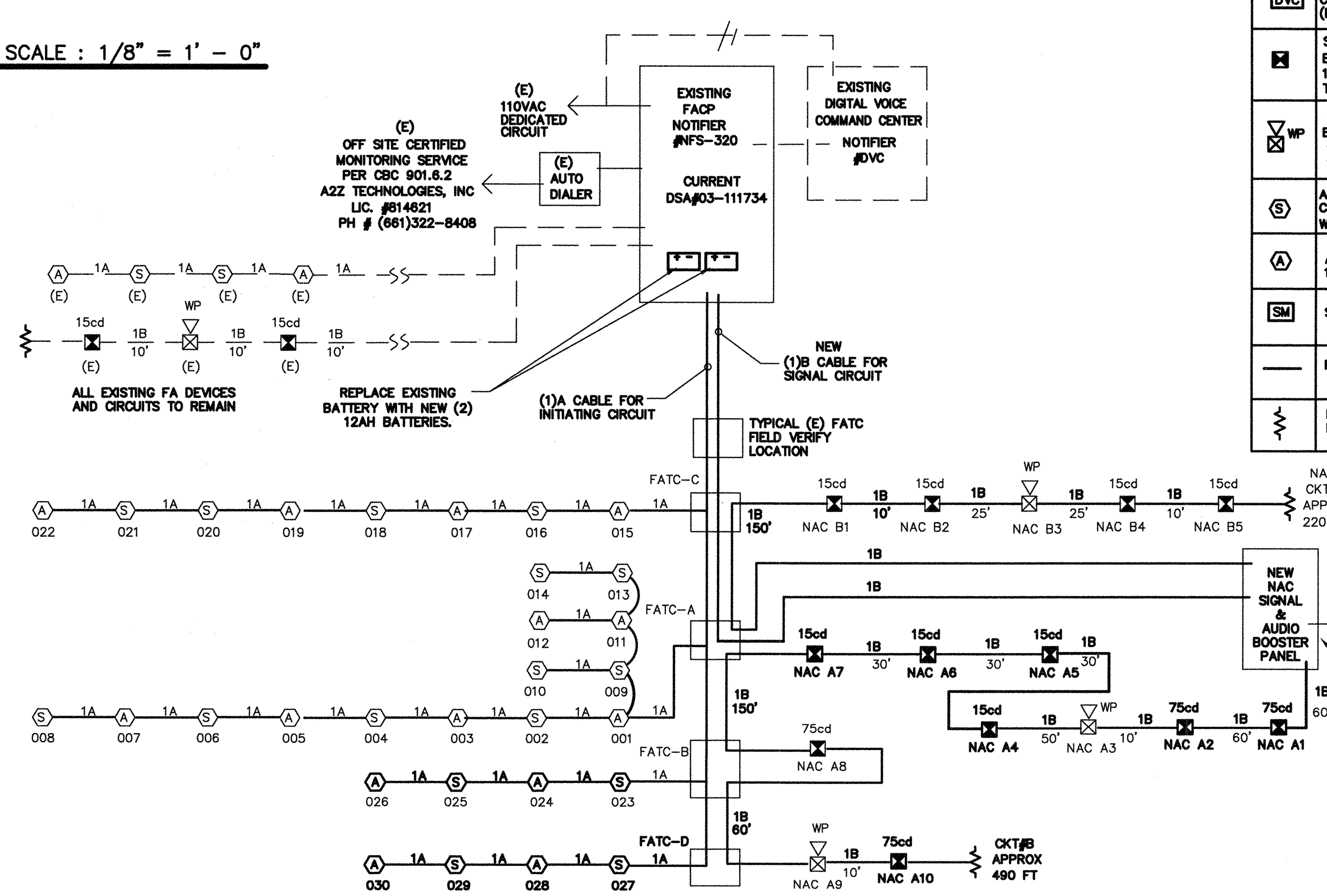
VD = VOLTAGE DROP
I = TOTAL LOAD
K = 21.6
L = DISTANCE TO THE LOAD
CM = CIRCULAR MILLS (CROOS SECTION OF 12 AWG = 6530)
V = VOLTAGE (24vdc)

$$VD = \frac{K * I * 2L}{CM}$$

SIGNAL CKT NO.	AMPERES	APPROX LENGTH	RESISTIVITY OHM	WIRE AWG	AREA CM	VOLTS DROPPED	% VOLTS DROP
CKT. A	0.970A	490'	21.6	12	6530	1.572V	6.6%
CKT. A	0.334A	220'	21.6	12	6530	0.243V	1.0%

FIRE ALARM SYMBOLS AND SCHEDULE

ITEM	DESCRIPTION	MODEL NUMBER	CSFM NUMBER	MOUNT	BACK BOX
FACP	(E) FACP FOR REFERENCE ONLY	NOTIFIER #NFS-320	7165-0028:0243	+60"	EQUIPMENT CABINET
NAC	NAC SIGNAL AND AUDIO BOOSTER PANEL	WHEELOCK #SPB-80/4	6911-0785:0157	+60"	EQUIPMENT CABINET
DVC	EXISTING DIGITAL VOICE COMMAND CENTER INTERCONNECT WITH (E) FACP IN ADMIN OFFICE	NOTIFIER #DVC – EM	7165-0028:0243	+60"	EQUIPMENT CABINET
⊠	SPEAKER STROBE WITH EVACUATION SPEAKER 15cd 30cd 75cd 110cd TEMPORAL CODE 3	NOTIFIER #SPSV WR	7320-1653:0201	+80"	4"SQ X 2 1/2"D
▽⊠ WP	OUTDOOR EVACUATION SPEAKER WITH WEATHERPROOF BOX TEMPORAL CODE 3	NOTIFIER #SPRK MWBB	7320-1653:0201	+90"	4"SQ X 2 1/2"D
(S)	ADDRESSABLE CEILING SMOKE DETECTOR WITH BASE	NOTIFIER #FSP-851/B710P	7272-0028:0206	CEILING	4"SQ X 2 1/2"D
(A)	ATTIC HEAT DETECTOR 190'F TEMP WITH BASE	NOTIFIER #FST-851H/B710P	7270-0028:0196	ATTIC	4"SQ X 2 1/2"D
SM	SYNC MODULE	WHEELOCK #DSM	7300-0785:0132		4"SQ X 2 1/2"D
——	POWER LIMITED CABLE	WEST PENN #AQ SERIES	7161-0859:0101		CONDUIT
⌇	END OF LINE RESISTOR	N/A	N/A	LAST DEVICE	4"SQ X 2 1/2"D

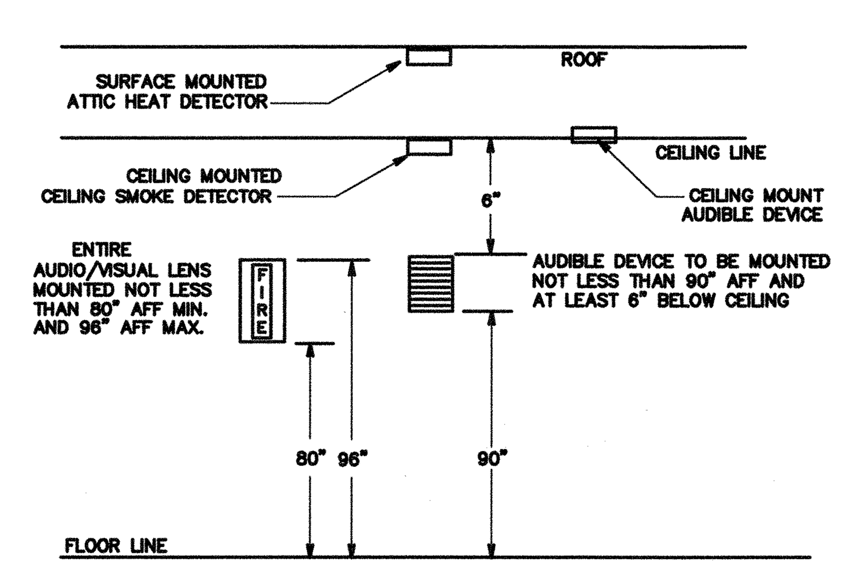


NOTES:

1. RISER DIAGRAM IS DIAGRAMMATIC. SEE FIRE ALARM FLOOR PLAN AND FIELD VERIFY EXACT ROUTING AS REQUIRED.
2. ALL INTERIOR FIRE ALARM CONDUCTORS ARE INSTALLED IN EMT CONDUIT AND CONCEAL ABOVE CEILING OR INSIDE WALL WITH 3/4"C.
3. FIRE ALARM CONDUCTOR CANNOT SPLICE INSIDE PULL BOX. CONDUCTOR MUST BE CONTINUE RUN BETWEEN FIRE ALARM DEVICES BACK BOX OR TERMINAL CABINET.

(1) FIRE ALARM RISER DIAGRAM

N.T.S



(2) TYPICAL FIRE ALARM DEVICES MT'D DETAIL

N.T.S.

F.A. MONITORING NOTES

1. THE AUTOMATIC FIRE ALARM SYSTEMS SHALL TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION AS REQUIRED BY NFPA 72 AND AMENDED EITHER UUFX OR UUJS BY UNDERWRITERS OF FACTORY MUTUAL RESEARCH APPROVAL STANDARD 3011. SUPERVISION OF SYSTEM AND LEASED TELEPHONE LINES SHALL BY ARRANGED BY OWNER.

SHEET NOTES

1. FURNISH AND INSTALL A NEW FIRE ALARM SIGNAL AND AUDIO BOOSTER PANEL AND CONNECT TO (E) FACP PER RISER DIAGRAM. EXISTING DEDICATED CIRCUIT FROM PANEL A-12. UPDATE FIRE ZONE MAP, MEASURE ACTUAL LOAD CURRENT AND VOLTAGE DROP FOR EACH NAC SIGNAL CIRCUITS, AND STANDBY CURRENT AND ALARM CURRENT. SEND THE REPORT TO OWNER AND ENGINEER FOR REVIEW, AND PLASTIC LAMINATED ONE COPY INSIDE CABINET DOOR. SEE FA RISER DIAGRAM FOR DETAIL.
2. LOCATE HEAT DETECTOR IN ATTIC AND SURFACE MOUNT ON THE BOTTOM OF RAFTER. DETECTOR COVERAGE WILL BE DERATED 50% ACROSS THE RAFTER. FIELD VERIFY LOCATION WITH GENERAL CONTRACTOR AND PROVIDE ATTIC HEAT DETECTOR IN EACH BAY OF STRUCTURAL.
3. CEILING SMOKE DETECTOR 5 FEET FROM NAC SIGNAL AND AUDIO BOOSTER PANEL.
4. NEW 4"x4"x4" NEMA3R FATC ON BUILDING EXTERIOR WALL WITH 3/4"C STUB INTO BUILDING ATTIC CAVITY. EXTEND NEW FA CONDUIT AND WIRING TO NEW BUILDINGS PER PLANS.
5. NEW 3/4"C FA FLEX CONDUIT AND WIRING BETWEEN BUILDING ATTIC CAVITY. CORE DRILL AND SEAL EXTERIOR WALL AS REQUIRED.
6. NEW 1"C UNDERGROUND CONDUIT FOR FIRE ALARM WIRING RACEWAY, FIELD VERIFY LOCATION.

F.A SYSTEM SCOPE OF WORK

1. PROVIDE AUTOMATIC FIRE ALARM SYSTEM WITH VOICE EVACUATION SPEAKERS FOR THE NEW CLASSROOM BUILDINGS PER PLANS.
2. EXISTING FACP IS 24VDC ADDRESSABLE, AND CLASS B WIRING SYSTEM. AND WITH OFF SITE MONITORING SERVICE VIA AUTO DUAL LINE DIALER AND TELEPHONE LINES.
3. DURING THE FINAL TESTING, MEASURE ALL FIRE ALARM CURRENTS, VOLTAGE DROP FOR EACH SIGNAL CIRCUITS. SEND OWNER AND ENGINEER ONE COPY RECORD FOR REVIEW, AND PLASTIC LAMINATED ONE COPY INSIDE FACP CABINET DOOR.
4. COMPLETE FIRE ALARM DRAWING SUBMITTAL IS PROVIDED.

FIRE ALARM NOTES

1) APPLICABLE STANDARD 2013 NFPA 72
2) INSTALLATION OF THE SYSTEMS SHALL NOT BE STARTED UNTIL DETAILED DESIGN DOCUMENTS AND SPECIFICATION, INCLUDING STATE FIRE MARSHAL LISTING NUMBERS FOR EACH COMPONENT OF THE SYSTEM HAS BEEN APPROVED BY DSA.
3) COMPLETION OF THE INSTALLATION OF THE SYSTEMS, A SATISFACTORY TEST OF THE ENTIRE SYSTEM SHALL BE MADE IN THE PRESENCE OF A DSA PROJECT INSPECTOR.
4) A STAMPED SET OF APPROVED FIRE ALARM DESIGN DOCUMENTS SHALL BE ON THE JOB SITE AND USED FOR INSTALLATION.
5) ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE CODE OR RECOGNIZED STANDARDS SHALL BE BROUGHT TO THE ATTENTION OF DSA AND THE ARCHITECT/ENGINEER OF THE PROJECT.
6) DSA, ARCHITECT/ENGINEER AND OWNER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR TO THE FINAL INSPECTION AND /OR TESTING.
7) PENETRATIONS THROUGH RATED ASSEMBLIES, REQUIRING OPENING PROTECTION SHALL BE PROVIDED WITH A PENETRATION FIRE STOP SYSTEM AS IDENTIFIED IN CBC CHAPTER 7, UL OR OTHER LAB TESTING CRITERIA. APPROVED TYPE OF MATERIALS SHALL BE IDENTIFIED WITHIN THE SPECIFICATION WITHIN THE FIRE ALARM SECTION.
8) WALL MOUNTED VISUAL NOTIFICATION DEVICES SHALL HAVE THEIR BOTTOMS MOUNTED AT 80" MINIMUM AND 96" MAXIMUM FROM FINISHED FLOOR.
9) WALL MOUNTED AUDIBLE NOTIFICATION DEVICES SHALL HAVE THEIR TOPS MOUNTED AT 90" MINIMUM AND 100" MAXIMUM FROM FINISHED FLOOR AND NO CLOSER THEN 6" TO A HORIZONTAL STRUCTURE.
10) AUDIBLE DEVICES SHALL PROVIDE A SOUND PRESSURE LEVEL OF 15 DECIBELS (Dba) AVOVE THE AVERAGE AMBIENT SOUND LEVEL OR 5 Dba ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEASE 60 SECONDS, WHICHEVER IS GREATER, IN EVERY OCCUPIAVLE SPACE WITHIN THE BUILDING.
11) AUDIBLE DEVICES SHALL BE SYNCHRONIZED TEMPORAL CODE 3 PATTERN.
12) THE CONTRACTOR SHALL ADJUST/INSTALL ALL DEVICES TO MAXIMIZE PERFORMANCE AND TO MINIMIZE FALSE ALARMS.
13) VISUAL DEVICES SHOULD NOT EXCEED 2 FLASHES PER SECOND AND SHOULD NOT BE SLOWER THAN 1 FLASH EVERY SECOND. THE DEVICE SHALL HAVE A PULSING LIGHT SOURCE NOT LESS THAN 15 CANDELLA. VISUAL DEVICES WITHIN 55' FROM EACH OTHER SHALL BE SYNCHRONIZED.
14) UNDERGROUND AND EXTERIOR CONDUITS TO HAVE WATERTIGHT FITTINGS AND WIRE TO BE APPROVAL FOR WET LOCATIONS.
15) ALL FIRE ALARM WIRING SHALL BE FLP OR FPLP (FIRE POWER LIMITED OR FIRE POWER LIMITED PLENUM) AS REQUIRED FOR APPLICATION. WIRING IN CONDUIT ABOVE GROUND MAY BE THHN OR THWN.
16) PER CEC STANDARDS, ALL WIRING IS TO BE PULLED THROUGH EACH JUNCTION BOX AND CONNECTED DIRECTLY TO EACH FIRE DEVICE. DO NOT SPLICE THE WIRE. ALL BOXES TO BE SIZED PER CEC.
17) SMOKE DETECTORS SHALL NOT BE ANY CLOSER THAN 1' FROM FIRE SPRINKLERS OR 3' FROM ANY SUPPLY DIFFUSER. IN AREA OF CONSTRUCTION OR POSSIBLE DAMAGE/CONTAMINATION ON NEWLY INSTALLED FIRE ALARM DEVICES SHALL BE COVERED UNTIL THAT AREA IS READY TO BE TURNED OVER TO THE OWNER.
18) ALL FIRE ALARM CIRCUITS SHALL BE IN CONDUIT, SURFACE RACEWAY OR OPEN RUN ABOVE CEILINGS, UNDER FLOORS AND IN WALLS IN A NEAT AND PROTECTED MANOR AS INDICATED ON DESIGN DOCUMENTS. EXPOSED CIRCUITS ARE ONLY PERMITTED WHEN NOTED AS EXPOSED ON DESIGN DOCUMENTS.
19) FIRE ALARM PANEL, REMOTES, AND COMPONENTS SHALL BE SECURED TO MOUNTING SURFACES PER MANUFACTURERS SPECIFICATIONS. NO SINGLE DEVICE SHALL EXCEED THE WEIGHT OF 20 LBS. WITHOUT SPECIAL MOUNTING DETAILS.
20) A DEDICATED BRANCH CIRCUIT SHALL BE PROVIDED FOR FIRE ALARM EQUIPMENT. THIS CIRCUIT SHALL BE ENERGIZED FROM THE COMMON USE AREA PANEL AND SHALL HAVE NO OTHER OUTLETS. THE BREAKER SHALL HAVE A RED LOCKING DEVICE TO BLOCK THE HANDLE IN THE "ON" POSITION. THE CIRCUIT BREAKER SHALL BE LABELED "FIRE ALARM CIRCUIT CONTROL". CIRCUIT ID TO BE LABELED AT FIRE PANEL/EXTENDERS.
21) THE INSTALLING CONTRACTOR SHALL PROVIDE A RECORD OF COMPLETION PER NFPA 72, FIGURE 10.18.2.1.1.
22) CONTROL PANELS, REMOTE ANNUNCIATORS SHALL BE INSTALLED WITH THEIR BOTTOMS MOUNTED AT 48"
23) THE INSTALLING CONTRACTOR SHALL PROVIDE SYSTEM PROGRAMMING FOR SUPERVISORY MONITORING PER CBC SECTION 901.6.2.
24) SUPERVISORY MONITORING SHALL BE TESTED AND VERIFIED AS SENDING CORRECT SIGNALS IN CONJUNCTION WITH FINAL ACCEPTANCE TEST.
25) OWNER SHALL BE RESPONSIBLE FOR ESTABLISHING A FIRE SYSTEM MONITORING CONTRACT OR PROVISIONS.

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Revision: | Revision Description: | Rev. Date:

Sheet Title: FIRE ALARM PLAN

Project Name & Address: WAYSIDE ELEMENTARY SCHOOL 3 RELOCATABLE CLRM 1 TOILET
BAKERSFIELD CITY SCHOOL DISTRICT
1000 MING AVE., BAKERSFIELD, CA

Issue Date: 00/00/14
Date: 05/27/14
Designer: J CHONG
DR: J CHONG
PC: CJM

Agency Approval Stamp:

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Release: