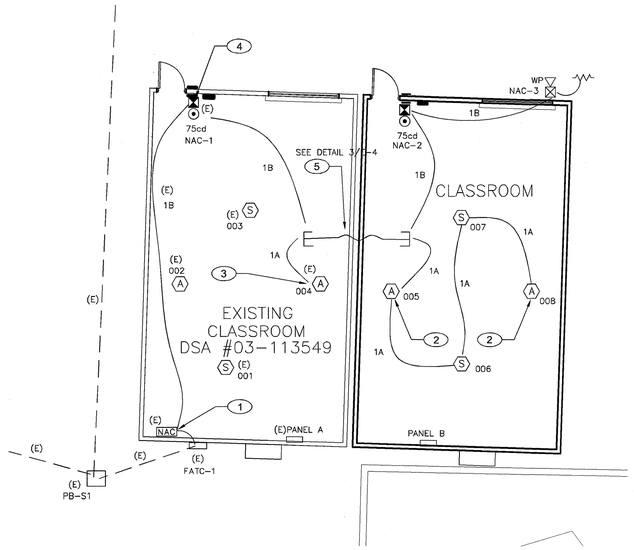
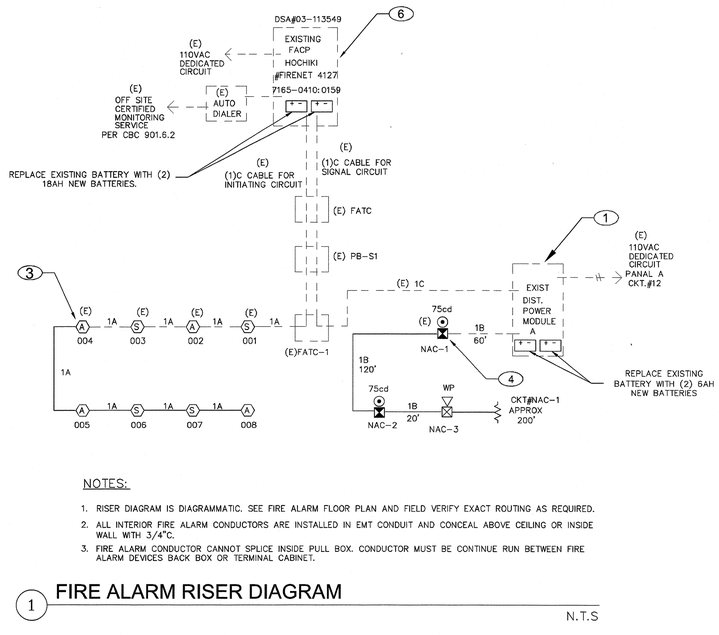


FIRE ALARM PLAN

SCALE : 1/8" = 1' – 0"



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

BATTERY POWER CALCULATIONS

EXISTING MASTER FACP NOTIFIER #NFS2-640
(1) IN EXISTING ADMIN BUILDING

DEVICE	NO. OF DEVICE	CURRENT PER DEVICE STANDBY	CURRENT PER DEVICE ALARM	STANDBY CURRENT	ALARM CURRENT
EXISTING UNIT				0.450A	3.6695A
NEW SMOKE DETECTOR	2	0.0065A	0.0003A	0.013A	0.0006A
NEW HEAT DETECTOR	2	0.0065A	0.0003A	0.013A	0.0006A
SUB-TOTAL				0.476A	3.6707A

24 HOUR STANDBY CURRENT	11.424AH
15 MINUTE ALARM CURRENT (0.25 HR)	0.918AH
SUBTOTAL ----------	12.342AH
20% SAFETY FACTOR ----------	3.468AH
TOTAL AMPS-HRS REQUIRED	15.810AH

REPLACE EXISTING BATTERY WITH NEW (2) 18AH 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.

BATTERY POWER CALCULATIONS

EXISTING NAC SIGNAL BOOSTER PANEL A

DEVICE	NO. OF DEVICE	CURRENT PER DEVICE STANDBY	CURRENT PER DEVICE ALARM	STANDBY CURRENT	ALARM CURRENT
UNIT	1	0.075A	0.175A	0.075A	0.175A
EXISTING OUTDOOR HORN	1	--	0.050A	--	0.150A
NEW OUTDOOR HORN	1	--	0.050A	--	0.150A
VISUAL 15cd	0	--	0.041A	--	0.000A
AUDIO/VISUAL 15cd	0	--	0.093A	--	0.000A
AUDIO/VISUAL 30cd	0	--	0.114A	--	0.000A
EXISTING AUDIO/VISUAL 75cd	3	--	0.157A	--	0.471A
NEW AUDIO/VISUAL 75cd	1	--	0.157A	--	0.157A
SUB-TOTAL				0.075A	0.903A

24 HOUR STANDBY CURRENT	1.800AH
15 MINUTE ALARM CURRENT (0.25 HR)	0.226AH
SUBTOTAL ----------	2.026AH
20% SAFETY FACTOR ----------	0.405AH
TOTAL AMPS-HRS REQUIRED	2.431AH

REPLACE EXISTING BATTERY WITH NEW (2) 6AH 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.

FIRE ALARM SYMBOLS AND SCHEDULE

ITEM	DESCRIPTION	MODEL NUMBER	CSFM NUMBER	MOUNT	BACK BOX
FACP	EXISTING FACP (FOR REFERENCE ONLY)	HOCHIKI #FIRENET 4127	7165-0410:0159	+80"	EQUIPMENT CABINET
NAC	EXISTING SIGNAL BOOSTER PANEL (FOR REFERENCE ONLY)	SILENT KNIGHT #5459	7300-0559:123	+60"	EQUIPMENT CABINET
	HORN STROBE 15cd 30cd 75cd 110cd TAMPORAL CODE 3	WHEELOCK #AS-24MCW-FR	7125-0785:131	+80"	4"SQ X 2 1/2"D
WP	OUTDOOR HORN TAMPORAL CODE 3	WHEELOCK #AH-24WP	7125-0785:131	+80"	4"SQ X 2 1/2"D
S	ADDRESSABLE CEILING SMOKE DETECTOR WITH BASE	HOCHIKI #ALK-V /YBN-NSA-4	7272-0410:173	CEILING	4"SQ X 2 1/2"D
A	ATTIC HEAT DETECTOR 190°F TEMP WITH BASE AND MONITOR MODULE	HOCHIKI #DFE 190°/HSC-XXXL #FRCME-4	7272-0410:119 7300-0410:150	ATTIC	4"SQ X 2 1/2"D
	FIRE ALARM CABLE POWER LIMITED	WEST PENN AQ SERIES	7161-0859:0101		
	END OF LINE RESISTOR	N/A	N/A	LAST DEVICE	4"SQ X 2 1/2"D

FA CABLE SCHEDULE

TYPE	DESCRIPTION
A	INITIALING CIRCUIT CABLE 2#18 AWG SOLID COPPER PVC JACKET POWER LIMITED FPLR CABLE, FOR INDOOR VIA J-HOOK AND OUTDOOR VIA MIN. 3/4" CONDUIT INSTALLATION
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. 1" CONDUIT INSTALLATION
C	INITIALING CIRCUIT CABLE 2#16 AWG SOLID COPPER PVC JACKET POWER LIMITED FPLR CABLE, FOR INDOOR VIA J-HOOK AND OUTDOOR VIA MIN. 1 1/2" CONDUIT INSTALLATION

SIGNAL CIRCUIT LOAD SUMMARY

	OUTDOOR HORN 0.050A	VISUAL 15cd 0.041A	AUDIO/VISUAL 15cd 0.093A	AUDIO/VISUAL 30cd 0.114A	AUDIO/VISUAL 75cd 0.157A	AUDIO/VISUAL 110cd 0.197A	MINI HORN 90dba 0.025A	SYNC MODULE 0.035A	TOTAL AMP
CKT. NAC-1	1	0	0	0	2	0	0	0	0.414A

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	0.414A	200'	21.6	12	6530	0.274V	1.1%

F.A. MONITORING NOTES

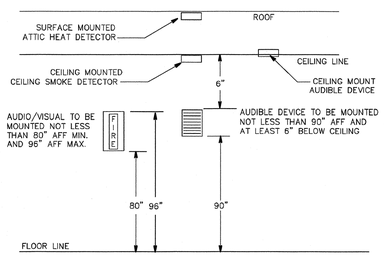
1. THE AUTOMATIC FIRE ALARM SYSTEMS SHALL TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION AS REQUIRED BY NFPA 72 AND AMENDED EITHER UUFX OR UUJS BY UNDERWRITERS OF FACTORY MUTUAL RESEARCH APPROVAL STANDARD 3011. SUPERVISION OF SYSTEM AND LEASED TELEPHONE LINES SHALL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

SEISMIC ANCHORAGE

1. TO COMPLY WITH 2016 CBC, TITLE 24, SECTION #1632A.
2. WHERE ANCHORAGE DETAILS ARE NOT SHOWN ON THE DRAWINGS, THE FIELD INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE ELECTRICAL ENGINEER AND THE FIELD ENGINEER OF THE DIVISION OF THE STATE ARCHITECT.

COMPLETE AUTOMATIC FIRE ALARM PLAN SUBMITTAL

1. THE FIRE ALARM SYSTEM SHOWN ON THESE PLANS HAS BEEN SUBMITTED AND APPROVED BY DIVISION OF THE STATE ARCHITECT. ANY SUBSTITUTION OF THE FIRE ALARM SYSTEM SHALL BE RESUBMITTED TO THE ARCHITECT FOR REVIEW AND APPROVAL. THE CONTRACTOR SHALL PAY ANY ADDITIONAL FEES THAT ARE INCURRED DUE TO THIS SUBSTITUTION.
2. THE AUTOMATIC FIRE ALARM SYSTEM SHALL COVER ALL ROOMS AND AREAS AND UPON ACTIVATION OF AN INITIATING DEVICE ALERT ALL OCCUPANTS AND TRANSMIT THE ALARM, SUPERVISORY, AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION. (EXCEPTION: SMOKE DETECTORS ARE NOT REQUIRED IN NON-ACCESSIBLE AREAS AS DEFINED IN EMERGENCY EXPRESS TERMS OF PROPOSED S.F.M. AMENDMENTS TO 2016 C.F.C. SECTION 210 (C.F.C. SECTIONS 1006.2.4.2.2.1.1 AND 1006.2.4.2.2.1.5)



2 TYPICAL FIRE ALARM DEVICES MT'D DETAIL

N.T.S.

SHEET NOTES

1. EXISTING FIRE ALARM DISTRIBUTED POWER MODULE NAC SIGNAL EXPANDER AND CONNECT TO (E) FACP PER RISER DIAGRAM. PROVIDE CONNECTION FOR NEW FA DEVICES PER PLANS AND UPDATED FIRE ZONE MAP INFORMATION, 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. EXTEND EXISTING FA INITIATING CIRCUIT TO NEW FA DEVICES PER PLANS. FIELD VERIFY LOCATION.
4. EXTEND EXISTING FA NAC SIGNAL CIRCUIT TO NEW FA DEVICES PER PLANS. FIELD VERIFY LOCATION.
5. PROVIDED 3/4" WEATHERPROOF FLEX CONDUIT BETWEEN BUILDING. CORE DRILL AND SEAL EXTERIOR WALL AS REQUIRED.
6. EXISTING FACP IN ADMIN OFFICE. UPDATED FIRE ZONE MAP INFORMATION, 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.

F.A SYSTEM SCOPE OF WORK

1. PROVIDE AUTOMATIC FIRE ALARM SYSTEM 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.
   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.
3. COMPLETE FIRE ALARM DRAWING SUBMITTAL IS PROVIDED.

FIRE ALARM NOTES

1) APPLICABLE STANDARD 2016 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 MATERALS 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.

CONSULTING ENGINEERS
JOHN CHONG ENGINEERING
1849 N HELM AVE #103 FRESNO CA 93727
(559) 325-3388 • FAX 237-3401
jcengineer@aol.com

JOHN S. CHONG
E 14419
Exp.6/30/2018
ELECTRICAL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

integrated designs by SOMAM, Inc.
ARCHITECTURE · ENGINEERING · INTERIOR DESIGN · CONSTRUCTION MANAGEMENT
6011 N. Fresno, Suite 130 - Fresno, California 93710
Phone (559) 436-0881 Fax (559) 436-0887 E-Mail: design@somam.com
www.integrateddesigns.com

Revision:	Revision Description:	Rev. Date:

Sheet Title: FIRE ALARM PLAN

Project Name & Address:
PIONEER ELEMENTRARY
1 RELOCATABLE CLASSROOM
BAKERSFIELD CITY SCHOOL DISTRICT
4404 PIONEER DR., BAKERSFIELD, CA

Issue Date:	Designer:	DR:	PC:
00/00/17	J CHONG	J CHONG	--
Date: 00/00/17			

Agency Approval Stamp:

FILE #: --
IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
OFFICE OF REGULATION SERVICES
03-118271
AC MF FLSS PH SS CL
DATE NOV 14 2018
TRACKING #: DSA TRACKING NO.

Stamp(s):

Job No.: 5289

Sheet No.: E-3

Release: