

(E) FIRE ALARM CONTROL PANEL "F.A.C.P." BATTERY CALCULATION					
DESCRIPTION	QUANTITY	SUPV. CURRENT		ALARM CURRENT	
		EACH	SUB-TOTAL	EACH	SUB-TOTAL
(E) FIRE ALARM CONTROL PANEL	1	0.300	0.300	0.350	0.350
(E) SUPERVISED OUTPUT MODULE	1	0.00022	0.00022	0.006	0.006
(E) ATTIC HEAT DETECTORS	8	0.00035	0.0028	0.00050	0.0040
(E) CEILING MTD. SMOKE DETECTOR	8	0.00045	0.0036	0.00054	0.00432
(E) MONITOR MODULES	2	0.00055	0.0011	0.00066	0.00132
NEW CEILING MTD. SMOKE DETECTOR	7	0.00045	0.00315	0.00054	0.00378
NEW ATTIC HEAT DETECTORS	4	0.00035	0.0014	0.00050	0.0020
TOTALS			0.3123		0.3714

TOTAL ALARM CURRENT OF 0.3714 x 0.250 (15 MINUTES) = 0.093 AH.
 TOTAL SUPERVISORY CURRENT OF 0.3123 x 24 HOURS = 7.495 AH.
 TOTAL AMP HOURS REQUIRED = 7.588 AH.
 x 1.2 SAFETY FACTOR
 9.105 AH.

PANEL HAS 10.0 AMP HOUR BATTERIES

(E) FIRE ALARM POWER EXPANDER PANEL "FAXP-NR" BATTERY CALCULATION					
DESCRIPTION	QUANTITY	SUPV. CURRENT		ALARM CURRENT	
		EACH	SUB-TOTAL	EACH	SUB-TOTAL
(E) FIRE ALARM POWER EXPANDER PANEL	1	0.04	0.04	0.175	0.175
(E) 30cd STROBE/SPEAKER (CEILING)	8	—	—	0.088	0.704
NEW 30cd STROBE/SPEAKER (CEILING)	4	—	—	0.088	0.352
TOTALS			0.04		1.231

TOTAL ALARM CURRENT OF 1.231 x 0.250 (15 MINUTES) = 1.481 AH.
 TOTAL SUPERVISORY CURRENT OF 0.04 x 24 HOURS = 2.160 AH.
 TOTAL AMP HOURS REQUIRED = 3.641 AH.
 x 1.2 SAFETY FACTOR
 4.369 AH.

PANEL HAS 7.0 AMP HOUR BATTERIES

BATTERY CALCULATION NOTES:

(A) THIS IS MAXIMUM VALUE WITH ALL OUTPUTS USED.

(E) FIRE ALARM DIGITAL VOICE PANEL "F.A.D.V." BATTERY CALCULATION					
DESCRIPTION	QUANTITY	SUPV. CURRENT		ALARM CURRENT	
		EACH	SUB-TOTAL	EACH	SUB-TOTAL
(E) FIRE ALARM DIGITAL VOICE PANEL	1	0.186	0.186	0.199	0.199
TOTALS			0.186		0.199

TOTAL ALARM CURRENT OF 0.199 x 0.250 (15 MINUTES) = 0.0498 AH.
 TOTAL SUPERVISORY CURRENT OF 0.186 x 24 HOURS = 4.464 AH.
 TOTAL AMP HOURS REQUIRED = 4.514 AH.
 x 1.2 SAFETY FACTOR
 5.417 AH.

PANEL HAS 7.0 AMP HOUR BATTERIES

(E) FIRE ALARM AMPLIFIER PANEL BATTERY CALCULATION					
DESCRIPTION	QUANTITY	SUPV. CURRENT		ALARM CURRENT	
		EACH	SUB-TOTAL	EACH	SUB-TOTAL
(E) FIRE ALARM AMPLIFIER PANEL	1	0.312	0.312	2.714	2.714
TOTALS			0.312		2.714

TOTAL ALARM CURRENT OF 2.714 x 0.250 (15 MINUTES) = 0.679 AH.
 TOTAL SUPERVISORY CURRENT OF 0.312 x 24 HOURS = 7.488 AH.
 TOTAL AMP HOURS REQUIRED = 8.167 AH.
 x 1.2 SAFETY FACTOR
 9.800 AH.

AMPLIFIER HAS 10.0 AMP HOUR BATTERIES

FIRE ALARM SYSTEM EQUIPMENT SPECIFICATIONS						
SYMBOL	DESCRIPTION	MODEL #	C5FM LISTING #	BACKBOX REQUIREMENTS (B)	MOUNTING HEIGHT (TO CENTER U.O.N.)	
FACP	(E) FIRE ALARM CONTROL PANEL "FACP"	HOCIKI #FN-4121 (4SL)	7165-0410-0191	INCLUDED	+54"	
FEXP	(E) FIRE ALARM NAC POWER EXPANDER	HOCIKI #FN-6424LADA-R	7315-0410-0166	INCLUDED	+54"	
BATT CAB	(E) BATTERY CABINET	HOCIKI #FN-ACC-R	7165-0410-0191	INCLUDED	+54"	
FADV	(E) FIRE ALARM DIGITAL VOICE COMMUNICATIONS CONTROL PANEL	HOCIKI #FN-MP-16-R	6411-0410-0175	INCLUDED	+54"	
AMP	(E) AMPLIFIER (8 CHANNEL)	HOCIKI #FN-DPS-100R	6411-0410-0175	INCLUDED	+54"	
DSM	(E) DUAL SYNC. MODULE	GENTEX #AV544	7125-0564-0123	4" SQ. x 2 1/8" D (B)		
MM	(E) MONITOR MODULE	HOCIKI #FN-ACC-P	7300-0410-0150	4" SQ. x 2 1/8" D (B)		
SOM	(E) SUPERVISED OUTPUT MODULE	HOCIKI #501-A	7300-0410-0150	4" SQ. x 2 1/8" D (B)		
AS	ANALOG ADDRESSABLE PHOTOELECTRONIC SMOKE SENSOR	HOCIKI #ALN-V, #EB-N5A-6 BASE	7212-0410-0204	3 1/2" OCTAGON BOX OR 4" OCTAGON BOX WITH RAISED ROUND COVER (B)	PER DETAIL #2/E2.2	
HD	ATTIC HEAT DETECTOR 180° FIXED AND BASE	HOCIKI #ATJ-EAF, #EB-N5A-6 BASE	7212-0410-0203	3 1/2" OCTAGON BOX OR 4" OCTAGON BOX WITH RAISED ROUND COVER (B)	PER DETAIL #2/E2.2	
SP W.P.	EXTERIOR WEATHERPROOF SPEAKER WALL MOUNTED	GENTEX #W6-PK-R	7320-0564-0141	4" SQ. x 1 1/2" D (B)	(C) (D)	
SP (S)	COMBINATION SPEAKER/30cd STROBE	HOCIKI #W6P-K24-PKR	7320-0410-0194	4" SQ. x 2 1/8" D (B)		
E.O.L.	END OF LINE RESISTOR					
"FA" CABLE	ADDRESSABLE FIRE ALARM CABLE (INDOORS)	WEST PENN #D910	7161-0854-0101			
"SFA" CABLE	ADDRESSABLE FIRE ALARM CABLE (OUTDOORS)	WEST PENN #A225	7161-0854-0101			
"FS" CABLE	FIRE ALARM SPEAKER CABLE (INDOOR/OUTDOORS)	WEST PENN #A225	7161-0854-0101			

NOTES (FIRE ALARM SYSTEM EQUIPMENT SPECIFICATIONS):

- (A) END OF LINE RESISTORS FOR NOTIFICATION APPLIANCE CIRCUITS SHALL BE 39K OHM, 1/2 WATT.
- (B) VERIFY BACKBOX REQUIREMENTS WITH FIRE ALARM SYSTEM EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
- (C) SEE FIRE ALARM PLAN FOR MOUNTING HEIGHT.
- (D) PROVIDED WITH W.P. BACKBOX #6BLP.

RESULT OF OPERATION	TYPE OF INITIATION					
	MANUAL PULL STATION	AREA SMOKE/HEAT DETECTOR (I)	LOSS OF POWER	SHORT CIRCUIT/GROUND FAULT	FIRE SPRINKLER RISER WATER FLOW SWITCH	FIRE SPRINKLER RISER TAMPER SWITCH
ANNUNCIATE ALARM AT FIRE ALARM CONTROL PANEL	YES	YES	—	—	YES	—
ANNUNCIATE TROUBLE AT FIRE ALARM CONTROL PANEL	—	—	YES	YES	—	YES
ACTIVATE ALL AUDIBLE ALARMS	YES	YES	—	—	YES	—
ACTIVATE ALL VISUAL ALARMS	YES	YES	—	—	YES	—
TRANSFER TO BATTERY BACK-UP	—	—	YES	—	—	—
ANNUNCIATE AT 24 HR. ATTENDED LOCATION	YES	YES	YES	—	YES	YES
CENTRAL STATION FOR MONITORING (ALARM)	YES	YES	—	—	—	—
CENTRAL STATION FOR MONITORING (TROUBLE)	—	—	YES	—	—	—
CENTRAL STATION FOR MONITORING (SUPERVISORY)	—	—	—	—	—	YES

SCOPE OF WORK		
1.	PROVIDE A NEW AUTOMATIC FIRE ALARM SYSTEM WITH SUPPLEMENTAL MANUAL FIRE DETECTION.	
2.	PROVIDE A FIRE ALARM CONTROL PANEL, FIRE ALARM POWER EXPANDER PANEL, ADDRESSABLE INITIATION DEVICES, NOTIFICATION APPLIANCES, CONDUIT, CABLING AND CONDUCTORS AS SHOWN ON THE DRAWINGS.	

FIRE ALARM MONITORING NOTE		
AUTOMATIC FIRE ALARM SYSTEMS SHALL TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION IN ACCORDANCE WITH NFPA 72. THE SUPERVISING STATION SHALL BE LISTED AS EITHER ULFC (CENTRAL STATION) OR ULIS (REMOTE AND PROPRIETARY) BY UNDERWRITERS LABORATORY (UL) OR SHALL COMPLY WITH THE REQUIREMENTS OF STANDARD FM 3011. SUPERVISION OF SYSTEM AND LEASED TELEPHONE LINES SHALL BE ARRANGED BY OWNER.		

SCHOOLS FIRE ALARM REQUIREMENTS		
THE FIRE ALARM SYSTEM SHALL CONFORM TO CALIFORNIA BUILDING CODE, SECTION 907.2.3, CALIFORNIA ELECTRICAL CODE, ARTICLE 760 AND CALIFORNIA FIRE CODE, CHAPTER 9, SECTION 907.		
UPON COMPLETION OF THE INSTALLATION OF THE FIRE PROTECTIVE SIGNALING EQUIPMENT, A SATISFACTORY TEST OF THE ENTIRE SYSTEM SHALL BE MADE IN THE PRESENCE OF THE ENFORCING FIRE AGENCY, NFPA 72. IF TESTING RESULTS DETERMINE FIRE ALARM AUDIBILITY DOES NOT MEET 15db OVER AMBIENT NOISE LEVELS, ADDITIONAL FIRE ALARM SIGNALING DEVICES MAY BE REQUIRED BY THE ENFORCING FIRE AGENCY.		
FIRE ALARM SYSTEM CERTIFICATION AND DESCRIPTION SHALL BE PROVIDED FOR TESTING AND A PLASTIC LAMINATED COPY SHALL REMAIN (WITH INSTRUCTIONS) AT THE FIRE ALARM CONTROL PANEL PER NFPA 72.		
THE FIRE ALARM "CERTIFICATE OF COMPLETION" FORM IN NFPA 72 SHALL BE COMPLETED, SIGNED AND SUBMITTED.		

FIRE ALARM LEVEL OF AUDIBILITY		
ALARM INDICATING DEVICES OF A FIRE ALARM SYSTEM INTENDED TO ALERT ALL OCCUPANTS SHALL BE SO LOCATED AND UNOBSTRUCTED AS TO CAUSE A LEVEL OF AUDIBILITY OF NOT LESS THAN 15db ABOVE AMBIENT NOISE LEVELS MEASURED FOUR FEET ABOVE THE FLOOR INSIDE BUILDINGS.		
AMBIENT NOISE LEVELS SHALL BE CONSIDERED TO MEAN THAT WHICH CAN NORMALLY BE EXPECTED TO EXIST WHEN THE FACILITY, BUILDING ROOM OR AREA IS FUNCTIONING UNDER NORMAL OPERATIVE OR WORKING CONDITIONS.		
THE FIRE ALARM SIGNAL SHALL COMPLY WITH THE CALIFORNIA EDUCATION CODE, SECTIONS 32000 AND 32004, AND BE A TEMPORAL PATTERN CODE 3.		

- GENERAL NOTES:**
- SMOKE DETECTORS SHALL BE INSTALLED 3' AWAY FROM SUPPLY AND RETURN AIR REGISTERS.
 - FINAL FIRE ALARM TEST OF ALL DEVICES SHALL BE WITNESSED BY THE PROJECT INSPECTOR. TEST SHALL INCLUDE ALL INFORMATION PER NFPA 72 FIGURE 7.8.2(g) AND READ OUT VERIFICATION FORM FROM CENTER STATION.
 - UNDERGROUND AND EXTERIOR CONDUITS WILL HAVE WATER-TIGHT FITTINGS. (C.E.C. 110.11 AND 300.6)
 - AUDIBLE DEVICES SHALL BE AT LEAST 15 DBA ABOVE AVERAGE AMBIENT SOUND LEVEL BUT NOT LESS THAN 15 DBA AT 10' OR MORE THAN 110 DBA IN TOTAL THROUGHOUT (NFPA 72 10.4.1, C.F.C. 907.5.2(1) AND C.F.C. 907.5.2.1.2).
 - AUDIBLE DEVICES SHALL SOUND THE CALIFORNIA CODE IN TEMPORAL PATTERN, CODE 3. EXCEPT WHEN ISSUING A VOICE MESSAGE.
 - VISUAL DEVICES SHALL NOT EXCEED TWO FLASHES PER SECOND AND SHALL NOT BE SLOWER THAN ONE FLASH PER SECOND (NFPA 72 10.5.3.1).
 - PROVIDE A COPY OF THE REVISED BATTERY CALCULATION AT THE EXISTING FIRE ALARM CONTROL PANEL AND A COPY OF THE REVISED BATTERY CALCULATION AT THE EXISTING FIRE ALARM POWER EXPANDER PANEL. BATTERY CALCULATION SHALL CONTAIN INFORMATION AS NOTED ON SCHEDULES AND BE PLASTIC LAMINATED. MOUNT ONTO INSIDE FACE OF DOOR.
 - MORE THAN TWO VISIBLE NOTIFICATION APPLIANCES OR GROUPS OF SYNCHRONIZED APPLIANCES IN THE SAME ROOM OR ADJACENT SPACE WITHIN THE FIELD OF VIEW SHALL FLASH IN SYNCHRONIZATION. NFPA 72 10.5.5.4.2(3).
 - THE AUTOMATIC ALARM SYSTEM SHALL BE INSTALLED, TESTED AND MAINTAINED IN ACCORDANCE WITH THE STATE FIRE MARSHAL'S REGULATIONS (C.F.C. 907.8).

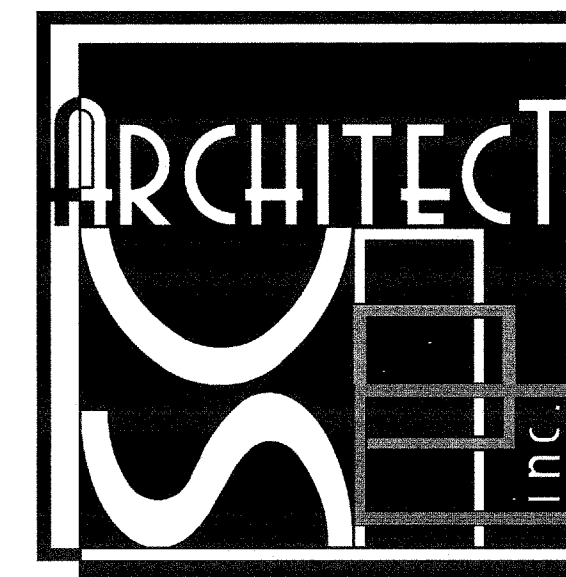
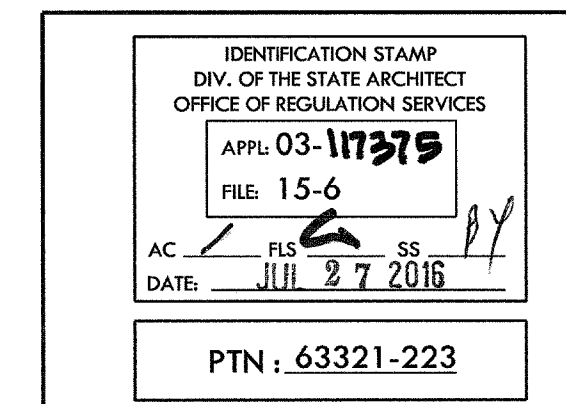
VOLTAGE DROP CALCULATIONS (OHM'S LAW)		
VOLTAGE DROP = 2 (DC RESISTANCE AT 75°C FROM TABLE B, C.E.C.) (LENGTH OF CIRCUIT / 1000) (CURRENT)		
PERCENT VOLTAGE DROP = (VOLTAGE DROP / NOMINAL VOLTAGE) x 100		
1. (E) NOTIFICATION APPLIANCE CIRCUIT "NP2":		
(E) (SP) (30)	: 2 x 0.088A = 0.176A	
(E) (SP) (30)	: 4 x 0.088A = 0.352A	
	0.528A	
VOLTAGE DROP = 2 (1.98) (450 / 1000) (0.528) = 0.941 V.D.		
PERCENT VOLTAGE DROP = (0.941 / 24) x 100 = 3.92%		

COMPLETE AUTOMATIC FIRE ALARM SYSTEM PLAN SUBMITTAL		
THE FIRE ALARM SYSTEM SHOWN ON THESE PLANS HAS BEEN SUBMITTED AND APPROVED BY THE 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.		
THE FIRE ALARM SYSTEM SHALL BE A TOTAL (COMPLETE) AUTOMATIC HEAT AND SMOKE DETECTION SYSTEM, PER C.F.C. SECTION 907.2.3.6, AND SHALL COVER EVERY ROOM AND/OR AREA. UPON THE ACTIVATION OF ANY INITIATION DEVICE THE FIRE ALARM SYSTEM SHALL ALERT ALL OCCUPANTS AND TRANSMIT THE ALARM, SUPERVISORY, AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION (C.F.C. SECTION 907.2.3.5).		

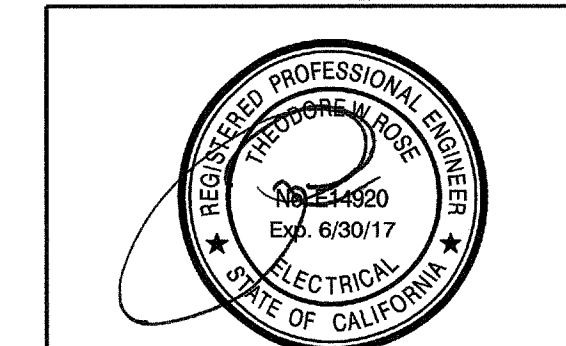
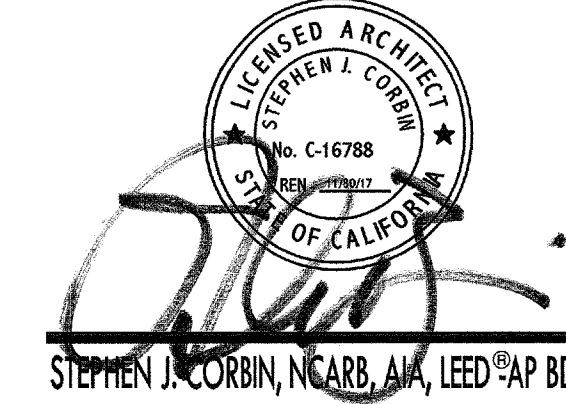
MARK	DATE	REVISIONS

CHECK AND VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT DISCREPANCIES TO THE ARCHITECT. ALL CONSTRUCTION SHALL CONFORM TO THE C.B.C.

SITE IMPROVEMENTS FOR (2) MODULAR CLASSROOMS AT:
HORACE MANN ELEMENTARY SCHOOL
 2770 NILES STREET, BAKERSFIELD, CA, 93306
 FOR
BAKERSFIELD CITY SCHOOL DISTRICT
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FIRE ALARM SYSTEM EQUIP., NOTES AND BATTERY CALCS

JOB NO. 1225
 DRAWN BY: TVW
 CHECKED BY: DS
 DATE: 05-25-16

3.1
 OF SHEETS