

FIRE ALARM CONTROL PANEL "F.A.C.P." BATTERY CALCULATION					
DESCRIPTION	QUANTITY	SUPV. CURRENT		ALARM CURRENT	
		EACH	SUB-TOTAL	EACH	SUB-TOTAL
FIRE ALARM CONTROL PANEL	1	0.300	0.300	0.350	0.350
SUPERVISED OUTPUT MODULE	1	0.00022	0.00022	0.006	0.006
ATTIC HEAD DETECTORS	8	0.00035	0.0028	0.00050	0.0040
CEILING MOUNTED SMOKE DETECTOR	8	0.00045	0.0036	0.00054	0.00432
MONITOR MODULES	2	0.00055	0.0011	0.00066	0.00132
TOTALS			0.308		0.3651

TOTAL ALARM CURRENT OF 0.3651 x 0.250 (15 MINUTES) = 0.0914 A.H.
 TOTAL SUPERVISORY CURRENT OF 0.308 x 24 HOURS = 7.392 A.H.
 TOTAL AMP HOURS REQUIRED = 7.484 A.H.
 x 1.2 SAFETY FACTOR = 8.981 A.H.

PROVIDE 18.0 AMP HOUR BATTERIES

FIRE ALARM POWER EXPANDER PANEL "FAXP-NR" BATTERY CALCULATION					
DESCRIPTION	QUANTITY	SUPV. CURRENT		ALARM CURRENT	
		EACH	SUB-TOTAL	EACH	SUB-TOTAL
FIRE ALARM POWER EXPANDER PANEL	1	0.04	0.04	0.175	0.175
30c/d STROBE/SPEAKER (CEILING)	8	—	—	0.088	0.704
TOTALS			0.04		0.879

TOTAL ALARM CURRENT OF 0.879 x 0.250 (15 MINUTES) = 0.2198 A.H.
 TOTAL SUPERVISORY CURRENT OF 0.04 x 24 HOURS = 0.960 A.H.
 TOTAL AMP HOURS REQUIRED = 2.880 A.H.
 x 1.2 SAFETY FACTOR = 3.456 A.H.

PROVIDE 10 AMP HOUR BATTERIES

FIRE ALARM SYSTEM SEQUENCE OF OPERATIONS						
RESULT OF OPERATION	TYPE OF INITIATION					
	MANUAL FULL 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	—	—	—
(1) SHUTDOWN RESPECTIVE A/C UNIT	—	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

(1) THIS OPERATION SHALL BE ACCOMPLISHED BY UTILIZING THE TOTAL SMOKE COVERAGE SYSTEM TO ACTIVATE THE RESPECTIVE RELAY MODULE. THE CONTACTS SHALL BE PROGRAMMED TO "OPEN" THIS "OPENING" THE H.V.A.C. CONTROL CIRCUIT.

FIRE ALARM DIGITAL VOICE PANEL "F.A.D.V." BATTERY CALCULATION					
DESCRIPTION	QUANTITY	SUPV. CURRENT		ALARM CURRENT	
		EACH	SUB-TOTAL	EACH	SUB-TOTAL
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 A.H.
 TOTAL SUPERVISORY CURRENT OF 0.186 x 24 HOURS = 4.464 A.H.
 TOTAL AMP HOURS REQUIRED = 4.514 A.H.
 x 1.2 SAFETY FACTOR = 5.417 A.H.

PROVIDE 7.0 AMP HOUR BATTERIES

FIRE ALARM AMPLIFIER PANEL BATTERY CALCULATION					
DESCRIPTION	QUANTITY	SUPV. CURRENT		ALARM CURRENT	
		EACH	SUB-TOTAL	EACH	SUB-TOTAL
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 A.H.
 TOTAL SUPERVISORY CURRENT OF 0.312 x 24 HOURS = 7.488 A.H.
 TOTAL AMP HOURS REQUIRED = 8.167 A.H.
 x 1.2 SAFETY FACTOR = 9.800 A.H.

PROVIDE 18.0 AMP HOUR BATTERIES

FIRE ALARM SYSTEM EQUIPMENT SPECIFICATIONS						
SYMBOL	DESCRIPTION	MODEL #	CFM LISTING #	BACKBOX REQUIREMENTS (B)	MOUNTING HEIGHT (TO CENTER 1/2 IN.)	
FACP	FIRE ALARM CONTROL PANEL "FACP"	HOCIKI #FN-4121 (49L.C)	7165-0410-0159	INCLUDED	+54"	
FAXP	FIRE ALARM NAC POWER EXPANDER	HOCIKI #FN-642-ULADA-R	7315-0410-0166	INCLUDED	+54"	
BAT.CAB.	BATTERY CABINET	HOCIKI #FN-ACG-R	7165-0410-0159	INCLUDED	+54"	
FADV	FIRE ALARM DIGITAL VOICE COMMUNICATIONS CONTROL PANEL	HOCIKI #FN-VP-16-R	6911-0410-0175	INCLUDED	+54"	
AMP	AMPLIFIER (8 CHANNEL)	HOCIKI #FN-VP-100R	6911-0410-0175	INCLUDED	+54"	
DSM	DUAL SYNC. MODULE	GENTEX #AV544	7125-0569-0123	4" SQ. x 2 1/8" D (B)	—	
MM	MONITOR MODULE	HOCIKI #FRCH-E-P	7300-0410-0150	4" SQ. x 2 1/8" D (B)	—	
SOM	SUPERVISED OUTPUT MODULE	HOCIKI #50M-A	7300-0410-0150	4" SQ. x 2 1/8" D (B)	—	
ASD	ANALOG ADDRESSABLE PHOTOELECTRONIC SMOKE SENSOR	HOCIKI #AUN-V, HSB-NSA-6 BASE	7272-0410-0204	3.5" OCTAGON BOX OR 4" OCTAGON BOX WITH RAISED ROUND COVER (C)	PER DETAIL #2/E2.2	
AD	ATTIC HEAD DETECTOR 190° FIXED AND BASE	HOCIKI #AT-FAF, HSB-NSA-6 BASE	7272-0410-0203	3.5" OCTAGON BOX OR 4" OCTAGON BOX WITH RAISED ROUND COVER (C)	PER DETAIL #2/E2.2	
SP	EXTERIOR WEATHERPROOF SPEAKER WALL MOUNTED	GENTEX #W65-FK-R	7320-0569-0141	4" SQ. x 1 1/2" D	(D, E)	
SS	COMBINATION SPEAKER/30c/d STROBE	HOCIKI #W65F-K24-PKR	7320-0410-0194	4" SQ. x 2 1/8" D	—	
E.O.L.	END OF LINE RESISTOR	—	—	—	—	
FA	"FA" CABLE ADDRESSABLE FIRE ALARM CABLE (INDOORS)	WEST PENN #D940	7161-0859-0101	—	—	
FA*	"FA*" CABLE ADDRESSABLE FIRE ALARM CABLE (OUTDOORS)	WEST PENN #A0225	7161-0859-0101	—	—	
FS	"FS" CABLE FIRE ALARM SPEAKER CABLE (INDOOR/OUTDOORS)	WEST PENN #A0225	7161-0859-0101	—	—	

NOTES (FIRE ALARM SYSTEM EQUIPMENT SPECIFICATIONS):

- (A) END OF LINE RESISTORS FOR NOTIFICATION APPLIANCE CIRCUITS SHALL BE 3.9K OHM, 1/2 WATT.
- (B) VERIFY BACKBOX REQUIREMENTS WITH FIRE ALARM SYSTEM EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
- (C) END OF LINE RESISTORS FOR CONVENTIONAL DEVICES CONNECTED TO ADDRESSABLE MONITOR MODULE DEVICES AND/OR ADDRESSABLE CONTROL MODULES SHALL BE 3.9K OHM, 1/2 WATT.
- (D) SEE FIRE ALARM PLAN FOR MOUNTING HEIGHT.
- (E) PROVIDED WITH W.P. BACKBOX #6BLP.

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, CABLES AND CONDUCTORS AS SHOWN ON THE DRAWINGS.	

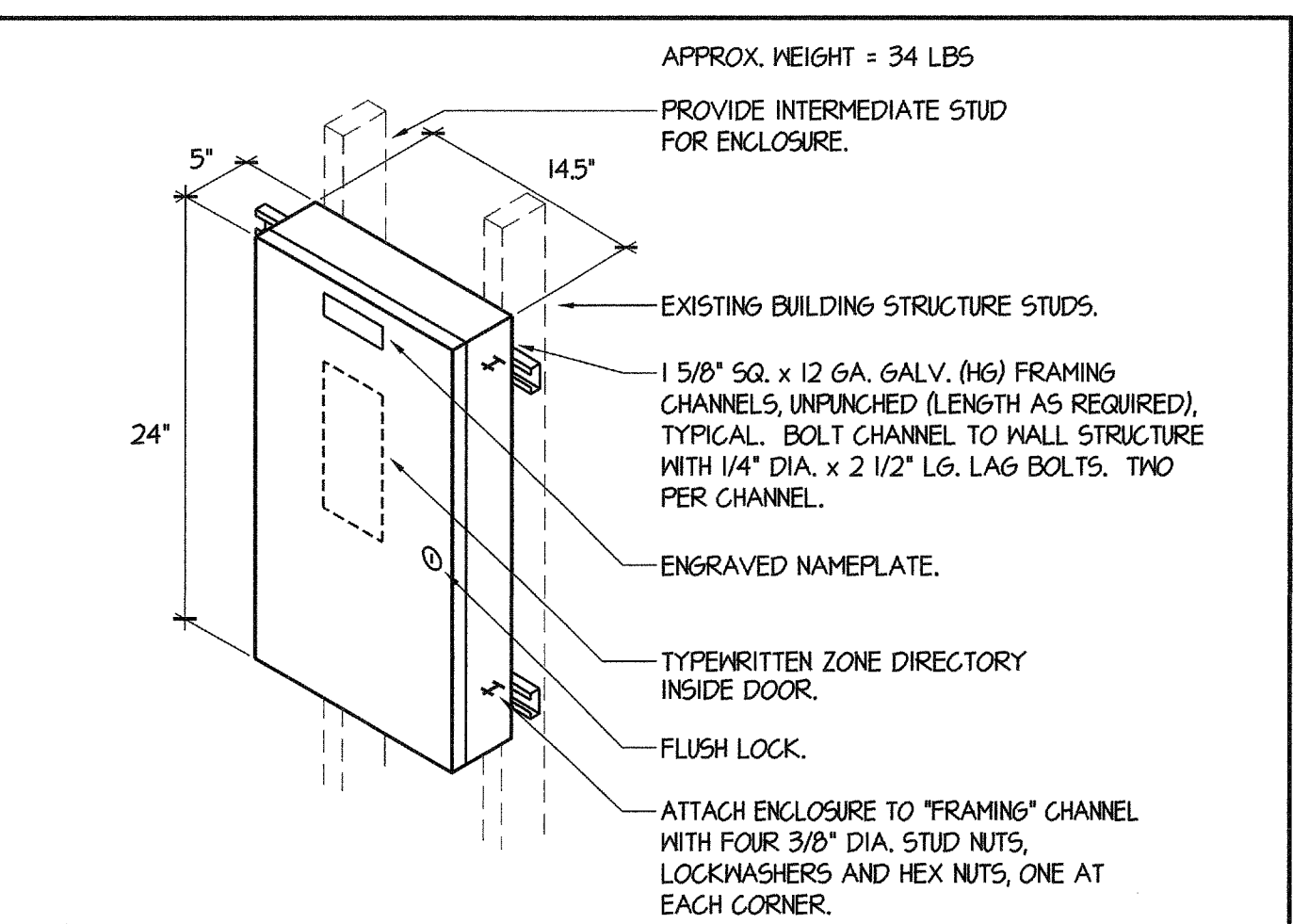
FIRE ALARM MONITORING NOTE
 AUTOMATIC FIRE ALARM SYSTEMS SHALL TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION IN ACCORDANCE WITH NFPA 72. THE SUPERVISING STATION SHALL BE LISTED AS EITHER IULX (CENTRAL STATION) OR IULS (REMOTE) BY UNDERWRITERS LABORATORY (UL) OR SHALL COMPLY WITH THE REQUIREMENTS OF STANDARD FM 300. 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 160 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.

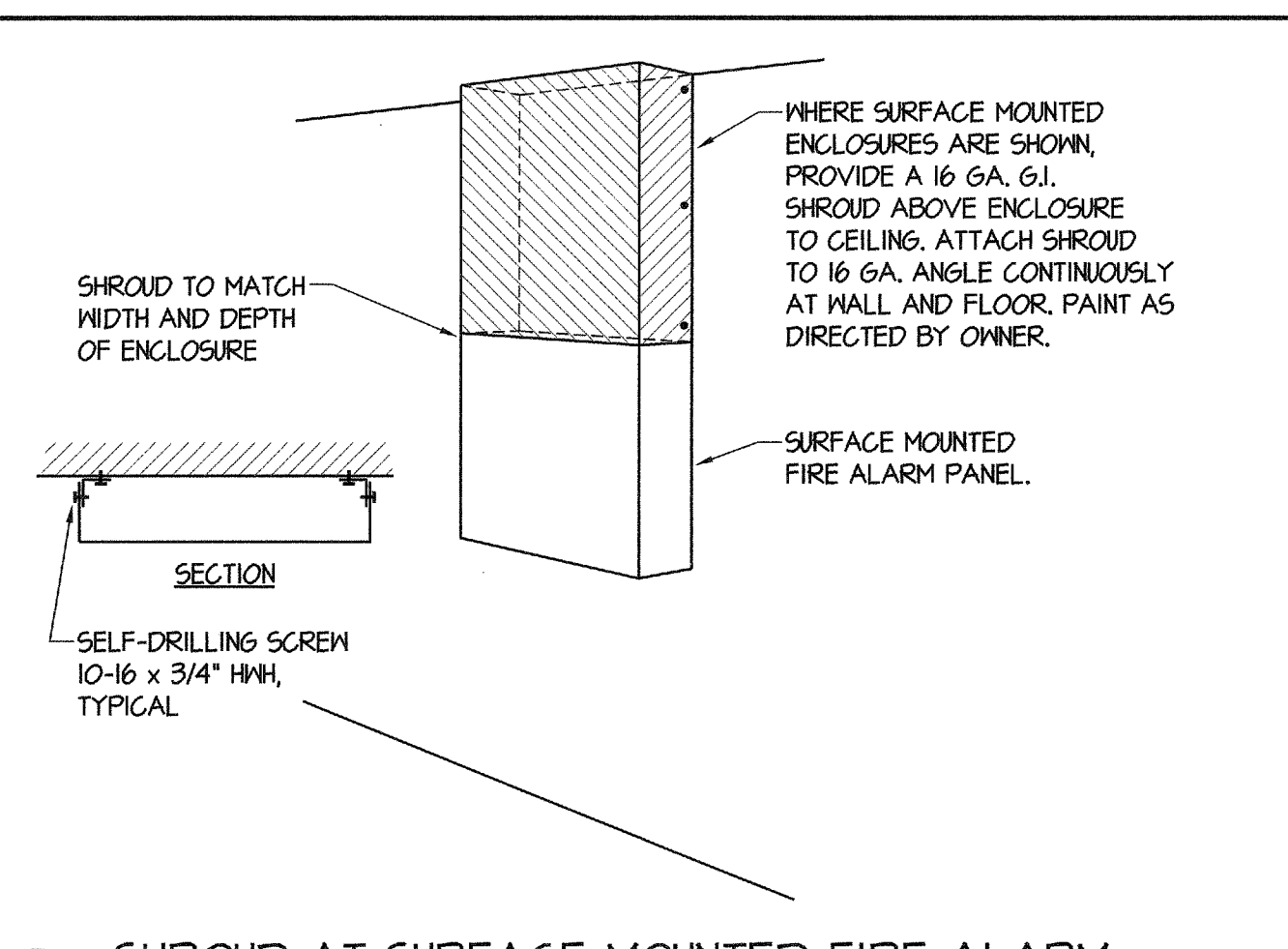
FIRE ALARM LEVEL OF AUDIBILITY
 ALARM INDICATING DEVICES OF A FIRE ALARM SYSTEM INTENDED TO ALERT ALL OCCUPANTS SHALL BE SO LOCATED AND UNOBSTRUCTED AS TO CAUSE A LEVEL OF AUDIBILITY OF NOT LESS THAN 15db ABOVE AMBIENT NOISE LEVELS MEASURED FOUR FEET ABOVE THE FLOOR INSIDE BUILDING.
 AMBIENT NOISE LEVELS SHALL BE CONSTRUED 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:

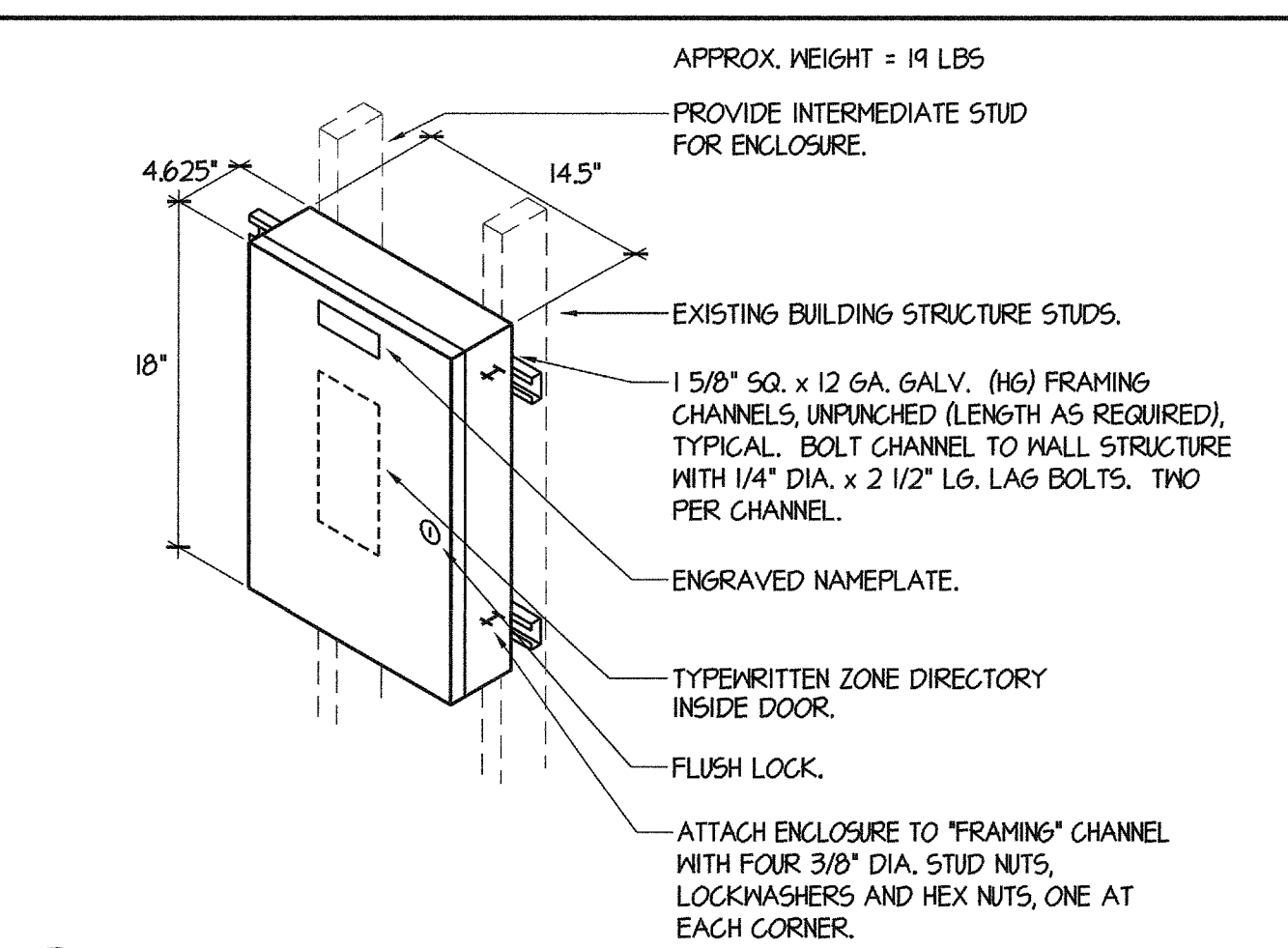
- SMOKE DETECTORS SHALL BE INSTALLED 3' AWAY FROM SUPPLY AND RETURN AIR REGISTERS.
- FINAL FIRE ALARM TEST OF ALL DEVICES SHALL BE WITNESSED BY THE PROJECT INSPECTOR. TEST SHALL INCLUDE ALL INFORMATION PER NFPA 72 FIGURE 18.2(g) AND READ OUT VERIFICATION FORM FROM CENTER STATION.
- UNDERGROUND AND EXTERIOR CONDUITS WILL HAVE WATER-TIGHT FITTINGS. (E.G., 1011 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 18.4.1, 6.7.6, 407.5.2.11 AND 6.7.6, 407.5.2.12)
- 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 18.5.3.1).
- PROVIDE AN ENGRAVED NAMEPLATE INDICATING THE D.S.A. APPLICATION NUMBER, FILE NUMBER AND DATE OF APPROVAL AT NEW FIRE ALARM CONTROL PANEL AND AT NEW FIRE ALARM POWER EXPANDER PANEL.
 - THE PRIMARY POWER SUPPLY TO THE NEW FIRE ALARM CONTROL PANEL "F.A.C.P." AND THE NEW FIRE ALARM POWER EXPANDER PANEL "F.E.P." SHALL BE IN ACCORDANCE WITH NFPA 72 10.6.5.1, 10.6.5.2 AND AS FOLLOWS:
 - THE CIRCUIT BREAKER FEEDING THE RESPECTIVE PANEL SHALL BE LOCATED IN A LOCKED ROOM OR BEHIND A LOCKABLE DOOR AND BE READILY ACCESSIBLE TO AUTHORIZED PERSONNEL ONLY. PAINT HANDLE RED IN COLOR.
 - THE CIRCUIT BREAKER SHALL BE EQUIPPED WITH A LOCK-ON ACCESSORY. PAINT ACCESSORY RED IN COLOR.
 - THE CIRCUIT BREAKER SHALL HAVE AN ENGRAVED NAMEPLATE THAT IDENTIFIES IT AS A "FIRE ALARM CIRCUIT". THIS ENGRAVED NAMEPLATE SHALL HAVE WHITE LETTERS ON A RED BACKGROUND. MOUNT ONTO THE INTERIOR TRIM AND LOCATE ADJACENT TO CIRCUIT BREAKER WHERE POSSIBLE.
 - THE LOCATION OF THE CIRCUIT DISCONNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED AT THE FIRE ALARM CONTROL PANEL "F.A.C.P." AND AT THE FIRE ALARM POWER EXPANDER PANEL "F.E.P." PROVIDE AN ENGRAVED NAMEPLATE (WHITE LETTERS ON A RED BACKGROUND)
 - ALL ENGRAVED NAMEPLATES SHALL BE ATTACHED TO THE FRONT OF THE RESPECTIVE ENCLOSURE WITH SCREWS OR RIVETS.
- PROVIDE A COPY OF THE BATTERY CALCULATION AT THE NEW FIRE ALARM CONTROL PANEL AND A COPY OF THE BATTERY CALCULATION AT NEW 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 18.5.5.4.2(b).
- THE AUTOMATIC ALARM SYSTEM SHALL BE INSTALLED, TESTED AND MAINTAINED IN ACCORDANCE WITH THE STATE FIRE MARSHAL'S REGULATIONS (C.F.C. 907.8).



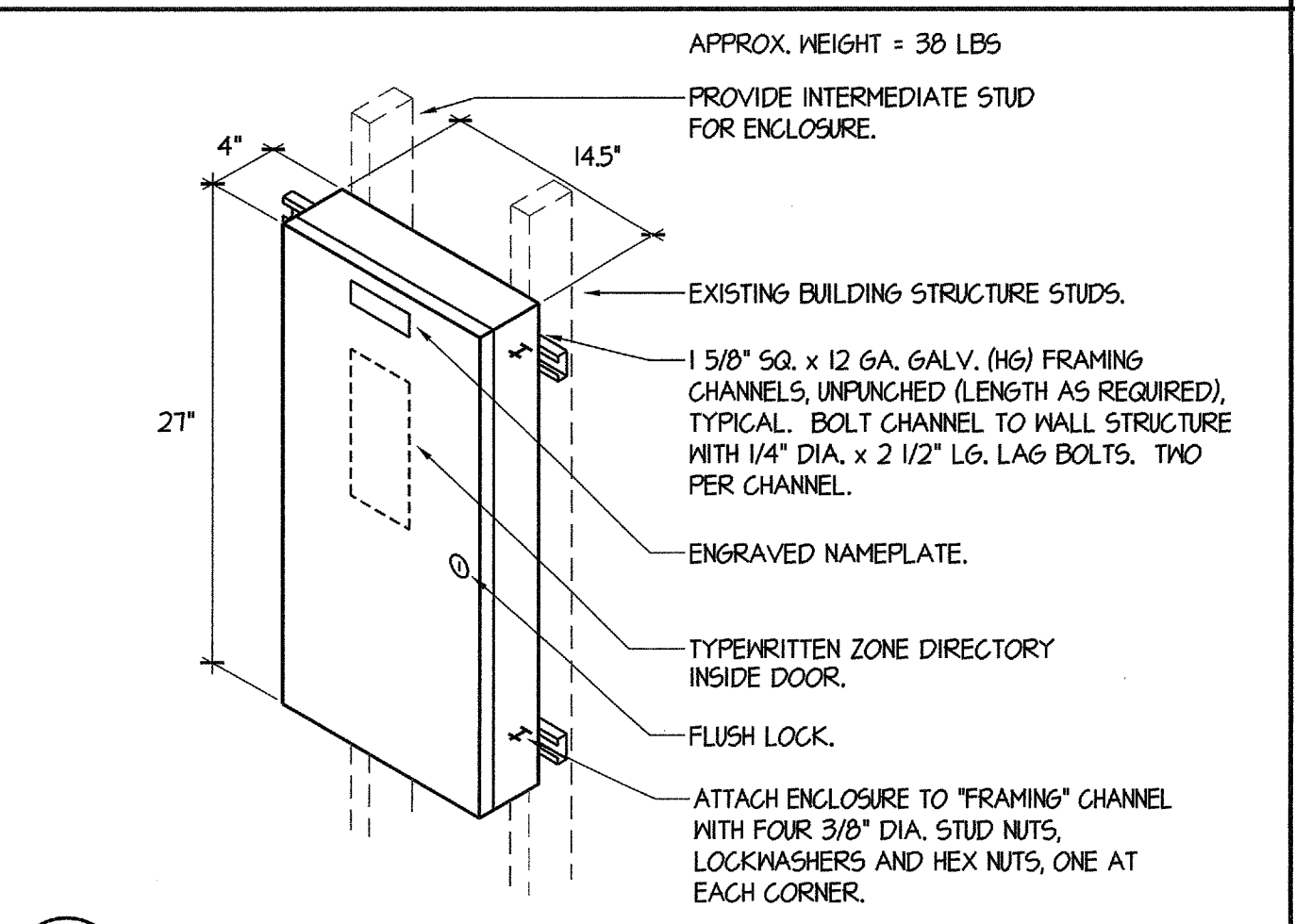
1 FIRE ALARM CONTROL PANEL MOUNTING NTS



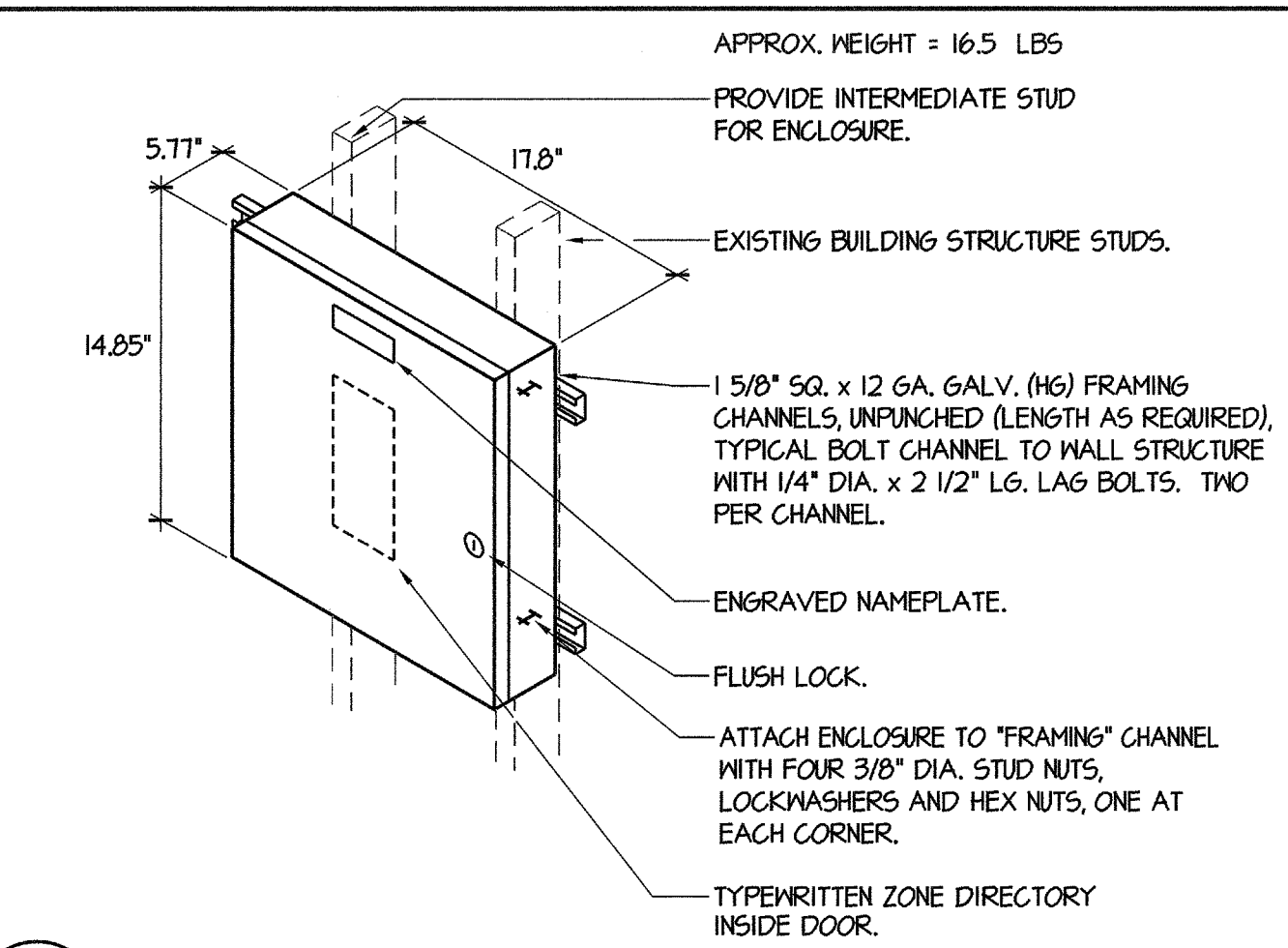
2 SHROUD AT SURFACE MOUNTED FIRE ALARM EXPANDER AND SURFACE MOUNTED AMPLIFIER (FOR ENCLOSING OF EXPOSED CONDUITS) NTS



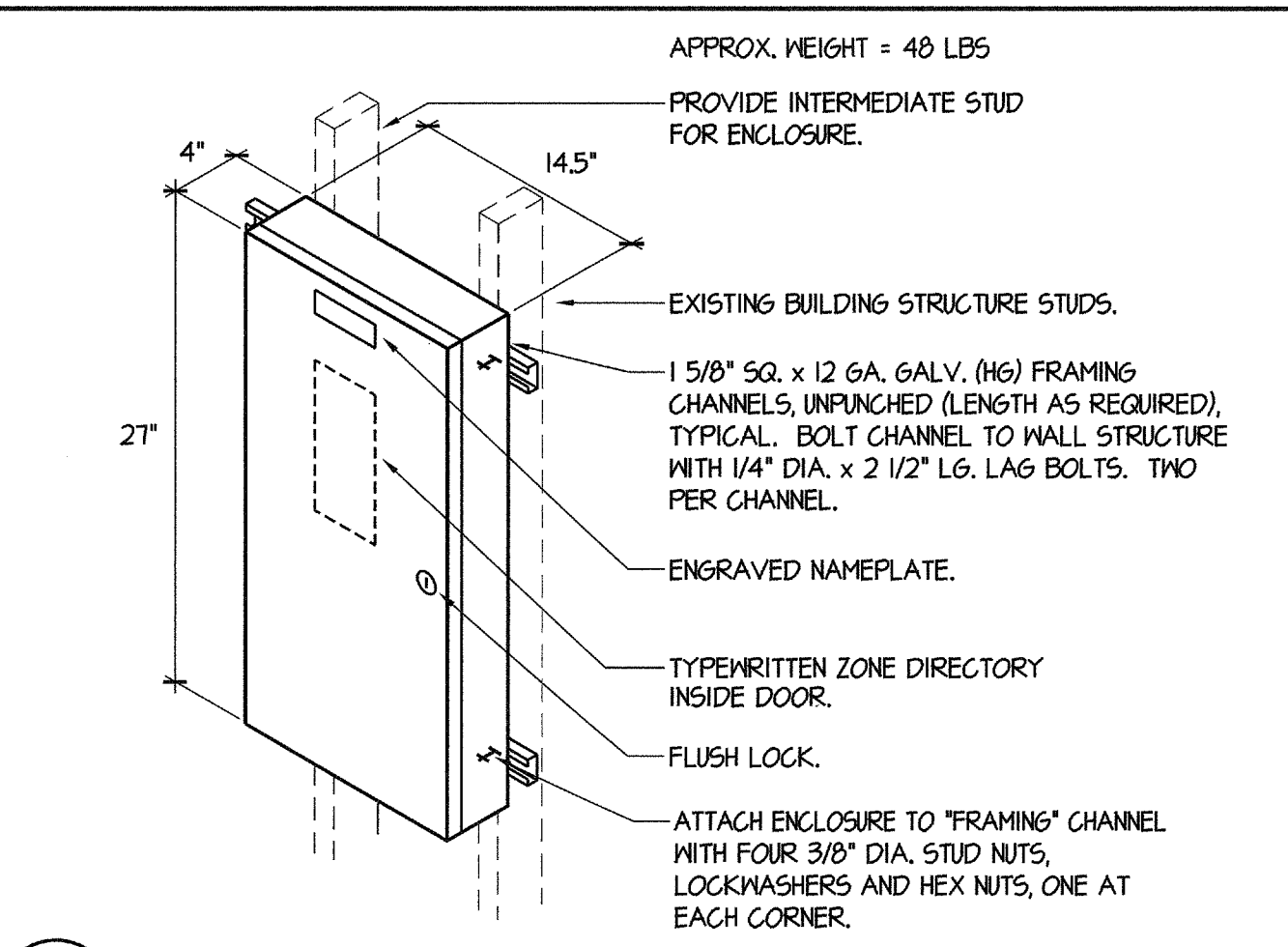
3 FIRE ALARM POWER EXPANDER PANEL MOUNTING NTS



4 FIRE ALARM DIGITAL VOICE PANEL MOUNTING NTS



5 FIRE ALARM BATTERY CABINET MOUNTING NTS



6 FIRE ALARM AMPLIFIER PANEL MOUNTING NTS

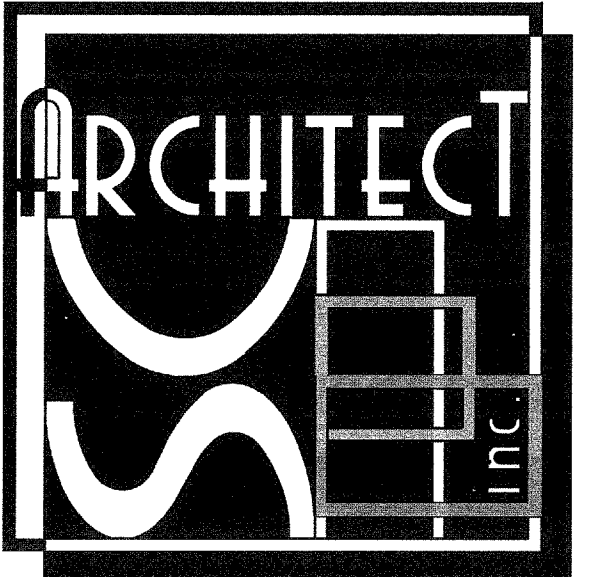
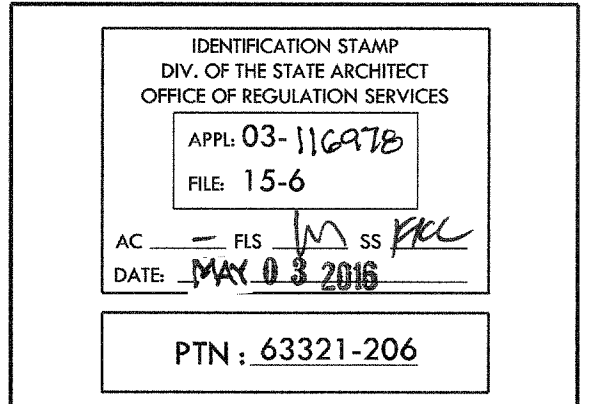
VOLTAGE DROP CALCULATIONS (OHM'S LAW)	
VOLTAGE DROP = 2 (DC RESISTANCE AT 75°C FROM TABLE B1 C.E.C.) (LENGTH OF CIRCUIT / 1000) (CURRENT)	
PERCENT VOLTAGE DROP = (VOLTAGE DROP / NOMINAL VOLTAGE) x 100	
1. NOTIFICATION APPLIANCE CIRCUIT "N1":	
(S) : 6 x 0.088A = 0.528A	
(S) : VOLTAGE DROP = 2 (1.98) (230 / 1000) (0.528) = 0.481 V.D.	
(S) : PERCENT VOLTAGE DROP = (0.481 / 24) x 100 = 2.00%	
2. NOTIFICATION APPLIANCE CIRCUIT "N2":	
(S) : 2 x 0.088A = 0.176A	
(S) : VOLTAGE DROP = 2 (1.98) (285 / 1000) (0.176) = 0.199 V.D.	
(S) : PERCENT VOLTAGE DROP = (0.199 / 24) x 100 = 0.83%	

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).

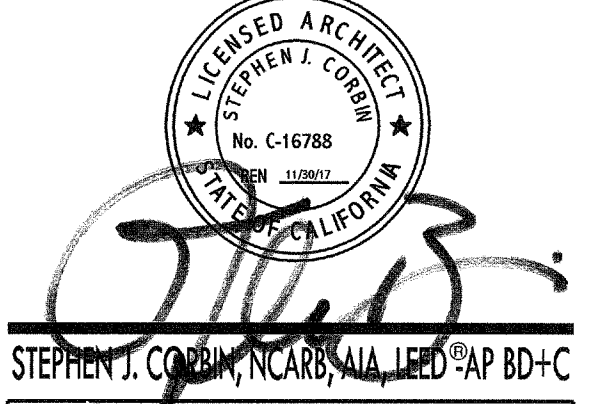
MARK	DATE	REVISIONS

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

HORACE MANN ELEMENTARY SCHOOL
SITE IMPROVEMENTS FOR (4) MODULAR CLASSROOMS
 2710 NILES STREET
 FOR
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FIRE ALARM SYSTEM EQUIP., NOTES AND BATTERY CALCS

JOB NO. 1218
 DRAWN: CS
 CHECKED: DS
 DATE: 04-26-16
3.1
 OF SHEETS