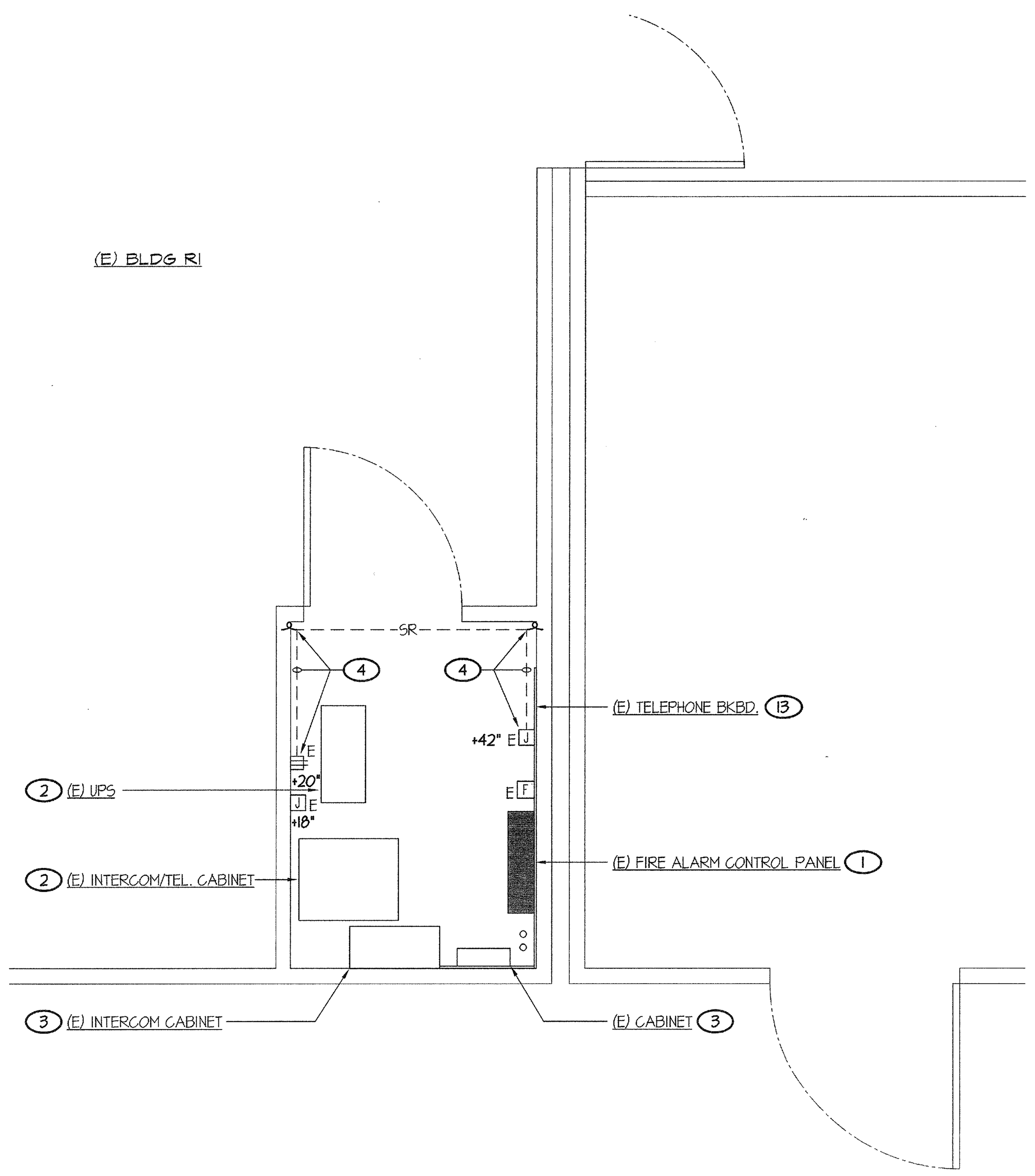


ADMIN. SIGNALS EQUIPMENT ROOM (E) ELEC. DEMO PLAN

PLAN NORTH

SCALE : 1/2" = 1'-0"

NOTES (THIS SHEET ONLY):

1. TO REMAIN IN USE FOR RECONNECTION PER FIRE ALARM RISER DIAGRAM #1/E3.2.
2. TO REMAIN IN USE. SEE KEYNOTE #12 FOR ADDITIONAL INFORMATION.
3. DISCONNECT REMOVE AND DISPOSE OF AS DIRECTED BY THE OWNER.
4. DISCONNECT AND REMOVE THIS SECTION OF SURFACE RACEWAY. LEAVE CONDUCTORS IN PLACE AT CORNER FOR RECONNECTION.
5. RUN NEW RACEWAY FROM EXISTING SURFACE RACEWAY JUNCTION BOX UP WALL THEN HORIZONTAL ON WALL TO CORNER AT CEILING. THEN TURN DOWN WALL AND RUN TO NEW SURFACE RACEWAY JUNCTION BOX (LOCATED TO INTERCEPT EXISTING RACEWAY). PULL IN 2 #12 + 1 #12 GND AND CONNECT TO COILED UP CONDUCTORS FROM KEYNOTE #4.
6. MOUNT PER DETAIL #1/E3.1.
7. MOUNT PER DETAIL #4/E3.1.
8. MOUNT PER DETAIL #5/E3.1.
9. PROVIDE A 1 1/4"C. PULL IN CABLES PER FIRE ALARM RISER DIAGRAM #1/E3.2.
10. 1/2"C - 2 #12.
11. RUN NEW RACEWAY FROM EXISTING SURFACE RACEWAY RECEPTACLE JUNCTION BOX HORIZONTAL ON WALL TO CORNER. THEN TURN UP WALL AND RUN TO NEW SURFACE RACEWAY JUNCTION BOX (LOCATED TO INTERCEPT EXISTING RACEWAY). PULL IN 2 #12 + 1 #12 GND AND CONNECT TO COILED UP CONDUCTORS FROM KEYNOTE #4.
12. RELOCATE TO THE SOUTH AS SHOWN. TO REMAIN CONNECTED AS IS.
13. TO REMAIN IN USE. NO WORK REQUIRED.
14. RUN A TWO SECTION, SURFACE NON-METALLIC RACEWAY UP WALL. FOLLOW PATH OF RACEWAY FROM KEYNOTES #5 AND #11 TO OTHER SIDE OF ROOM. IN ONE SECTION PULL IN 3 #12 + 1 #12 GND (POWER). IN THE OTHER PULL IN 2 #14.
15. PROVIDE A 3/4"C. PULL IN CABLES PER FIRE ALARM RISER DIAGRAM #1/E3.2.
16. MOUNT PER DETAIL #6/E3.1. MOUNT ON WALL BELOW DIGITAL VOICE PANEL.
17. OVERHEAD FIRE ALARM FEED PER SITE ELECTRICAL PLAN.
18. PROVIDE A 20A DUPLEX RECEPTACLE IN A SURFACE MOUNTED BOX. MOUNT ON BACKBOARD AT 36" FOR PLUGGING IN THE AC TRANSFORMER FOR THE COMMUNICATOR PANEL.
19. PROVIDE NEW CIRCUIT BREAKERS PER PANEL "PUMP" SCHEDULE ON SHEET #E4.1.
20. PROVIDE A SURFACE JUNCTION BOX AND INSTALL 8" BELOW NEW SURFACE DUPLEX RECEPTACLE. SEE DETAIL #3/E3.2 FOR ADDITIONAL INFORMATION.
21. NEW SURFACE RACEWAY JUNCTION BOX.
22. RUN CONDUIT UP WALL FROM RACEWAY JUNCTION BOX INTO ACCESSIBLE ATTIC SPACE. CONTINUE IN ATTIC SPACE T END OF BUILDING. THEN PENETRATE THROUGH WALL (SEAL PENETRATION TO PREVENT LEAKS) THEN DOWN WALL AND OVER TO PANEL "PUMP" AND CONNECT.

DIVISION OF THE STATE ARCHITECT APPLICABLE CODES AND STANDARDS

CODES:

2013 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, PART 1, TITLE 24 C.C.R.

2013 CALIFORNIA BUILDING CODE (C.B.C.), PART 2, TITLE 24 C.C.R. (2012 INTERNATIONAL BUILDING CODE, VOLUMES 1 AND 2 WITH 2013 CALIFORNIA AMENDMENTS)

2013 CALIFORNIA ELECTRICAL CODE (C.E.C.), PART 3, TITLE 24 C.C.R. (2011 NATIONAL ELECTRICAL CODE WITH 2013 CALIFORNIA AMENDMENTS)

2013 CALIFORNIA MECHANICAL CODE (C.M.C.), PART 4, TITLE 24 C.C.R. (2012 UNIFORM MECHANICAL CODE WITH 2013 CALIFORNIA AMENDMENTS)

2013 CALIFORNIA PLUMBING CODE (C.P.C.), PART 5, TITLE 24 C.C.R. (2012 UNIFORM PLUMBING CODE WITH 2013 CALIFORNIA AMENDMENTS).

2013 CALIFORNIA ENERGY CODE (CEnC), PART 6, TITLE 24 C.C.R.

2013 CALIFORNIA FIRE CODE (C.F.C.), PART 9, TITLE 24 C.C.R. (2012 INTERNATIONAL FIRE CODE WITH 2013 CALIFORNIA AMENDMENTS)

2013 CALIFORNIA REFERENCE STANDARDS CODE (C.R.S.C.), PART 12, TITLE 24 C.C.R.

TITLE 19, C.C.R. PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS.

STANDARDS AND GUIDES:

NFPA 72 (CALIFORNIA AMENDED) - NATIONAL FIRE ALARM CODE, 2013 EDITION

ADAAG - AMERICANS WITH DISABILITIES ACT, ACCESSIBILITY GUIDELINES

UL 38 - MANUAL OPERATING SIGNAL BOXES, 2013 EDITION

UL 268 - SMOKE DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS, 2013 EDITION

UL 268A - SMOKE DETECTORS DUCT APPLICATIONS, 2009 EDITION

UL 464 - AUDIBLE SIGNAL APPLIANCES, 2012 EDITION

UL 521 - HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS, 2010 EDITION

UL 864 - CONTROL UNITS FOR FIRE PROTECTIVE SIGNALING SYSTEMS, 2012 EDITION

SEISMIC ANCHORAGE REQUIREMENTS

MECHANICAL, ELECTRICAL AND PLUMBING ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2013 CBC, SECTIONS 1616A.1.18 THROUGH 1616A.1.26 AND ASCE 7-10 CHAPTER 13, 26 AND 30.

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER.
3. MOVABLE EQUIPMENT WHICH IS STATIONED IN ONE PLACE FOR MORE THAN 8 HOURS AND HEAVIER THAN 400 POUNDS ARE REQUIRED TO BE ANCHORED WITH TEMPORARY ATTACHMENTS.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT THE ATTACHMENT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING AND CONDUIT.

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.

B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD AND THE DSA DISTRICT STRUCTURAL ENGINEER. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-10 SECTION 13.3 AS DEFINED IN ASCE 7-10 SECTION 13.6.8, 13.6.7, 13.6.5.6 AND 2013 CBC, SECTIONS 1616A.1.23, 1616A.1.24, 1616A.1.25 AND 1616A.1.26.

THE BRACING AND ATTACHMENTS TO THE STRUCTURE SHALL BE DETAILED ON THE APPROVED DRAWINGS OR THEY SHALL COMPLY WITH ONE OF THE OSHPD PRE-APPROVALS (OPM#).

COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF HANGING AND BRACING OF THE PIPE, DUCTWORK AND ELECTRICAL DISTRIBUTION SYSTEMS.

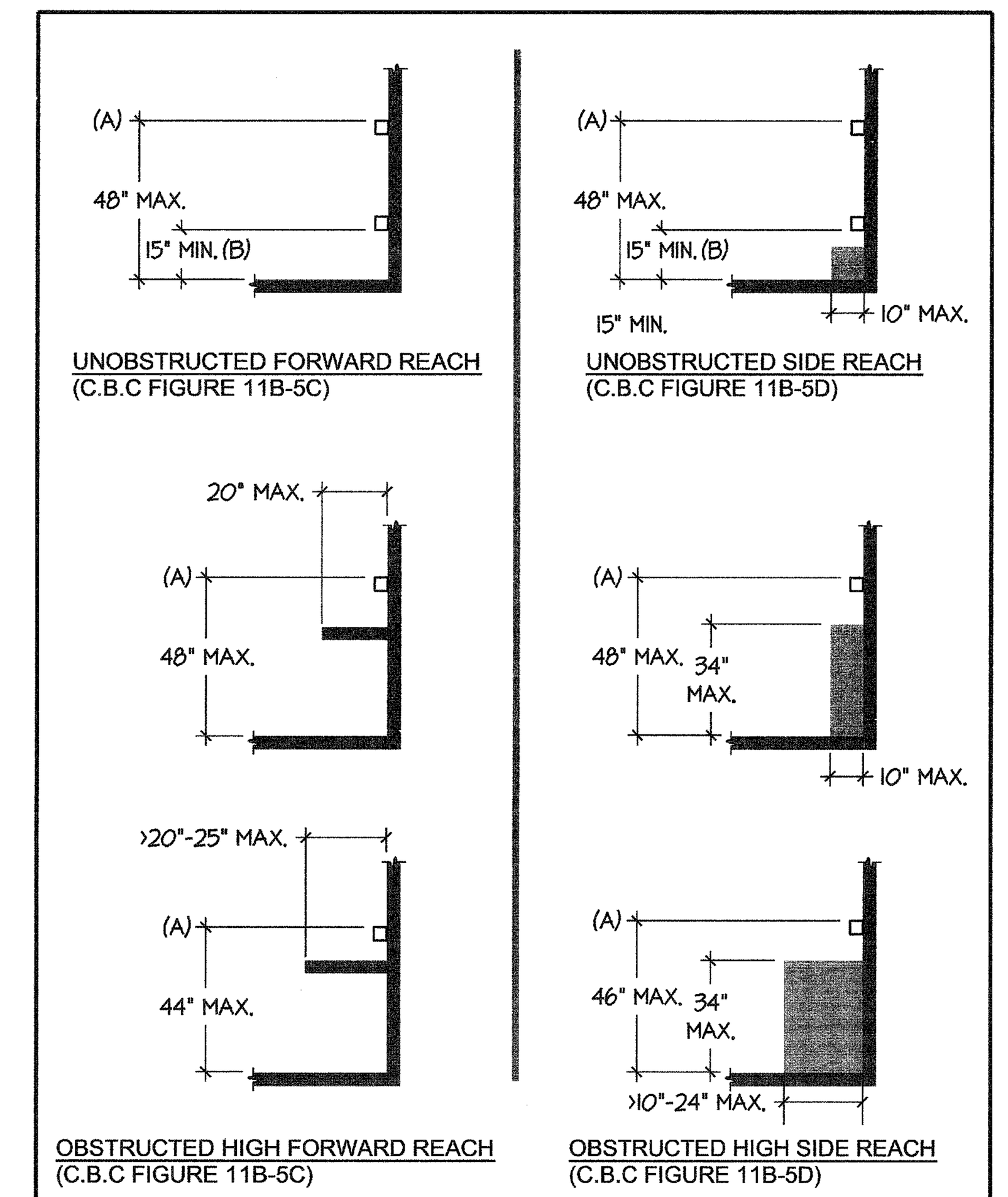
THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

TITLE 24, PART 6

THE CALIFORNIA ENERGY EFFICIENCY STANDARDS FOR NONRESIDENTIAL BUILDINGS HAS BEEN REVIEWED AND THE BUILDING DESIGN DESCRIBED ON THESE PAGES IS IN SUBSTANTIAL CONFORMANCE.

CODE, RULES AND REGULATIONS

ALL WORK AND MATERIALS SHALL COMPLY WITH THE LATEST REGULATIONS OF THE STATE FIRE MARSHAL, CALIFORNIA CODE OF REGULATIONS, SERVING UTILITY COMPANIES AND OTHER APPLICABLE STATE ORDINANCES. NOTHING IN THESE PLANS OR SPECIFICATIONS IS TO BE CONSTRUED AS TO PERMIT WORK NOT CONFORMING TO THESE CODES. WHERE WORK OF A HIGHER DEGREE IS INDICATED IN THE PLANS OR SPECIFICATIONS THIS REQUIREMENT SHALL GOVERN.



(A) TOP OF OUTLET BOX FOR RECEPTACLES, SWITCHES AND CONTROLS.

(B) BOTTOM OF OUTLET BOX FOR RECEPTACLES, SWITCHES AND CONTROLS.

1 ELECTRICAL RECEPTACLE SWITCH AND CONTROL HEIGHTS

NTS

ELECTRICAL SYMBOLS

ALL DIMENSIONS TO CENTER OF BOX, U.O.N.

	(A/3 symbol)	HOME RUN 3/4"C - MIN. (PANEL A, CIRCUIT #3)
	(——)	CONDUIT RUN IN WALL OR ATTIC (1/2"C - 2 #12 AWG THWN + 1 #12 GND)
	(—·—)	CONDUIT RUN IN FLOOR OR UG (1/2"C - 2 #12 AWG THWN + 1 #12 GND)
	(stub symbol)	CONDUIT STUB - CAPPED AND LABELED.
	(1)	ELECTRICAL KEYNOTE #1, REFER TO NOTES ON SAME SHEET
	U.O.N.	UNLESS OTHERWISE NOTED
	W.P.	WEATHERPROOF
	(symbol)	TERMINAL CABINET (SIZE AS SHOWN)
	(symbol)	ELECTRICAL PANELBOARD
	(symbol)	SURFACE MOUNTED DUPLEX RECEPTACLE ON WALL (+18" U.O.N.)
	(J)	JUNCTION BOX EQUIPPED WITH BLANK COVER
	(SD)	ADDRESSABLE SMOKE DETECTOR MOUNTED ON CEILING
	(HD)	HEAT DETECTOR MOUNTED IN ACCESSIBLE ATTIC
	[MM]	ADDRESSABLE MONITOR MODULE
	[F]	ADDRESSABLE MANUAL PULL STATION
(A)	(SP)(30)	FIRE ALARM VISUAL STROBE, 30 CANDELA, CEILING MOUNTED
(B)	[SP] W.P.	FIRE ALARM EXTERIOR SPEAKER IN WALL
	[SOM]	ADDRESSABLE SUPERVISED OUTPUT MODULE
	[J]	SURFACE MOUNTED JUNCTION BOX ON WALL

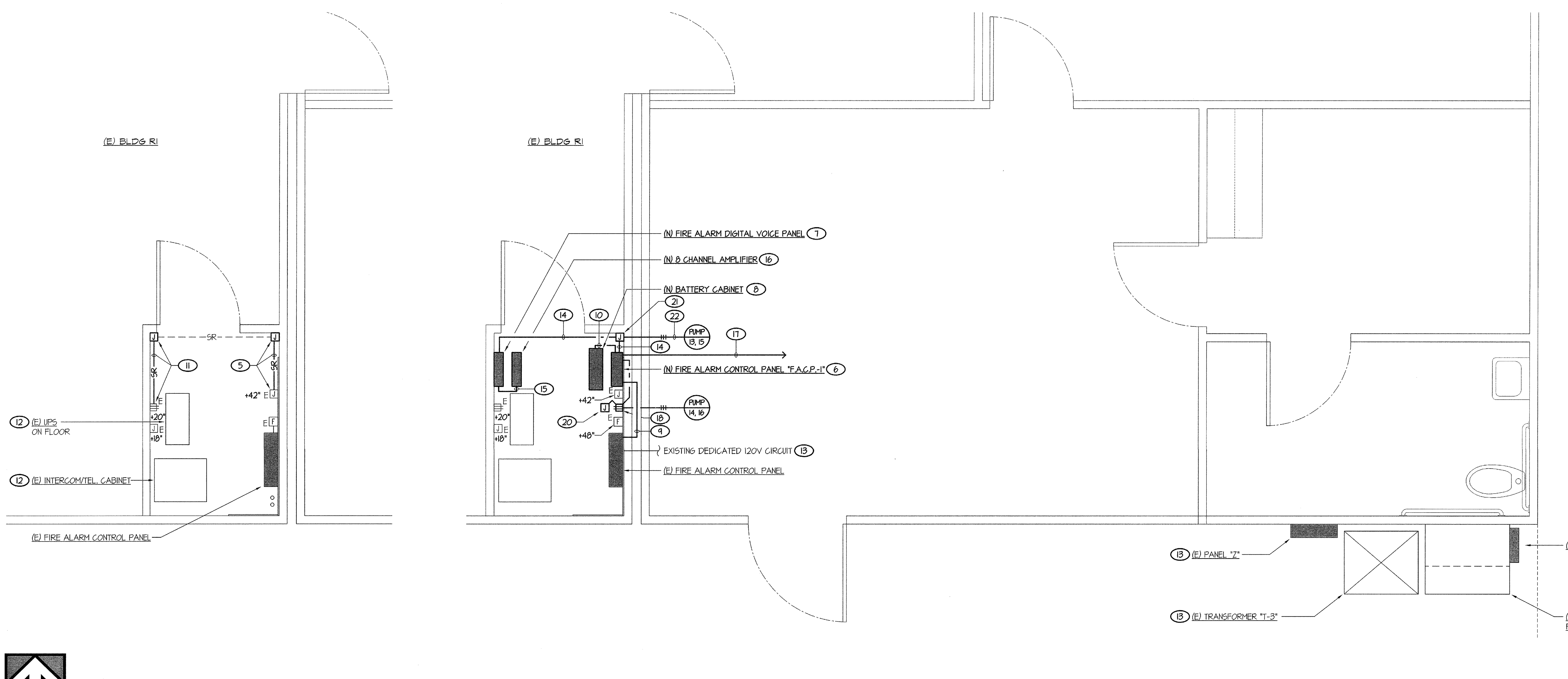
ELECTRICAL SYMBOLS NOTES:

(A) REFER TO FIRE ALARM DEVICES ELEVATION, DETAIL #5/E3.2 FOR RESPECTIVE MOUNTING HEIGHTS.

(B) SEE FIRE ALARM PLAN FOR MOUNTING HEIGHTS.

GENERAL NOTE:

(1) PROVIDE ALL SURFACE RACEWAY COMPONENTS TO FORM COMPLETE AND FINISHED RACEWAY SYSTEMS.



(E) ADMIN. SIGNALS EQUIPMENT ROOM ELECTRICAL PLANS

PLAN NORTH

SCALE : 1/2" = 1'-0"

COMPLETE AUTOMATIC FIRE ALARM SYSTEM PLAN SUBMITTAL

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MARK	DATE	REVISIONS
1		
2		
3		

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BAKERSFIELD SCHOOL DISTRICT
BAKERSFIELD, KERN COUNTY, CALIFORNIA

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DIV. OF THE STATE ARCHITECT
OFFICE OF REGULATION SERVICES
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AC ___ FLS ___ SS ___
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PTN : 63321-206

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LICENSED ARCHITECT STEPHEN J. CORBIN C-16788 STATE OF CALIFORNIA
STEPHEN J. CORBIN, NCARB, AIA, LEED-AP BD+C

REGISTERED PROFESSIONAL ENGINEER THEODORE W. ROSE No. E14920 Exp. 6/30/17 ELECTRICAL STATE OF CALIFORNIA

Rose Sing and Associates, Inc.
Electrical Consultants
131 S. Dunworth – (559)733-2671
Visalia, California 93292-6705

ELECTRICAL SYMBOLS, CODES AND PARTIAL ADMIN. ELECTRICAL ROOM PLANS

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

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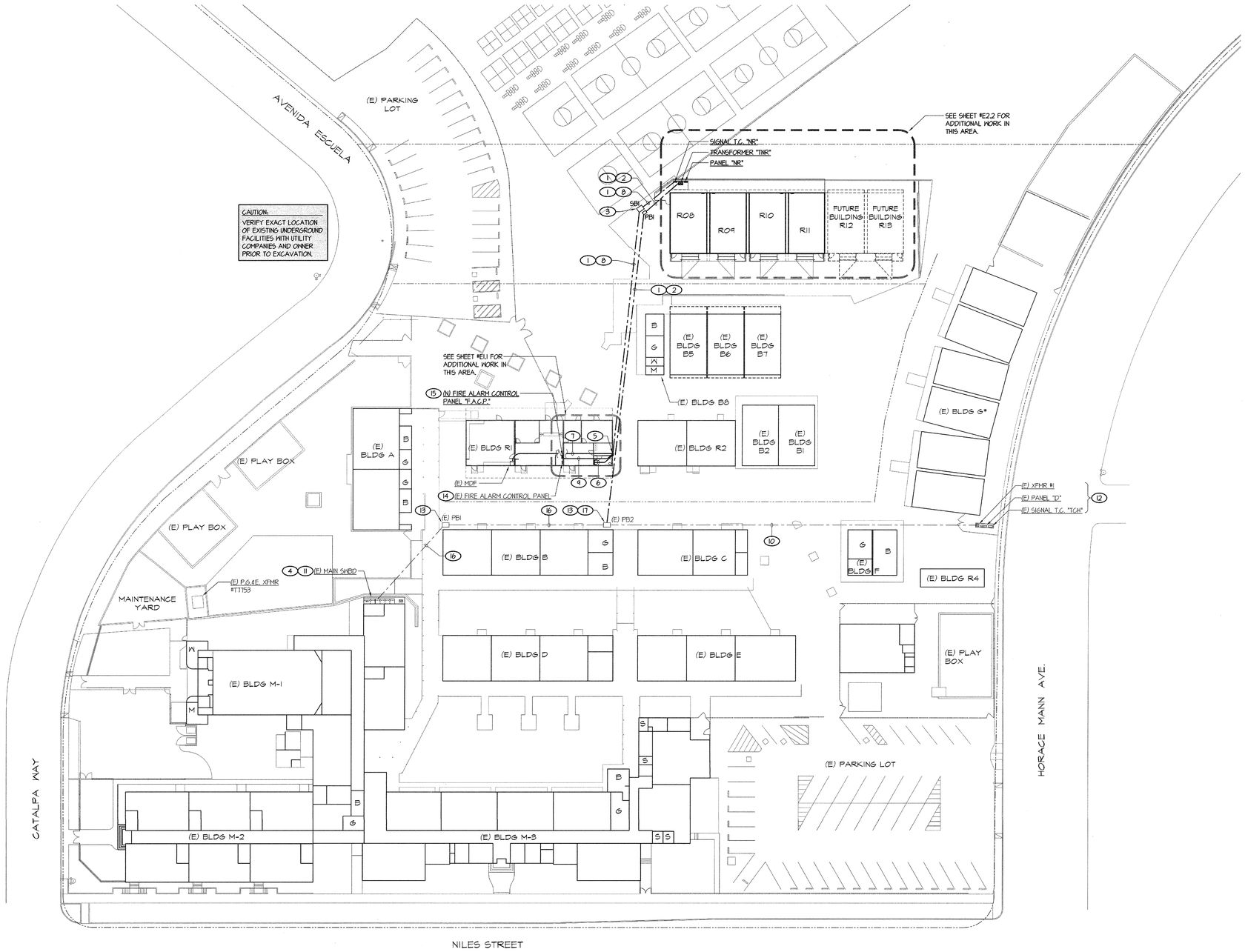

PLAN NORTH

(E) SITE ELECTRICAL PLAN - OVERALL

SCALE : 1" = 30'-0"

NOTES (THIS SHEET ONLY):

1. BORE UNDER OR SAWCUT AND PATCH EXISTING PAVED AREA AS REQUIRED TO UNDERGROUND CONDUITS AS SHOWN.
2. FEEDER PER ONE LINE DIAGRAM #1/E4.1.
3. NEW PULL BOXES PER DETAIL #3/E5.1. TYPICAL, U.O.N.
4. ACCESS AS REQUIRED TO CONNECT NEW FEEDER CONDUCTORS AND NEW CIRCUIT BREAKER AS REQUIRED.
5. PROVIDE A NEW 36" SQ x 12" D, NEMA 3R SCREW COVER ENCLOSURE HIGH UP ON EXTERIOR WALL ABOVE HEIGHT OF INTERIOR OF BUILDING ACCESSIBLE ATTIC SPACE. SEE DETAIL #8/E5.1.
6. PROVIDE THREE 1 1/2"C STUBS INTO ACCESSIBLE ATTIC SPACE FOR OWNER'S USE.
7. RUN ONE 2"C FROM M.D.F. UP WALL INTO ACCESSIBLE ATTIC SPACE THEN CONCEALED IN ACCESSIBLE ATTIC SPACE TO EXTERIOR WALL. THEN PENETRATE THROUGH EXTERIOR WALL INTO BACK OF NEW PULL ENCLOSURE AT KEYNOTE #5.
8. THREE 1 1/2"C AND ONE 1 1/4"C - ONE "SFA" CABLE AND TWO "FS" CABLES.
9. 1 1/4"C - ONE "SFA" CABLE AND TWO "FS" CABLES. ONE SPARE 1"C.
10. EXISTING FEEDER TO REMAIN. SEE KEYNOTES #16 AND #17.
11. TO REMAIN IN USE. PROVIDE NEW CIRCUIT BREAKER. PER ONE LINE DIAGRAM #1/E4.1.
12. TO REMAIN IN USE. NO WORK REQUIRED.
13. ACCESS AS REQUIRED TO DO NEW WORK AS NOTED.
14. TO REMAIN IN USE. RECONNECT TO NEW "F.A.C.P." PER FIRE ALARM RISER DIAGRAM #1/E3.2.
15. PER FIRE ALARM SYSTEM EQUIPMENT SPECIFICATIONS ON SHEET #E3.1.
16. EXISTING 4"C. PULL OUT EXISTING FEEDER CONDUCTORS FROM MAIN SWITCHBOARD BACK TO EXISTING PULL BOX #2 AND COIL UP THERE FOR RECONNECTION. PULL IN NEW FEEDER CONDUCTORS PER ONE LINE DIAGRAM #1/E4.1.
17. PROVIDE M.P. SPLICE KITS (AS REQUIRED) TO SPLICE NEW FEEDER CONDUCTORS (COMING FROM MAIN SWITCHBOARD) TO EXISTING CONDUCTORS THAT SUPPLY EXISTING PANEL "D".

COMPLETE AUTOMATIC FIRE ALARM SYSTEM PLAN SUBMITTAL

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SITE ELECTRICAL PLAN - OVERALL

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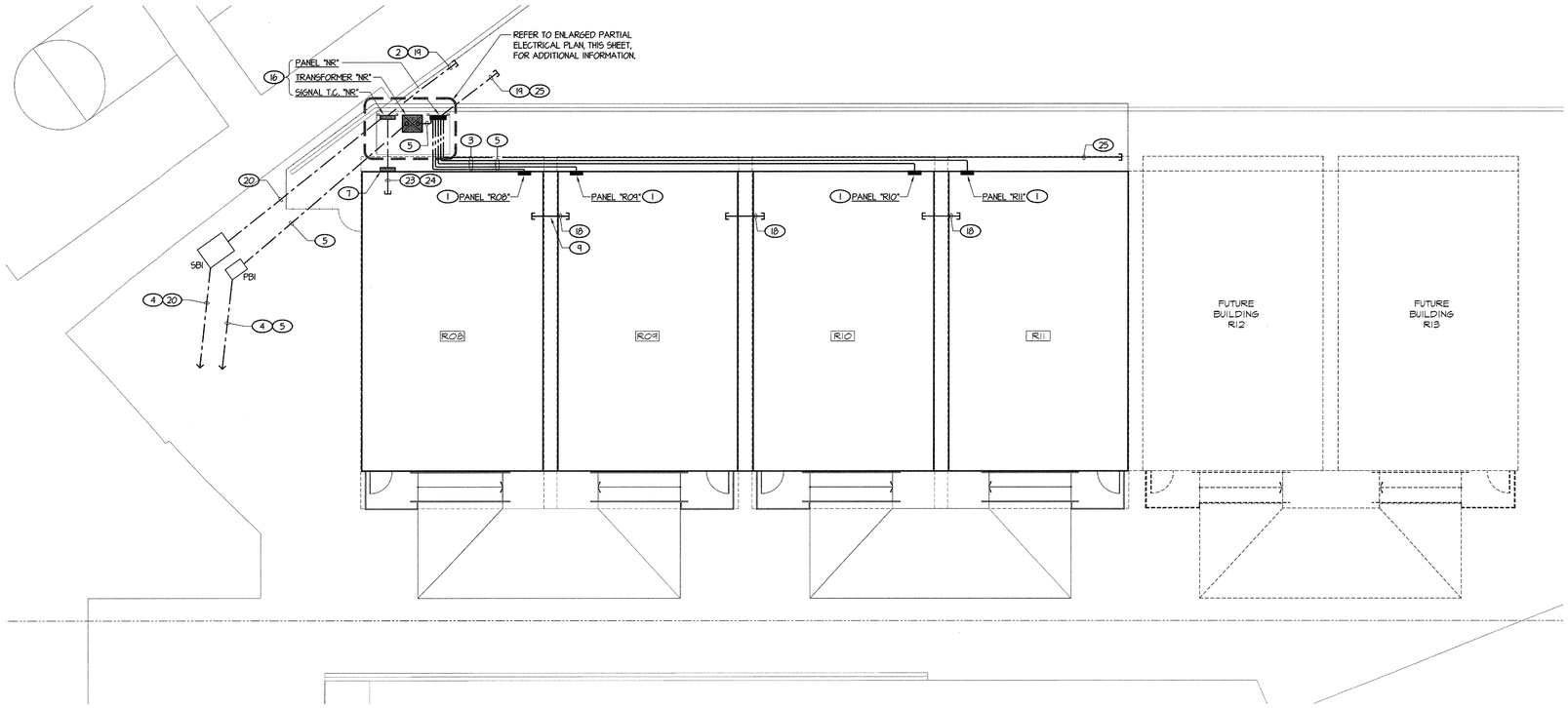
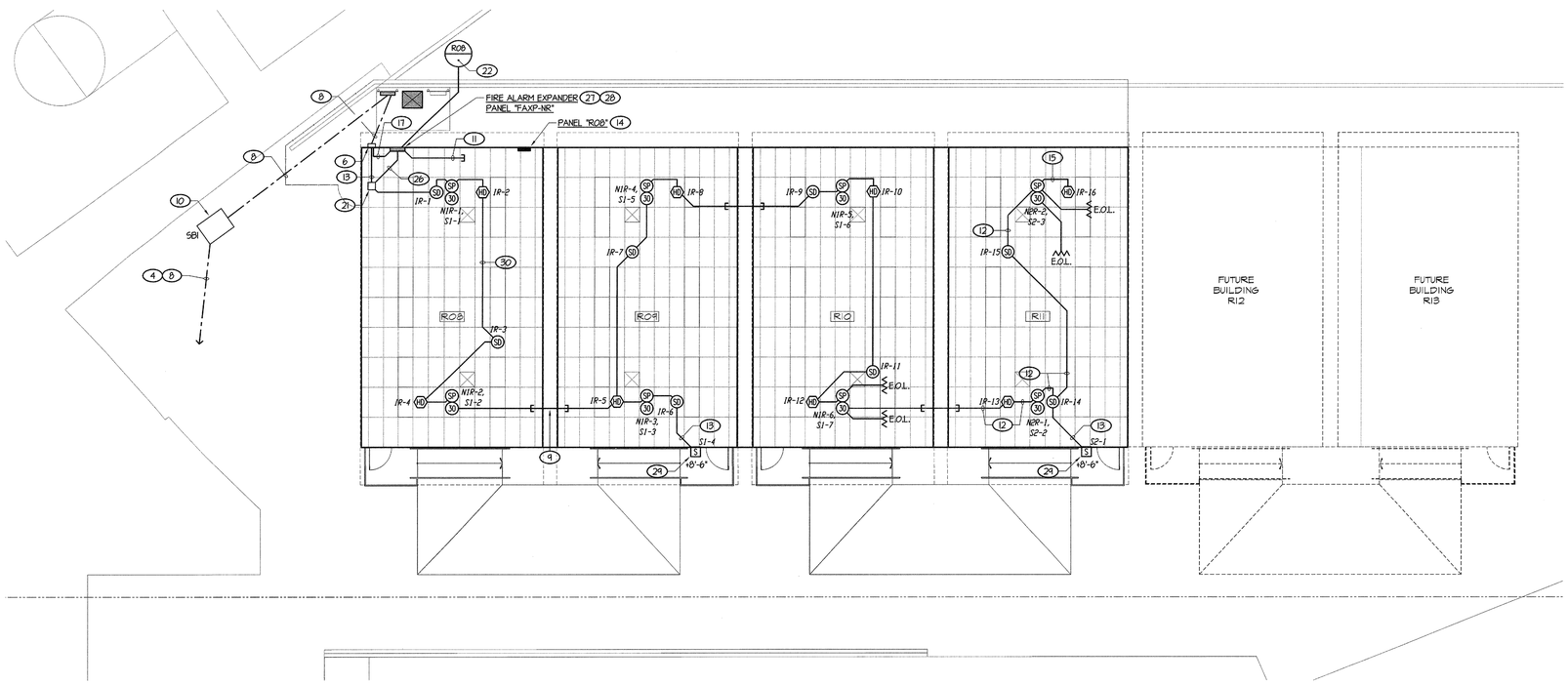


PLAN NORTH

(E) POWER AND SIGNALS PLAN

SCALE : 1/8" = 1'-0"



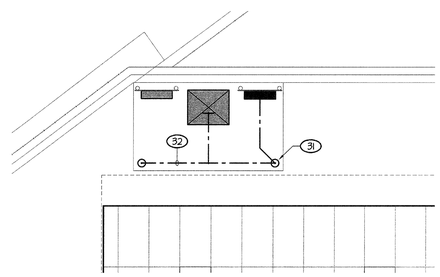
PLAN NORTH

(E) FIRE ALARM PLAN

SCALE : 1/8" = 1'-0"

NOTES (THIS SHEET ONLY):

1. CONNECT PANEL PROVIDED WITH RELOCATABLE BUILDING.
2. PROVIDE FOUR 1 1/2"C STUB OUTS FOR FUTURE USE.
3. RUN CONDUITS SURFACE MOUNTED ON WALL ON BACK OF RELOCATABLE BUILDING.
4. SEE SITE ELECTRICAL PLAN SHEET #E2.1 FOR CONTINUATION AND REQUIREMENTS.
5. FEEDER PER ONE LINE DIAGRAM #1/E4.1.
6. PROVIDE A 18" H x 12" W x 6" D, NEMA 3R, SCREW COVER ENCLOSURE HIGH ON WALL ABOVE INTERIOR T-BAR CEILING. MOUNT PER DETAIL #5/E5.1.
7. PROVIDE A 36" H x 24"W x 6" D, NEMA 3R, SCREW COVER ENCLOSURE HIGH ON WALL ABOVE INTERIOR T-BAR CEILING. MOUNT PER DETAIL #1/E5.1.
8. 1 1/4"C - ONE "SFA" CABLE, TWO "FS" CABLES.
9. SEE DETAIL #10/E5.1 FOR CONDUIT CONNECTIONS REQUIREMENTS BETWEEN BUILDINGS, TYPICAL.
10. PROVIDE NEW PULL BOX PER SITE ELECTRICAL PLAN. SEE SHEET #E2.1 FOR REQUIREMENTS.
11. TWO SPARE 1"C.
12. 1"C - ONE "FA" CABLE, ONE "FS CABLE, 2 #12.
13. 3/4"C - TWO "FS" CABLES.
14. PROVIDE A NEW 20A, 1-POLE CIRCUIT BREAKER WITH "LOCK" ACCESSORY AND RED HANDLE FOR FIRE ALARM CONNECTIONS.
15. 3/4"C - ONE "FA" CABLE.
16. SEE DETAIL #9/E5.1 FOR MOUNTING REQUIREMENTS.
17. 3/4"C - ONE "SFA" CABLE.
18. PROVIDE ONE 1"C, ONE 3/4"C AND TWO 1 1/4"C BETWEEN BUILDINGS FOR USE BY THE OWNER. INSTALL IN ACCESSIBLE ATTIC SPACE.
19. STUB INTO ACCESSIBLE PLANTER AREA AND CAP FOR FUTURE USE.
20. PROVIDE THREE 1 1/2"C (WITH NYLON PULL ROPE) FOR OWNER'S USE.
21. PROVIDE A 12" SQ x 6"D, NEMA 1, SCREW COVER CAN CONCEALED IN ACCESSIBLE ATTIC SPACE.
22. CONNECT TO A NEW DEDICATED 20A, 1-POLE CIRCUIT BREAKER IN LISTED PANEL.
23. TWO SPARE 1"C (F.A.), FOUR 1 1/4"C AND ONE 2"C FOR OWNER'S USE.
24. STUB INTO ACCESSIBLE ATTIC SPACE ABOVE T-BAR CEILING.
25. SPARE CONDUIT(S) FOR FUTURE RELOCATABLE BUILDINGS PER ONE LINE DIAGRAM #1/E4.1.
26. 1"C - ONE "FA" CABLE, 4 #12.
27. PROVIDE CONDUIT ENCLOSING SHROUD PER DETAIL #2/E3.1.
28. MOUNT PER DETAIL #3/E3.1.
29. USE JUNCTION BOX SUPPLIED WITH RELOCATABLE BUILDING FOR MOUNTING OF EXTERIOR SPEAKER.
30. 1 1/4"C - TWO "FS" CABLES, ONE "FA" CABLE, 4 #12. TYPICAL "FA" WIRING, U.O.N.
31. PROVIDE GROUND ROD AND WELL PER DETAIL #2/E5.1
32. 1 #2/0 CU. TYPICAL BETWEEN GROUND RODS AND EQUIPMENT.



PLAN NORTH

(E) PARTIAL ENLARGED ELECTRICAL PLAN

SCALE : 1/4" = 1'-0"

AUTOMATIC FIRE SPRINKLER SYSTEM

BUILDING ___ HAS AN AUTOMATIC FIRE SPRINKLER SYSTEM. HEAT DETECTORS HAVE BEEN OMITTED IN CONCEALED ATTIC SPACES ABOVE CEILINGS AND SOFFITS DUE TO THE AUTOMATIC FIRE SPRINKLER SYSTEM IS FULLY EQUIPPED IN THESE AREAS. C.F.C. 907.2.3.6.1.

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LICENSED ARCHITECT STEPHEN J. CORBIN No. C-16788 STATE OF CALIFORNIA

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Rose Sing and Associates, Inc.
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POWER AND SIGNALS PLAN AND FIRE ALARM PLAN

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

2.2
OF . SHEETS

Z:\Drafting\Jobs\PSA\SCHOOLS\BFIELD\Bakersfield City Schools\Horace Mann\E2.2.dwg DATE SAVED: 03/24/16 DATE PLOTTED: 04/25/16 BY: Casey JOB #: 1509B-JJ

FIRE ALARM CONTROL PANEL "F.A.C.P." BATTERY CALCULATION

DESCRIPTION	QUANTITY	SUPV. CURRENT EACH	SUPV. CURRENT SUB-TOTAL	ALARM CURRENT EACH	ALARM CURRENT 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 HEAT 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 DIGITAL VOICE PANEL "F.A.D.V." BATTERY CALCULATION

DESCRIPTION	QUANTITY	SUPV. CURRENT EACH	SUPV. CURRENT SUB-TOTAL	ALARM CURRENT EACH	ALARM CURRENT 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 5.514 A.H.
x 1.2 SAFETY FACTOR
6.617 A.H.

PROVIDE 7.0 AMP HOUR BATTERIES

FIRE ALARM POWER EXPANDER PANEL "FAXP-NR" BATTERY CALCULATION

DESCRIPTION	QUANTITY	SUPV. CURRENT EACH	SUPV. CURRENT SUB-TOTAL	ALARM CURRENT EACH	ALARM CURRENT SUB-TOTAL
FIRE ALARM POWER EXPANDER PANEL	1	0.09	0.09	0.175	0.175
30cd STROBE/SPEAKER (CEILING)	8	—	—	0.088	0.704
	TOTALS		0.09		0.879

TOTAL ALARM CURRENT OF 0.879 x 0.250 (15 MINUTES) = 0.2198 A.H.
TOTAL SUPERVISORY CURRENT OF 0.09 x 24 HOURS = 2.160 A.H.
TOTAL AMP HOURS REQUIRED 2.380 A.H.
x 1.2 SAFETY FACTOR
2.856 A.H.

PROVIDE 7.0 AMP HOUR BATTERIES

FIRE ALARM AMPLIFIER PANEL BATTERY CALCULATION

DESCRIPTION	QUANTITY	SUPV. CURRENT EACH	SUPV. CURRENT SUB-TOTAL	ALARM CURRENT EACH	ALARM CURRENT 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 SEQUENCE OF OPERATIONS

RESULT OF OPERATION	TYPE OF INITIATION: MANUAL PULL STATION	AREA SMOKE/ HEAT DETECTOR (1)	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", THUS "OPENING" THE H.V.A.C. CONTROL CIRCUIT.

FIRE ALARM SYSTEM EQUIPMENT SPECIFICATIONS

SYMBOL	DESCRIPTION	MODEL #	CSFM LISTING #	BACKBOX REQUIREMENTS (B)	MOUNTING HEIGHT (TO CENTER U.O.N.)
FACP	FIRE ALARM CONTROL PANEL "FACP"	HOCHIKI #FN-4121 (4SLC)	7165-0410:0159	INCLUDED	+54"
FAXP	FIRE ALARM NAC POWER EXPANDER	HOCHIKI #FN-642-ULADA-R	7315-0410:0166	INCLUDED	+54"
BATT.CAB.	BATTERY CABINET	HOCHIKI #FN-ACC-R	7165-0410:0159	INCLUDED	+54"
FADV	FIRE ALARM DIGITAL VOICE COMMUNICATIONS CONTROL PANEL	HOCHIKI #FNV-MP-16-R	6411-0410:0175	INCLUDED	+54"
AMP	AMPLIFIER (8 CHANNEL)	HOCHIKI #FNV-DPS-100R	6411-0410:0175	INCLUDED	+54"
DSM	DUAL SYNC. MODULE	GENTEX #AV544	7125-0569:0123	4" SQ. x 2 1/8" D (B)	—
MM	MONITOR MODULE	HOCHIKI #FRCME-P	7300-0410:0150	4" SQ. x 2 1/8" D (B)	
SOM	SUPERVISED OUTPUT MODULE	HOCHIKI #SOM-A	7300-0410:0150	4" SQ. x 2 1/8" D (B)	
SD	ANALOG ADDRESSABLE PHOTOELECTRONIC SMOKE SENSOR	HOCHIKI #ALN-V, HSB-NSA-6 BASE	7272-0410:0204	3.5" OCTAGON BOX OR 4" OCTAGON BOX WITH RAISED ROUND COVER (B)	PER DETAIL #2/E2.2
HD	ATTIC HEAD DETECTOR 190° FIXED AND BASE	HOCHIKI #ATJ-EAF, HSB-NSA-6 BASE	7272-0410-0203	3.5" 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 #WSS-FR-R	7320-0569:0141	4" SQ. x 1 1/2" D	(D) (E)
SP/SD	COMBINATION SPEAKER/30cd STROBE	HOCHIKI #HSSP-E24-PKR	7320-0410:0194	4" SQ. x 2 1/8" D	
(A) E.O.L.	END OF LINE RESISTOR	—	—	—	—
(A) (C) "FA" CABLE	ADDRESSABLE FIRE ALARM CABLE (INDOORS)	WEST PENN #D490	7161-0859:0101	—	—
"SFA" CABLE	ADDRESSABLE FIRE ALARM CABLE (OUTDOORS)	WEST PENN #AQ225	7161-0859:0101	—	—
"FS" CABLE	FIRE ALARM SPEAKER CABLE (INDOOR/OUTDOORS)	WEST PENN #AQC225	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 M.P. BACKBOX #GBLP.

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 UL#X (CENTRAL STATION OR ULC (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 BUILDING.

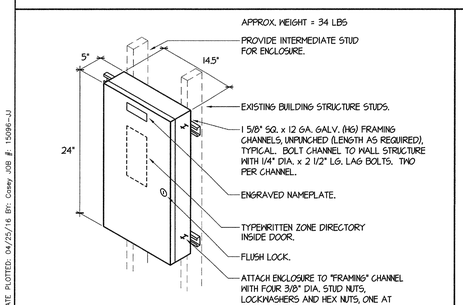
AMBIENT NOISE LEVELS SHALL BE CONSTRUED TO MEAN THAT WHICH CAN NORMALLY BE EXPECTED TO EXIST WHEN THE FACILITY, BUILDING, ROOM OR AREA IS FUNCTIONING UNDER NORMAL OPERATIVE OR WORKING CONDITIONS.

THE FIRE ALARM SIGNAL SHALL COMPLY WITH THE CALIFORNIA EDUCATION CODE, SECTIONS 32000 AND 32004, AND BE A TEMPORAL PATTERN, CODE 3.

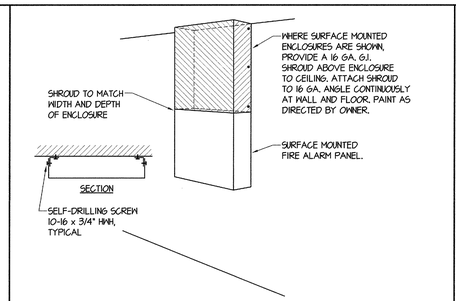
GENERAL NOTES:

1. SMOKE DETECTORS SHALL BE INSTALLED 3' AWAY FROM SUPPLY AND RETURN AIR REGISTERS.
2. 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.
3. UNDERGROUND AND EXTERIOR CONDUITS WILL HAVE WATER-TIGHT FITTINGS. (C.E.C. 110.11 AND 300.6)
4. AUDIBLE DEVICE(S) 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, C.F.C. 907.5.2.1.1 AND C.F.C. 907.5.2.1.2).
5. AUDIBLE DEVICES SHALL SOUND THE CALIFORNIA CODE IN TEMPORAL PATTERN, CODE 3. EXCEPT WHEN ISSUING A VOICE MESSAGE.
6. 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).
7. 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.
   A. THE PRIMARY POWER SUPPLY TO THE NEW FIRE ALARM CONTROL PANEL "F.A.C.P." AND THE NEW FIRE ALARM POWER EXPANDER PANEL "P.E.P." SHALL BE IN ACCORDANCE WITH NFPA 72 10.6.5.1, 10.6.5.2 AND AS FOLLOWS:
      a) 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.
      b) THE CIRCUIT BREAKER SHALL BE EQUIPPED WITH A LOCK-ON ACCESSORY. PAINT ACCESSORY RED IN COLOR.
      c) 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.
      d) 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 "P.E.P.". PROVIDE AN ENGRAVED NAMEPLATE (WHITE LETTERS ON A RED BACKGROUND) WHICH INDICATES THIS.

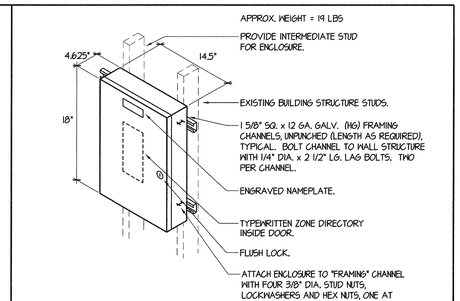
   THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY CONFORMANCE WITH THE ABOVEMENTIONED REQUIREMENTS AND PROVIDE ANY ACCESSORIES/ NAMEPLATES AS REQUIRED.
   B. ALL ENGRAVED NAMEPLATES SHALL BE ATTACHED TO THE FRONT OF THE RESPECTIVE ENCLOSURE WITH SCREWS OR RIVETS.
8. PROVIDE A COPY OF THE BATTERY CALCULATION 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.
9. 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(3).
10. THE AUTOMATIC ALARM SYSTEM SHALL BE INSTALLED, TESTED AND MAINTAINED IN ACCORDANCE WITH THE STATE FIRE MARSHAL'S REGULATIONS (C.F.C. 901.1).



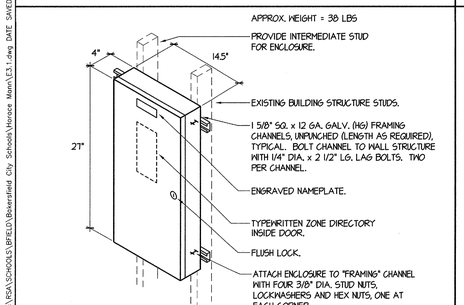
1 FIRE ALARM CONTROL PANEL MOUNTING — NTS



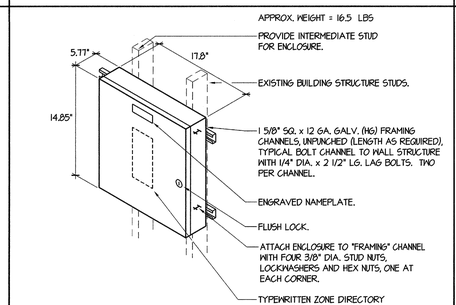
2 SHROUD AT SURFACE MOUNTED FIRE ALARM EXPANDER AND SURFACE MOUNTED AMPLIFIER (FOR ENCLOSING OF EXPOSED CONDUITS) — NTS



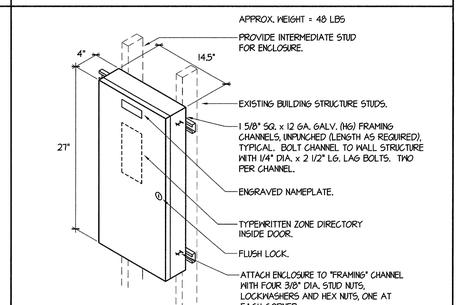
3 FIRE ALARM POWER EXPANDER PANEL MOUNTING — NTS



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 8 C.E.C.) (LENGTH OF CIRCUIT / 1000) (CURRENT)

PERCENT VOLTAGE DROP = VOLTAGE DROP / NOMINAL VOLTAGE x 100

1. NOTIFICATION APPLIANCE CIRCUIT "NP1":

(SP/SD) : 6 x 0.088A = 0.528A

VOLTAGE DROP = 2 (1.98) (230' / 1000) (0.528) = 0.481 V.D.

PERCENT VOLTAGE DROP = 0.481 / 24 x 100 = 2.00%

2. NOTIFICATION APPLIANCE CIRCUIT "NP2":

(SP/SD) : 2 x 0.088A = 0.176A

VOLTAGE DROP = 2 (1.98) (285' / 1000) (0.176) = 0.199 V.D.

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
1		
2		
3		

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
BAKERSFIELD SCHOOL DISTRICT
BAKERSFIELD, KERN COUNTY, CALIFORNIA

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
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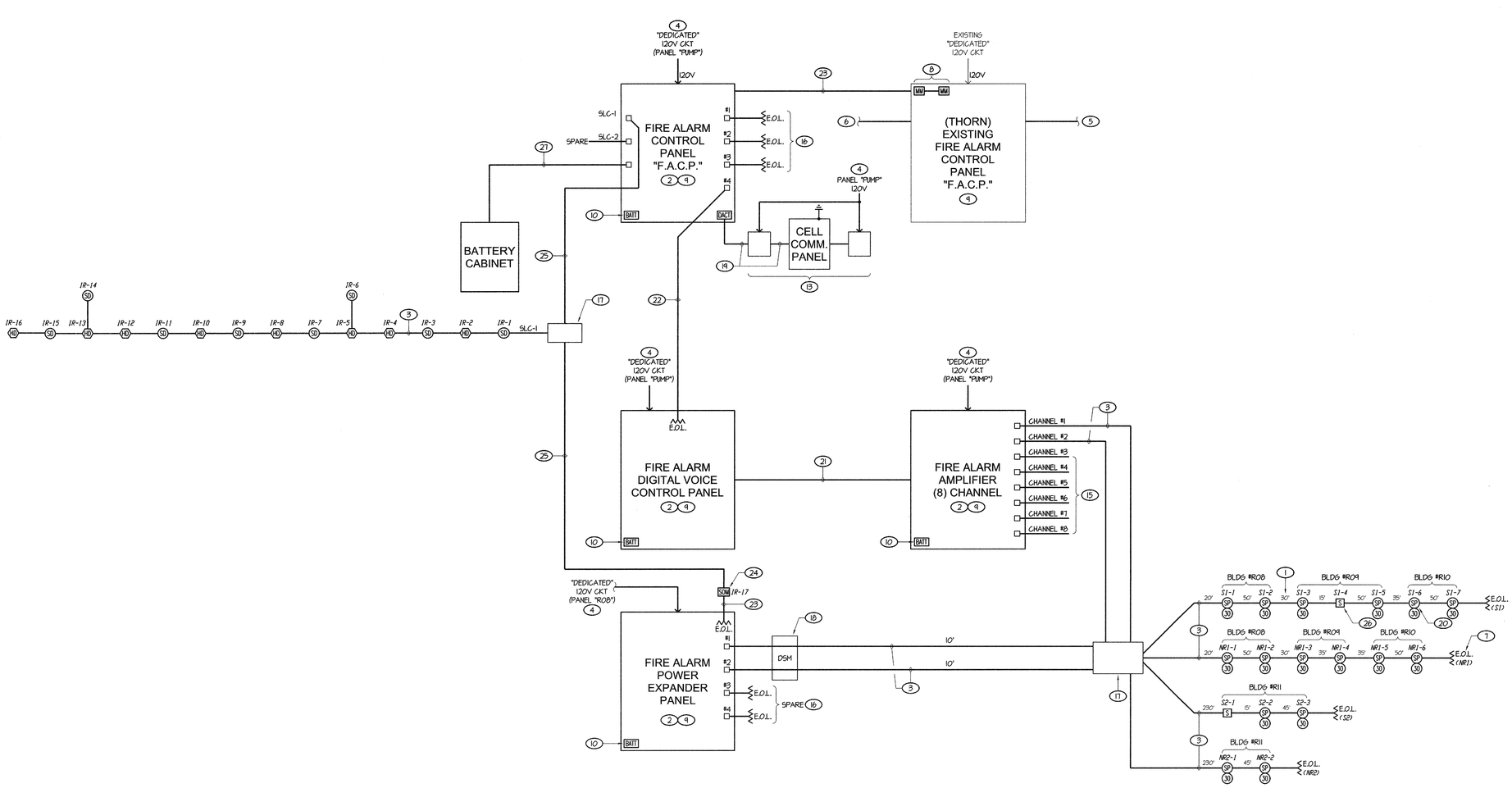
FIRE ALARM SYSTEM EQUIP., NOTES AND BATTERY CALCS

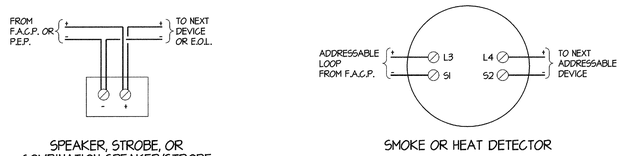
JOB NO. 1218
DRAWN: CS
CHECKED: DS
DATE: 04-26-16

3.1 OF . SHEETS



1 FIRE ALARM SYSTEM RISER DIAGRAM

NTS



2 FIRE ALARM EQUIPMENT WIRING DIAGRAMS

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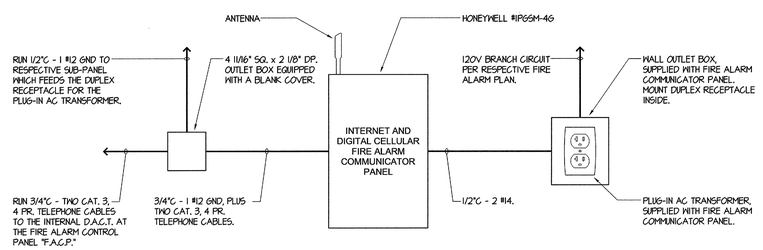
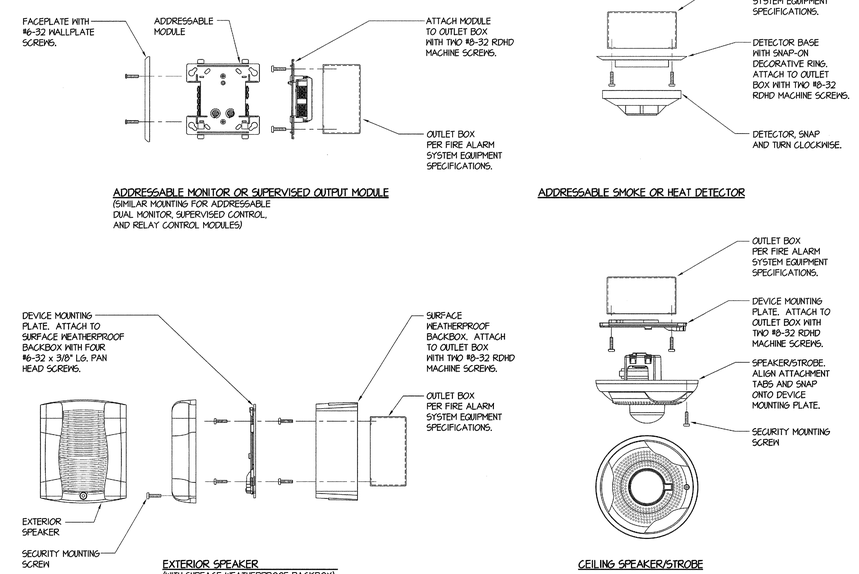


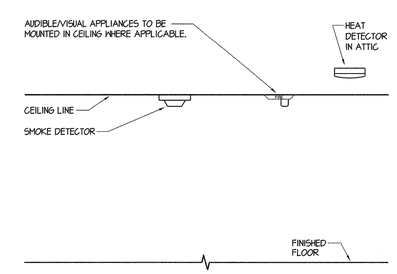
3 FIRE ALARM COMMUNICATOR PANEL WIRING DIAGRAM

NTS



4 FIRE ALARM DEVICE MOUNTING

NTS



5 FIRE ALARM DEVICES ELEVATION

NTS

NOTES (THIS DETAIL ONLY):

1. LENGTHS INDICATED WERE USED FOR CALCULATIONS/DESIGN PURPOSES ONLY AND BASED UPON THE "DIAGRAMMATIC" LAYOUT SHOWN ON THE DRAWINGS. LENGTHS SHALL NOT BE USED FOR BIDDING.
2. PROVIDE A COPY OF THE BATTERY CALCULATION FOR THE FIRE ALARM EQUIPMENT. THE BATTERY CALCULATION SHALL CONTAIN INFORMATION (AS NOTED ON THESE PLANS) AND BE PLASTIC LAMINATED. MOUNT ONTO INSIDE FACE OF PANEL DOOR.
3. REFER TO RESPECTIVE FIRE ALARM PLAN FOR CONDUIT AND CABLING/ CONDUCTOR REQUIREMENTS, TYPICAL.
4. CIRCUIT BREAKER SHALL BE EQUIPPED WITH A LOCK-ON ACCESSORY. PROVIDE AN ENGRAVED NAMEPLATE: "FIRE ALARM - LEAVE ON". NAMEPLATE SHALL HAVE WHITE LETTERS ON A RED BACKGROUND. PAINT CIRCUIT BREAKER HANDLE OR LOCK-ON ACCESSORY "RED" IN COLOR.
5. EXISTING SIGNALING CIRCUITS TO REMAIN. NO WORK REQUIRED.
6. EXISTING INITIATION ZONES TO REMAIN. NO WORK REQUIRED.
7. DENOTES END OF LINE RESISTOR ON NOTIFICATION APPLIANCE CIRCUIT. RESISTORS SUPPLIED WITH CONTROL/EXPANDER PANELS AS REQUIRED. LOCATE RESISTORS AT END OF LINE APPLIANCES (CLASS "B" WIRING). TYPICAL.
8. PROVIDE TWO MONITOR MODULES INSIDE THE EXISTING "F.A.C.P." TO INTERTIE IT TO THE NEW "F.A.C.P."
9. PER FIRE ALARM SYSTEM EQUIPMENT SPECIFICATION. SEE SHEET #E3.1.
10. PROVIDE BATTERIES PER RESPECTIVE BATTERY CALCULATION.
11. ONE 1 1/4"C (SPARE) WITH NYLON PULL STRING.
12. SPARE CONDUITS PER FIRE ALARM PLAN. SEE SHEET #E1.2.
13. SEE DETAIL #3/E3.2 FOR ADDITIONAL INFORMATION.
14. PROVIDE NEW FIBER CONNECTION MODULE HARDWARE PER FIRE ALARM SYSTEM EQUIPMENT SHEET #E2.1 FOR ADDITIONAL INFORMATION.
15. SPARE SPEAKER CHANNELS FOR FUTURE USE.
16. PROVIDE "END-OF-LINE" RESISTORS AT ALL UNUSED OUTPUTS. TYPICAL.
17. JUNCTION BOX IN ACCESSIBLE ATTIC SPACE OF BUILDING #ROB PER FIRE ALARM PLAN.
18. ROUTE STROBE CIRCUIT THROUGH DUAL SYNCH MODULE.
19. PROVIDE TWO DEDICATED CATEGORY 3, 4-PAIR TEL. CABLES.
20. SET INTERIOR SPEAKER TAPS AT 1/2 WATT, TYPICAL.
21. 3/4"C - ONE, STRANDED, 4-PAIR (16 GA.), NON-SHIELDED CABLE.
22. TWO SECTION SURFACE NON-METALLIC RACEWAY. IN "FA" SECTION, PULL IN 2 #14.
23. 1 1/4"C - THREE, STRANDED, 2-PAIR (16 GA.) SHIELDED CABLE + ONE "FA" CABLE.
24. PROVIDE SUPERVISED OUTPUT MODULE. LOCATE ADJACENT TO EXPANDER PANEL IN A 4" SQ. x 2 1/8" D JUNCTION BOX.
25. ONE "SFA" CABLE.
26. SET EXTERIOR SPEAKER TAPS AT 1 WATT, TYPICAL.
27. 1/2"C - 2 #12.

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
1		
2		
3		

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

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Rose Sing and Associates, Inc.
Electrical Consultants
131 S. Dunworth – (559)733-2671
Visalia, California 93292-6705

FIRE ALARM SYSTEM RISER

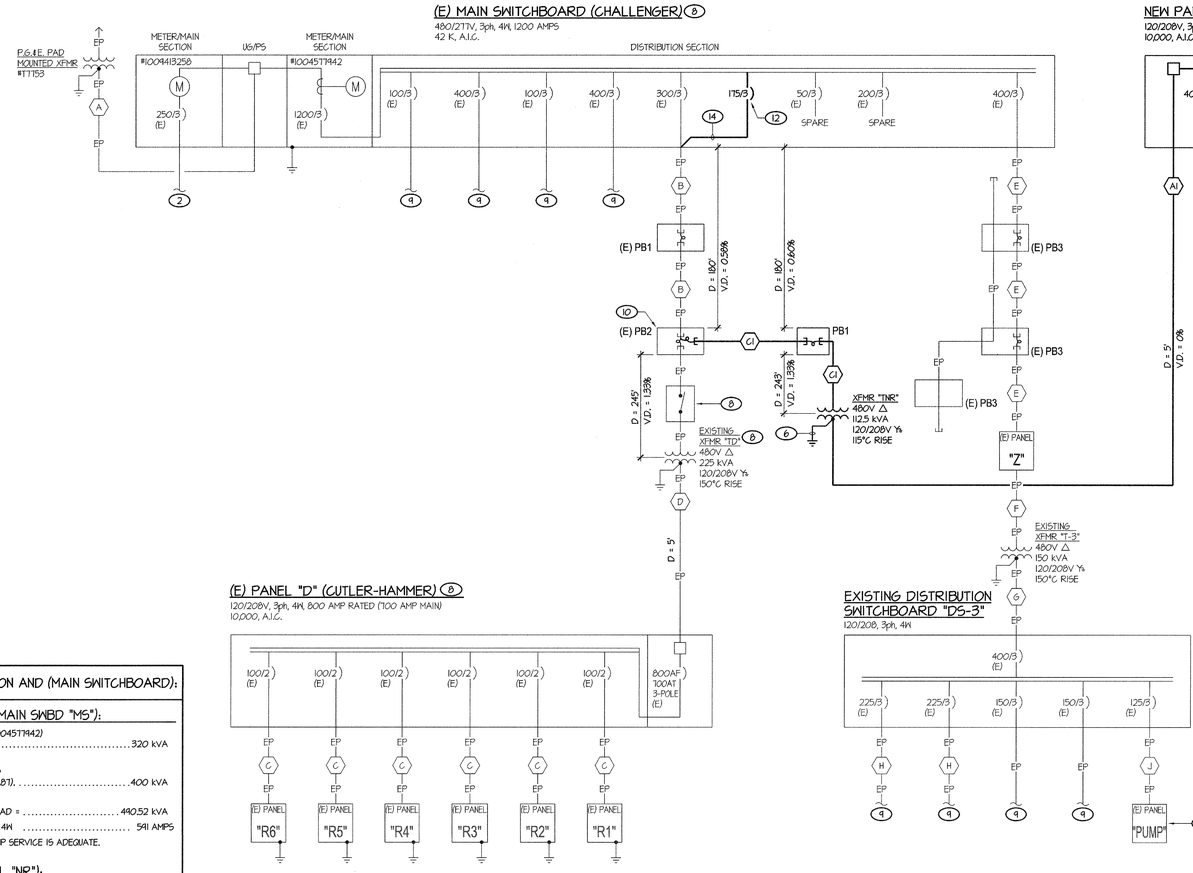
JOB NO.	
1218	
DRAWN: CS	
CHECKED: DS	
DATE: 04-26-16	

3.2 OF . SHEETS

Z:\Drafting\Jobs\PSA\SCHOOLS\BFIELD\Bakersfield City Schools\Horace Mann\E3.2.dwg DATE SAVED: 03/22/16 DATE PLOTTED: 04/25/16 BY: Casey JOB #: 15096-JJ

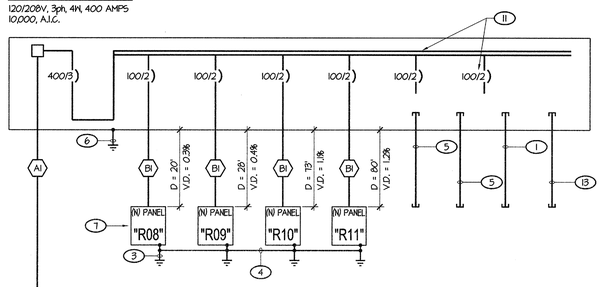
(E) MAIN SWITCHBOARD (CHALLENGER) (8)

480/277V, 3ph, 4W, 1200 AMPS
42 K, A.I.C.



NEW PANEL "NR"

120/208V, 3ph, 4W, 400 AMPS
10,000, A.I.C.

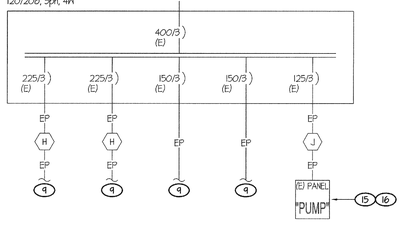


(E) PANEL "D" (CUTLER-HAMMER) (8)

120/208V, 3ph, 4W, 800 AMP RATED (700 AMP MAIN)
10,000, A.I.C.

EXISTING DISTRIBUTION SWITCHBOARD "DS-3"

120/208, 3ph, 4W



LOAD CALCULATION AND (MAIN SWITCHBOARD):

EXISTING LOAD (MAIN SWBD "MS"):

MAX DEMAND (METER #1004577442) PER P.G.&E. RECORDS ..... 320 kVA

MAXIMUM DEMAND x 125% (PER C.E.C. ARTICLE 220.87). ..... 400 kVA

EXISTING LOAD + NEW LOAD = ... 490.52 kVA
AMPS AT 480/277V, 3ph, 4W ..... 591 AMPS
THEREFORE THE 1200 AMP SERVICE IS ADEQUATE.

NEW LOAD (PANEL "NR"):

FOUR RELOCATABLE BLDGS. ..... 60.44 kVA
TWO FUTURE RELOCATABLE BLDGS ..... 30.08 kVA
TOTAL..... 90.52 kVA
252 AMPS

THEREFORE A 400 AMP PANEL IS ADEQUATE

NOTES (THIS DETAIL ONLY):

1. ONE SPARE 2 1/2"C.
2. TO EXISTING BRINE CHILLER. NO WORK REQUIRED.
3. BOND & GROUND PER DETAIL #4/E5.1. TYPICAL OF 4.
4. 1 #4 CU BETWEEN ADJACENT GROUND RODS.
5. SPARE 1 1/2"C (WITH NYLON PULL ROPE) FOR FUTURE RELOCATABLE BUILDINGS.
6. GROUND PER DETAIL #13/E5.1.
7. CONNECT PANEL PROVIDED WITH RELOCATABLE BUILDING, TYPICAL.
8. TO REMAIN IN USE. NO WORK REQUIRED.
9. VARIOUS FEEDERS AND CIRCUIT BREAKERS TO REMAIN. NO WORK REQUIRED.
10. AT THIS PULL BOX LOCATION SPLICE 6 #4/0 + 1 #4 GND TO THE EXISTING 6 #1/0 + 1 #4 GND. SPLICE 3 #250 kcmil + 1 #4 GND DOWN TO 3 #2/0 + 1 #4 GND. PROVIDE WP. SPLICE KITS AS REQUIRED.
11. PROVIDE SPARE CIRCUIT BREAKER, AMP RATING AND CONFIGURATION AS SHOWN.
12. REMOVE EXISTING 200A, 3-POLE CIRCUIT BREAKER AND RETURN TO OWNER. PROVIDE NEW 175A, 3-POLE CIRCUIT BREAKER FOR CONNECTION OF NEW RELOCATABLE BUILDINGS.
13. THREE SPARE 1 1/2"C (WITH NYLON PULL ROPE).
14. 3 #250 kcmil + 1 #4 GND (CU-XHHW-2).
15. PROVIDE THREE NEW 20A, 1-POLE CIRCUIT BREAKERS.
16. DISCONNECT THE NEUTRAL BOND AT THIS PANEL.

FEEDER SCHEDULE:

(ALL CONDUCTORS IN 480V OR 480/277V UNDERGROUND FEEDERS SHALL BE CU-XHHW-2. ALL OTHER CONDUCTORS, INCLUDING THE EQUIPMENT GROUNDING CONDUCTOR, SHALL BE CU-THHN-2 FOR #8 AWG OR LARGER AND CU-THWN FOR #10 AWG OR SMALLER).

- (A) EXISTING PG&E SECONDARY TO REMAIN.
- (B) (E) 4"C - 6 #1/0 + 1 #4 GND. PULL OUT CONDUCTORS FROM MAIN SWITCHBOARD BACK TO EXISTING PULL BOX #2 AND COIL UP FOR RECONNECTION. PULL IN NEW 3 #300 + 6 #4/0 + 1 #4 GND.
- (C) (E) 1 1/2"C - 3 #2 + 1 #8 GND.
- (D) (E) TWO 3"C - 4 #400 kcmil + 1 #1/0 GND IN EACH.
- (E) (E) 3 1/2"C - 4 #350 MCM CU.
- (F) (E) 2"C - 3 #3/0 AWG CU.
- (G) (E) 3 1/2"C - 4 #500 MCM CU.
- (H) (E) 3"C - 3 #4/0 AWG CU.
- (J) (E) 1 1/2"C (NIPPLE) - 4 #1 + 1 #6 GND.
- (A1) TWO 3 1/2"C - 4 #350 kcmil + 1 #1 GND IN EACH CONDUIT.
- (B1) 1 1/2" C - 3 #2 + 1 #8 GND.
- (C1) 2"C - 3 #2/0 + 1 #4 GND (CU-XHHW-2).

NOTE:

ALL VOLTAGE DROP CALCULATIONS ARE DONE USING 80% OF THE AMP RATING OF THE EQUIPMENT BEING SUPPLIED.

1 ONE LINE DIAGRAM

NTS

120/208 VOLTS 3 Φ 4 WIRE
400 A. BUSSING 400 A. MAIN BKR.
30 CIRCUIT
BOLT-ON CKT BKRS/PNLBD

10,000 BREAKER A.I.C.
6 1/4" MAX. ENCL. DEPTH
POST MOUNTING
WEATHERPROOF

PANEL "NR"

CKT	BKR	LOAD V.A. ΦA	LOAD V.A. ΦB	LOAD V.A. ΦC	DESCRIPTION	DESCRIPTION	LOAD V.A. ΦC	LOAD V.A. ΦB	LOAD V.A. ΦA	BKR	CKT
1	60/2	7660			RELOC. BLDG. "R08"	RELOC. BLDG. "R11"			7660	60/2	2
3			7380					7380			4
5	60/2			7660	RELOC. BLDG. "R09"	SPARE				60/2	6
7		7380									8
9	60/2		7660		RELOC. BLDG. "R10"	SPARE				60/2	10
11				7380							12
13											14
15											16
17											18
19											20
21											22
23											24
25											26
27											28
29											30

TOTAL LOAD: ΦA: 22,700 V.A. / — V.A. / 22,700 V.A. / 189 A
ΦB: 22,700 V.A. / — V.A. / 22,700 V.A. / 189 A
ΦC: 15,040 V.A. / — V.A. / 15,040 V.A. / 126 A
L.C.L. x 25%:

120/208 VOLTS 3 Φ 4 WIRE
125 A. BUSSING NO A. MAIN BKR.
16 CIRCUIT
BOLT-ON CKT BKRS/PNLBD

10,000 BREAKER A.I.C.
3 3/4" MAX. ENCL. DEPTH
SURFACE MOUNTING
WEATHERPROOF

(E) PANEL "PUMP"

CKT	BKR	LOAD V.A. ΦA	LOAD V.A. ΦB	LOAD V.A. ΦC	DESCRIPTION	DESCRIPTION	LOAD V.A. ΦC	LOAD V.A. ΦB	LOAD V.A. ΦA	BKR	CKT
1	3/3	3100			PUMP	RECEPT - IMC			900	1/1	2
3			3100					1080			4
5				3100			1080				6
7	1/1	1080			RECEPT - IMC				900		8
9			1260					720			10
11	2/1			—	SPARE		900				12
13		500			FIRE ALARM DIGITAL VOICE PANEL	RECEPT - DACT XFMR			180	1/1	14
15			500		FIRE ALARM AMPLIFIER PANEL	FIRE ALARM CONTROL PANEL		500			16

(1) (1)

TOTAL LOAD: ΦA: 6,660 V.A. / — V.A. / 6,660 V.A. / 55 A
ΦB: 6,660 V.A. / — V.A. / 6,660 V.A. / 55 A
ΦC: 5,080 V.A. / — V.A. / 5,080 V.A. / 43 A
L.C.L. x 25%:

PANEL SCHEDULE NOTES:

(1) PROVIDE NEW CIRCUIT BREAKER, AMP RATING AS SHOWN.

MARK	DATE	REVISIONS
1		
2		
3		

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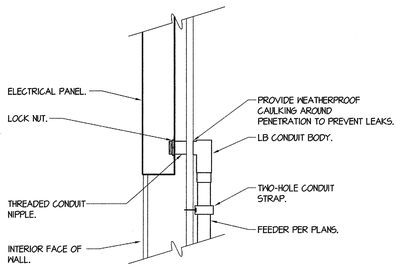
Visalia, California 93292-6705

ONE LINE DIAGRAM AND PANEL SCHEDULE

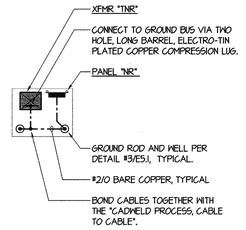
JOB NO.
1218
DRAWN : CS
CHECKED : DS
DATE : 04-26-16

4.1
OF . SHEETS



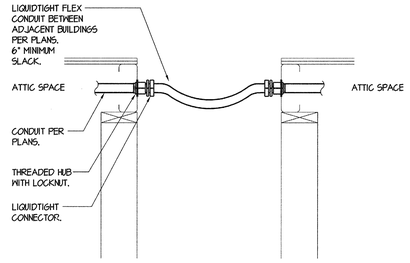
1 CONDUIT PENETRATION AT ELECTRICAL PANEL

NTS



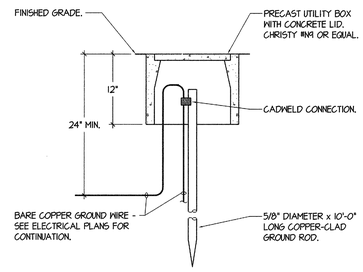
6 BONDING AND GROUNDING - PANEL "NR"

NTS



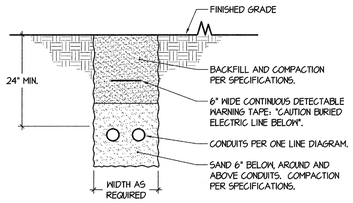
10 CONDUIT CONNECTION BETWEEN ADJACENT BUILDINGS

NTS



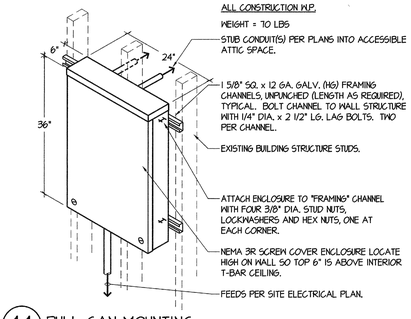
2 GROUND ROD DETAIL

NTS



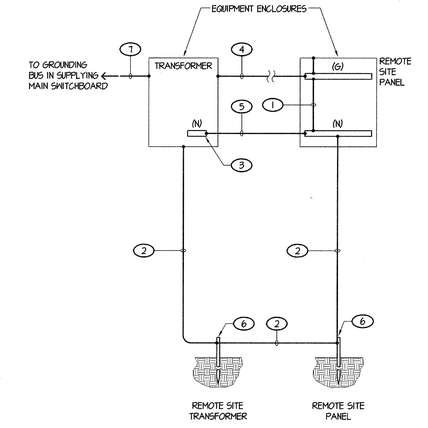
7 TRENCH DETAIL

NTS



11 PULL CAN MOUNTING

NTS



NOTES (THIS DETAIL ONLY):

1. SYSTEM BONDING JUMPER PER C.E.C. 250.30 (A), (1).
2. FULL SIZE GROUNDING ELECTRODE CONDUCTOR PER C.E.C., TABLE 250.66.
3. NEUTRAL BAR.
4. SUPPLY SIDE BONDING JUMPER PER C.E.C. 250.30 (A), (2).
5. NEUTRAL CONDUCTOR PER FEEDER SCHEDULE.
6. 5/8" DIA. ROD ELECTRODE PER C.E.C. 250.52 (A), (5).
7. EQUIPMENT GROUND CONDUCTOR PER C.E.C., TABLE 250.122.

LEGEND:

(G) DENOTES THE GROUND BUS OR BAR
(N) DENOTES THE NEUTRAL BUS OR BAR

GENERAL NOTE:

ALL MATERIALS AND METHODS USED IN GROUNDING AND BONDING SHALL COMPLY WITH C.E.C. ARTICLE 250.

13 REMOTE TRANSFORMER "TNR" AND REMOTE PANEL "NR" - GROUNDING AND BONDING

NTS

PULL BOX	SB #2	PB #2	
W	30 1/4"	16 1/4"	
L	48 1/4"	27"	

*NOTE: WHERE PULL BOX IS ADJACENT TO CONCRETE WALK, EXTEND MOWSTRIP TO CONNECT WITH WALK. FOAM SEAL ALL CONDUITS IN YARD BOXES.

**NOTE: INTERIOR DIMENSIONS MEASURED AT "BASE" OF PULL BOX.

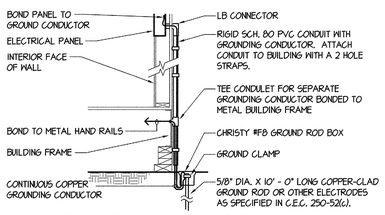
3 POWER PULL BOX

CHRISTY OR EQUAL

NTS

8 SIGNALS PULL ENCLOSURE MOUNTING

NTS



TEST SPECIFICATION FOR GROUNDING ELECTRODE SYSTEM -
THE GROUNDING ELECTRODE(S) SHALL BE TESTED BY THE FALL OF POTENTIAL METHOD AS SPECIFIED IN IEEE STD. 81-1983 & SHOWN TO BE 25 OHMS OR LESS. A COPY OF THE TEST REPORT SHALL BE SUBMITTED TO THE ARCHITECT. PROJECT INSPECTOR SHALL WITNESS TEST.

4 GROUNDING ELECTRODE SYSTEM

BOND ADJACENT MODULES TOGETHER WITH 1 #6 CU.

NTS

5 PULL CAN MOUNTING

NTS

9 SIGNAL T.C. "NR", TRANSFORMER "TNR" AND PANEL "NR" MOUNTING

NTS

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3		

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