VOLTAGE DROP CALCULATIONS

VOLTAGE DROP CALCULATION

BLDG.	CIRCUIT NO.	SERVICE TO	DISTANCE FEET	CONDUCTOR SIZE	DEVICE TYPE	DEVICES NO	LOAD AMP	TOTAL AMP.	VOLT. DROP PERCENT.
MAIN BLDG.	N1	VISUAL AND AUDIBLE DEVICES	260	12	WP HORN	2	0.041	0.486	1.74
					30cd	2	0.078		
					75cd	0	0.096		
					110cd	0	0.224		
					15cd/HORN	0	0.106		
					75cd/HORN	2	0.124		
					110cd/HORN	0	0.252		
MAIN BLDG.	N2	VISUAL AND AUDIBLE DEVICES	320	12	WP HORN	1	0.041	0.293	1.29
					30cd	0	0.078		
					75cd	0	0.096		
					110cd	0	0.224		
					15cd/HORN	0	0.106		
					75cd/HORN	0	0.124		
					110cd/HORN	1	0.252		

FORMULA $\frac{\text{LENGTH} \times \text{AMPS} \times 21.6 \times 100}{\text{VOLTAGE} \times \text{CIRCULAR MILS}} = \%$

CIRCUIT # N1 $\frac{260' \times 0.486 \times 21.6 \times 100}{24 \times 6530} = 1.74\%$

DISTANCE SHOWN IN VOLTAGE DROP CALCULATIONS ARE FOR CALCULATION PURPOSES ONLY, AND SHALL NOT BE USED FOR BID TAKE-OFF.

STROBES IN SAME ROOM SHALL BE SYNCHRONIZED

FIRE ALARM NOTE:
FIRE ALARM SUBMITTAL IS A COMPLETE PLAN SUBMITTAL IN ACCORDANCE WITH DSA POLICY #95-03(FLS) FEBRUARY 1, 1995.

FIRE ALARM EQUIPMENT SCHEDULE

ITEM DESCRIPTION	SYMBOL	MOUNTING	CATALOG NUMBER	CSFM LISTING NUMBER	NOTES	24V LOAD (AMPS)
FIRE ALARM CONTROL PANEL "FACP"		+48"	FARADAY MPC-6000	7165-0065:183		
FIRE ALARM EXPANDER PANEL		+48"	NOTIFIER #FCPS-24	7165-0065:214		0.045
SMOKE DETECTOR ON FLUSH WALL MOUNTED OUTLET BOX		CEILING	FARADAY #8710	7272-0065:184		0.00023 (STANDBY) 0.00026 (ALARM)
HEAT DETECTOR ON CEILING MOUNTED OUTLET BOX	H	ATTIC	FARADAY #8712	7270-0065:186		0.00023 (STANDBY) 0.00026 (ALARM)
ELECTRONIC HORN ON FLUSH WALL MOUNTED OUTLET BOX		+80"	WHEELOCK #AH-24R	7125-0785:131		0.017
WEATHERPROOF HORN SURFACE MOUNTED ON FLUSH WALL MOUNTED OUTLET BOX	WP	+96"	NOTIFIER #AH-24WP-R	7125-0785:131		0.033
VISUAL DEVICE ON FLUSH WALL MOUNTED OUTLET BOX	15cd	+80"	WHEELOCK #RSS-2415 SERIES	7125-0785:140	15 CANDELA PER UL MINIMUM PER U.L. STANDARD 1971	0.060
VISUAL DEVICE ON FLUSH WALL MOUNTED OUTLET BOX	75cd	+80"	WHEELOCK #RSS-2475 SERIES	7125-0785:140	75 CANDELA PER UL MINIMUM PER U.L. STANDARD 1971	0.165
VISUAL DEVICE ON FLUSH WALL MOUNTED OUTLET BOX	110cd	+80"	WHEELOCK #RSS-24110 SERIES	7125-0785:140	110 CANDELA PER UL MINIMUM PER U.L. STANDARD 1971	0.220
ELECTRONIC HORN AND VISUAL DEVICE ON SEPARATE FLUSH WALL MOUNTED OUTLET BOXES.	30cd	+80" +80"	WHEELOCK # AH-24R WHEELOCK # RSS-2430	7125-0785:131 7125-0785:140	30 CANDELA PER UL MINIMUM PER U.L. STANDARD 1971	0.017 0.092
ELECTRONIC HORN AND VISUAL DEVICE ON SEPARATE FLUSH WALL MOUNTED OUTLET BOXES.	110cd	+80" +80"	WHEELOCK # AH-24R WHEELOCK # RSS-24110	7125-0785:131 7125-0785:140	110 CANDELA PER UL MINIMUM PER U.L. STANDARD 1971	0.017 0.220
MONITOR MODULE	MM	—	FARADAY #8702	7300-0065:188		0.0004
CONTROL MODULE	CM	—	FARADAY #8704	7300-0065:188		0.0065
WATER FLOW AND SUPERVISORY SWITCH		VERIFY	NOTIFIER #WFD/1040	7770-1653:114		
TAMPER SWITCH		VERIFY	NOTIFIER #PIBV2	7770-1209:149		
FIRE ALARM BELL	W.P.	+90" VERIFY	WHEELOCK #43T-G10-115R	7135-0785:108		120 VOLT

FIRE ALARM SYSTEM NOTES

FIRE ALARM COMPLETE PLAN SUBMITTAL

1.0 PROJECT INFORMATION

A. OCCUPANCY GROUP
E-1 EDUCATION CLASSROOM

B. CONSTRUCTION TYPE
TYPE V NON-RATED
TYPE V 1 HR

C. PENETRATIONS OF FIRE RATED WALLS SHALL BE PROTECTED IN ACCORDANCE WITH CALIFORNIA BUILDING CODE, PART 2, CHAPTER 7, TITLE 24. REFER TO THE ARCHITECTURAL PLANS FOR FIRE-RATED CORRIDOR(S), OCCUPANCY SEPARATION(S) AND AREA SEPARATION WALL(S).

D. UPON COMPLETION OF SYSTEM INSTALLATION, THE SYSTEM SHALL BE TESTED IN THE PRESENCE OF AND IN A MANNER ACCEPTABLE TO THE ENFORCING AGENCY.

E. AN EXTENSION OF THE EXISTING FIRE ALARM SYSTEM WILL BE PROVIDED TO SERVE THE NEW CONSTRUCTION.

F. THE FIRE ALARM SYSTEM IS AN AUTOMATIC SYSTEM WITH SUPPLIMENTAL MANUAL DEVICES.

2.0 APPLICABLE CODES AND STANDARDS

A. APPLICABLE CODES AS OF NOVEMBER 1, 2002

2007 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, PART 1, TITLE 24 C.C.R.
2007 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R.
2007 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 C.C.R.
2007 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 C.C.R.
2007 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 C.C.R.
2007 CALIFORNIA ENERGY CODE, PART 6, TITLE 24 C.C.R.
2007 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 C.C.R.
2007 CALIFORNIA REFERENCE STANDARDS CODE, PART 12, TITLE 24 C.C.R.
1990 TITLE 19, C.C.R. PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

B. PARTIAL LIST OF APPLICABLE NFPA STANDARDS (CURRENT EDITIONS)

NFPA 13	AUTOMATIC SPRINKLER SYSTEMS	2002 EDITION
NFPA 14	STANDPIPE SYSTEMS	2007 EDITION
NFPA 17	DRY CHEMICAL EXTINGUISHING SYSTEMS	2002 EDITION
NFPA 17A	WET CHEMICAL SYSTEMS	2002 EDITION
NFPA 20	STATIONARY PUMPS	2003 EDITION
NFPA 24	PRIVATE FIRE SERVICE MAINS	2007 EDITION
NFPA 72	NATIONAL FIRE ALARM CODE (CALIFORNIA AMENDED) (NOTE SEE UL STANDARD 1971 FOR "VISUAL DEVICES")	2007 EDITION
NFPA 253	CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS	2006 EDITION
NFPA 2001	CLEAN AGENT FIRE EXTINGUISHING SYSTEMS	2004 EDITION

REFERENCE CODE SECTION FOR NFPA STANDARDS - CBC (SFM) CHAPTER 35

3.0 UPON RECEIPT OF THE CERTIFICATE OF COMPLIANCE, THE INSTALLER SHALL SUPPLY THE OWNER WITH A WRITTEN OPERATING, TESTING AND MAINTENANCE INSTRUCTIONS, POINT-TO-POINT AS BUILD DRAWINGS AND EQUIPMENT SPECIFICATIONS.

4.0 NFPA 72 CHAPTER 7 INSPECTION TESTING AND MAINTENANCE (1999) COMPLETE THE INSPECTION AND TESTING FORM IN ITS ENTIRETY SUBMIT A COPY TO THE DISTRICT, ARCHITECT AND DSA DIVISION OF FIRE AND LIFE SAFETY.

FIRE ALARM BATTERY CALCULATIONS

FIRE ALARM BATTERY CALCULATIONS

CONTROL PANEL "FACP"

QTY	DEVICE	STAND BY CURRENT	ALARM CURRENT
36	SMOKE DETECTOR	0.012	0.012
6	HEAT DETECTOR	0.002	0.002
0	MANUAL PULL STATION	0.000	0.000
4	CONTROL MODULES	0.001	0.001
3	MONITOR MODULES	0.001	0.001
	TOTAL CURRENTS	0.016	0.016

TOTAL STAND-BY CURRENT X 60 HOURS = 0.016 X 60 = 0.970 A-HR
TOTAL ALARM CURRENT X 10 MINUTES = 0.02 X 0.083 = 0.001 A-HR
EXISTING LOADS 27.044

TOTAL MINIMUM AMP HOURS OF BATTERIES = 28.016 A-HR

NOTES:
1. BATTERY CALCULATION SHALL BE BASED ON 60 HOURS OF STAND BY AND 10 MINUTES OF ALARM CURRENT
2. PROVIDE MINIMUM OF 36 A-HOURS ADDITIONAL STANDBY BATTERY POWER.

FIRE ALARM BATTERY CALCULATIONS

EXTENDER PANEL "EXP1"

QTY	DEVICE	STAND BY CURRENT	ALARM CURRENT
1	SNAC-9	0.075	0.175
3	WP HORN	0.000	0.123
0	15cd STROBES	0.000	0.000
2	30cd STROBES	0.000	0.114
0	15cd HORN STROBE	0.000	0.000
0	30cd HORN STROBE	0.000	0.000
2	75cd HORN STROBE	0.000	0.178
1	110cd HORN STROBE	0.000	0.102
	TOTAL CURRENTS	0.075	0.692

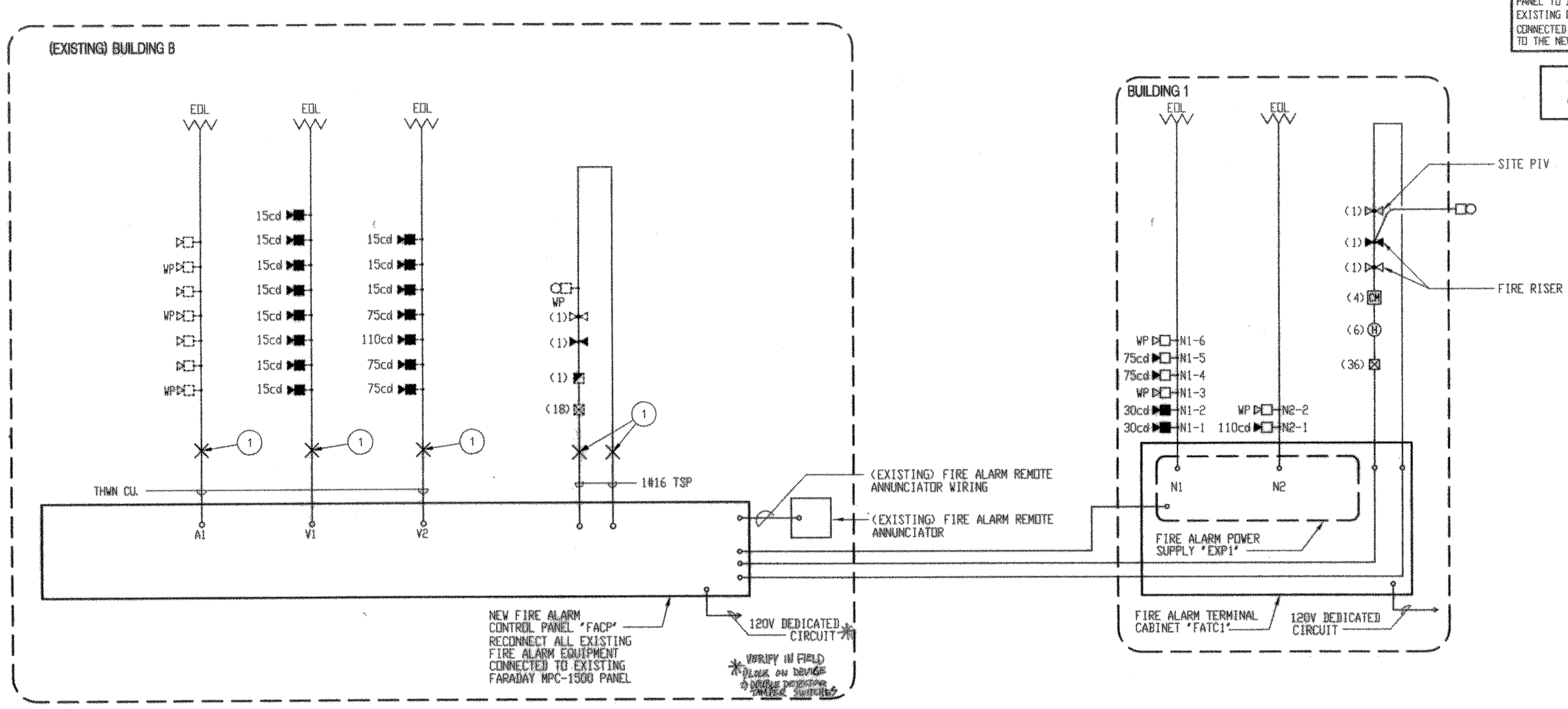
TOTAL STAND-BY CURRENT X 60 HOURS = 0.075 X 60 = 4.500 A-HR
TOTAL ALARM CURRENT X 5 MINUTES = 0.69 X 0.083 = 0.058 A-HR

TOTAL MINIMUM AMP HOURS OF BATTERIES = 4.558 A-HR

NOTES:
1. BATTERY CALCULATION SHALL BE BASED ON 60 HOURS OF STAND BY AND 5 MINUTES OF ALARM CURRENT
2. PROVIDE MINIMUM OF 7 A-HOURS ADDITIONAL STANDBY BATTERY POWER.

SCOPE OF WORK:
PROVIDE FIRE ALARM DEVICES TO MATCH EXISTING SYSTEM. CONNECT NEW BUILDING TO NEW FACP IN LOCATION OF THE EXISTING FIRE ALARM CONTROL PANEL TO BE DISCONNECTED AND REMOVED. THE EXISTING FIRE ALARM DEVICES PREVIOUSLY CONNECTED TO THE MPC-1500 ARE TO BE RECONNECTED TO THE NEW FIRE ALARM CONTROL PANEL.

THE FIRE ALARM SYSTEM IS AN AUTOMATIC, ADDRESSABLE SYSTEM.



(1) INTERCEPT EXISTING FIRE ALARM ADDRESSABLE LOOPS AND NOTIFICATION CIRCUITS AT THE EXISTING FIRE ALARM CONTROL PANEL. EXTEND THE EXISTING CIRCUITS TO THE NEW FIRE ALARM CONTROL PANEL AND RECONNECT TO FULLY RESTORE FOR A COMPLETE AND OPERABLE SYSTEM.

San Gabriel Unified School District
408 Junipero Serra
San Gabriel, CA 91776

IBI GROUP
ARCHITECTS ENGINEERS PLANNERS

ARCHITECT:
IBI Group
18401 Von Karman Avenue, Suite 110
Irvine, California 92612
Phone 949-833-5588
Fax 949-833-5511

STRUCTURAL ENGINEER:
Martin, Chow & Nakabara, Inc.
3185-C Airway Avenue
Costa Mesa, CA 92626
Phone 714-979-3003
Fax 714-979-3259

MECHANICAL ENGINEER:
Fundament & Associates
26 Executive Park #100
Irvine, CA 92614
Phone 949-251-1131
Fax 949-251-9434

ELECTRICAL ENGINEER:
FBA
3420 Irvine Avenue, Suite 200
Newport Beach, CA 92660-3189
Phone 949-852-9995
Fax 949-852-1657

CIVIL ENGINEER:
Snipes-Dye Associates
8348 Center Drive, Suite G
La Mesa, CA 91942-2910
Phone 619-697-9234
Fax 619-460-2033

LANDSCAPE ENGINEER:
IBI Group
10 Exchange Place- Suite 112
Salt Lake City UT 84111 USA
Phone 801-532-4233
Fax 801-532-4231

FBA # 888.170
FBA Engineering
Consulting Electrical Engineers
3420 Irvine Avenue Suite 200
Newport Beach, California 92660-3189
TEL 949 852 9995 FAX 949 852 1657
EMAIL: fba@fbaengineering.net

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. ZAJICEK No. E 10372 Exp. 09-30-10 ELECTRICAL STATE OF CALIFORNIA

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
OFFICE OF REGULATION SERVICES
03-112620
AC FLS SS
DATE

LICENSED ARCHITECT KEVIN S. FLEMING NO. C26668 08-31-11 RENEWAL DATE STATE OF CALIFORNIA

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Del Mar High School
312 Del Mar Ave
San Gabriel, CA 91776

FIRE ALARM RISER AND CALCULATIONS

Project Number	20318
Date	FEBRUARY, 2010
Drawn By	JBM
Checked By	RR

E0.3

Scale