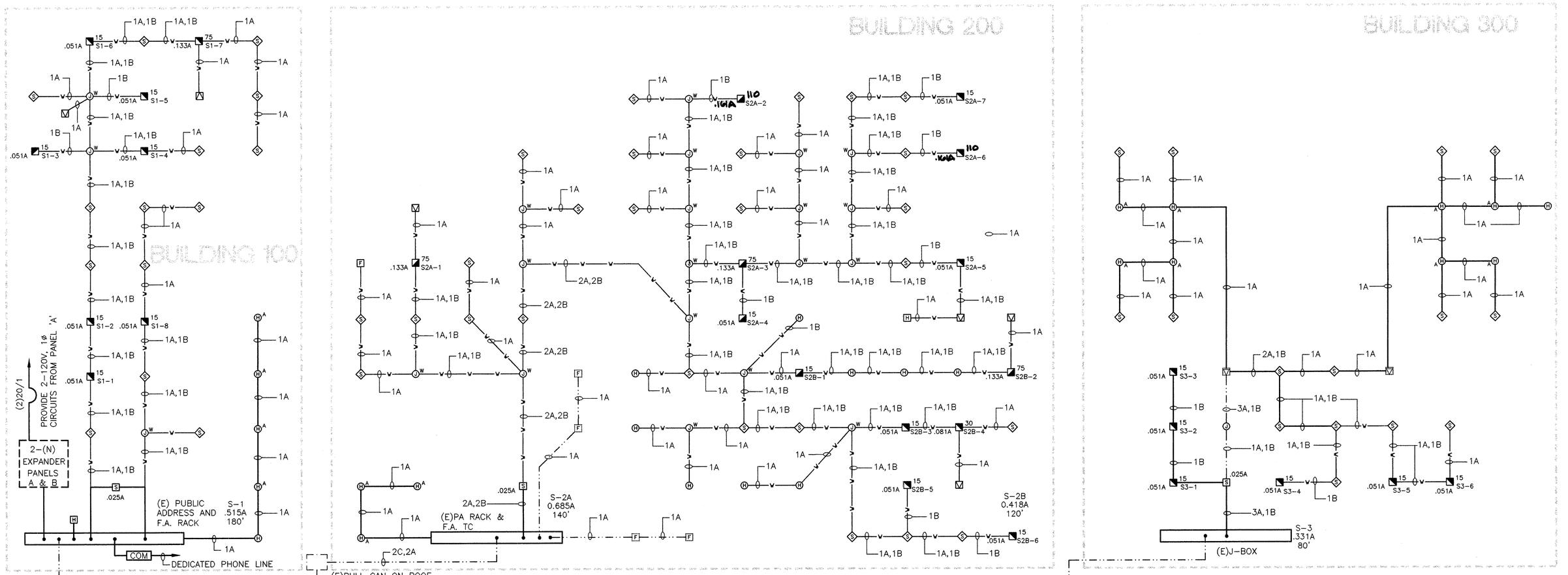


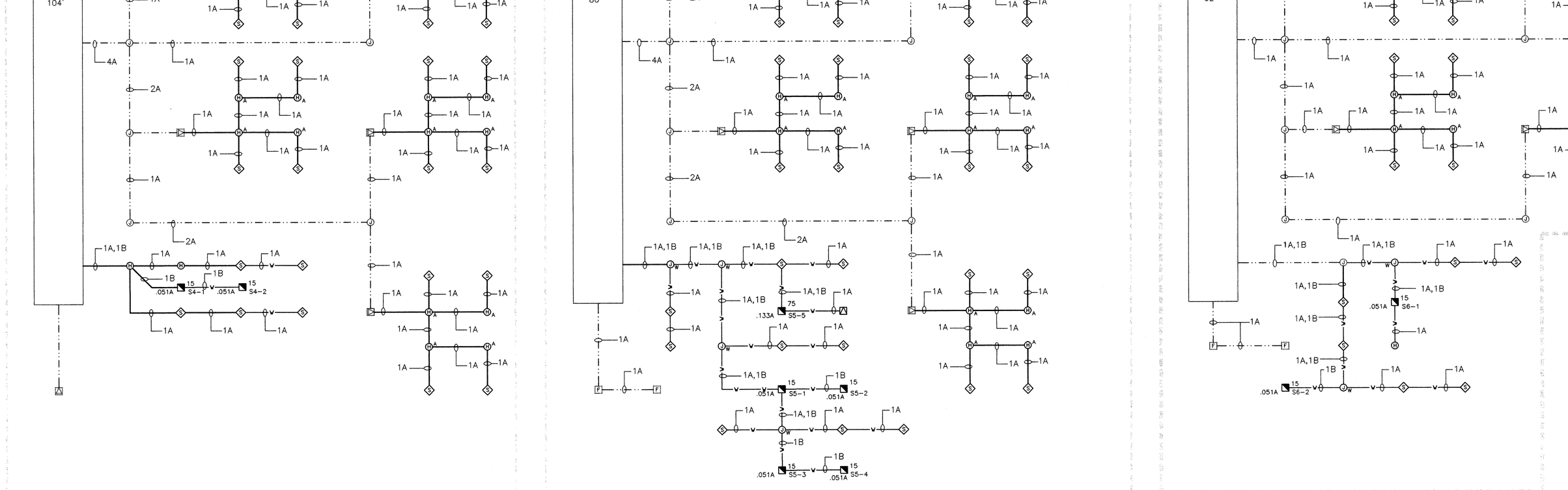


## BATTERY CALCULATIONS — FIREPLEX PANEL

| | | SUPERVISORY | ALARM |
|---|---|---|---|
| EXISTING LOAD | | 1.31140A | 19.800A * |
| ADITIONAL LOAD –SMOKE DETECTORS | (135) | .0054A | 20.250A |
| –BASE | (135) | | 6.885A |
| | SUB-TOTAL | 1.31680A | 46.935A |
| ALARM CURRENT | .1 HR. X 46.935A = | 4.6935Ahr | |
| SUP. CURRENT | 24 HR. X 1.31680A = | 31.6032Ahr | |
| | TOTAL REQ'D = | 36.2967Ahr | |

EXISTING BATTERY HAVE CAPACITY FOR 55Ahr

*EXISTING LOAD INCLUDES AMPLIFIER AT FULL LOAD OF 250WATTS
THE EXISTING AMPLIFIER HAS A LOAD OF 71.85WATTS
INTERIOR SPEAKERS ADD 3.25WATTS
NEW LOAD 75.10WATTS

*EXISTING LOAD BASED ON PREVIOUS PROJECT DSA#103922

## BATTERY CALCULATIONS — EXPANDER A

| | | SUPERVISORY | ALARM |
|---|---|---|---|
| EXPANDER CKTS 1, 2A & 2B –VISUALS TOTAL | | .075A | .175A |
| | | | 1.646A |
| | SUB-TOTAL | .075A | 1.821A |
| ALARM CURRENT | .1 HR. X 1.821 = | .1821Ahr | |
| SUP. CURRENT | 24 HR. X .075A = | 1.8000Ahr | |
| | TOTAL REQ'D = | 1.9821Ahr | |

BATTERIES ARE 7AHr CAPACITY

## BATTERY CALCULATIONS — EXPANDER B

| | | SUPERVISORY | ALARM |
|---|---|---|---|
| EXPANDER CKTS 3, 4, 5, & 6 –VISUALS TOTAL | | .075A | .175A |
| | | | .874A |
| | SUB-TOTAL | .075A | 1.049A |
| ALARM CURRENT | .1 HR. X 1.049A = | .1049Ahr | |
| SUP. CURRENT | 24 HR. X .075A = | 1.8000Ahr | |
| | TOTAL REQ'D = | 1.9049Ahr | |

BATTERIES ARE 7AHr CAPACITY

| FA CABLE SCHEDULE | |
|---|---|
| A | (3) WESTPENN 355 INDOOR |
| | (3) WESTPENN AQC-355 OUTDOOR |
| B | (4)#12 CU THHN |
| C | (4)#14,(4)#12 CU THWN |
| | |
| | |

NOTE:
1. ITEMS LISTED FOR CALCULATION PURPOSES ONLY, PROVIDE ALL APPURTENANCES FOR COMPLETE SYSTEM.

**FULLY AUTOMATIC SYSTEM**

**FIRE ALARM COMPLETE PLAN SUBMITTAL**

# FIRE ALARM RISER DIAGRAM

## VOLTAGE DROP CALCULATION CKT# S-1 (BLDG 100)

VD = Voltage Drop
I = Total Load = .515 Amps
K = 11(Copper Constant)
L = Distance to the load (180')
CM = Circular Mills (Cross Section of 12 AWG = 6530)
V = Voltage (24vdc)

$VD = \frac{K * I * 2L}{CM}$ OR $\frac{11 * .515 * (180' * 2)}{6530} = 0.312$

VD = .312/24= .013 OR 1.3 % VOLTAGE DROP

## VOLTAGE DROP CALCULATION CKT# S-2A (BLDG 200)

VD = Voltage Drop
I = Total Load = 0.713 Amps
K = 11(Copper Constant)
L = Distance to the load (540')
CM = Circular Mills (Cross Section of 12 AWG = 6530)
V = Voltage (24vdc)

$VD = \frac{K * I * 2L}{CM}$ OR $\frac{11 * .713 * (540' * 2)}{6530} = 1.297$

VD = 1.297/24= .054 OR 5.4 % VOLTAGE DROP

## VOLTAGE DROP CALCULATION CKT# S-2B (BLDG 200)

VD = Voltage Drop
I = Total Load = 0.418 Amps
K = 11(Copper Constant)
L = Distance to the load (120')
CM = Circular Mills (Cross Section of 12 AWG = 6530)
V = Voltage (24vdc)

$VD = \frac{K * I * 2L}{CM}$ OR $\frac{11 * .418 * (120' * 2)}{6530} = .169$

VD = .169/24= .007 OR .7% VOLTAGE DROP

## VOLTAGE DROP CALCULATION CKT# S-3 (BLDG 300)

VD = Voltage Drop
I = Total Load = .331 Amps
K = 11(Copper Constant)
L = Distance to the load (260') + 180
CM = Circular Mills (Cross Section of 12 AWG = 6530)
V = Voltage (24vdc)

$VD = \frac{K * I * 2L}{CM}$ OR $\frac{11 * .331 * (260' * 2)}{6530} = 0.290$

VD = .290/24= .012 OR 1.2 % VOLTAGE DROP

## VOLTAGE DROP CALCULATION CKT# S-4 (BLDG 400)

VD = Voltage Drop
I = Total Load = .102 Amps
K = 11(Copper Constant)
L = Distance to the load (244')
CM = Circular Mills (Cross Section of 12 AWG = 6530)
V = Voltage (24vdc)

$VD = \frac{K * I * 2L}{CM}$ OR $\frac{11 * .102 * (244' * 2)}{6530} = 0.084$

VD = .084/24= .0035 OR .35 % VOLTAGE DROP

## VOLTAGE DROP CALCULATION CKT# S-5 (BLDG 500)

VD = Voltage Drop
I = Total Load = .337 Amps
K = 11(Copper Constant)
L = Distance to the load (320')
CM = Circular Mills (Cross Section of 12 AWG = 6530)
V = Voltage (24vdc)

$VD = \frac{K * I * 2L}{CM}$ OR $\frac{11 * .337 * (320' * 2)}{6530} = 0.36$

VD = .036/24= .015 OR 1.5 % VOLTAGE DROP

## VOLTAGE DROP CALCULATION CKT# S-6 (BLDG 600)

VD = Voltage Drop
I = Total Load = .102 Amps
K = 11(Copper Constant)
L = Distance to the load (392')
CM = Circular Mills (Cross Section of 12 AWG = 6530)
V = Voltage (24vdc)

$VD = \frac{K * I * 2L}{CM}$ OR $\frac{11 * .102 * (392' * 2)}{6530} = 0.135$

VD = 0.135/24= .0056 OR 0.56% VOLTAGE DROP

ALARM CURRENT: .1 HR. X 2.665 A = .2665Ahr
SUP. CURRENT: 24 HR. X .146 A = 3.5044Ahr
TOTAL REQ'D = 3.771Ahr

PROVIDE 15 Ahr BATTERY


bfgc Architecture

**Bakersfield**
5500 ming avenue, suite 450, bakersfield, ca 93309
661.836.4300 fax 661.836.4311

**San Jose**
150 south first st., suite 200
san jose, california 95113
408.924.0841
fax 408.924.0844

**San Luis Obispo**
4115 broad street, suite b-6
san luis obispo, ca 93401
805.546.0433
fax 805.546.0504

**Oakland**
350 frank ogawa plaza., suite 300
oakland, california 94612
510.891.0670
fax 510.891.0674

**Principal Architects**
david r. cortral, f.a.i.a., C-8564
frank a. ghezzi, a.i.a., C-3132
mark engelen, a.i.a., C-8021
william r. tuculet, a.i.a., C-8702
dean a. tatsuno, a.i.a., C- 9190
bruce m. bigger, a.i.a., C-23134
brad henderson, a.i.a., C-10901
richard l. mello, a.i.a., C-18079

REGISTERED PROFESSIONAL ENGINEER JAMES W. GRAHAM No. 5101 09/30/06 ELECTRICAL STATE OF CALIFORNIA

INTERSTATE ENGINEERING INC ESTABLISHED 1968
466 W. Fallbrook Ave., Suite 106
Fresno, California 93711
(559) 432-4490 / (559) 432-4494 fax
James W. Graham, Electrical Engineer
E.E. #5101


FILE NO: 15-6

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APPL NO: 03-106664
AC FLS V SS K2
DATE AUG 2 6 2003

# MODERNIZATION

**FOR**

COLONEL HOWARD NICHOLS SCHOOL
3401 RENEGADE AVE.
BAKERSFIELD, CA 93306

BAKERSFIELD CITY SCHOOL DISTRICT

## FIRE ALARM RISER DIAGRAM AND CALCULATIONS

| Version Date: | Version time: |
|---|---|
| job no. 02-127 | E 1.13 |
| date 06/24/03 | |
| drawn by T.A. | |
| chk'd by D.G. | |
| ©copyright 2003 | |