NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV2: 90 FLRS 2, 3 & 4 DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd	–	0.5010	0.0000
WHEELOCK HORN/STROBE 15cd	–	0.0000	0.0000
WHEELOCK STROBE 30 cd	–	0.0300	0.0000
WHEELOCK HORN/STROBE 30 cd	–	0.0450	0.0000
WHEELOCK STROBE 75 cd	–	0.1650	0.0000
WHEELOCK HORN/STROBE 75 cd	–	0.1650	0.0000
WHEELOCK STROBE 110 cd	–	0.1100	0.0000
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	–	0.0000	0.0000
AUTOCALL BELL	21	0.0500	1.0500
AUTOCALL BELL/STROBE	–	0.2150	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT			1.0500

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = A CONSTANT

CM = CIRCULAR MILS

VD = {(1.05 A) (1080 FT) (21.64)}/4110 = 5.96 V

%VD = {5.96 V / 24 V} X 100 = 24.832%

REMAINING VOLTS = 18.04

WIRE SIZE	CIRCULAR MILS
12AWG	6530
14AWG	4110
16AWG	2580
18AWG	1620
20AWG	1020

BATTERY CALCULATIONS FAP-001 & -001A-90

ITEM	DESCRIPTION	QTY	STANDBY CURRENT PER ITEM (AMPS)	TOTAL STANDBY CURRENT PER ITEM	ALARM CURRENT PER ITEM (AMPS)	TOTAL ALARM CURRENT PER ITEM
CP-35	FACP w/2ZN'S + AUD	1	0.1750	0.1750	0.5010	0.5010
PS-35	POWER SUPPLY	2	0.0000	0.0000	0.0000	0.0000
BC-35	BATTERY CHARGER	1	0.0450	0.0450	0.0300	0.0300
AE-30U	CLASS B BELL MODULE	3	0.0065	0.0195	0.0400	0.1200
PM-32	MATRIX MODULE	–	0.0000	0.0000	0.0000	0.0000
RM-30U	RELEASE MODULE	–	0.0050	0.0000	1.5000	0.0000
SM-30	SWITCH MODULE	4	0.0000	0.0000	0.0450	0.1800
SR-30	2 RELAY MODULE	1	0.0000	0.0000	0.0450	0.0450
SR-35	8 RELAY MODULE	1	0.0000	0.0000	0.0210	0.0210
TC-30U	BATTERY TRANSFER	1	0.0300	0.0300	0.0150	0.0150
ZN-34US	SUPERVISORY MODULE	4	0.0100	0.0400	0.1100	0.4400
ZU-35	ZONE MODULE	8	0.0090	0.0720	0.1100	0.8800
ZU-35DS	ZONE MODULE	4	0.0090	0.0360	0.1100	0.4400
	SMOKE DETECTOR	32	0.0001	0.0032	0.0010	0.0320
MOI	TRANSMITTER	1	0.1200	0.1200	0.1750	0.1750
MID	INPUT BOARD	3	0.0020	0.0060	0.0000	0.0000
PS-5A	POWER SUPPLY	1	0.0380	0.0380	0.0000	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT						2.0650
	TOTAL SYSTEM CURRENT		STANDBY	0.5847	ALARM	4.9440

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) + (TOT. ALARM CURRENT X ALARM TIME)} X 1.25

MIN. BATTERY CAPACITY = {(0.5847 A X 24 HR) + (4.944 A X 0.083 HR)} X 1.25

MIN. BATTERY CAPACITY = {14.0328 AHr + 0.4104 AHr} X 1.25 = 18.0539 AHr

FIRE ALARM SYSTEM FUNCTION CHART

SYSTEM EVENT / RESPONSE	ANNUNCIATE AT FACU	FIRE SIGNAL TO RECEIVER	TROUBLE SIGNAL TO LBNL RECEIVER	SUPERVISORY SIGNAL TO LBNL RECEIVER	OPERATE 90 NOTIFICATION APPLIANCES	OPERATE B90C & P NOTIFICATION DEVICES	ELEVATOR RECALL	FAN SHUTDOWN	1ST FLR DAMPER CLOSE	DOOR HOLDERS RELEASE
90 FIRE CALL BOXES	●	●			●					
90 SMOKE DETECTORS	●	●			●					
90 FLRS B,2&3 ELEVATOR LOBBY SMOKE DETECTORS	●	●			●		●			
90 FACP SMOKE DETECTOR	●	●			●					
90 1ST FLR DOOR HOLDER SMOKE DETECTORS	●	●			●					●
90 FLRS 2,3&4 DOOR HOLDER SMOKE DETECTORS	●	●			●					●
90 ROOF & LOADING DOCK DUCT SMOKE DETECTORS	●	●			●			●	●	
90 FIRE SPRINKLER WATERFLOW SWITCHES	●	●			●					
90 FIRE SPRINKLER VALVE SUPERVISORY SWITCHES	●			●						
B90C & P FIRE CALL BOXES	●	●				●				
B90C & P FIRE SPRINKLER WATERFLOW SWITCHES	●	●				●				
B90C & P FIRE SPRINKLER VALVE SUPERVISORY SWITCHES	●			●		●				
AC POWER FAILURE	●		●							
SYSTEM FAULT	●		●							

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV3: B90C & B90P DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd	–	0.5010	0.0000
WHEELOCK HORN/STROBE 15cd	–	0.0000	0.0000
WHEELOCK STROBE 30 cd	–	0.0300	0.0000
WHEELOCK HORN/STROBE 30 cd	–	0.0450	0.0000
WHEELOCK STROBE 75 cd	–	0.1650	0.0000
WHEELOCK HORN/STROBE 75 cd	–	0.1650	0.0000
WHEELOCK STROBE 110 cd	–	0.1100	0.0000
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	–	0.0000	0.0000
AUTOCALL BELL	3	0.0500	0.1500
AUTOCALL BELL/STROBE	–	0.2150	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT			0.1500

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = A CONSTANT

CM = CIRCULAR MILS

VD = {(0.15 A) (890 FT) (21.64)}/4110 = 0.702

%VD = {0.702 V / 24 V} X 100 = 2.923%

REMAINING VOLTS = 23.298

WIRE SIZE	CIRCULAR MILS
12AWG	6530
14AWG	4110
16AWG	2580
18AWG	1620
20AWG	1020

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1: 90 BSMN'T & 1ST FLR DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd	–	0.5010	0.0000
WHEELOCK HORN/STROBE 15cd	–	0.0000	0.0000
WHEELOCK STROBE 30 cd	–	0.0300	0.0000
WHEELOCK HORN/STROBE 30 cd	–	0.0450	0.0000
WHEELOCK STROBE 75 cd	1	0.1650	0.1650
WHEELOCK HORN/STROBE 75 cd	–	0.1650	0.0000
WHEELOCK STROBE 110 cd	–	0.1100	0.0000
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	–	0.0000	0.0000
AUTOCALL BELL	14	0.0500	0.7000
AUTOCALL BELL/STROBE	–	0.2150	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT			0.8650

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = A CONSTANT

CM = CIRCULAR MILS

VD = {(0.865 A) (530 FT) (21.64)}/4110 = 2.409

%VD = {2.409 V / 24 V} X 100 = 10.039%

REMAINING VOLTS = 21.591

WIRE SIZE	CIRCULAR MILS
12AWG	6530
14AWG	4110
16AWG	2580
18AWG	1620
20AWG	1020

NOTIFICATION APPLIANCE CIRCUIT CURRENT

CKT AV1	90 B'SMNT & 1ST FLR	0.865
CKT AV2	90 FLRS 2, 3 & 4	1.050
CKT AV3	B90C, B90P	0.150
CKT AV4	–	–
CKT AV5	–	–
CKT AV6	–	–
CKT AV7	–	–
CKT AV8	–	–
	TOTAL NOTIFICATION APPLIANCES CURRENT	2.065

PROFESSIONAL SEAL (IF REVISION, APPLIES ONLY TO REVISED WORK)

ISSUE (PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD): AS BUILT – – 10/29/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
_	LDD	LDD	MCD	10/29/13	AS BUILT

BLDG 90 FIRE ALARM
B90C & B90P
FUNCTION CHART & CALCULATIONS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY LDD	DATE 10/29/2013	
CHECKED BY LDD	10/29/2013	
APPROVED BY MCD	10/29/2013	
SCALE AS NOTED		
DRAWING NO. 4B90E156_		SHEET FA
PROJECT NO. 000000		1 OF 1