NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV4: 2ND FLOOR NORTH 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	5	0.1650	0.8250
WHEELOCK HORN/STROBE 75 cd	–	0.1100	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	6	0.0500	0.3000
TOTAL NOTIFICATION APPLIANCES CURRENT			1.1250

VOLTAGE DROP (VD) CALCULATIONS

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

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = CONSTANT

CM = WIRE CROSS-SECTIONAL AREA (CIRCULAR MILS)

VD = {(1.125A) (280FT) (21.64)}/4110 = 1.655V

%VD = {1.655V / 24V} X 100 = 6.898%

REMAINING VOLTS = 22.345

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

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV2: 1ST FLOOR NORTH 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	4	0.1650	0.6600
WHEELOCK HORN/STROBE 75 cd	–	0.1100	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	8	0.0500	0.4000
TOTAL NOTIFICATION APPLIANCES CURRENT			1.0600

VOLTAGE DROP (VD) CALCULATIONS

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

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = CONSTANT

CM = WIRE CROSS-SECTIONAL AREA (CIRCULAR MILS)

VD = {(1.06A) (260FT) (21.64)}/4110 = 1.448V

%VD = {1.448V / 24V} X 100 = 6.035%

REMAINING VOLTS = 22.552

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

BATTERY CALCULATIONS FAP-001 & -001A-70

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
AA-30U	CLASS B BELL MODULE	9	0.0065	0.0585	0.0300	0.3600
PM-32	MATRIX MODULE	1	0.0000	0.0000	0.0000	0.0000
SM-30	SWITCH MODULE	4	0.0000	0.0000	0.0450	0.1800
SR-32	6 RELAY MODULE	2	0.0000	0.0000	0.0450	0.0900
SR-35	8 RELAY MODULE	3	0.0000	0.0000	0.0210	0.0630
TC-30U	BATTERY TRANSFER	1	0.0300	0.0300	0.0150	0.0150
ZN-34US	SUPERVISORY MODULE	3	0.0100	0.0300	0.1100	0.3300
ZU-35	ZONE MODULE	8	0.0090	0.0720	0.1100	0.8800
ZU-35DS	ZONE MODULE/SD's	8	0.0090	0.0720	0.1100	0.8800
SMOKE	SMOKE DETECTOR	101	0.0001	0.0101	0.0010	0.1010
MOI	TRANSMITTER	2	0.1200	0.2400	0.1750	0.3500
MID	INPUT BOARD	4	0.0020	0.0080	0.0000	0.0000
PS-5A	POWER SUPPLY	2	0.0380	0.0760	0.0000	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT						8.1800
	TOTAL SYSTEM CURRENT		STANDBY	0.8166	ALARM	11.9600

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

MIN. BATTERY CAPACITY = {(0.8166 A X 24 HR) + (11.96 A X 0.083 HR)} X 1.25

MIN. BATTERY CAPACITY = {19.5984 AHr + 0.9927 AHr} X 1.25 = 25.7389 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 NOTIFICATION APPLIANCES	ELEVATOR RECALL	DOOR HOLDER RELEASE	DAMPER CLOSE
FIRE CALL BOX	●	●			●	●	●	●
HEAT DETECTOR	●	●			●	●	●	●
SMOKE DETECTOR	●	●			●	●	●	●
DUCT SMOKE DETECTOR	●	●			●	●	●	●
DOOR HOLDER SMOKE DETECTOR	●	●			●	●	●	●
FIRE SPRINKLER WATERFLOW SWITCH	●	●			●	●	●	●
FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●				
AC POWER FAILURE	●		●					
SYSTEM FAULT	●		●					

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV5: 2ND FLOOR SOUTH & ROOF 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	5	0.1650	0.8250
WHEELOCK HORN/STROBE 75 cd	–	0.1100	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	8	0.0500	0.4000
TOTAL NOTIFICATION APPLIANCES CURRENT			1.2250

VOLTAGE DROP (VD) CALCULATIONS

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

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = CONSTANT

CM = WIRE CROSS-SECTIONAL AREA (CIRCULAR MILS)

VD = {(1.225A) (320FT) (21.64)}/4110 = 2.06V

%VD = {2.06V / 24V} X 100 = 8.584%

REMAINING VOLTS = 21.94

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

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV3: 1ST FLOOR SOUTH 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	9	0.1650	1.485
WHEELOCK HORN/STROBE 75 cd	–	0.1100	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	6	0.0500	0.3000
TOTAL NOTIFICATION APPLIANCES CURRENT			1.7850

VOLTAGE DROP (VD) CALCULATIONS

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

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = CONSTANT

CM = WIRE CROSS-SECTIONAL AREA (CIRCULAR MILS)

VD = {(1.785A) (300FT) (21.64)}/4110 = 2.814V

%VD = {2.814V / 24V} X 100 = 11.726%

REMAINING VOLTS = 21.186

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

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1: 70 ANNEX 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	8	0.1650	1.3200
WHEELOCK HORN/STROBE 75 cd	–	0.1100	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	6	0.0500	0.3000
TOTAL NOTIFICATION APPLIANCES CURRENT			1.6200

VOLTAGE DROP (VD) CALCULATIONS

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

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = CONSTANT

CM = WIRE CROSS-SECTIONAL AREA (CIRCULAR MILS)

VD = {(1.62A) (110FT) (21.64)}/4110 = 0.937V

%VD = {0.937V / 24V} X 100 = 3.902%

REMAINING VOLTS = 23.063

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

NOTIFICATION APPLIANCE CIRCUIT CURRENTS

CKT AV1	70 ANNEX	1.620
CKT AV2	1ST FLOOR NORTH	1.060
CKT AV3	1ST FLOOR SOUTH	1.785
CKT AV4	2ND FLOOR NORTH	1.655
CKT AV5	2ND FLOOR SOUTH & ROOF	2.060
CKT AV6	–	–
CKT AV7	–	–
CKT AV8	–	–
	TOTAL NOTIFICATION APPLIANCES CURRENT	8.180

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

ISSUE (PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD): AS BUILT – – 10/02/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
–	LDD	LDD	MCD	10/02/13	AS BUILT

BLDG 70 FIRE ALARM FUNCTION CHART & CALCULATIONS

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UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY	LDD	DATE 10/02/2013
CHECKED BY	LDD	10/02/2013
APPROVED BY	MCD	10/02/2013
SCALE	AS NOTED	
DRAWING NO.	4B70E246_	SHEET
PROJECT NO.	000000	1 OF 1