NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV2 – BLDG 36A 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	–	0.0210	0.0000
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	2	0.0500	0.1000
TOTAL NOTIFICATION APPLIANCES CURRENT			0.1000

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 = {(0.1A) (75FT) (21.64)}/4110 = 0.039V
%VD = {0.039V / 24V} X 100 = 0.164%
REMAINING VOLTS = 23.961

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

BATTERY CALCULATIONS FAP–001–36

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	1	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	1	0.0065	0.0065	0.0300	0.0300
SM–30	SWITCH MODULE	1	0.0000	0.0000	0.0450	0.0450
SR–35	8 RELAY MODULE	1	0.0000	0.0000	0.0210	0.0210
ZN–34US	SUPERVISORY MODULE	1	0.0100	0.0100	0.1100	0.1100
ZU–35	ZONE MODULE	3	0.0090	0.0270	0.1100	0.3300
ZU–35DS	ZONE MODULE/SD's	–	0.0090	0.0000	0.1100	0.0000
SMOKE	SMOKE DETECTOR	8	0.0001	0.0008	0.0010	0.0080
MOI	TRANSMITTER	1	0.1200	0.1200	0.1750	0.1750
MID	INPUT BOARD	1	0.0020	0.0020	0.0000	0.0000
PS–5A	POWER SUPPLY	1	0.0380	0.0380	0.0000	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT						0.2000
	TOTAL SYSTEM CURRENT		STANDBY	0.4243	ALARM	1.7100

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) + (TOT. ALARM CURRENT X ALARM TIME)} X 1.25
MIN. BATTERY CAPACITY = {(0.4243 A X 24 HR) + (1.7100 A X 0.083 HR)} X 1.25
MIN. BATTERY CAPACITY = {10.1832 AHr + 0.1419 AHr} X 1.25 = 12.9064 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 B36 NOTIFICATION APPLIANCES	OPERATE B36A NOTIFICATION APPLIANCES	OPERATE B61 NOTIFICATION APPLIANCES
B36 FIRE CALL BOX	●	●			●		
B36 SMOKE DETECTOR	●	●			●		
B36A FIRE CALL BOX	●	●				●	
B36A SMOKE DETECTOR	●	●				●	
B61 FIRE CALL BOX	●	●					●
B61 HEAT DETECTOR	●	●					●
AC POWER FAILURE	●		●				
SYSTEM FAULT	●		●				

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV3 – BLDG 61 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	–	0.0210	0.0000
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	1	0.0500	0.0500
TOTAL NOTIFICATION APPLIANCES CURRENT			0.0500

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 = {(0.05A) (320FT) (21.64)}/4110 = 0.084V
%VD = {0.084V / 24V} X 100 = 0.35%
REMAINING VOLTS = 23.916

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

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1 – BLDG 36 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	–	0.0210	0.0000
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	1	0.0500	0.0500
TOTAL NOTIFICATION APPLIANCES CURRENT			0.0500

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 = {(0.05A) (10FT) (21.64)}/4110 = 0.003V
%VD = {0.003V / 24V} X 100 = 0.011%
REMAINING VOLTS = 23.997

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

NOTIFICATION APPLIANCE CIRCUIT CURRENTS

CKT AV1	BLDG 36	0.050
CKT AV2	BLDG 36A	0.100
CKT AV3	BLDG 61	0.050
CKT AV4	–	–
CKT AV5	–	–
CKT AV6	–	–
CKT AV7	–	–
CKT AV8	–	–
	TOTAL NOTIFICATION APPLIANCES CURRENT	0.200

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

ISSUE (PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD): AS BUILT – – 09/16/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
_	LDD	LDD	MCD	09/16/13	AS BUILT

BLDG 36 FIRE ALARM FUNCTION CHART & CALCULATIONS
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UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY	LDD	DATE 09/16/2013
CHECKED BY	LDD	09/16/2013
APPROVED BY	MCD	09/16/2013
SCALE	AS NOTED	
DRAWING NO.	4B36E273_	SHEET 1 OF 1
PROJECT NO.	000000	