NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV2: 76 2ND FLR CENTER 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	–	0.165	0.0000
WHEELOCK HORN/STROBE 75 cd	–	0.1100	0.0000
WHEELOCK STROBE 110 cd	11	0.2200	2.4200
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	11	0.0870	0.9570
AUTOCALL BELL	–	0.0500	0.0000
AUTOCALL BELL/STROBE 75 cd	–	0.2150	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT			3.377

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 = {(3.377) (330FT) (21.64)}/4110 = 5.857V
%VD = {5.857V / 24V} X 100 = 24.403%
REMAINING VOLTS = 18.143

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

BATTERY CALCULATIONS FAP-001-76

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	5	0.0065	0.0325	0.0400	0.2000
PM-32	MATRIX MODULE	1	0.0000	0.0000	0.0000	0.0000
RM-30U	RELEASE MODULE	–	0.0050	0.0000	1.5000	0.0000
SM-30	SWITCH MODULE	2	0.0000	0.0000	0.0450	0.0900
SR-32	6 RELAY MODULE	–	0.0000	0.0000	0.0450	0.0000
SR-35	8 RELAY MODULE	1	0.0000	0.0000	0.0210	0.0210
TC-30U	BATTERY TRANSFER	–	0.0000	0.0000	0.0500	0.0000
TL-30U	TIME LIMIT	–	0.0300	0.0000	0.0150	0.0000
ZN-34US	SUPERVISORY MODULE	5	0.0100	0.0500	0.1100	0.5500
ZU-35	ZONE MODULE	6	0.0090	0.0540	0.1100	0.6600
ZU-35DS	ZONE MODULE/SD's	2	0.0090	0.0180	0.1100	0.2200
SMOKE	SMOKE DETECTOR	54	0.0001	0.0054	0.0010	0.0540
MOI	TRANSMITTER	1	0.1200	0.1200	0.1750	0.1750
MID	INPUT BOARD	2	0.0020	0.0040	0.0000	0.0000
PS-5A	POWER SUPPLY	1	0.0380	0.0380	0.0000	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT						13.1310
TOTAL SYSTEM CURRENT			STANDBY	0.5419	ALARM	15.6320

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) + (TOT. ALARM CURRENT X ALARM TIME)} X 1.25
MIN. BATTERY CAPACITY = {(0.5419 A X 24 HR) + (15.632 A X 0.083 HR)} X 1.25
MIN. BATTERY CAPACITY = {13.0056 AHr + 1.2975 AHr} X 1.25 = 17.8788 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 76,76K,76L,78 NOTIFICATION DEVICES	AHU-1,-2 SHUTDOWN	WAA DRY CHEM DUMP	WAA BELL & LIGHT
76,76K,76L,78 FIRE CALL BOXES	●	●			●			
76 HEAT DETECTORS	●	●			●			
76 FACP SMOKE DETECTOR	●	●			●			
76 (AHU-1,-2) DUCT SMOKE DETECTORS	●	●			●	●		
76,76L,78 FIRE SPRINKLER WATERFLOW SWITCHES	●	●			●			
76,76L,78 FIRE SPRINKLER VALVE SUPERVISORY SWITCHES	●			●				
76 WAA POWER FAILURE	●		●					
76 WAA HEAT SENSOR	●	●			●		●	●
AC POWER FAILURE	●		●					
SYSTEM FAULT	●		●					

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV3: 76 2ND FLR EAST 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	–	0.165	0.0000
WHEELOCK HORN/STROBE 75 cd	–	0.1100	0.0000
WHEELOCK STROBE 110 cd	16	0.2200	3.5200
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	16	0.0870	1.392
AUTOCALL BELL	–	0.0500	0.0000
AUTOCALL BELL/STROBE 75 cd	–	0.2150	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT			4.912

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 = {(4.912) (320FT) (21.64)}/4110 = 8.261V
%VD = {8.261 / 24V} X 100 = 34.42%
REMAINING VOLTS = 15.739

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

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1: 76 2ND FLR WEST 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	–	0.165	0.0000
WHEELOCK HORN/STROBE 75 cd	–	0.1100	0.0000
WHEELOCK STROBE 110 cd	5	0.2200	1.1000
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	5	0.0870	0.4350
AUTOCALL BELL	–	0.0500	0.0000
AUTOCALL BELL/STROBE 75 cd	–	0.2150	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT			1.5350

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 = {(1.535) (420FT) (21.64)}/4110 = 3.388V
%VD = {3.388V / 24V} X 100 = 14.118%
REMAINING VOLTS = 20.612

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

NOTIFICATION APPLIANCE CIRCUIT CURRENTS

CKT AV1	76 2ND FLR WEST	1.535
CKT AV2	76 2ND FLR CENTER	3.377
CKT AV3	76 2ND FLR EAST	4.912
CKT AV4	76 1ST FLOOR	1.315
CKT AV5	78 & 76K	1.585
CKT AV6	76-202 & 76L	0.407
CKT AV7	–	–
CKT AV8	–	–
	TOTAL NOTIFICATION APPLIANCES CURRENT	13.131

AS BUIT
–
–
10/21/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
_	LDD	LDD	MCD	10/21/13	AS BUILT

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

ISSUE (PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD)

76 FIRE ALARM SYSTEM
76 TRAILERS, 78
FUNCTION CHART & CALCULATIONS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY LDD	DATE 10/21/2013	
CHECKED BY LDD	10/21/2013	
APPROVED BY MCD	10/21/2013	
SCALE AS NOTED		
DRAWING NO. 4B76E089_	SHEET FA	
PROJECT NO. 000000	1 OF 2	