

FACP Battery Calculation		7/25/2017	
PROJECT NAME:	60 Munjoy Hill - Portland		
Required Standby Time:	24 Hours		
Required Alarm Time:	5 Minutes		
AC Branch Current			
AC Branch Current:	Amps @ 120V		
Regulated Load in Standby			
Device Type	Number of Devices	Current (Amps)	Total Current (Amps)
FACP MAINBOARD	1	0.12000	0.12000
SMOKE DETECTOR	8	0.00030	0.00240
MONITOR MODULE	2	0.00040	0.00080
PULL STATION	4	0.00023	0.00092
ANNUNCIATOR	1	0.01500	0.01500
<b>TOTAL STANDBY LOAD</b>			<b>0.13912</b>
Regulated Load in ALARM			
Device Type	Number of Devices	Current (Amps)	Total Current (Amps)
FACP MAINBOARD	1	0.20000	0.20000
MAX ADDRESSABLE ALARM DRAW ANNUNCIATOR	1	0.40000	0.40000
FACP-1 (See Voltage Drop Calculations)	1	0.73700	0.73700
FACP-2 (See Voltage Drop Calculations)	1	0.84000	0.84000
<b>TOTAL ALARM LOAD</b>			<b>2.21700</b>
Battery Requirements			
Standby Load	Required Standby Time in Hours		
Current (Amps)	0.13912 X 24.00000	= 3.33888	
Alarm Load	Required Alarm Time in Hours		
Current (Amps)	2.21700 X 0.08333	= 0.18475	
Total Ampere Hours (before derating factor)		3.52363	
Derating Factor	X	1.2	
<b>TOTAL AMPERE HOURS REQUIRED</b>		<b>4.22836</b>	
<b>BATTERIES TO BE PROVIDED (2 - 12v)</b>		<b>7 AH</b>	

Point to Point NAC Voltage Drop Calculation		7/25/2017		
Project Name	60 Munjoy Hill - Portland			
Circuit Number	FACP-2			
Nominal System Voltage	20.4 volts	Wire Resistance		
Minimum Device Voltage	16.0 volts	Gauge Per 1000		
Distance from source to 1st device	70 feet	14 3.07		
Wire Gauge for balance of circuit		14 3.07		
Max Output Current	2.50 amps			
Total Circuit Current	0.840 amps			
End of Line Voltage	19.76 volts			
<b>Circuit is within limits</b>				
Device	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.078	70	20.04	0.361 1.77%
Device 2	0.078	20	19.95	0.455 2.23%
Device 3	0.176	15	19.88	0.518 2.54%
Device 4	0.176	15	19.84	0.564 2.77%
Device 5	0.078	15	19.81	0.595 2.92%
Device 6	0.078	20	19.77	0.626 3.07%
Device 7	0.176	15	19.76	0.642 3.15%
<b>Totals</b>	<b>0.840</b>	<b>170</b>		

FIRE ALARM SYMBOL LEGEND		
SYMBOL	DESCRIPTION	MOUNTING
FACP	FIRE ALARM CONTROL PANEL	WALL-TOP @ 66"
FSA	FIRE SYSTEM ANNUNCIATOR	WALL-TOP @ 66"
⊙	SMOKE DETECTOR	CEILING
MM	ADDRESSABLE MONITOR MODULE	FIELD VERIFY
P	MANUAL PULL STATION	WALL @ 48"
WF	WATER FLOW SWITCH	BY OTHERS
VS	VALVE SUPERVISORY SWITCH	BY OTHERS
⊠	MINI HORN	WALL @ 10'-0"
⊠ WP	WEATHER PROOF HORN / STROBE	WALL 80"-96"
⊠	HORN / STROBE	WALL 80"-96"

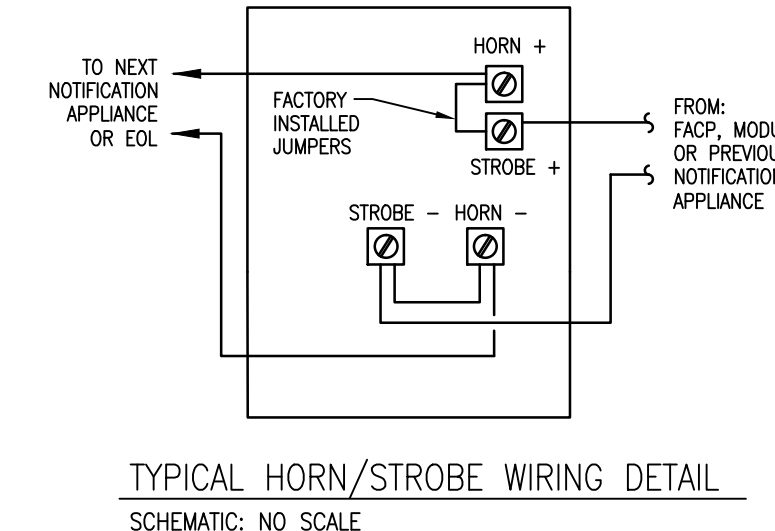
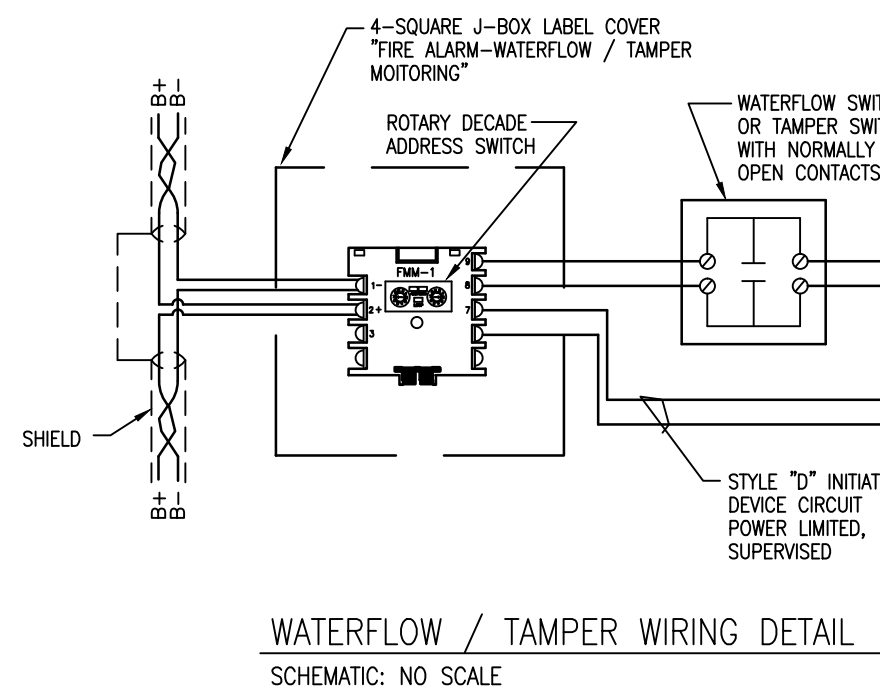
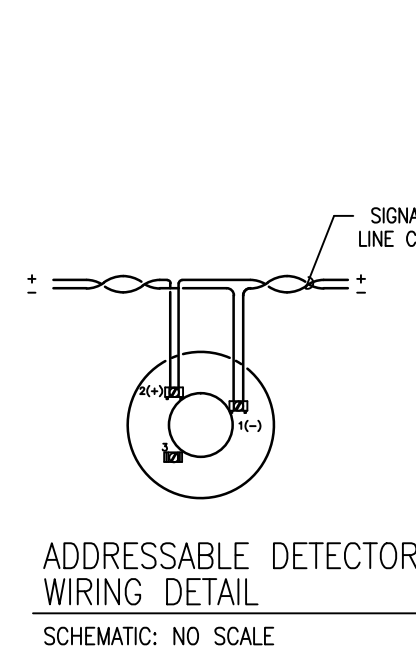
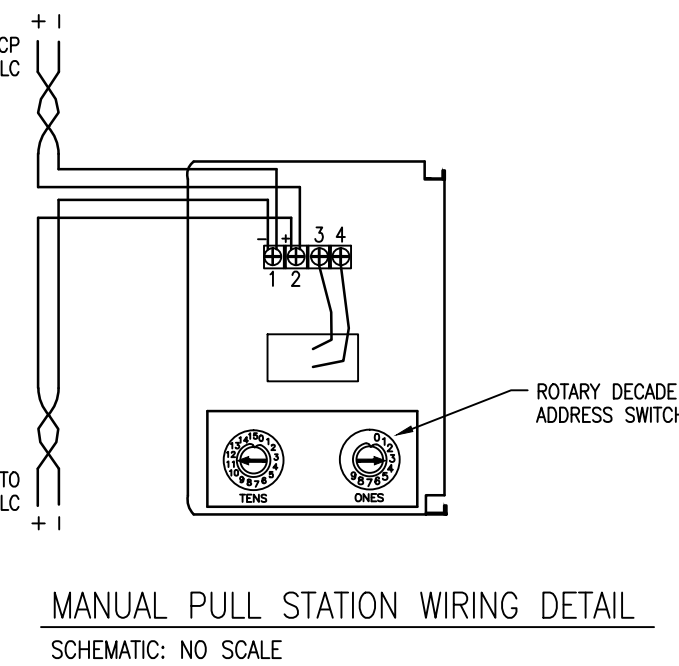
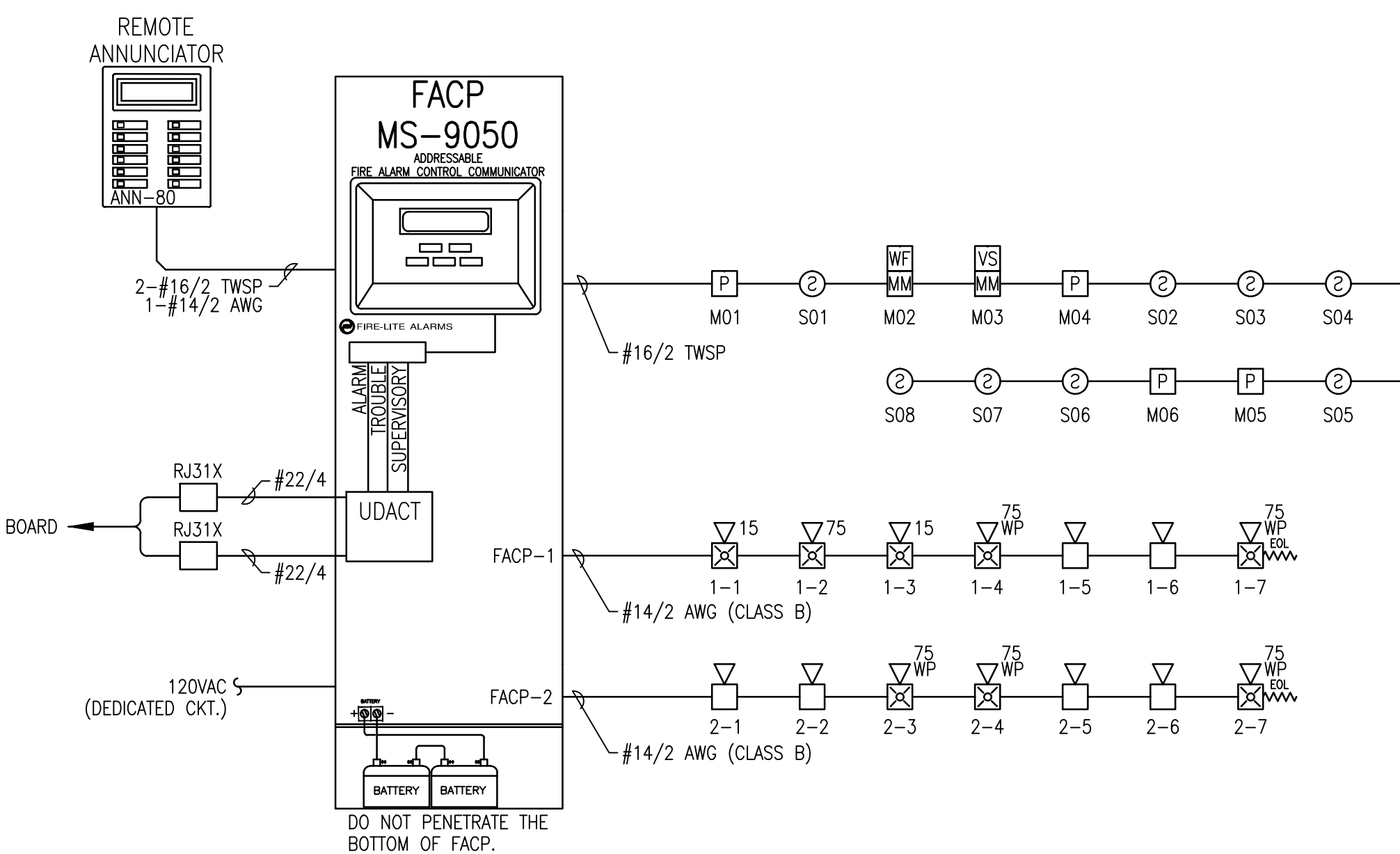
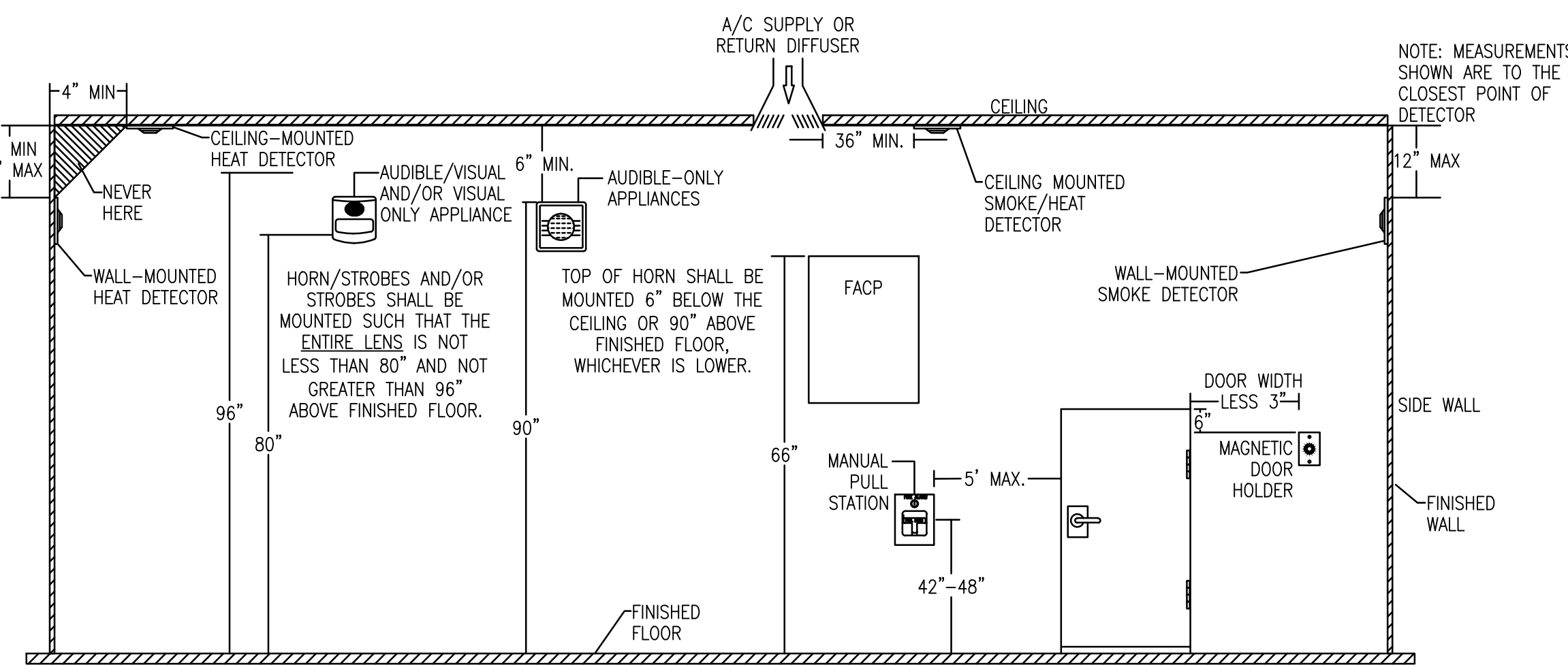
  

ABBREVIATION	DESCRIPTION
E	EXISTING
WG	WITH GUARD
P	PENDANT MOUNT
R	RESIDENTIAL (110V)
S	SOULIDER BASE
WP	WEATHER PROOF
EOL	END OF LINE RESISTOR
EOLR	END OF LINE RELAY
AWG	AMERICAN WIRE GAUGE
TWP	TWISTED PAIR
TWSP	TWISTED SHIELDED PAIR
FPLP	FIRE POWER LIMITED PLENUM
FPLR	FIRE POWER LIMITED RISER
NAC	NOTIFICATION APPLIANCE CIRCUIT
SLC	SIGNALING LINE CIRCUIT

**GENERAL NOTES:**

- SCOPE OF WORK: THIS PROJECT SHALL INCLUDE THE INSTALLATION OF A NEW ADDRESSABLE FIRE ALARM SYSTEM WITH MANUAL PULL STATIONS LOCATED AT EACH MAIN EXIT.
- THESE DRAWINGS ARE DIAGRAMMATIC. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS.
- INSTALLATION SHALL COMPLY WITH NEC, NFPA 72 AND ALL OTHER APPLICABLE CODES AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
- WIRING DEPICTED ON THESE PLANS IS SCHEMATIC - ACTUAL WIRE LOCATIONS MAY DIFFER FROM THESE PLANS. WIRING SHALL BE PERFORMED AS ACTUAL BUILDING CONSTRUCTION CONDITIONS ALLOW AND TO MINIMIZE PENETRATIONS THROUGH AREA SEPARATION WALLS AND FIRE WALLS. THE USE OF A RACEWAY IS PERMITTED AS LONG AS NO 110V OR HIGHER VOLTAGE CABLES ARE IN THE SAME RACEWAY.
- FIRE RATINGS SHALL BE MAINTAINED FOR ALL PENETRATIONS THROUGH FIRE-RATED CONSTRUCTION.
- POWER FOR ALL FIRE ALARM PANELS AND FIRE ALARM POWER SUPPLIES MUST BE PROVIDED BY A DEDICATED AC BRANCH CIRCUIT. THE LOCATION OF THE BRANCH CIRCUIT BREAKER SHALL BE PERMANENTLY IDENTIFIED AT THE CONTROL UNIT AND SHALL HAVE A RED MARKING IN ACCORDANCE WITH NFPA 72.
- POWER-LIMITED AND NONPOWER-LIMITED CIRCUIT WIRING MUST REMAIN SEPARATED IN CABINET. ALL POWER-LIMITED CIRCUIT WIRING MUST REMAIN AT LEAST 0.25" AWAY FROM ANY NONPOWER-LIMITED CIRCUIT WIRING. FURTHERMORE, ALL POWER-LIMITED AND NONPOWER-LIMITED CIRCUIT WIRING MUST ENTER AND EXIT THE CABINET THROUGH DIFFERENT KNOCK OUTS AND/OR SEPARATE CONDUITS.
- WHEN UTILIZING CLASS "A" CIRCUITS, SEPARATE OUTGOING AND RETURN CONDUCTORS OF CLASS "A" CIRCUITS BY A MINIMUM OF 12" WHERE RUN VERTICALLY AND 48" WHERE RUN HORIZONTALLY.
- WHEN UTILIZING SHIELDED CABLE TIE SHIELDS THROUGH AND INSULATE AT EACH JUNCTION BOX. INSULATE AND TAPE BACK AT END.
- ALL FIRE ALARM CABLING SHALL BE ACCEPTABLE TO THE FIRE ALARM EQUIPMENT MANUFACTURER FOR THE INTENDED PURPOSE.
- SMOKE DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER CONSTRUCTION CLEAN-UP IS COMPLETED AND FINAL.
- LOCATE SMOKE DETECTORS A MINIMUM OF THREE (3) FEET FROM MECHANICAL DIFFUSERS. WALL-MOUNTED SMOKE DETECTORS SHALL BE LOCATED A MINIMUM OF 4" AND A MAXIMUM OF 12" FROM CEILING. CEILING-MOUNTED SMOKE DETECTORS SHALL BE MOUNTED ON CEILINGS AND NOT ON THE BOTTOMS OF BEAMS OR JOISTS.
- PROVIDE SYNCHRONIZATION OF ALL VISUAL NOTIFICATION APPLIANCE CIRCUITS. PROVIDE ALL REQUIRED SYNC MODULES. PROVIDE A MULTI-SYNC MODE SLAVE CONNECTION BETWEEN ALL SYNC MODULES.
- VERIFY ALL FIELD SELECTABLE AUDIBILITY SETTINGS OF NOTIFICATION APPLIANCES WITH FIRE ALARM CONTRACTOR.
- UPON COMPLETION OF THE FIRE ALARM SYSTEM INSTALLATION AND PROGRAMMING, THE INSTALLING CONTRACTOR SHALL PERFORM FINAL TESTING OF THE ENTIRE SYSTEM, PER ALL APPLICABLE CODES, AND SHALL COORDINATE AND PERFORM A FINAL FIRE ALARM SYSTEM INSPECTION.
- PROVIDE OFF-SITE MONITORING AS REQUIRED BY THE INTERNATIONAL FIRE CODE, SECTION 907.6.5 AND THE LOCAL AUTHORITY HAVING JURISDICTION.
- INSTALLING CONTRACTOR SHALL, PHYSICALLY, LABEL ALL INITIATING DEVICES AND NOTIFICATION APPLIANCE CIRCUIT END OF LINE (WHEN WIRING CLASS "B"). THESE LABELS SHALL BE IN PLACE PRIOR TO START-UP AND TESTING.

Point to Point NAC Voltage Drop Calculation		7/25/2017		
Project Name	60 Munjoy Hill - Portland			
Circuit Number	FACP-1			
Nominal System Voltage	20.4 volts	Wire Resistance		
Minimum Device Voltage	16.0 volts	Gauge Per 1000		
Distance from source to 1st device	25 feet	14 3.07		
Wire Gauge for balance of circuit		14 3.07		
Max Output Current	2.50 amps			
Total Circuit Current	0.737 amps			
End of Line Voltage	19.85 volts			
<b>Circuit is within limits</b>				
Device	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.054	25	20.29	0.113 0.55%
Device 2	0.121	25	20.18	0.218 1.07%
Device 3	0.054	25	20.10	0.304 1.49%
Device 4	0.176	35	19.99	0.413 2.03%
Device 5	0.078	45	19.89	0.505 2.48%
Device 6	0.078	20	19.86	0.536 2.63%
Device 7	0.176	15	19.85	0.553 2.71%
<b>Totals</b>	<b>0.737</b>	<b>190</b>		



**APPLICABLE CODES**

MAINE UNIFORM ENERGY & BUILDING CODE  
 PORTLAND CITY CODE, CHAPTER 10, FIRE PREVENTION & PROTECTION  
 NFPA 1, FIRE CODE & NFPA 101, LIFE SAFETY CODE

OPERATIONS MATRIX	FIRE ALARM INPUT										
	FIRE ALARM OUTPUT	ACTIVE ALARM INDICATOR	ACTIVE AUDIBLE ALARM	ACTIVE SUPERVISORY INDICATOR	ACTIVE AUDIBLE SUPERVISORY SIGNAL	ACTIVE TROUBLE INDICATOR	ACTIVE AUDIBLE TROUBLE INDICATOR	TRANSMIT ALARM SIGNAL	TRANSMIT SUPERVISORY SIGNAL	TRANSMIT TROUBLE SIGNAL	ACTIVE NOTIFICATION APPLIANCES
SMOKE DETECTORS		●	●								
PULL STATIONS		●	●								
WATERFLOW SWITCHES		●	●								
VALVE TAMPER SWITCHES				●	●						
FIRE ALARM AC POWER FAIL						●	●				
FIRE ALARM LOW BATTERY						●	●				
OPEN CIRCUIT						●	●				
GROUND FAULT						●	●				
NAC SHORT CIRCUIT						●	●				
LOSS OF AC TO BUILDING						●	●				