

FACP Battery Calculation			11/7/2016		
PROJECT NAME: MACHIAS SAVINGS BANK					
Required standby time: 24 Hours					
Required alarm time: 24 Hours					
Regulated Load in Standby					
Device Type	Number of Devices	Current (Amps)	Current (Amps)	Total Current (Amps)	
EXISTING FACP - MS-9200UDLS	X	0.00038		0.00038	
NEW PULL STATION - RC-12LX	X				
NEW PULL STATION - RC-12LX	X				
TOTAL STANDBY LOAD					
Regulated Load in ALARM					
Device Type	Number of Devices	Current (Amps)	Current (Amps)	Total Current (Amps)	
EXISTING FACP - MS-9200UDLS	X	0.00038		0.00038	
NEW PULL STATION - RC-12LX	X	0.98600		0.98600	
SPARE CKT.1 (See Voltage Drop Calculations)	X	0.87700		0.87700	
SPARE CKT.2 (See Voltage Drop Calculations)	X				
TOTAL ALARM LOAD					
Battery Requirements					
Standby Load	Required Standby Time in Hours				
0.00038	24.00000				
Alarm Load	Required Alarm Time in Hours				
1.88800	0.08333				
Total Ampere Hours (before derating factor)					
Derating Factor					
TOTAL AMPERE HOURS REQUIRED					
BATTERIES TO BE PROVIDED (2 - 12V)					
NOTE: THE ABOVE BATTERY CALCULATION IS A COMBINED TOTAL OF THE ADDITIONAL LOADS THAT WILL BE ADDED FROM THE SCOPE OF THIS PROJECT. FIELD VERIFY THE SIZE OF THE EXISTING BATTERIES AND UPSIZE ACCORDINGLY.					

Point to Point NAC Voltage Drop Calculation									
Project Name: MACHIAS SAVINGS BANK									
Circuit Number: SPARE CKT.1									
Nominal System Voltage: 20.4 volts									
Minimum Device Voltage: 16.0 volts									
Distance from source to 1st device: 75 feet									
Wire Gauge for balance of circuit: 14									
Max Output Current: 1.50 amps									
Total Circuit Current: 0.986 amps									
End of Line Voltage: 19.36 volts									
Circuit is within limits									
Device	Current	Distance	Device previous	Voltage at device	Drop from source	Percent Drop			
Device 1	0.272	75	19.95	0.454	2.23%				
Device 2	0.066	35	19.78	0.620	3.04%				
Device 3	0.176	17	19.71	0.694	3.40%				
Device 4	0.176	49	19.55	0.854	4.19%				
Device 5	0.079	50	19.44	0.964	4.72%				
Device 6	0.066	18	19.41	0.994	4.87%				
Device 7	0.066	18	19.37	1.018	4.99%				
Device 8	0.066	12	19.32	1.038	5.10%				
Device 9	0.079	14	19.36	1.035	5.07%				
LEADS: 0.886									
Notes: Wire resistance is doubled in the calculations for two wires (Positive and Negative). The voltage calculated to the last device must not be lower than the manufacturer's listed minimum operating voltage. (E: rated operating voltage 16-33 VDC (24 VDC nominal)).									

Point to Point NAC Voltage Drop Calculation									
Project Name: MACHIAS SAVINGS BANK									
Circuit Number: SPARE CKT.2									
Nominal System Voltage: 20.4 volts									
Minimum Device Voltage: 16.0 volts									
Distance from source to 1st device: 75 feet									
Wire Gauge for balance of circuit: 14									
Max Output Current: 1.50 amps									
Total Circuit Current: 0.877 amps									
End of Line Voltage: 19.57 volts									
Circuit is within limits									
Device	Current	Distance	Device previous	Voltage at device	Drop from source	Percent Drop			
Device 1	0.066	75	20.00	0.404	1.98%				
Device 2	0.066	13	19.93	0.469	2.30%				
Device 3	0.079	9	19.89	0.510	2.50%				
Device 4	0.072	20	19.81	0.592	2.90%				
Device 5	0.066	39	19.70	0.700	3.43%				
Device 6	0.072	50	19.56	0.819	4.02%				
Device 7	0.176	9	19.57	0.829	4.03%				
LEADS: 0.877									
Notes: Wire resistance is doubled in the calculations for two wires (Positive and Negative). The voltage calculated to the last device must not be lower than the manufacturer's listed minimum operating voltage. (E: rated operating voltage 16-33 VDC (24 VDC nominal)).									

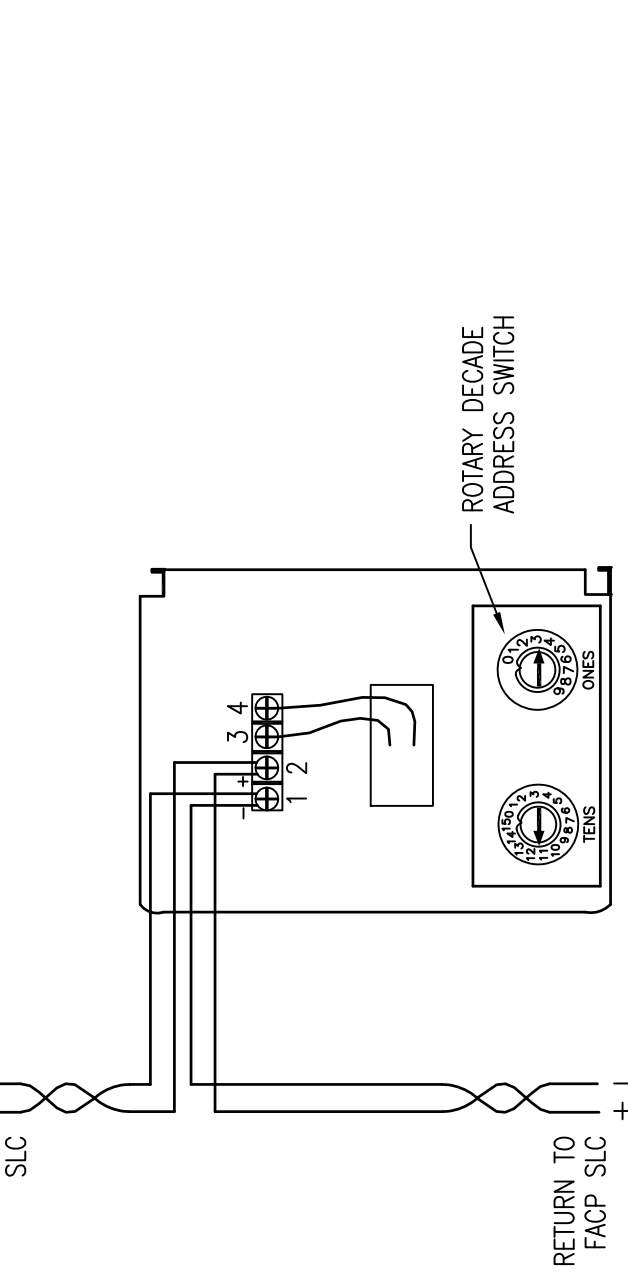
GENERAL NOTES:

- 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.
- 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 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 907.13 AND THE LOCAL AUTHORITY HAVING JURISDICTION.
- INSTALL 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.

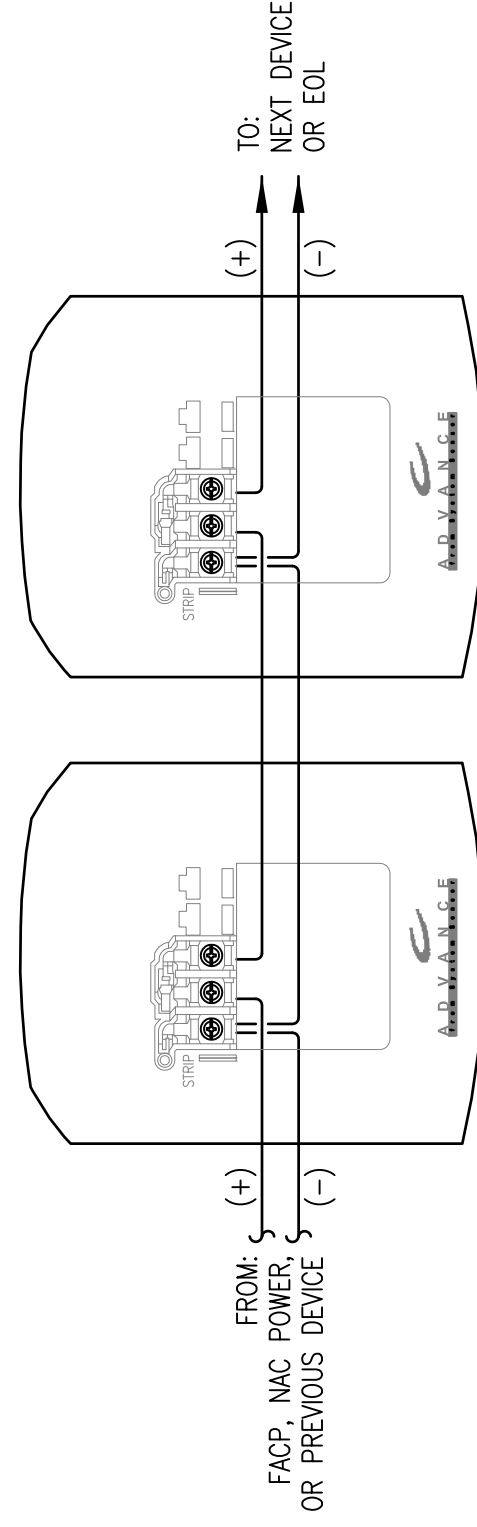
FIRE ALARM SYMBOL LEGEND		
SYMBOL	DESCRIPTION	MOUNTING
FACP	FIRE ALARM CONTROL PANEL	WALL-TOP @ 66"
FPS	FIRE ALARM POWER SUPPLY	FIELD VERIFY
FSA	FIRE SYSTEM ANNUNCIATOR	WALL-TOP @ 66"
SD	SMOKE DETECTOR	CEILING
SR	120V RESIDENTIAL SMOKE DETECTOR	BY OTHERS
SR	CARBON MONOXIDE DETECTOR	CEILING
SR	SMOKE/CARBON MONOXIDE COMBO DETECTOR	CEILING
M	ADDRESSABLE MONITOR MODULE	FIELD VERIFY
MM	ADDRESSABLE MINI MONITOR MODULE	FIELD VERIFY
P	MANUAL PULL STATION	WALL @ 48"
R	CONTROL RELAY (MULTI-VOLTAGE)	FIELD VERIFY
RM	ADDRESSABLE RELAY MODULE	FIELD VERIFY
DL	MAGNETIC DOOR HOLDER	FIELD VERIFY
WS	WATER FLOW SWITCH	BY OTHERS
VS	VALVE TAMPER SWITCH	BY OTHERS
B	BELL	BY OTHERS
CS	CEILING MOUNT STROBE	FIELD VERIFY
CS	CEILING MOUNT HORN / STROBE	FIELD VERIFY
CS	CEILING MOUNT SPEAKER / STROBE	FIELD VERIFY
H	HORN	WALL @ 10'-0"
H	HORN / STROBE	WALL 80"-96"
S	SPEAKER / STROBE	WALL 80"-96"
S	SPEAKER	WALL @ 90"
ST	STROBE	WALL 80"-96"
KB	KNOX BOX	FIELD VERIFY

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

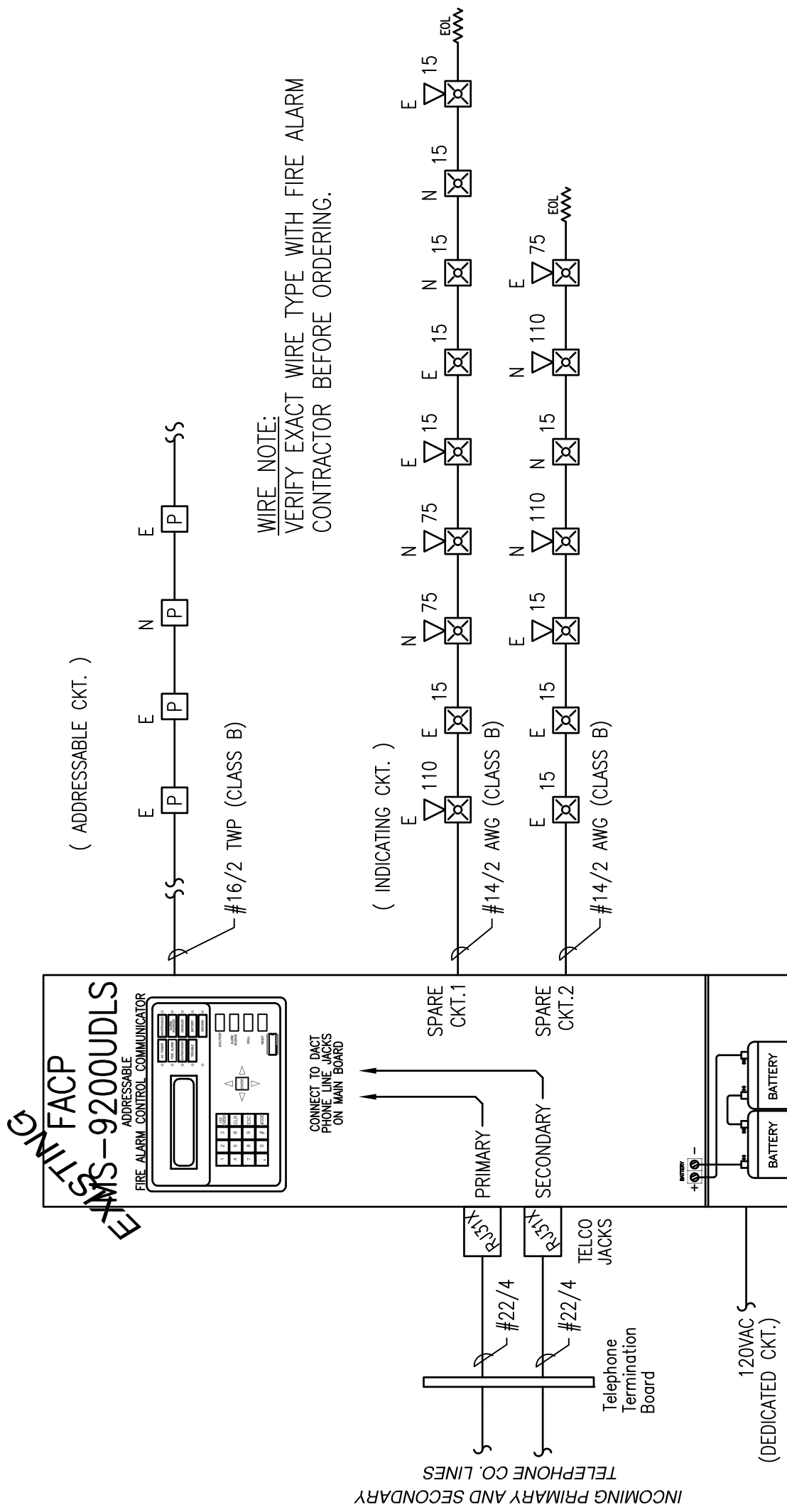
TI OPERATIONS MATRIX	
FIRE ALARM OUTPUT	●
ACTIVATE ALARM INDICATOR	●
ACTIVATE TROUBLE INDICATOR	●
ACTIVATE AUDIBLE TROUBLE INDICATOR	●
TRANSMIT ALARM SIGNAL	●
TRANSMIT TROUBLE SIGNAL	●
FIRE ALARM INPUT	●
PULL STATIONS	●
FIRE ALARM AC POWER FAIL	●
FIRE ALARM LOW BATTERY	●
OPEN CIRCUIT	●
GROUND FAULT	●
NAC SHORT CIRCUIT	●
LOSS OF AC TO BUILDING	●



MANUAL PULL STATION WIRING DETAIL
 SCHEMATIC: NO SCALE



TYPICAL 2 WIRE STROBE WIRING DETAIL
 SCHEMATIC: NO SCALE



FIRE ALARM RISER DIAGRAM
 SCHEMATIC: NO SCALE

REVISION	DESCRIPTION	DATE
0	ISSUED FOR REVIEW & APPROVAL	11/7/2016

RESERVED FOR CITY STAMP

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MACHIAS SAVINGS BANK
 193 MIDDLE STREET
 PORTLAND, MAINE 04101
 CALCS, DETAILS, LEGEND, MATRIX, NOTES

DRAWN	JPB UNICAD JOB #16870
CHECKED	WAYNE B. HANS NICT # 90496
DATE	11/7/2016
REVISION	0
SCALE	NONE