

PART 1 - GENERAL

- 1. GENERAL PROVISIONS: DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF WORK IN CONTRACT.
- 2. DESCRIPTION OF PROJECT: BANGOR SAVING BANK OFFICE RENOVATION
- 3. SCOPE: PERFORM WORK AND PROVIDE NEW MATERIAL AND EQUIPMENT AS SHOWN ON DRAWINGS AND AS SPECIFIED IN THIS SECTION OF THE SPECIFICATIONS. PROVIDE ALL COMPONENTS AND MATERIALS, WHETHER SPECIFICALLY SHOWN OR NOT, THAT ARE NECESSARY TO MAKE THE SYSTEMS COMPLETE AND FULLY OPERATIONAL AS INTENDED IN THE CONSTRUCTION DOCUMENTS. WORK SHALL INCLUDE, BUT NOT BE LIMITED TO THE DESIGN INTENT AS ILLUSTRATED ON THESE DRAWINGS AND ALL TESTING AND CERTIFICATIONS NECESSARY FOR COMPLIANCE INCLUDING ANY REQUIRED REMEDIAL ACTIONS AND RETESTING DUE TO FAILURE.
- 4. SITE VISIT: THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS IN THE FIELD PRIOR TO ANY DEMOLITION OR NEW INSTALLATION. VISIT AND CAREFULLY EXAMINE SITE TO IDENTIFY EXISTING CONDITIONS THAT MAY AFFECT WORK OF THIS SECTION BEFORE SUBMITTING BID. NO EXTRA PAYMENT WILL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY DISCERNED BY AN EXPERIENCED OBSERVER.
- 5. RELATED WORK: THE FOLLOWING WORK IS NOT INCLUDED IN THIS SECTION AND WILL BE PROVIDED UNDER OTHER SECTIONS: 1) TEMPORARY HEAT FOR USE DURING CONSTRUCTION AND TESTING UNLESS SPECIFICALLY NOTED IN OTHER SPECIFICATION SECTIONS, 2) PAINTING, EXCEPT AS SPECIFIED, AND 3) ELECTRICAL POWER WIRING TO ALL EQUIPMENT OTHER THAN AUTOMATIC TEMPERATURE CONTROL PANELS AND COMPONENTS.
- 6. CODES, STANDARDS, AUTHORITIES AND PERMITS: CODES, LAWS AND ORDINANCES PROVIDE A BASIS FOR THE MINIMUM INSTALLATION CRITERIA. THESE DRAWINGS AND SPECIFICATIONS ILLUSTRATE THE SCOPE REQUIRED FOR THIS PROJECT, WHICH MAY EXCEED MINIMUM CODE, LAW AND STANDARDS CRITERIA. GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY FEES AND BACKCHARGES AND OBTAIN NECESSARY APPROVALS FROM AUTHORITIES HAVING JURISDICTION AS REQUIRED FOR THE EXECUTION OF ALL WORK ASSOCIATED WITH THIS PROJECT. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITIONS OF: 1) THE STATE BUILDING, ELECTRICAL, MECHANICAL, AND ENERGY CODES, 2) SMACNA, NFPA, ANSI/ASHRAE, ASME, UL, AND NEMA STANDARDS, 3) ALL OTHER APPLICABLE CODES, REGULATIONS, STANDARDS AND LAWS OF LOCAL, STATE AND FEDERAL GOVERNMENT AND OTHER AUTHORITIES HAVING JURISDICTION, AND 4) APPLICABLE BASE BUILDING STANDARDS AND SPECIFICATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING VIOLATIONS OF THESE CODES, STANDARDS, AUTHORITIES OR PERMITS SHALL BE CORRECTED BY THE CONTRACTOR.
- 7. INTERPRETATIONS OF DOCUMENTS: DUCTWORK AND PIPING ARE SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO THE APPROVAL OF THE ARCHITECT. COORDINATION WITH THE EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES IS REQUIRED WHERE DRAWINGS OR SPECIFICATIONS DO NOT COINCIDE WITH MANUFACTURER'S RECOMMENDATIONS, OR ARE UNCLEAR AS TO INTENT, OR REQUIRED MATERIAL QUALITY. ADVISE THE ENGINEER IN WRITING BEFORE PROCEEDING WITH THE WORK. ALL COST FOR REWORK NECESSARY TO RESOLVE DISCREPANCIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

- 8. REQUESTS FOR INFORMATION: ANY RFI FOR RESOLVING AN APPARENT CONFLICT OR UNCLEARITY, OR A REQUEST FOR ADDITIONAL DETAIL, SHALL INCLUDE A SKETCH OR EQUIVALENT DESCRIPTION OF CONTRACTOR'S PROPOSED SOLUTION.
- 9. SUBMITTALS: PROVIDE SPECIFIED ITEMS AND EQUIPMENT UNLESS "EQUAL" OR "APPROVED EQUAL" IS EXPLICITLY INDICATED ON THE DRAWINGS. DEVIATIONS TO SPECIFIED ITEMS SHALL BE AT THE SOLE RISK OF THE CONTRACTOR, WHO SHALL BE RESPONSIBLE FOR ALL ASSOCIATED CHANGES TO THIS AND OTHER TRADES. REVIEW OF THE SHOP DRAWINGS BY THE ENGINEER SHALL NOT ABSOLVE THE CONTRACTOR FROM MEETING THE FULL DESIGN INTENT OF THE ASSOCIATED SYSTEM(S). SUBMITTALS SHALL INDICATE PRIOR REVIEW AND APPROVAL BY THE RESPONSIBLE CONTRACTOR. SUBMIT SUBMITTALS FOR REVIEW ELECTRONICALLY VIA SMRT'S INFORMATION EXCHANGE PROGRAM OR OTHER MUTUALLY AGREED UPON FILE SHARING SOFTWARE: 1) AIR DISTRIBUTION LAYOUT DRAWINGS AND DETAILS, 2) PIPING DISTRIBUTION LAYOUT DRAWINGS, COMPONENTS, AND DETAILS, 3) ALL EQUIPMENT, 4) CONTROL SCHEMATICS, COMPONENTS, AND SEQUENCES, 5) BALANCING REPORTS, 6) ALL TEST REPORTS, AND 7) ALL CERTIFICATES. ALLOW ENGINEER A MINIMUM OF 10 WORKING DAYS FOR PROCESSING AND REVIEW OF EACH SUBMISSION.
- 10. OPERATION AND MAINTENANCE DATA: SUBMIT (3) SETS OF OPERATING AND MAINTENANCE MANUALS PRIOR TO THE COMPLETION OF THE PROJECT. O&M'S SHALL ACCURATELY INDICATE ALL PROVIDED ITEMS AND COMPONENTS OF THE EQUIPMENT - DO NOT SUBMIT GENERIC O&M WITHOUT INDICATING ALL OPTIONS, ACCESSORIES AND MODEL NUMBERS. PROVIDE ON-SITE DEMONSTRATION OF ALL SYSTEMS TO OWNER AFTER SYSTEMS ARE FULLY OPERATIONAL. O&M MANUALS SHALL INCLUDE ALL COMPONENTS (DIFFUSERS, VALVES, ETC.) AS WELL AS SYSTEM DESCRIPTIONS OF ALL SYSTEMS WITH FLOW DIAGRAMS, WIRING DIAGRAMS, WRITTEN WARRANTIES, RECOMMENDED SPARE PARTS AND ROUTINE MAINTENANCE REQUIREMENTS WITH RECOMMENDED INTERVALS FOR ALL MOVING EQUIPMENT AND CONTROLS.
- 11. RECORD DRAWINGS: CAD RECORD DRAWING FILES SHALL BE SUBMITTED AT THE COMPLETION OF THE PROJECT SHOWING THE "AS-BUILT" CONDITION INCLUDING WORK INSTALLED AND ALL MODIFICATIONS OR ADDITIONS TO ORIGINAL DESIGN. OBTAIN THE AUTOCAD FILES FOR PREPARATION OF AS-BUILT DRAWINGS FROM THE ARCHITECT. THE ARCHITECT AND ENGINEER ARE NOT GRANTING ANY OWNERSHIP OR PROPERTY INTEREST IN THE CAD DRAWINGS BY THE DELIVERY OF THE CAD FILES. THE USE OF THE CAD FILES AND DRAWINGS ARE LIMITED FOR THE SOLE PURPOSE OF ASSISTING IN THE CONTRACTOR'S PERFORMANCE IN ITS CONTRACTUAL OBLIGATIONS WITH RESPECT TO THIS PROJECT. ANY REUSE AND/OR OTHER USE BY THE CONTRACTOR WILL BE AT THE CONTRACTOR'S SOLE RISK AND WITHOUT LIABILITY TO THE ARCHITECT AND ENGINEER.
- 12. WARRANTIES: WARRANTY INSTALLATION IN WRITING FOR ONE YEAR FROM DATE OF OWNER'S ACCEPTANCE OF CERTIFICATE OF SUBSTANTIAL COMPLETION. WHERE INDIVIDUAL EQUIPMENT SECTIONS SPECIFY LONGER WARRANTIES, PROVIDE THE LONGER WARRANTIES. REPAIR, REPLACE OR PROVIDE TEMPORARY ACCOMMODATIONS FOR DEFECTIVE MATERIALS, EQUIPMENT, WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN 24 HOURS OF NOTIFICATION. WARRANTY SHALL INCLUDE A CONTACT PERSON (NAME AND 24 HOUR TELEPHONE NUMBER) FOR SERVICE REQUESTS. CORRECT DAMAGE CAUSED WHILE MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER WARRANTY PERIOD AT NO ADDITIONAL COST.
- 13. COORDINATION: CONFER WITH ALL OTHER TRADES RELATIVE TO LOCATION OF ALL APPARATUS AND EQUIPMENT TO BE INSTALLED AND SELECT LOCATIONS SO AS NOT TO CONFLICT WITH OR HINDER THE PROGRESS OF THE WORK OF OTHER SECTIONS. WORK INSTALLED THAT CREATES INTERFERENCE OR RESTRICTS ACCESS REQUIRED BY CODE (INCLUDING CLEARANCES TO ELECTRICAL COMPONENTS) OR TO CONDUCT MAINTENANCE AND/OR ADJUSTMENTS SHALL BE MODIFIED AT NO ADDITIONAL COST TO THE OWNER.
- 14. SUPPORTS: INCLUDE ALL STRUCTURAL STEEL SUPPORTS, UNI-STRUT, HANGER BRACKETS, ETC., REQUIRED FOR THE EXECUTION OF THE WORK OF THIS SECTION. THE WELDS AND EDGES OF ALL BRACKETS SHALL BE FILED OR GROUND SMOOTH FOR PAINTING. HANGERS

- SHALL BE STEEL ANGLE IRON, CHANNEL OR STEEL ROD USED WITH APPROVED CLAMPS, INSERTS, ETC. ALL HANGERS SHALL BE GALVANIZED OR PAINTED WITH TWO COATS OF RUSTOLEUM PAINT BEFORE INSTALLATION. APPLY TOUCH-UP PAINT (ZINC GALVANIZING FOR GALVANIZED STEEL) AFTER INSTALLATION. SUPPORTS INSTALLED IN EXTERIOR LOCATIONS SHALL BE PVC COATED STEEL, GALVANIZED STEEL, OR STAINLESS STEEL WITH STAINLESS STEEL HARDWARE.
- 15. CUTTING AND PATCHING: INCLUDE ALL CORING, CUTTING, PATCHING AND FIREPROOFING NECESSARY FOR THE EXECUTION OF THE WORK OF THIS SECTION. STRUCTURAL ELEMENTS SHALL NOT BE CUT WITHOUT WRITTEN APPROVAL OF THE ARCHITECT. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING ALL PRECAUTIONS REQUIRED TO IDENTIFY HIDDEN PIPING, CONDUITS, ETC. BEFORE ANY CORE DRILLING AND/OR CUTTING OF SLABS COMMENCES, INCLUDING X-RAYING THE AFFECTED SLABS. REPAIR AND PATCH AROUND THE WORK SPECIFIED HEREIN TO MATCH THE EXISTING ADJACENT SURFACES TO THE SATISFACTION OF THE ARCHITECT. FILL AND PATCH ALL OPENINGS OR HOLES LEFT IN THE EXISTING STRUCTURES BY THE REMOVAL OF EXISTING EQUIPMENT THAT IS PART OF THIS SECTION OF THE SPECIFICATIONS. PATCH AND SEAL ALL EXISTING OPENINGS IN DUCTWORK AND PIPING NOT UTILIZED FOR NEW LAYOUT. PROVIDE FIRE STOPPING TO MAINTAIN THE FIRE RATING OF THE FIRE RESISTANCE-RATED ASSEMBLY. ALL PENETRATIONS AND ASSOCIATED FIRE STOPPING SHALL BE INSTALLED IN ACCORDANCE WITH THE FIRE STOPPING MANUFACTURER'S LISTED INSTALLATION DETAILS AND BE LISTED BY UL OR FM.
- 16. HOISTING, SCAFFOLDING AND PLANKING: INCLUDE THE FURNISHING, SET-UP AND MAINTENANCE OF ALL HOISTING MACHINERY, CRANES, SCAFFOLDS, STAGING AND PLANKING AS REQUIRED FOR THE EXECUTION OF WORK FOR THIS SECTION.
- 17. SAFETY PRECAUTIONS: LIFE SAFETY AND ACCIDENT PREVENTION SHALL BE A PRIMARY CONSIDERATION. COMPLY WITH ALL OF THE SAFETY REQUIREMENTS OF THE OWNER AND OSHA THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD OF THE PROJECT. FURNISH, PLACE AND MAINTAIN PROPER GUARDS AND ANY OTHER NECESSARY CONSTRUCTION REQUIRED TO SECURE SAFETY OF LIFE AND PROPERTY.
- 18. ACCESSIBILITY: ALL WORK PROVIDED UNDER THIS SECTION OF THE SPECIFICATION SHALL BE INSTALLED SO THAT PARTS REQUIRING PERIODIC INSPECTION, MAINTENANCE AND REPAIR ARE READILY ACCESSIBLE. WORK OF THIS TRADE SHALL NOT INFRINGE UPON CLEARANCES REQUIRED BY EQUIPMENT OF OTHER TRADES.
- 19. PROTECTION OF WORK AND PROPERTY: THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE CARE AND PROTECTION OF ALL WORK INCLUDED UNDER THIS SECTION UNTIL THE COMPLETION AND FINAL ACCEPTANCE OF THIS PROJECT. PROTECT ALL EQUIPMENT AND MATERIALS FROM DAMAGE FROM ALL CAUSES INCLUDING, BUT NOT LIMITED TO, FIRE, VANDALISM AND THEFT. ALL MATERIALS AND EQUIPMENT DAMAGED OR STOLEN SHALL BE REPAIRED OR REPLACED WITH EQUAL MATERIAL OR EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER. PROTECT ALL EQUIPMENT, OUTLETS AND OPENINGS, AND ROOF PENETRATIONS WITH TEMPORARY PLUGS, CAPS AND COVERS. PROTECT WORK AND MATERIALS OF OTHER TRADES FROM DAMAGE THAT MIGHT BE CAUSED BY WORK OR WORKMEN UNDER THIS SECTION AND MAKE GOOD DAMAGE THUS CAUSED. DAMAGED MATERIALS ARE TO BE REMOVED FROM THE SITE. NO SITE STORAGE OF DAMAGED MATERIALS WILL BE ALLOWED. ANY DAMAGE TO EXISTING SYSTEMS AND EQUIPMENT CAUSED BY THIS CONTRACTOR DURING INSTALLATION SHALL BE REPAIRED AND/OR REPLACED AT THIS CONTRACTOR'S EXPENSE TO THE COMPLETE SATISFACTION OF THE BUILDING OWNER.

PART 2 - PRODUCTS

- 1. DUCTWORK: DUCTWORK SHALL BE ASTM A653 GALVANIZED STEEL SHEET, LOCK-FORMING QUALITY, AND G90 ZINC COATING. MATERIAL, CONSTRUCTION, AND INSTALLATION SHALL MEET REQUIREMENTS OF MOST RECENT EDITIONS OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS, EXCEPT FOR MORE STRINGENT REQUIREMENTS SPECIFIED OR SHOWN ON DRAWINGS. PROVIDE DUCTWORK 4" PRESSURE CLASS "A" AND SEAL CLASS "A". PROVIDE FLEXIBLE CONNECTION ON ALL DUCTS CONNECTING TO FANS AND ROTATING EQUIPMENT. ALL DUCTS SHALL BE GROUNDED ACROSS FLEXIBLE CONNECTION WITH FLEXIBLE COPPER GROUNDING STRAPS. MAXIMUM LENGTH OF FLEXIBLE RUN-OUT TO DIFFUSERS SHALL BE 6 FEET. FOR LONGER RUN-OUTS, ADD RIGID DUCT. DUCTS SHALL BE CONSTRUCTED OF HOT DIPPED GALVANIZED STEEL UNLESS OTHERWISE NOTED. KITCHEN HOOD EXHAUST SHALL BE WELDED BLACK STEEL WHERE HIDDEN AND WELDED STAINLESS STEEL WHERE EXPOSED. DISHWASHER AND SHOWER EXHAUST DUCTWORK SHALL BE STAINLESS STEEL OR ALUMINUM. SEALED WATERTIGHT.
- 2. FIRE DAMPERS: PROVIDE DYNAMIC FIRE DAMPERS THROUGHOUT AIR SYSTEMS FOR ALL DUCTS PENETRATING FIRE RATED WALLS AND AS REQUIRED BY APPLICABLE CODES, STANDARDS, AND AUTHORITIES. STATIC FIRE DAMPERS SHALL ONLY BE ALLOWED ON SYSTEMS WITHOUT FANS. PROVIDE ACCESS DOOR FOR EACH FIRE DAMPER OF SUFFICIENT SIZE TO REPAIR INTERNAL LINK. FIRE DAMPERS SHALL BE AS MANUFACTURED BY GREENHECK, RUSKIN, ARROW, OR APPROVED EQUIP. DAMPER BLADES SHALL BE OUT OF AIR STREAM (UNLESS SIZE IS LARGER THAN AVAILABLE IN CURTAIN TYPE, THEN BLADE TYPE SHALL BE USED, SIMILAR TO FIRE/SMOKE DAMPERS. IF ACTUATORS ARE REQUIRED, MECHANICAL CONTRACTOR SHALL INCLUDE THE WIRING IN HIS COST.). DAMPERS SHALL BEAR 1-1/2 HOUR MINIMUM UL-RATING FIRE DAMPER LABEL AND BE CONSTRUCTED AND INSTALLED AS REQUIRED BY UL 555.
- 3. VOLUME DAMPERS: PROVIDE MANUAL ADJUSTABLE VOLUME DAMPERS, WITH EXTENDED MOUNT, INDICATING AND LOCKING SHROTTANTS ON EACH TAKE-OFF TO REGISTER, GRILLE, OR DIFFUSER (NOT ALL MAY BE SHOWN ON DRAWINGS). INSTALL VOLUME DAMPERS IN ACCESSIBLE LOCATIONS BUT AS FAR AWAY FROM THE RGD IT SERVES AS POSSIBLE.
- 4. DIFFUSERS, REGISTERS, AND GRILLES: PROVIDE DIFFUSERS, REGISTERS AND GRILLES FOR SUPPLY, RETURN, AND EXHAUST OUTLETS, OF SIZE, TYPE, AND DESIGN SHOWN AND SCHEDULED ON DRAWINGS. DIFFUSER SIZES SHOWN ARE NECK SIZES; REGISTER AND GRILLE SIZE ARE NOMINAL. ACCEPTABLE MANUFACTURERS: TITUS, ANEMOSTAT, KRUEGER, TUTTLE & BAILEY, PRICE, OR METALFAIR. SOUND PRESSURE LEVELS ARE NOT TO EXCEED NC 30.
- 5.
- 6. ACOUSTICAL SOUND LINING: MATERIALS AND INSTALLATION SHALL MEET THE FOLLOWING STANDARDS, AS APPLICABLE: NFPA-90A, UL723, NFPA-255; SMACNA DUCT LINER APPLICATIONS STANDARD; SMACNA MECHANICAL FASTENERS STANDARD; ADHESIVE AND SEALANT COUNCIL: ADHESIVES STANDARD FOR DUCT LINER - ASC-A-7001A; ASTM E-84 FIRE HAZARD CLASSIFICATIONS OF 25 FLAME SPREAD, 50 SMOKE DEVELOPED, AND 50 FUEL CONTRIBUTED. INSULATION SHALL HAVE A NOMINAL R-VALUE OF 4.0 AT 1" THICKNESS AND SHALL PASS UL 181 TESTS FOR MOLD GROWTH AND AIR EROSION. INTERNAL AIRFLOW DIMENSIONS ARE SHOWN FOR DUCTS. CONTRACTOR SHALL INCREASE DUCT SIZE FOR LINING. PROVIDE MINIMUM 1" THICK ACOUSTICAL LINING. SEAL ALL JOINTS WITH MANUFACTURER APPROVED MASTIC. USE SHEET METAL NOSING AT ALL RAW EDGES. FACTORY FABRICATED DOUBLE-WALL INTERNALLY INSULATED DUCT WITH PERFORATED PANEL MAY BE USED IN PLACE OF LINING. FIBER GLASS LINING SHALL BE JOHN MANVILLE PERMACOTE LINACOUSTIC OR EQUAL BY CERTAIN-TEED, KNAUF, OR OWENS CORNING.
- 7. DUCT INSULATION (EXTERNAL): INSULATION SHALL BE CERTAIN-TEED, KNAUF, MANVILLE, OR OWENS CORNING. MATERIALS SHALL MEET REQUIREMENTS OF ADHESIVE AND SEALANT COUNCIL STANDARDS AND SMACNA. MINIMUM DUCTWORK INSULATION THICKNESS SHALL BE AS REQUIRED TO MEET THE MINIMUM R-VALUES AS INDICATED IN THE APPLICABLE STATE BUILDING CODE. FOR CONCEALED INSULATION, USE FIBROUS GLASS DUCT WRAP WITH FOIL-KRAFT FLAME RESISTANT VAPOR BARRIER. WHERE DUCTWORK IS LINED, THE R-VALUE OF THE LINER CAN BE COMBINED WITH THE R-VALUE OF THE EXTERNAL DUCT INSULATION TO ACHIEVE THE STATE CODE MINIMUM.

- 8. WATER PIPING AND VALVES: PIPING 2-1/2" AND LARGER SHALL BE WELDED SCHEDULE 40 STEEL, 2" AND SMALLER SHALL BE SWEATED SCHEDULE 40 STEEL OR 95% SOLDERED TYPE L COPPER. CONDENSATE DRAIN PIPING SHALL BE COPPER, PROVIDE FLEX CONNECTORS (DOUBLE SPHERE) AT ALL CONNECTIONS TO ROTATING EQUIPMENT. PROVIDE DIELECTRIC FITTINGS EQUAL TO PPP CLEARFLOW TO CONNECT DISSIMILAR PIPING MATERIALS. VALVES SHALL HAVE NAME OF MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON BODIES. VALVES AND STRAINERS SHALL BE AS MANUFACTURED BY CRANE, HAMMOND, JENKINS, STOCKHOLM, MUELLER, APOLLO, WATTS, SARCO, OR MILWAUKEE. BALL VALVES SHALL BE USED ON 2" AND SMALLER WATER PIPING, BUTTERFLY USED ON 2-1/2" AND LARGER WATER PIPING. CALIBRATED COMBINATION BALANCING AND SHUT-OFF VALVES SHALL BE BY ARMSTRONG, BELL AND GOSSETT, FLOWSET, MEPCO, AUTOFLOW, MACON, OR TACO. PROVIDE DIFFERENTIAL PRESSURE METER KIT WITH FLOW CALIBRATION CHARTS. PROVIDE DRAIN VALVES AT LOW POINTS IN PIPING AND VALVED VENTS AT HIGH POINTS. STRAINERS SHALL BE "Y" TYPE (ALTERNATIVELY, NON-REDUCING SUCTION DIFFUSERS MAY BE USED ON PUMP INLETS), FULL SIZE OF ENTERING PIPE SIZE AND HAVE A MAXIMUM CLEAN PRESSURE DROP OF ONE PSID. STRAINERS SHALL INCLUDE BLOW DOWN VALVE. CHECK VALVES SHALL BE SWING TYPE EXCEPT. AUTOMATIC FLOW CONTROL VALVES SHALL BE BY GRISWOLD OR AUTOFLOW WHERE INDICATED ON THE DRAWINGS. VALVES SHALL BE FACTORY SET AND SHALL AUTOMATICALLY LIMIT THE RATE OF FLOW TO REQUIRED ENGINEERED CAPACITY WITHIN 5% ACCURACY OVER ITS CONTROL RANGE. PROVIDE DIFFERENTIAL PRESSURE METER KIT.
- 9. PIPE INSULATION: WATER PIPING INSULATION SHALL BE FIBROUS GLASS INSULATION WITH FACTORY-APPLIED FIRE RETARDANT VAPOR BARRIER JACKET WITH K FACTOR OF AT LEAST 0.23 AT 75 DEG. F MEAN TEMPERATURE BY OWENS CORNING, CERTAIN-TEED, MANVILLE, OR KNAUF. REFRIGERANT SUCTION LINES, HOT GAS BYPASS LINES, CONDENSATE DRAIN LINES, AND OUTDOOR LIQUID LINES SHALL BE INSULATED WITH UV RESISTANT RIGID CLOSED CELL FOAM INSULATION, EQUAL TO ARIMACELL APARMAFLEX OR HALSTEAD/NOVACO (INSULTUBE). HEAT PUMP REFRIGERANT PIPING SHALL HAVE BOTH LINES INSULATED. ASTM E-84 FIRE HAZARD RATINGS SHALL BE 25 FLAME SPREAD, 50 SMOKE DEVELOPED AND 50 FUEL CONTRIBUTED. INSULATION THICKNESS SHALL BE AS INDICATED IN THE APPLICABLE STATE ENERGY CODE. ALL OUTDOOR PIPING SHALL BE COVERED WITH WEATHERPROOFED ALUMINUM JACKET.
- 10. PIPE HANGERS AND SUPPORTS: PROVIDE PIPE STANDS, SUPPORTS, HANGERS, AND OTHER SUPPORTING APPLIANCES AS NECESSARY TO SUPPORT WORK REQUIRED BY CONTRACT DOCUMENTS. SPACING OF HANGERS SHALL BE INSTRUCTED IN ACCORDANCE WITH APPLICABLE BUILDING AND MECHANICAL CODES. SIZE OF HANGERS SHALL INCLUDE THE PIPE INSULATION WITH SHIELD. WHERE HANGERS ARE USED OUTDOORS, THEY SHALL BE STAINLESS STEEL OR PVC COATED GALVANIZED STEEL.
- 11. FIRESTOPPING: PROVIDE ASBESTOS-FREE FIRESTOPPING MATERIAL CAPABLE OF MAINTAINING AN EFFECTIVE BARRIER AGAINST FLAME, GASES, AND TEMPERATURE. PROVIDE NONCOMBUSTIBLE FIRESTOPPING THAT IS NONTOXIC TO HUMAN BEINGS DURING INSTALLATION OR DURING FIRE CONDITIONS. DEVICES AND EQUIPMENT FOR FIRESTOPPING SERVICE SHALL BE UL FRD LISTED OR FM P7825 APPROVED FOR USE WITH APPLICABLE CONSTRUCTION, AND PENETRATING ITEMS. MATERIAL SHALL HAVE A FLAME SPREAD OF 25 OR LESS, A SMOKE DEVELOPED RATING OF 50 OR LESS WHEN TESTED IN ACCORDANCE WITH UL 723 OR UL LISTED AND EXCEPTED. FIRESTOPPING MATERIALS SHALL BE UL FRD LISTED OR FM P7825 APPROVED FOR "F" AND "T" RATING AT LEAST EQUAL TO FIRE-RATING OF FIRE WALL OR FLOOR IN WHICH PENETRATED OPENINGS ARE TO BE PROTECTED, EXCEPT THAT "F" AND "T" RATINGS MAY BE 3 HOURS FOR FIRESTOPPING IN THROUGH-PENETRATIONS OF 4-HOUR FIRE RATED WALL OR FLOOR.
- 12. VARIABLE AIR VOLUME BOXES: PROVIDE BOXES BY PRICE, TITUS, ENVIROTEC, TRANE, KRUEGER, OR ANEMOSTAT. ALL BOXES SHALL HAVE PRESSURE INDEPENDENT CONTROLLERS COMPATIBLE WITH THE CONTROL SYSTEM AND MULTIPLE POINT FLOW SENSORS. UNITS SHALL NOT DEVIATE FROM SET MINIMUM OR MAXIMUM FLOW SETTINGS BY MORE THAN 10%, REGARDLESS OF INLET ANGLE. INLET VELOCITIES SHALL NOT EXCEED 2000 FPM. SOUND DATA SHALL BE CERTIFIED IN ACCORDANCE WITH ADC STANDARD 1062. BOX AIR LEAKAGE SHALL NOT BE MORE THAN 2% OF MAXIMUM AIRFLOW. INSULATION SHALL BE HOSPITAL GRADE FOAM TYPE. PROVIDE INTEGRAL REHEAT COILS OF TYPE AND CAPACITY INDICATED ON DRAWINGS.
- 13. SPLIT SYSTEM DIRECT EXPANSION AIR CONDITIONING: PROVIDE COMPLETE DX SYSTEM FOR CENTRAL STATION AIR CONDITIONING UNITS OF TYPES, SIZES, AND CAPACITIES SHOWN ON SCHEDULES. SYSTEM SHALL CONSIST OF MATCHING AIR COOLED CONDENSING UNITS, COMPRESSORS, INSULATED PIPING (SIZED BY THE MANUFACTURER FOR THE INSTALLATION CONDITIONS - INCLUDING DOUBLE SUCTION RISERS WHERE NEEDED), CONTROLS PER THE SEQUENCES ON THE DRAWINGS, WIRING, AND OTHER ACCESSORIES AND APPURTENANCES NECESSARY TO PROVIDE FULLY AUTOMATICALLY FUNCTIONING SYSTEM. DX AIR CONDITIONING SYSTEM SHALL BE CAPABLE OF STARTING AND OPERATING DOWN TO 0°F AMBIENT. PROVIDE TIME DELAY RELAY FOR TIMED BYPASS OF THE LOW PRESSURE SWITCH OR OTHER MEANS TO START CONDENSING UNIT AT 0 DEG. F WITHOUT NUISANCE SAFETY TRIP UNITS. UNITS SHALL HAVE THE SCHEDULED NUMBER OF STAGES (AT LEAST ONE PER COMPRESSOR) OF COOLING (PLUS, FOR VAV UNITS, HOT GAS BY-PASS FOR EACH REFRIGERANT CIRCUIT). PROVIDE INSULATED REFRIGERANT PIPING BETWEEN AIR-COOLED CONDENSING UNIT AND AIR HANDLING UNIT. PROVIDE ALL NECESSARY AUXILIARIES AND APPURTENANCES.
- 14. AUTOMATIC TEMPERATURE CONTROLS: PROVIDE COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS BY MAINE CONTROLS (DISTECH PRODUCT). CONTROL SYSTEM SHALL BE CAPABLE OF PERFORMING ALL SEQUENCES OF OPERATION SHOWN ON THE DRAWINGS OR DESCRIBED IN THESE SPECIFICATIONS. INDIVIDUAL CONTROL COMPONENTS MAY NOT BE SHOWN ON CONTRACT DOCUMENTS, BUT ATC CONTRACTOR SHALL SUPPLY ALL COMPONENTS AND CONTROL WIRING (INCLUDING POWER WIRING TO ALL PANELS, CONTROLLERS, TRANSFORMERS, ACTUATORS, ETC.) NECESSARY FOR A COMPLETE OPERABLE SYSTEM. COORDINATE WITH ELECTRICAL CONTRACTOR FOR LOCATION OF LINE VOLTAGE JUNCTION BOX IN EACH MECHANICAL AREA. ATC CONTRACTOR SHALL EXTEND WIRING FROM THESE BOXES) TO ALL CONTROL COMPONENTS AND SHALL BE RESPONSIBLE FOR ALL SYSTEM COMPONENTS, WHETHER HE SUBCONTRACTS ELECTRICAL AND OTHER WORK OR NOT. PROVIDE FRONT END WORKSTATION, INCLUDING MONITOR, TOWER, PRINTER, SOFTWARE, ETC. FOR A COMPLETE AND OPERABLE SYSTEM. DDC SYSTEM SHALL BE PASSWORD PROTECTED WEB-BASED SYSTEM AND BE VIEWABLE VIA ANY COMPUTER THROUGH THE INTERNET. PROVIDE NEW MAIN CONTROLLER(S) AND EQUIPMENT CONTROLLERS, WIRING, SOFTWARE, HARDWARE AND INFRASTRUCTURE CAPABLE OF BEING SCALABLE TO ULTIMATELY CONTROL THE EXISTING BUILDING. GRAPHICALLY SHOW FLOOR PLANS AND ROOMS WITH POINT AND CLICK FUNCTIONS TO SHOW INFORMATION DESCRIBED IN SEQUENCES ON WEB BASED SYSTEM.
- 18. DDC/BUILDING AUTOMATION SYSTEM INTERFACE:
 - 18.1. ALL COMPONENTS MUST BE COMPATIBLE WITH EXISTING OUTPUT DEVICES. PROVIDE HAND HELD OPERATOR TERMINALS FOR LOCAL OUTPUT OF SENSORS WHEN NO OUTPUT DEVICES EXIST. PROVIDE TO OWNER FULL OPERATING AND MAINTENANCE INSTRUCTIONS FOR USE AND/OR ALTERATION OF DDC SYSTEMS.
 - 18.2. LOCAL CONTROL UNITS (LCU'S) (PRIMARY SYSTEMS SUCH AS AHU, VAV, BOILER, WATER SYSTEMS):
 - 18.2.1. ALL LOCAL CONTROL UNITS SHALL USE BACNET/IP PROTOCOL (NOT MS/TP), SHALL COMPLY WITH THE FOLLOWING COMMUNICATION SPECIFICATIONS, AND ACHIEVE PERFORMANCE AS SPECIFIED HEREIN:
 - 18.2.1.1. ALL CONTROLLERS SHALL BE ABLE TO COMMUNICATE PEER-TO-PEER WITHOUT THE NEED FOR A NETWORK CONTROL UNIT (NCU)

- 18.2.1.1. ANY CONTROLLER ON THE ETHERNET DATA LINK/PHYSICAL LAYER SHALL BE ABLE TO ACT AS A MASTER TO ALLOW FOR THE EXCHANGE AND SHARING OF DATA VARIABLES AND MESSAGES WITH ANY OTHER CONTROLLER CONNECTED ON THE SAME COMMUNICATION CABLING. SLAVE CONTROLLERS ARE NOT ACCEPTABLE.
- 18.2.2. THE LOCAL CONTROL UNITS (LCU) SHALL BE 32-BIT MICROPROCESSOR-BASED WITH MINIMUM OF 4GB NON-VOLATILE FLASH. THEY SHALL ALSO BE MULTI-TASKING, REAL-TIME DIGITAL CONTROL PROCESSORS CONSISTING OF MODULAR HARDWARE WITH PLUG-IN ENCLOSED PROCESSORS, COMMUNICATION CONTROLLERS, POWER SUPPLIES AND INPUT/OUTPUT POINT MODULES.
- 18.2.3. THE LCU SHALL CONTINUOUSLY PERFORM SELF-DIAGNOSTICS, COMMUNICATION DIAGNOSIS AND DIAGNOSIS OF ALL PANEL COMPONENTS. THE CONTROLLER SHALL PROVIDE BOTH LOCAL AND REMOTE ANNUNCIATIONS OF ANY DETECTED COMPONENT FAILURES OR REPEATED FAILURE TO ESTABLISH COMMUNICATION.
- 18.2.4. WIRELESS PORT SUPPORTING A WIRELESS TRANSCIEVER FOR COMMUNICATION WITH WIRELESS SENSORS/SWITCHES.
- 18.2.5. BAS SHALL BE INTEGRATED TO THE EXISTING NIAGARA 4 SUPERVISOR SERVER ON THE BANGOR SAVINGS FACILITIES NETWORK
- 18.2.6. ACCEPTABLE PRODUCTS:
 - 19. AUTOMATIC TEMPERATURE CONTROL WIRING, CONDUITS AND CABLE
 - A. ALL WIRING SHALL BE COPPER AND MEET THE REQUIREMENTS OF THE NEC.
 - B. RACEWAYS AND CONDUIT: RIGID GALVANIZED STEEL CONDUIT (RGS) SHALL BE UTILIZED WITH THREADED FITTINGS ONLY. ELECTRICAL METALLIC TUBING (EMT) SHALL BE UTILIZED WITH SET SCREW TYPE FITTINGS.
 - B.A. CONDUIT IN FINISHED AREAS SHALL BE CONCEALED IN CEILING CAVITY SPACES, PLENUMS, FURRED SPACES AND WALL CONSTRUCTION. EXCEPTION: METALLIC SURFACE RACEWAY MAY BE USED IN FINISHED AREAS ON MASONRY WALLS. ALL SURFACE RACEWAY IN FINISHED AREAS MUST BE COLOR MATCHED TO THE EXISTING FINISH WITHIN THE LIMITATIONS OF STANDARD MANUFACTURED COLORS.
 - B.B. CONDUIT IN NON-FINISHED AREAS WHERE POSSIBLE, SHALL BE CONCEALED IN CEILING CAVITY SPACES, PLENUMS, FURRED SPACES, AND WALL CONSTRUCTION. EXPOSED CONDUIT WILL RUN PARALLEL TO OR AT RIGHT ANGLES TO THE BUILDING STRUCTURE.
 - C. ALL EXPOSED RACEWAY THAT IS EXPOSED TO MOISTURE OR LOCATED OUTDOORS SHALL BE INSTALLED IN RIGID METAL CONDUIT WITH FLEXIBLE CONNECTIONS TO ALL MECHANICAL EQUIPMENT UTILIZING LIQUID TIGHT FLEXIBLE METAL CONDUIT NOT TO EXCEED 18". ALL PENETRATIONS OF WEATHER TIGHT BOXES SHALL UTILIZE WEATHERPROOF HUBS. ALL CONDUIT SUPPORTS SHALL BE HOT DIPPED GALVANIZED. EXPOSED HORIZONTAL RUNS SHALL BE MINIMIZED. ALL FASTENERS, MISCELLANEOUS SUPPORTS (UNISTRUT OR EQUAL) AND HARDWARE UTILIZED FOR THE WIRING INSTALLATION SHALL BE STAINLESS STEEL. ALL ROOF PENETRATIONS SHALL BE IN ACCORDANCE WITH THE ROOFING MANUFACTURER'S INSTRUCTIONS TO MAINTAIN THE INTEGRITY AND ANY REMAINING WARRANTEE ON THE ROOFING SYSTEM.
 - D. FLEXIBLE METALLIC CONDUIT (MAX. 3 FEET) SHALL BE USED FOR CONNECTIONS TO ACTUATOR MOTORS, CONTROLLERS, AND SENSORS MOUNTED ON VIBRATION PRODUCING EQUIPMENT. LIQUID-TIGHT FLEXIBLE CONDUIT SHALL BE USE IN EXTERIOR LOCATIONS AND INTERIOR LOCATIONS SUBJECT TO MOISTURE.
 - E. JUNCTION BOXES SHALL BE PROVIDED AT ALL CABLE SPLICES. EQUIPMENT TERMINATION, AND TRANSITIONS FROM EMT TO FLEXIBLE CONDUIT, INTERIOR DRY LOCATION J-BOXES SHALL BE GALVANIZED PRESSED STEEL, NOMINAL FOUR-INCH SQUARE WITH BLANK COVER. EXTERIOR AND DAMP LOCATION JH-BOXES SHALL BE CAST ALLOY FS BOXES WITH THREADED HUBS AND GASKETED COVERS.
 - F. WHERE THE SPACE ABOVE THE CEILING IS A SUPPLY OR RETURN AIR PLENUM, THE WIRING SHALL BE PLENUM RATED. TEFLON WIRING CAN BE RUN WITHOUT CONDUIT ABOVE SUSPENDED CEILINGS. EXCEPTION: ANY WIRE RUN IN SUSPENDED CEILINGS THAT IS USED TO CONTROL OUTSIDE AIR DAMPERS OR TO CONNECT THE SYSTEM TO THE FIRE MANAGEMENT OR SMOKE CONTROL SYSTEMS SHALL BE IN CONDUIT.
 - G. COAXIAL CABLE SHALL CONFORM TO RG62 OR RG59 RATING. PROVIDE PLENUM RATED COAXIAL CABLE WHEN RUNNING IN RETURN AIR PLENUMS.
 - H. ETHERNET 10/100 BASE -T NETWORK WIRING SHALL BE EQUIVALENT TO OWNER'S REMISE WIRING OR, AS A MINIMUM, CATEGORY 5E OR 6 CABLING UP TO 300' MAXIMUM RUN. FIBER OPTIC CABLE SHALL BE USED FOR RUNS OVER 300' AND SHALL INCLUDE THE FOLLOWING SIZES: 50/125, 62.5/125 OR 100/140. ONLY GLASS FIBER IS ACCEPTABLE, NO PLASTIC. FIBER OPTIC CABLE SHALL ONLY BE INSTALLED AND TERMINATED BY AN EXPERIENCED CONTRACTOR. THE BAS CONTRACTOR SHALL SUBMIT TO THE ENGINEER THE NAME OF THE INTENDED CONTRACTOR OF THE FIBER OPTIC CABLE WITH HIS SUBMITTAL DOCUMENTS.
 - I. CABLES SHALL BE ATTACHED TO THE BUILDING PROPER AT REGULAR INTERVALS SUCH THAT THERE IS NO DROOP GREATER THAN 2 INCHES BETWEEN SUPPORTS. CABLES SHALL NOT TO BE AFFIXED TO OR SUPPORTED BY PIPES, CONDUITS (UNLESS SPECIFICALLY ALLOWED BY THE NEC), DUCTS, ETC. WIRES SHALL BE KEPT A MINIMUM OF THREE (3) INCHES FROM ALL PIPING.
 - J. WHERE SENSOR WIRES LEAVE THE CONDUIT SYSTEM, THEY ARE TO BE PROTECTED BY A NON-METALLIC BUSHING.
 - K. WIRING SHALL NOT BE ALLOWED TO RUN THROUGH ELEVATOR, TELEPHONE EQUIPMENT, AND ELECTRIC ROOMS.

(CONTINUED ON M-003)

NOTE:

- 1. SEE SHEET M-001 FOR THE LEGEND AND ABBREVIATIONS.

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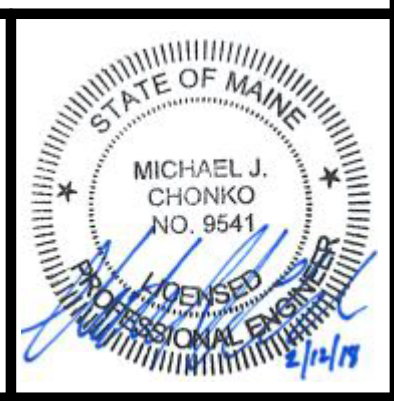
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BANGOR SAVINGS BANK - RENOVATIONS TO 280 FORE STREET PORTLAND, MAINE

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SHEET TITLE
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M-002