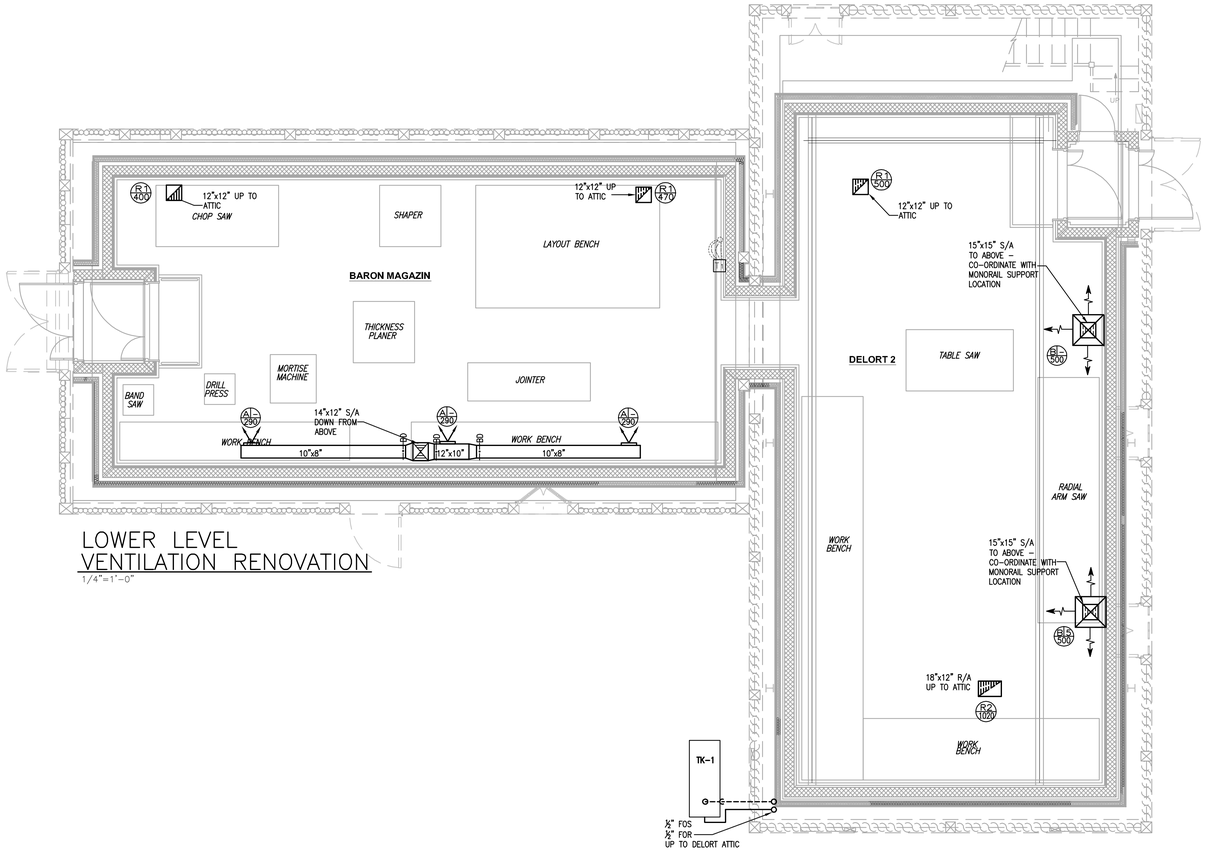
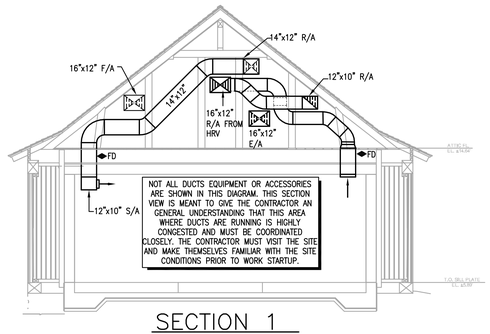
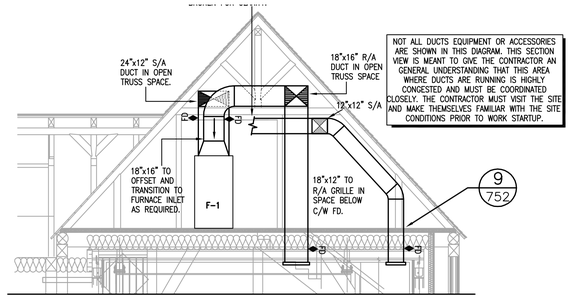


LOWER LEVEL
VENTILATION RENOVATION
1/4"=1'-0"



SECTION 1
1/4"=1'-0"



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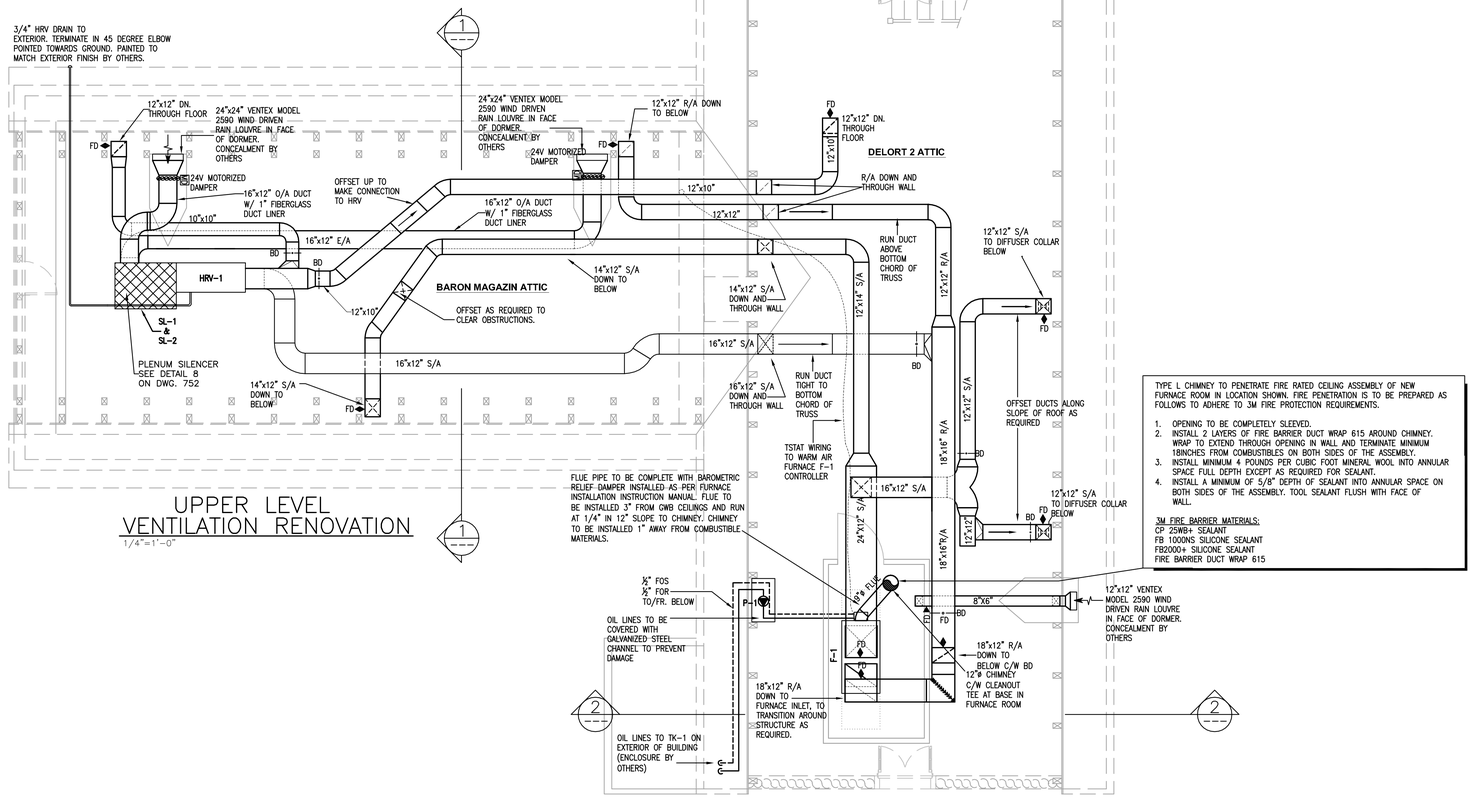

UPPER LEVEL
VENTILATION RENOVATION
1/4"=1'-0"

TYPE L CHIMNEY TO PENETRATE FIRE RATED CEILING ASSEMBLY OF NEW FURNACE ROOM IN LOCATION SHOWN. FIRE PENETRATION IS TO BE PREPARED AS FOLLOWS TO ADHERE TO 3M FIRE PROTECTION REQUIREMENTS.

1. OPENING TO BE COMPLETELY SLEEVED.
2. INSTALL 2 LAYERS OF FIRE BARRIER DUCT WRAP 615 AROUND CHIMNEY. WRAP TO EXTEND THROUGH OPENING IN WALL AND TERMINATE MINIMUM 18INCHES FROM COMBUSTIBLES ON BOTH SIDES OF THE ASSEMBLY.
3. INSTALL MINIMUM 4 POUNDS PER CUBIC FOOT MINERAL WOOL INTO ANNULAR SPACE FULL DEPTH EXCEPT AS REQUIRED FOR SEALANT.
4. INSTALL A MINIMUM OF 5/8" DEPTH OF SEALANT INTO ANNULAR SPACE ON BOTH SIDES OF THE ASSEMBLY. TOOL SEALANT FLUSH WITH FACE OF WALL.

3M FIRE BARRIER MATERIALS:
CP 25WB+ SEALANT
FB 1000NS SILICONE SEALANT
FB2000+ SILICONE SEALANT
FIRE BARRIER DUCT WRAP 615

INSULATION NOTES

1. ALL S/A, R/A, F/A AND E/A DUCTWORK LOCATED IN ATTIC NOT LINED WITH ACOUSTICAL DUCT LINER IS TO BE INSULATED WITH 1" RIGID DUCT INSULATION C/W CANVAS JACKET..

VENTILATION NOTES

1. DUCT BRANCHES TO BE RUN TO AVOID CROSS–OVER OF LIGHTS AND OTHER DUCTS BECAUSE THE CEILING SPACES ARE MINIMAL. THE DRAWING LAYOUT ATTEMPTS TO ACHIEVE THIS BUT COORDINATION IS REQUIRED.
2. INSTALL BALANCING DAMPERS ON ALL DUCT BRANCHES TO SUPPLY DIFFUSERS AND RETURN/EXHAUST GRILLES.
3. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING MOUNTED EQUIPMENT. IF AN ITEM IS NOT SHOWN ON THE REFLECTED CEILING PLAN PREPARE A DRAWING AND SUBMIT TO ARCHITECT FOR APPROVAL.
4. MOUNTING FRAME OF CEILING MOUNTED AIR DISTRIBUTION DEVICES SHALL BE COMPATIBLE WITH CEILING TYPE. REFER TO ARCH. DRAWINGS FOR CEILING TYPE.
5. CONTRACTOR SHALL COORDINATE VOLTAGE AND PHASE OF EACH PIECE OF EQUIPMENT WITH THE ELECTRICAL CONTRACTOR PRIOR TO ORDERING.
6. MOUNT THERMOSTATS WHERE INDICATED ON PLANS 48" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED.
7. FIRE DAMPERS SHALL BE PROVIDED IN ALL RATED WALL AND FLOOR/CEILING PENETRATIONS. VERIFY LOCATION OF RATED ASSEMBLIES WITH ARCHITECTURAL DRAWINGS.
8. ALL PENETRATIONS FROM FURNACE ROOM TO BE FIRE RATED BY ULC FIRE STOP ASSEMBLIES.
9. FUEL DELIVERY PUMPS, TANK AND WARM AIR FURNACE TO BE INSTALLED IN ACCORDANCE WITH WRITTEN MANUFACTURERS INSTALLATION INSTRUCTIONS, IN ACCORDANCE WITH THE NOVA SCOTIA BUILDING CODE REGULATIONS AND IN ACCORDANCE WITH CSA B–139 STANDARD FOR OIL BURNING APPLIANCES.
10. DUCT RISER LOCATIONS MAY NOT BE SHOWN IN THEIR FINAL POSITIONS. CONTRACTOR IS TO COORDINATE CLOSELY WITH HOLLOW CORE ROOF PANEL INSTALLERS TO DETERMINE THE BEST LOCATION FOR THESE RISERS ON SITE.

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
	BALANCING DAMPER (BD)
	DUCT OFFSET
	DUCT WORK
	S/A DIFFUSER (ROUND)
	DUCT OFFSET
	DUCT UP (S/A)
	DUCT UP (R/A or E/A)
	DUCT DOWN (S/A)
	DUCT DOWN (R/A or E/A)
	VERTICAL FIRE DAMPER (FD)
	HORIZONTAL FIRE DAMPER (FD)
A4 500	DIFFUSER/GRILLE DESIGNATION (SEE DIFFUSER/GRILLE SCHEDULE)
A/C#1	EQUIPMENT TAG
T	THERMOSTAT
	FUEL OIL PUMP
	FUEL OIL SUPPLY
	FLEXIBLE DUCTWORK (ROUND)
	FUEL OIL RELIEF (RETURN VALVE)

GENERAL NOTES

IT IS THE CONTRACTORS RESPONSIBILITY TO CHECK AND VERIFY THAT ALL DIMENSIONS AND SIZES ARE CORRECT, AND TO REPORT IN WRITING ANY ERRORS OR OMISSIONS TO THE ENGINEER PRIOR TO PROCEEDING WITH WORK. AVOID SCALING OF DRAWING, EXCEPT AS PERMITTED BY ENGINEER . READ THE DRAWINGS IN CONJUNCTION WITH ALL ARCHITECTURAL, ELECTRICAL, MECHANICAL, STRUCTURAL, AND COMPLETE SPECIFICATIONS. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THE NATIONAL BUILDING CODE OF CANADA 2010. THESE DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AND SEALED BY THE ENGINEER.

NOTES

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NO.	DESCRIPTION	Y - M - D
4.	ISSUED FOR TENDER	16-10-26
3.	REVISED FOR 95% REVIEW	16-04-14
2.	ISSUE FOR 95% REVIEW	16-03-11
1.	ISSUE FOR INFORMATION	16-02-10

REVISIONS

SEAL

REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF NOVA SCOTIA — DATE — D.L. THACKERSON — 6416

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Fortress of Louisbourg
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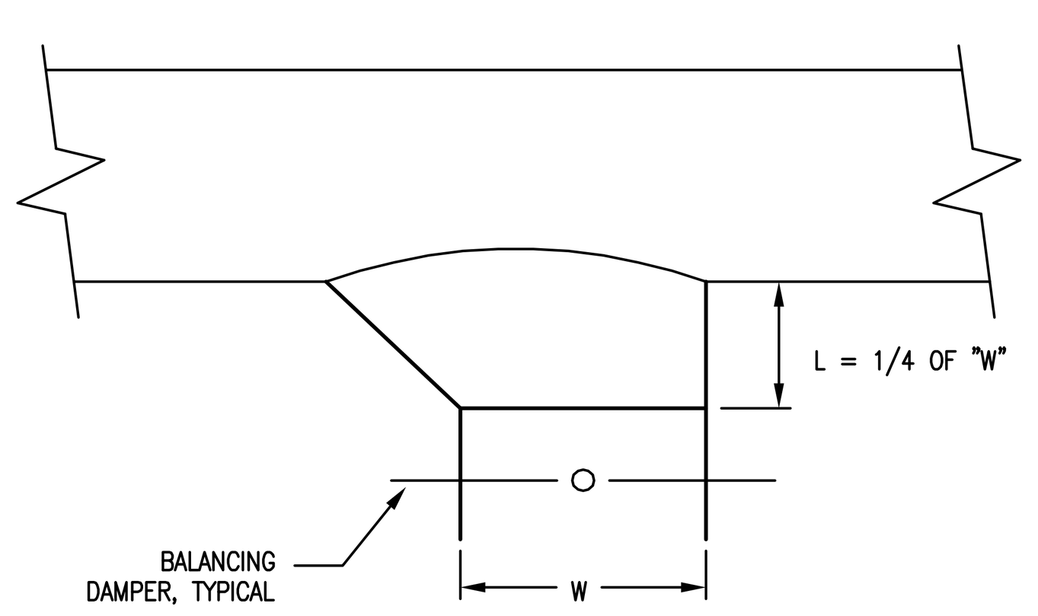
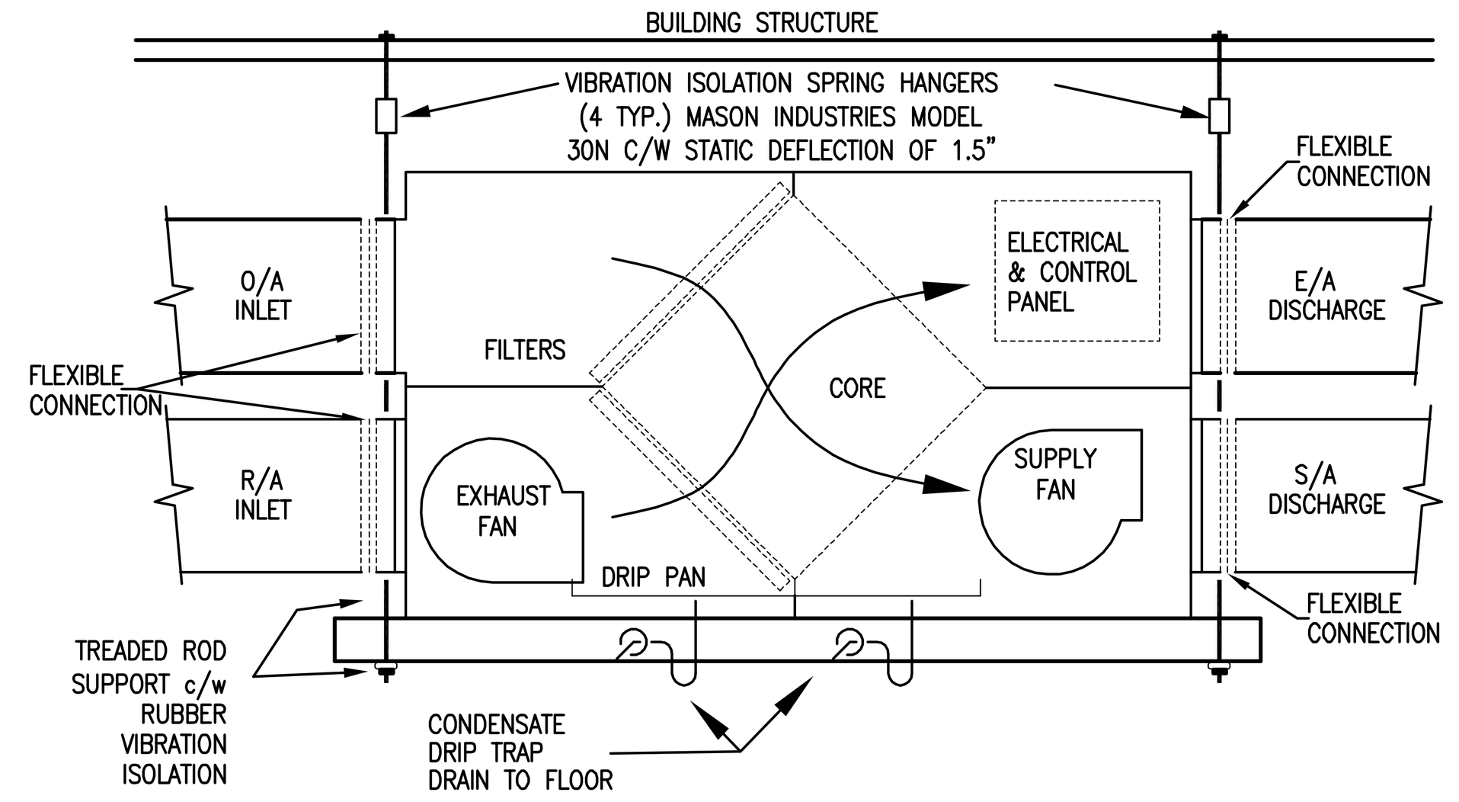
DRAWING
VENTILATION PLAN

DRAWN BY	B.W.R
CHECKED BY	D.L.P
SCALE	AS NOTED
DATE	OCT, 2016

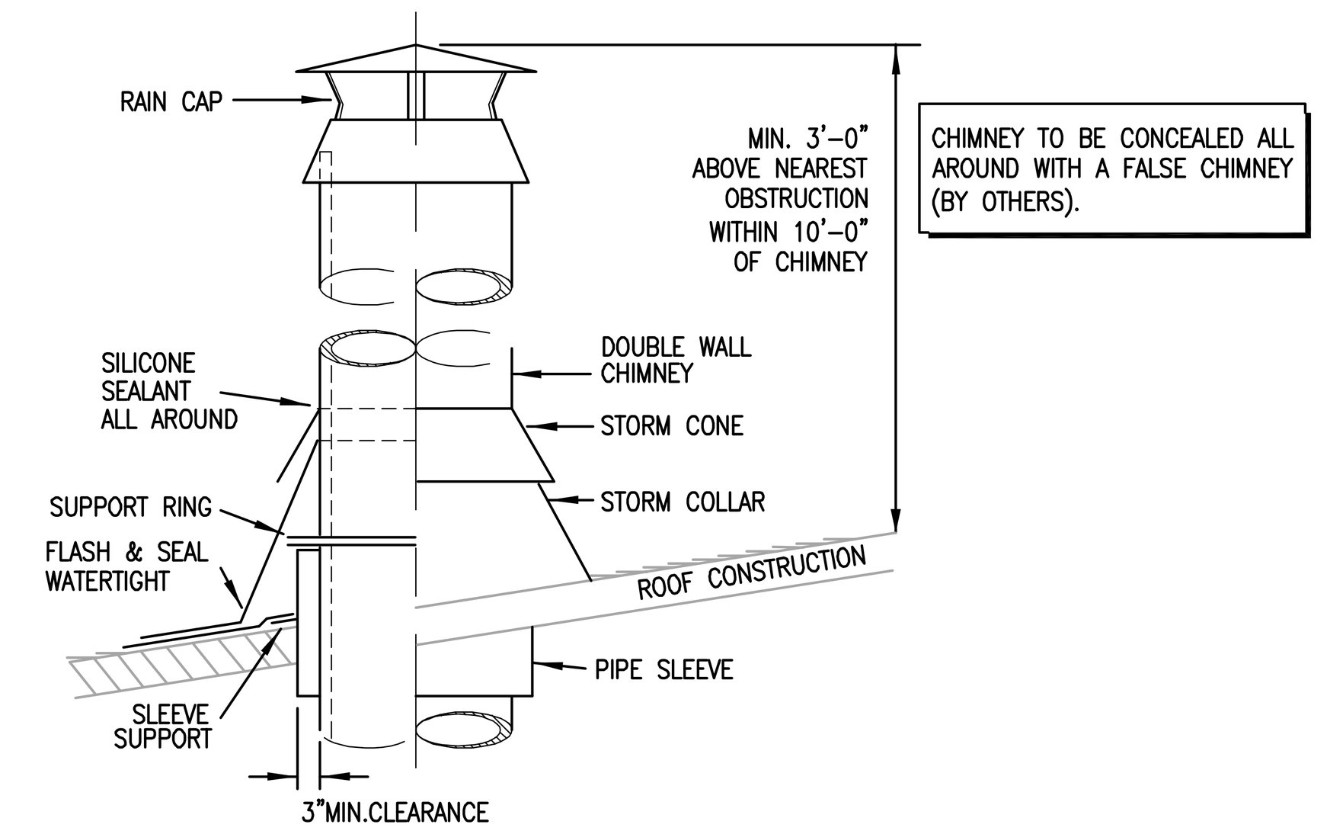
ONSA CAD FILE	DRWG.
15-573	M-751



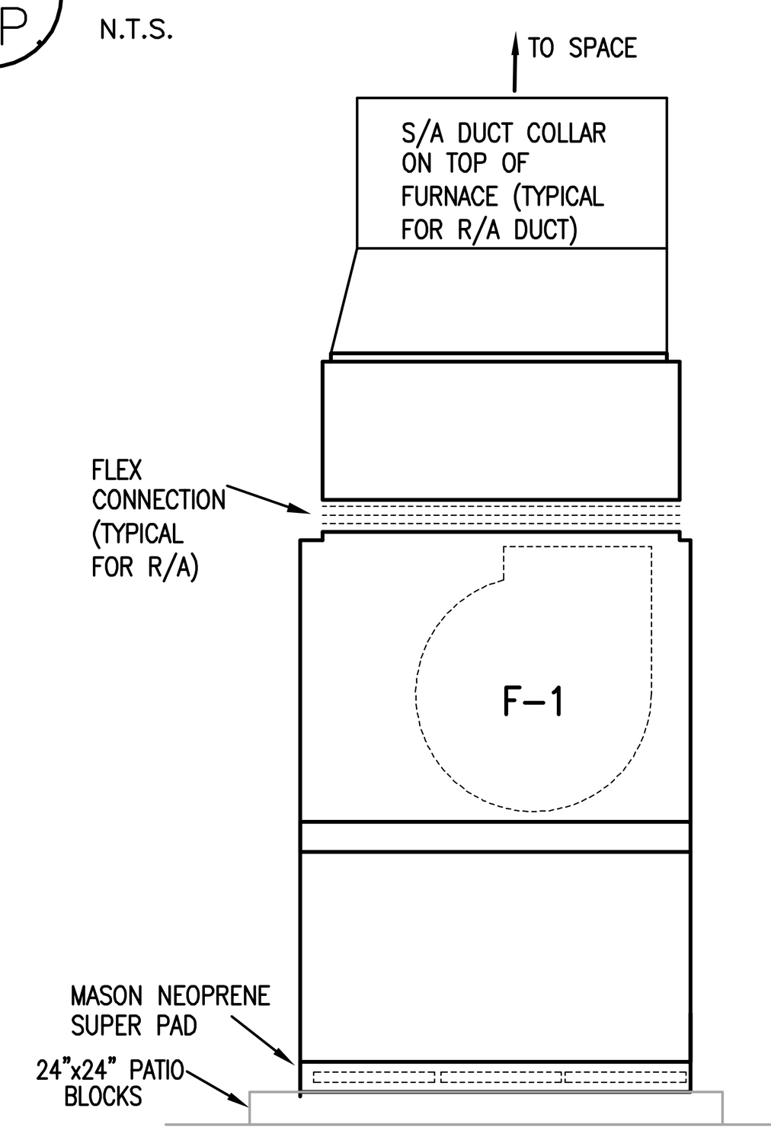
1 TYP TYPICAL BRANCH DUCT TAKE-OFF
N.T.S.



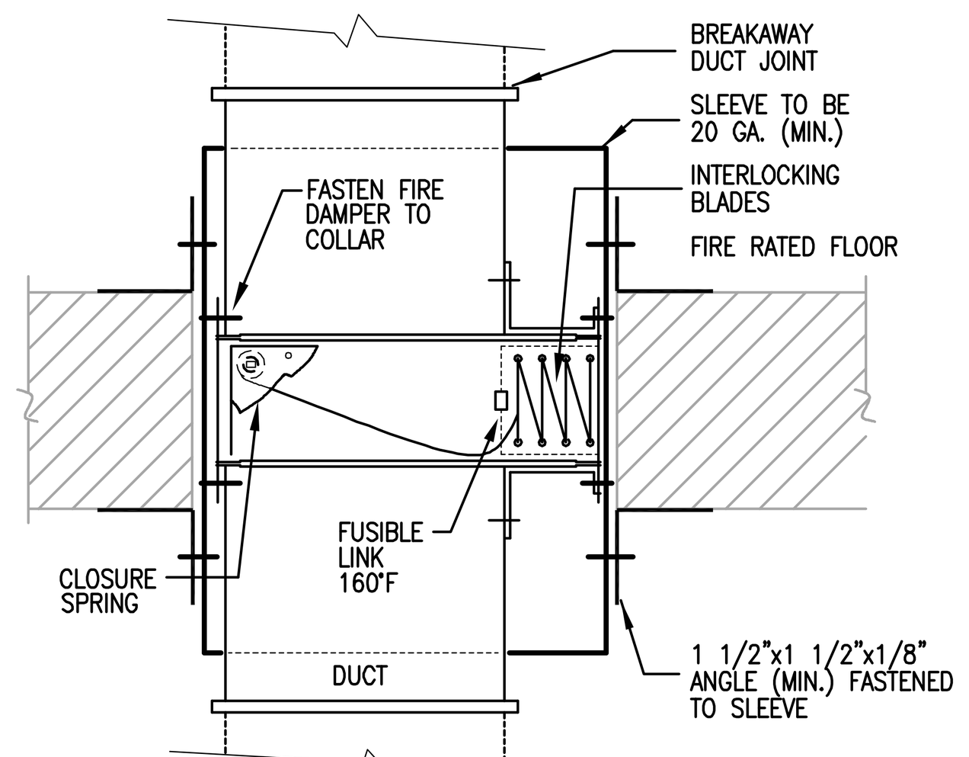
2 TYP HRV SUPPORT
N.T.S.



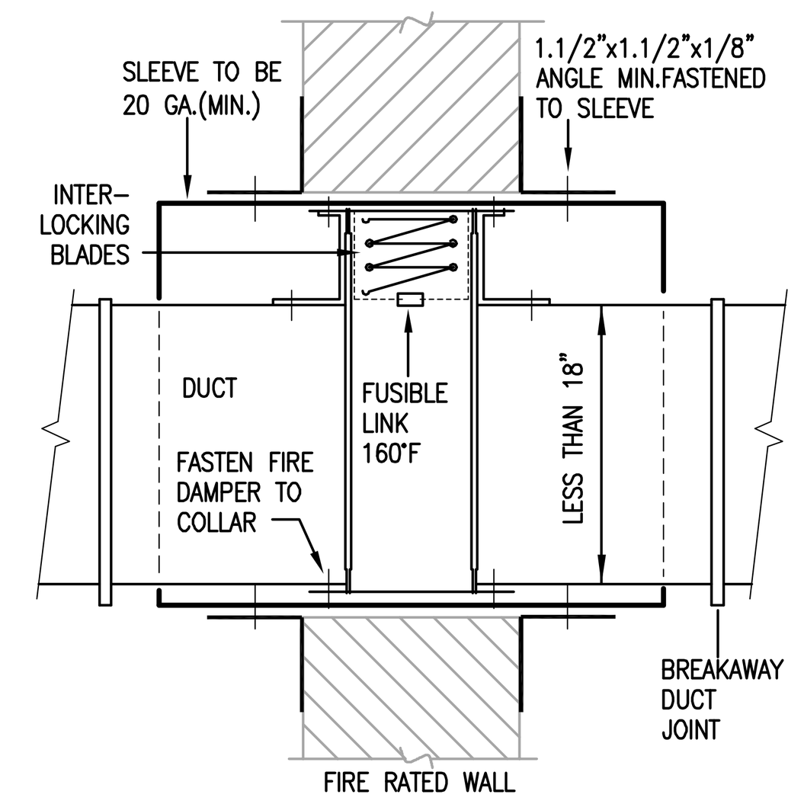
3 TYP DOUBLE WALL CHIMNEY
N.T.S. (SLOPED ROOF)



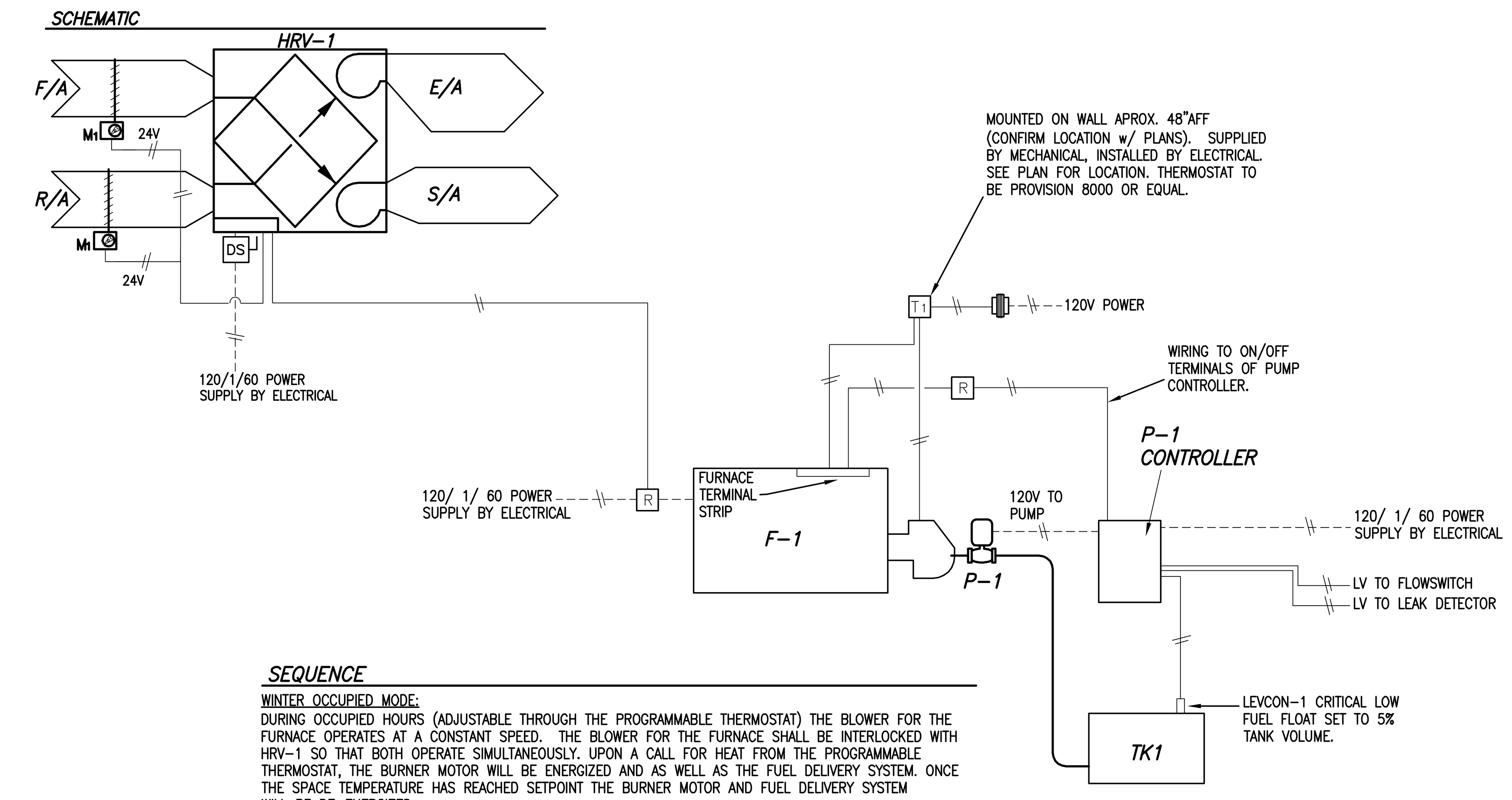
4 TYP WARM AIR FURNACE DETAIL
N.T.S.



5 TYP HORIZONTAL FIRE DAMPER
N.T.S. (DUCTS 18" OR LESS)



6 TYP VERTICAL FIRE DAMPER
N.T.S. (DUCTS 18" OR LESS)



SEQUENCE

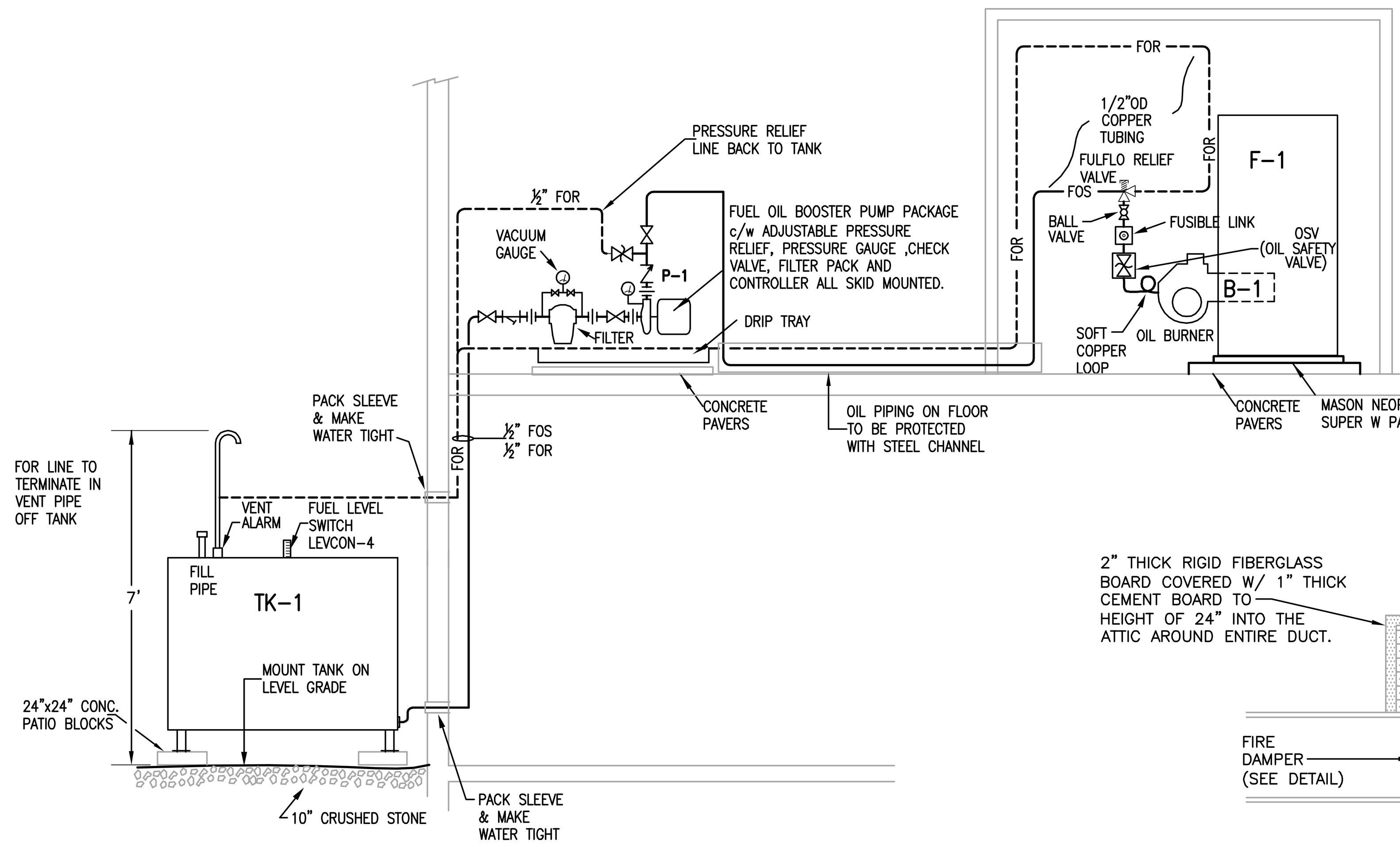
WINTER OCCUPIED MODE:
DURING OCCUPIED HOURS (ADJUSTABLE THROUGH THE PROGRAMMABLE THERMOSTAT) THE BLOWER FOR THE FURNACE OPERATES AT A CONSTANT SPEED. THE BLOWER FOR THE FURNACE SHALL BE INTERLOCKED WITH HRV-1 SO THAT BOTH OPERATE SIMULTANEOUSLY. UPON A CALL FOR HEAT FROM THE PROGRAMMABLE THERMOSTAT, THE BURNER MOTOR WILL BE ENERGIZED AND AS WELL AS THE FUEL DELIVERY SYSTEM. ONCE THE SPACE TEMPERATURE HAS REACHED SETPOINT THE BURNER MOTOR AND FUEL DELIVERY SYSTEM WILL BE DE-ENERGIZED.

WINTER UNOCCUPIED MODE:
DURING UNOCCUPIED HOURS, THE PROGRAMMABLE THERMOSTAT WILL BE SET TO NIGHT SETBACK MODE (ADJUSTABLE THROUGH THE PROGRAMMABLE THERMOSTAT). THE FURNACE BLOWER, HRV, BURNER MOTOR AND FUEL DELIVERY SYSTEM WILL ONLY BE ENERGIZED TO MAINTAIN THE NIGHT SETBACK TEMPERATURE SETPOINT.

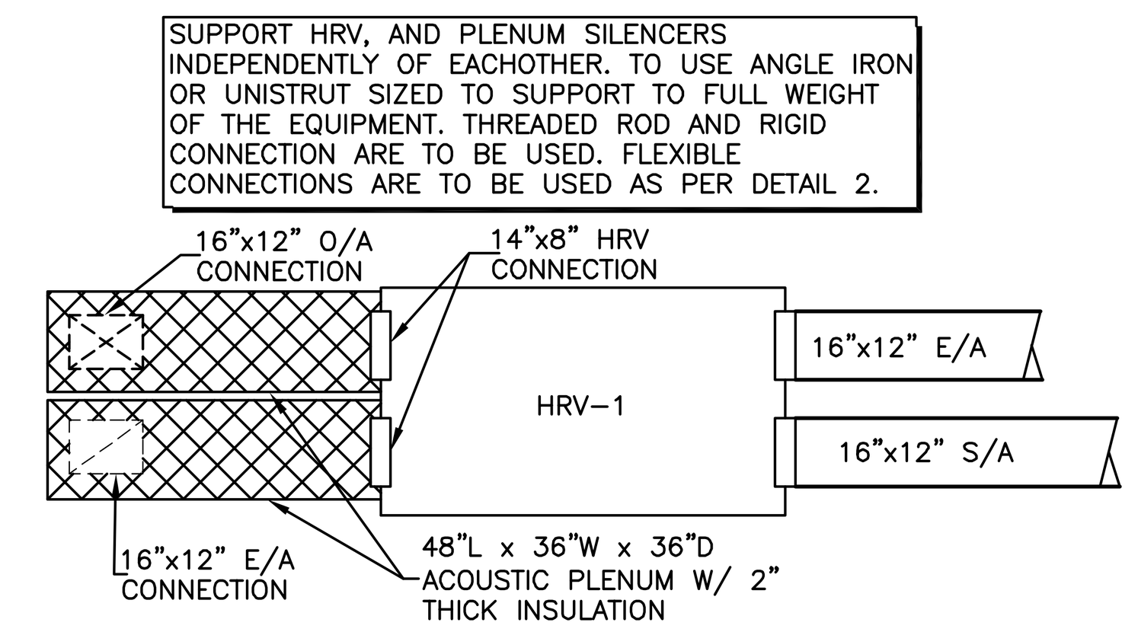
SUMMER OCCUPIED MODE:
DURING OCCUPIED HOURS, THE FURNACE BLOWER AND HRV WILL OPERATE CONTINUOUSLY.

SUMMER UNOCCUPIED MODE:
DURING UNOCCUPIED PERIODS, THE FURNACE BLOWER, HRV, BURNER MOTOR AND FUEL DELIVERY SYSTEM WILL BE OFF.

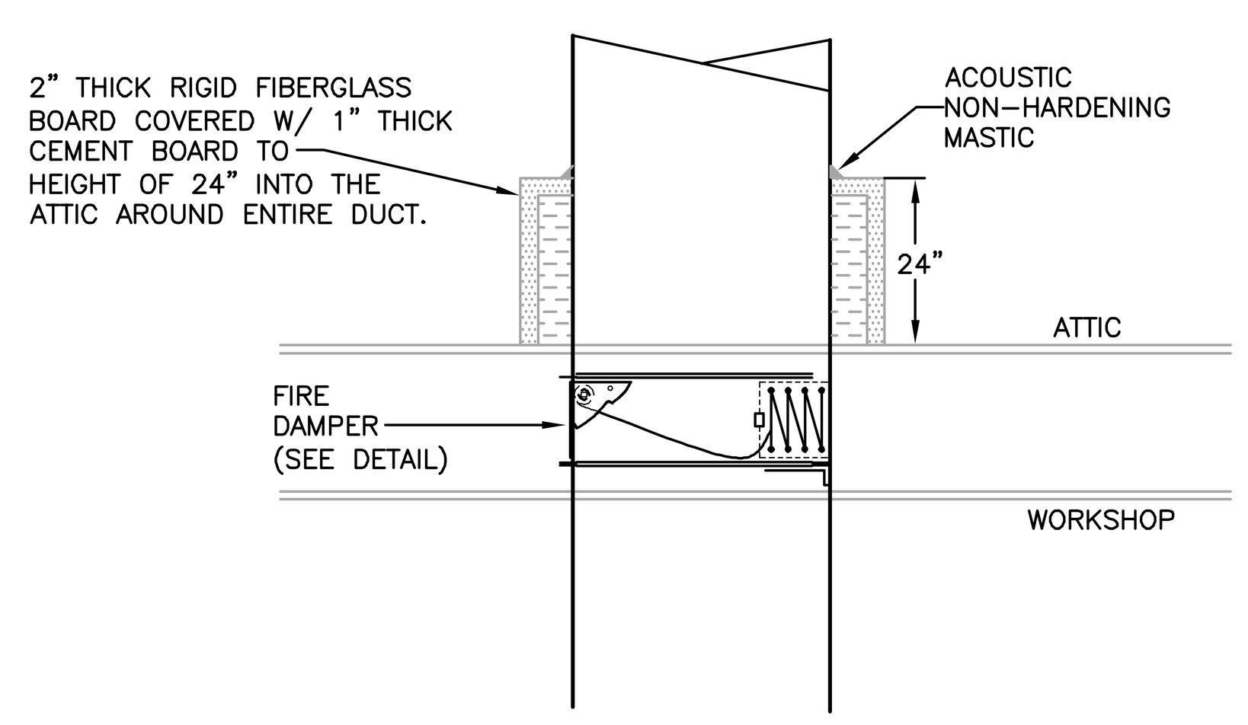
9 TYP HRV/FURNACE/OIL PUMP CONTROL
N.T.S.



7 TYP FUEL OIL BOOSTER PUMP
NTS



8 TYP HRV/PLENUM DETAIL
NTS



9 TYP ATTIC DUCT PENETRATION
NTS

EQUIPMENT LIST

F-1	SUSPENDED WARM AIR FURNACE STANDARD OF ACCEPTANCE: METROMATIC MODEL : LB200 PERFORMANCE: HEATING CAPACITY: 204MBH OUTPUT C/W BECKETT BURNER (1.75GPH) HIGH SPEED BLOWER CAPACITY: 2000cfm @ 0.5" WITH A 1/2 Hp MOTOR & 120/ 1/ 60 POWER SUPPLY. FURNACE TO BE C/W FACTORY SERVICE DISCONNECT, CONTROL PANEL, AND BE CONFIGURED FOR VERTICAL INSTALLATION WITH TOP DUCT DISCHARGE.
HRV-1	HRV NU-AIR MODEL NU1200 c/w 900 cfm CAPACITY @ 0.9" ESP, MOTORS: 2 @ ½ Hp EACH @ 120/1/60. LOW SPEED SETTING. HRV TO BE c/w POLY CORE, ISOLATION HANGERS AND BACKDRAFT DAMPER. UNIT TO BE C/W ES-M2 AND DSTAT-1 CONTROL SET TO CYCLE 20 MINS ON/40 MINS OFF.
TK-1	OIL STORAGE TANK STANDARD OF ACCEPTANCE: AFL DESCRIPTION: 200 Gal. DOUBLE BOTTOM TANK C/W DOUBLE BOTTOM SEAL INDICATOR, TANK FILL GAUGE, VENT, WHISTLE, FILL CAP AND HIGH LEVEL VENT ALARM.
P-1	FUEL OIL LIFT PUMP STANDARD OF ACCEPTANCE: ALBANY 03GC61312 CAST IRON HELICAL GEAR FUEL OIL PUMP CAPABLE OF PUMPING 3GPM @ 25PSI PUMP MOTOR – 1/2 HP WITH 120/ 1/ 60 POWER SUPPLY. 1800 RPM OPTIONS: PUMP TO COME SKID MOUNTED C/W CONTROLLER, RELIEF VALVE AND FILTER PACKED PRE-WIRED AND PRE-PIPED FOR EASE OF INSTALLATION. PUMP PACKAGE TO ALSO C/W LEVCON 4 FLOAT CONTROLS FOR INSTALLATION IN TK-1.

SILENCER SCHEDULE

DESIG.	SYS. No.	MANUFACTURE	MODEL	PLENUM SIZE L x W x H	AIR CAP. cfm	VELOCITY fpm	S.P. in H20	dB LOSS 63 Hz	dB LOSS 125 Hz	dB LOSS 250 Hz	SHAPE
SL-1	HRV-1	VIBRO-ACOUSTICS	ACOUSTICAL PLENUM	48"x36"x36" See Note 1	---	--	--	--	--	27	ACOUSTICAL PLENUM – HRV S/A DISCHARGE
SL-2	HRV-1	VIBRO-ACOUSTICS	ACOUSTICAL PLENUM	48"x36"x36" See Note 1	---	--	--	--	--	27	ACOUSTICAL PLENUM – HRV R/A INLET

ABBREVIATIONS : LGTH – LENGTH (ALONG CENTER LINE) SP – STATIC PRESSURE m/s – METER PER SECOND HTL – HIGH TRANSMISSION LOSS DUCT

NOTES: 1. CONFIRM DIMENSIONAL REQUIREMENTS OF ACOUSTICAL PLENUMS ON SITE PRIOR TO ORDERING PRODUCT. ACOUSTICAL PLENUM TO BE 4" THICK AND CONSTRUCTED OF min. 18ga GALVANIZED EXTERIOR PANELS AND 22ga PERFORATED INTERIOR LINER. PANELS TO BE INSULATED WITH 4" THICK GLASS FIBER INSULATION WRAPPED IN TEDLAR. PLENUM TO COME KNOCKED DOWN READY FOR FEILD ASSEMBLY. OPENINGS IN PLENUM TO MATCH SITE CONDITION REQUIREMENTS AND BE FACTORY CUT.

PLENUM TO MEET FLAME SPREAD AND SMOKE DEVELOPMENT RATINGS OF THE NBC AND HAVE THE FOLLOWING ACOUSTICAL PERFORMANCE:

Octave Band (Hz)	63	125	250	500	1k	2k	4k	8k
Trans. Loss (dB)	18	21	27	37	48	54	54	54

S/A AIRFLOW PATTERNS

DIFFUSER DESIGNATION A 3 115 CFM CAP. AIRFLOW PATTERN INDICATOR	1	2	3	4	5
	ONE WAY	TWO WAY CORNER	THREE WAY	FOUR WAY	TWO WAY

DIFFUSER / GRILLE SCHEDULE

DESIGNATION	MANUF.	MODEL	NECK	FACE	AIR CAP. CFM	COMMENTS
A	E.H. PRICE	520D	12"x6"	12"x6"	300	DOUBLE DEFLECTION (FOR DUCT)
B	E.H. PRICE	SMX	12"x12"	24"x24"	520	THREE WAY DEFLECTION (FOR GWB)
R1	E.H. PRICE	80 FF	12"x12"	12"x12"	600	C/W 1" FILTER (FOR GWB)
R2	E.H. PRICE	80 FF	18"x12"	18"x12"	1000	C/W 1" FILTER (FOR GWB)

S/A DESIGNATION – A 4 – AIR PATTERN; AIR CAPACITY – 100. R/A DESIGNATION – R1; AIR CAPACITY – 100

ABBREVIATIONS : OBD – OPPOSED BLADE DAMPER; GWB – GYPSUM WALL BOARD; PERFOR – PERFORATED FACE; EGG – EGGCRATE GRILLE

NOTES:

1. LOCATION AND QUANTITY OF RELAYS, CONTROLLERS, CONTROL TRANSFORMERS ETC. TO BE VERIFIED ON SITE. RESPONSIBILITY FOR RELATED CONTROL WIRING IS THE RESPONSIBILITY OF THE CONTROLS CONTRACTOR.
2. CONTROL WIRING WHETHER LINE OR LOW VOLTAGE NOT INDICATED ON THE EITHER THE MECHANICAL TRADE CONTRATOR OR ELECTRICAL TRADE CONTRACTORS DRAWINGS IS THE REPONSIBILITY OF THE CONTROLS CONTRACTOR.
3. CONTROL SCHEMATICS SHOWN ON THIS DRAWING ARE NOT WIRING SCHEMATICS, BUT ARE INTENDED TO REPRESENT THE CONTROL INTENT OF THE SYSTEM. IT IS THE CONTROLS CONTRACTORS RESONSIBILITY TO DETERMINE THE NUMBER OF WIRES THAT ARE NECESSARY TO MAKE THE SYSTEM OPERATED SO IT MEETS THE INTENT OF THESE SCHEMATICS.

CONTROL LEGEND

———	WIRING BY MECHANICAL CONTRACTOR
- - - -	WIRING BY ELECTRICAL CONTRACTOR

LEGEND

TAG	SYMBOL	CONTROL POINT	PNEU.(P) ELEC.(E)	POWER	DESCRIPTION
.		–	E	–	ELECTRICAL WIRING (2 WIRE), DIV. 15
.		–	E	–	ELECTRICAL WIRING (2 WIRE), DIV. 16
.		–	E	–	ELECTRICAL WIRING (3 WIRE), DIV. 16
D1		–	–	–	LOW LEAKAGE DAMPER O.B.D.
M1		–	E	LV	ELECTRIC DAMPER MOTOR
.	T1	---	E	LV	FURNACE PROGRAMMABLE CONTROL
.		–	E	–	ELECTRICAL TRANSFORMER 120V-24V
	R	---	E	LV	RELAY

CONTROL SYSTEM SPECIFICATION

SCOPE OF WORK
1. THE WORK INCLUDED IN THIS CONTRACT SHALL INCLUDE THE FURNISHING OF ALL LABOUR, MATERIALS, EQUIPMENT, PLANT TOOLS, AND SERVICES NECESSARY FOR, OR INCIDENTAL TO, THE SUPPLY, INSTALLATION AND COMPLETION OF AN AUTOMATIC CONTROL SYSTEM TO THE FULL INTENT OF THE DRAWINGS AND AS HEREAFTER SPECIFIED.

DESCRIPTION OF SYSTEM
1. THE AUTOMATIC CONTROL SYSTEM WILL BE ELECTRONIC.
2. CONTROL EQUIPMENT TO BE THE PRODUCT OF ONE MANUFACTURER UNLESS OTHERWISE SPECIFIED.
3. THE SYSTEM SHALL BE INSTALLED COMPLETE IN ALL RESPECTS BY COMPETENT MECHANICS REGULARLY EMPLOYED BY THE MANUFACTURER OF THE TEMPERATURE CONTROL SYSTEM.
4. PREWIRED OR PREPIPED CONTROLS ON PACKAGE EQUIPMENT SPECIFIED, IS NOT INCLUDED IN THIS SECTION.
5. ALL LOW VOLTAGE CONTROL WIRING IS THE RESPONSIBILITY OF THIS CONTRACTOR. LINE VOLTAGE CONTROL WIRING WHERE NOTED ON THE DRAWINGS SHALL BE INSTALLED BY DIVISION 16 BUT UNDER THE SUPERVISION OF THIS CONTRACTOR. ANY CONTROL OR POWER WIRING OR COMPONENTS NOT INDICATED BY DIVISION 16 IS THE RESPONSIBILITY OF THIS CONTRACTOR.

PROGRAMMABLE THERMOSTATS
STANDARD OF ACCEPTANCE : PROVISION 8000
ALTERNATES AS APPROVED BY THE ENGINEER

RELAYS
STANDARD OF ACCEPTANCE : RIB U SERIES RELAYS
ALTERNATES AS APPROVED BY THE ENGINEER

TRANSFORMERS
STANDARD OF ACCEPTANCE : RIB TR75VA001
ALTERNATES AS APPROVED BY THE ENGINEER

WIRING & CONDUIT
1. ALL WIRE WILL BE COPPER AND MEET THE MINIMUM WIRE SIZE AND INSULATION CLASS LISTED BELOW:

WIRE CLASS	WIRE SIZE	ISOLATION CLASS
POWER	12 GAUGE	600 VOLT
CLASS ONE	14 GAUGE STD.	600 VOLT
CLASS TWO	18 GAUGE STD.	300 VOLT
CLASS THREE	18 GAUGE STD.	300 VOLT
COMMUNICATIONS PER MANUFACTURER		

2. POWER AND CLASS ONE WIRING MAY BE RUN IN THE SAME CONDUIT. CLASS TWO AND THREE WIRING AND COMMUNICATIONS WIRING MAY BE RUN IN THE SAME CONDUIT.
3. WHERE DIFFERENT WIRING CLASSES TERMINATE WITHIN THE SAME ENCLOSURE, MAINTAIN CLEARANCES AND INSTALL BARRIERS PER THE CANADIAN ELECTRICAL CODE.
4. WHERE WIRING IS REQUIRED TO BE INSTALLED IN CONDUIT, EMT SHALL BE USED. CONDUIT SHALL BE MINIMUM 1/2" EMT. SET SCREW FITTINGS ARE ACCEPTABLE FOR DRY INTERIOR LOCATIONS. WATERTIGHT COMPRESSION FITTINGS SHALL BE USED FOR EXTERIOR LOCATIONS AND INTERIOR LOCATIONS SUBJECT TO MOISTURE. PROVIDE CONDUIT SEAL-OFF FITTING WHERE EXTERIOR CONDUITS ENTER THE BUILDING OR BETWEEN AREAS OF HIGH TEMPERATURE/MOISTURE DIFFERENTIAL.
5. FLEXIBLE METALLIC CONDUIT 1 M SHALL BE USED FOR CONNECTIONS TO MOTORS, ACTUATORS, CONTROLLERS, AND SENSORS MOUNTED ON VIBRATION PRODUCING EQUIPMENT. LIQUID TIGHT FLEXIBLE CONDUIT SHALL BE USED IN EXTERIOR LOCATIONS AND INTERIOR LOCATIONS SUBJECT TO MOISTURE.
6. JUNCTION BOXES SHALL BE PROVIDED AT ALL CABLE SPLICES, EQUIPMENT TERMINATIONS AND TRANSITIONS FROM EMT TO FLEXIBLE CONDUIT. INTERIOR DRY LOCATION J-BOXES SHALL BE GALVANIZED PRESSED STEEL, NOMINAL 100 MM SQUARE WITH BLANK COVER. EXTERIOR AND DAMP LOCATION JH-BOXES SHALL BE CAST ALLOY FS BOXES WITH THREADED HUBS AND GASKETTED COVERS.
7. 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. ALL WIRING MUST COMPLY WITH THE QUALITY AND STANDARDS CALLED FOR IN THE ELECTRICAL TRADE CONTRACTOR SPECIFICATIONS, INCLUDING IDENTIFICATION.

COMMUNICATIONS WIRING
.1 THE MAXIMUM SPACING OF SUPPORTS FOR COMMUNICATIONS CABLES OR ANY TYPE OF LOW VOLTAGE CABLES RUN INDOORS IN FREE AIR SHALL BE 1.5 M (5FT).
.2 CABLES SHALL BE INDEPENDENTLY SUPPORTED BY AN APPROVED METHOD, AND CABLES CANNOT LAY DIRECTLY ON THE TOP OF A T-BAR TYPE CEILING. ALL CABLES SHALL BE RUN PARALLEL/PERPENDICULAR TO BUILDING LINES.
.3 THE T-BAR TIE WIRE SUPPORT MAY BE USED FOR THE SUPPORT OF CABLES BY USE OF AN ATTACHED J-HOOK OR SIMILAR METAL SUPPORT AT THE POINT WHERE THE CABLES BRANCH OFF FROM THE MAIN CABLE RUN.
.4 WHERE OPEN WEB STEEL JOISTS EXIST, WHICH ARE NOT SPACED MORE THAN 1.5 M (5FT) ON CENTRE, THEY MAY BE USED FOR THE SUPPORT OF COMMUNICATIONS CABLES AND LOW VOLTAGE CABLES, BUT THE CABLES MUST BE SECURED TO EVERY JOIST. IN THIS CASE TYE WRAPS ARE PERMITTED TO SECURE THE CABLES TO THE JOIST.

GENERAL NOTES

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2.	ISSUE FOR 95% REVIEW	16-03-11
1.	ISSUE FOR INFORMATION	16-02-10

REVISIONS

SEAL

REGISTERED PROFESSIONAL ENGINEER
DATE
D.L. PARKINSON
6416
PROVINCE OF NOVA SCOTIA

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PROJECT
CARPENTRY MILL SHOP
Fortress of Louisbourg
Louisbourg, N.S.

DRAWING
VENTILATION DETAILS, SCHEDULES AND CONTROLS

DRAWN BY	B.W.R
CHECKED BY	D.L.P
SCALE	AS NOTED
DATE	OCT, 2016

ONSA CAD FILE 15-573

DRWG. M-752

GENERAL

1.1 DRAWINGS AND SPECIFICATIONS
.1 Not intended to show structural details or architectural features.
.2 Except where dimensioned, indicates general mechanical layouts only. Do not scale.
.3 The Mechanical Trade Contractor shall check the content of all architectural, structural, mechanical and electrical drawings and specifications, and review these documents for coordination of clearances available for equipment and services, required equipment power supplies and equipment quantities. Before proceeding, report to the Engineer any error or omission, or lack of coordination between the plans and specifications.
.4 All Mechanical Trade Contractors shall make themselves familiar with the overall intended operation of the mechanical systems prior to installation so that all necessary accessories such as dampers, vents, valves, controls, etc., can be installed during the normal progress of the work. Failure to do so will result in Mechanical Trade Contractor's responsibility in providing such devices, at his expense when the need of such devices becomes apparent during start-up.

1.2 GUARANTEES
.1 This Mechanical Trade Contractor shall guarantee all his work free from defects for a period of one (1) year, unless specifically noted otherwise, after final acceptance of such work by the Owner and shall make good all defects other than normal wear and tear during the life of the guarantee. This Mechanical Trade Contractor shall guarantee all work and equipment supplied by him to work quietly and satisfactorily and to accomplish the work for which it was installed during the life of the above guarantee. At any time during this period, he shall make any necessary changes and adjustments or replacements, to accomplish this at his own expense.
.2 Submit manufacturers' written guarantees to Engineer.

1.3 PERMITS AND REGULATIONS
.1 All Mechanical Trade Contractors shall comply with all regulations of Authorities having jurisdiction, where applicable, including but not limited to the following:
- Provincial Department of Labour
- Provincial Fire Marshal
- Municipal Plumbing Inspector

.2 The Mechanical Trade Contractor shall obtain and pay for any permits required by Local Codes and Regulations and arrange for inspections.
.3 Any additional materials or labour required to conform to any of these rules and regulations will be furnished under the Contract with no additional cost to the Owner.

1.4 CO-ORDINATION
.1 Co-ordinate work with other trades to avoid conflict.
.2 Locate distribution systems, equipment and materials to provide minimum interference and maximum useable space.
.3 Co-ordinate location of duct drops, pipe drops and risers with trades erecting walls and ceilings to ensure that all pipes and ducts are concealed in walls or ceilings spaces. If space is not available in walls or ceilings, locate ducts and pipes so that they can be easilyboxed in by the relevant trades.
.4 Each Mechanical Trade Contractor shall consult with structural requirements and shall re-route pipes or ducts or re-locate equipment as required subject to the approval of the Structural Engineer.

1.5 SHOP DRAWINGS
.1 This Mechanical Trade Contractor shall prepare a minimum of ten (10) copies of shop drawings for all mechanical equipment and systems for this project.
.2 All such drawings shall be submitted to the Engineer for review and the work shall not commence until such review has been obtained.
.3 The Engineer's review of these drawings is general. It is not intended to release the Mechanical Trade Contractor from necessity of furnishing systems/equipment of adequate capacity and power supply and performing the work as required by the plans and specifications.
.4 All shop drawings must be checked against the requirements of the plans and specifications by this Mechanical Trade Contractor prior to forwarding them to the Engineer.
.5 All shop drawings must be first quality reproductions with all details, lettering, etc. distinct and legible.
.6 Where drawings and specifications are in metric or in both imperial and metric, all design data, capacities, sizes and dimensions specifically called for on the drawing or in the specifications will be submitted in like terms on the shop drawings.
.7 All shop drawings, other than standard manufacturers dimensions and data sheets, shall bear the stamp of a registered professional Engineer who shall be fully responsible for the Engineering content of such drawings. Where such drawings are prepared in Nova Scotia and/or apply to products to be manufactured in Nova Scotia, the Engineer shall be a member of APENS.

1.6 BELT GUARDS
.1 Provide for each v-belt drive a perforated galvanized iron belt guard, constructed with a round galvanized iron frame and access openings for tachometers.
.2 Belt guards will be securely bolted to floor or apparatus, to completely enclose drive and pulleys. Provide hinged access doors not less than 126 mm x 152 mm (5" x 6") for access to motor and fan shafts for test purposes. Provide RPM holes at ends of each equipment shaft.

1.7 ELECTRICAL CONNECTIONS, MOTORS AND STARTERS
.1 Electrical equipment shall bear CSA Label. Obtain special inspection labels required by Provincial Authority having jurisdiction.
.2 The Mechanical Trade Contractor is to review electrical drawings and ensure that equipment power supplies match those indicated on the Electrical Trade Contractors drawings and specification. Bring all discrepancies to the attention of the Engineer prior to ordering equipment.
.3 Use 1750 rpm, open drip-proof, ball bearing motors manufactured to CEMA standard for 40oC temperature rise and designed for continuous service and vibration free, quiet operation.
.4 Conform to requirements of Canadian Electrical Code, Division 16 specifications, Local and Municipal and Provincial Authorities, and specified standards.
.5 All equipment not located in mechanical rooms shall be supplied complete with a disconnect switch. Where exposed to the weather, "weatherproof" disconnects shall be provided.

1.8 CUTTING AND PATCHING
.1 Cutting and patching to be performed by the Mechanical Trade Contractor.
.2 Make every effort to minimize cutting and patching and provide dimensions, locations and other data for bases, sleeves, boxes, etc., to be built in as construction proceeds. Set sleeves and make openings in concrete forms and masonry before placing concrete and masonry.

1.9 SLEEVES AND ESCUTCHEONS
.1 Sleeves
.1 Unless otherwise specified, supply pipe sleeves for all points where pipe passes through masonary or concrete walls or floors. Sleeve supplied by Mechanical Sub-contractor & built in by appropriate trade.
.2 Unless otherwise specified, construct sleeve of galvanized sheet steel with lock seam joints of minimum 16 Ga.
.3 Use cast iron or galvanized sheet pipe sleeves with perimeter fin welded continuously welded at the midpoint.
.1 Through foundation walls
.2 Where sleeve extends above finished floor.
.3 In kitchens, washrooms and other wet areas where water from spills or leaks may penetrate the floor slab, sleeves to be Sch.40 pipe and to extend 1" above finished floor.
.2 Sizes:
.1 Provide approx 1/2" clearance, all around, between sleeve and insulation.
.2 Through footings use sleeves large enough to accommodate hub of CI soil pipe.
.3 Where pipe passes below footings, provide minimum all around clearance of 2" between pipe and sleeve. Backfill up to underside of footing with concrete of same strength as footing.
.4 Unless otherwise specified, terminate sleeves flush with walls and ceilings.
.5 Sleeves shall be sized to accommodate the insulated pipe diameter.
.3 Unless otherwise indicated for pipes passing through roofs, use galvanized or cast iron sleeves with caulking recess and flashing clamp device. Anchor sleeves in roof construction. Caulk between sleeve recess and pipe Fasten roof flashing to clamp device, make watertight durable joint.
.4 Caulking:
.1 Caulk sleeves in foundation walls and below grade floors with oakum and lead between sleeve and pipe, or use Link-Seal hydrostatic seal.
.2 Where sleeves pass through foundation walls or on grade slab floors, caulk space between insulation and sleeve or between pipe and sleeve with dry oakum. Seal space at each end of sleeve with non-hardening mastic.
.3 Ensure no contact between copper tube or pipe and ferrous sleeve.
.5 Escutcheons and Plates:
.1 Provide on pipes passing through finished walls, partition floors and ceilings.
.2 Use chrome or nickel plated brass, either split or solid type, with set screws for ceiling or wall mounted. For equipment room use cast iron type.
.3 Inside diameter shall fit around finished pipe insulation or uninsulated pipe. Outside diameter shall cover sleeve.
.4 Where sleeve extends above finished floor, escutcheons or plates shall be bell shaped to cover the sleeve extension.
.5 Secure to pipe or sleeve but not to insulation.
.5 Penetrations of Fire Separations:
.1 Where pipes or ducts pass through walls or floors which provide fire separations, seal around openings with ULC classified fire stop material. Material shall be installed to manufacturers' recommendations and shall provide a fire rating equal to that of the separation which has been penetrated.
.2 Acceptable Products: Dow Corning Fire Stop System, 3M Fire Barrier Penetration Sealing System, Bio-Fire Biotherm or Bio-K10 (Supplied by Wormald), Hilti Fire Stop System

1.10 BASES AND SUPPORTS
.1 Concrete bases are by the General Contractor.
.2 Concrete bases will be required under all floor mounted equipment including equipment with attached skids and bases unless otherwise noted. All such bases will be 100 mm (4") deep and will be 100 mm (4") larger in all directions than the equipment being supported.
.3 Where equipment is raised above the floor it will be supported by means of angle iron, I beams or pipe. All such supports shall be anchored to the floor and shall have a metal base to spread the load. These supports shall be cross-braced with diagonal members.
.4 Where equipment is suspended from the structure provide appropriately sized hanger rods, channel iron or angle iron hangers. Distribute the weight of the units uniformly across the structure, consistent with the design loading for the structure and as approved by the Engineer.
.5 Where structure has not been designed to support equipment, this Mechanical Trade Contractor shall provide pipe stands or angle iron supports to support the equipment from the floor.
.6 Unless specifically noted otherwise, provide spring isolators under all floor mounted vibrating, rotating or oscillating equipment designed to eliminate 90% of the vibration from being transmitted to the structure. For similar suspended equipment, provide spring hangers.

1.11 SPECIAL TOOLS AND SPARE PARTS
.1 Furnish spare parts as follows:
.1 One spare set of filters for each filter bank.
.2 Identify spare parts containers as to contents and replacement parts number.
.3 Provide one set of all tools required to service equipment as recommended by manufacturers.
.4 Furnish one grease gun and adapters to suit different types of greases and grease fittings.
.5 Upon handover of spare parts to the Owner, obtain the signature of the Owner's representative on the list of spare parts confirming receipt of the spare parts. Provide a copy of the signed list to the Engineer.

1.12 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS
.1 Provide factory trained personnel to instruct operating staff on maintenance, adjustment and operation of mechanical equipment. Instruct staff on changes or modification in equipment made under terms of guarantee.
.2 Provide instruction during regular work hours prior to acceptance and turn over to operating staff for regular operation.
.3 Prepare a maintenance schedule which will advise the Owner's staff what maintenance must be done and the suggested intervals at which it should be done.
.4 Provide three (3) copies to the Owner of the maintenance manual suitably bound with hard covers, 216mm x 279mm (8½" x 11"). Binders shall be thick enough to hold literature flat. Where necessary, provide two (2) binders.
.5 The maintenance manual shall include the following:
.1 Have a title sheet, or sheets, preceding data on which shall be recorded Project name, date, list of contents, and Trade Contractor's name.
.2 Be organized into applicable Sections of work with each Section separated by hard paper dividers with plastic covered tabs marked by Section.
.3 Contain a list of local (or nearest) representative of each piece of equipment including address and phone number.
.4 One (1) copy of each final approved shop drawing on which have been recorded changes made during fabrication and installation.
.5 Typed or printed information and notes, and neatly drafted drawings.
.6 Maintenance and operating instructions on all building equipment supplied by the Mechanical Trade Contractor.
.7 Maintenance instructions as by the equipment manufacturer.
.8 Brochures and parts lists on all equipment as supplied by the equipment manufacturer.
.9 Sources of supply for all proprietary products used in the work.
.10 Lists of supply sources for maintenance of all equipment in the project of which more detailed information is not included above.
.11 List of recommended spare parts.
.12 Submit all guarantees and extended guarantees together in a separate binder.
.13 Material Safety Data Sheets (MSDS) for all chemicals remaining as part of the finished building (e.g. glycol, pipe treatment, etc.).
.14 Material Safety Data Sheets (MSDS) for all chemicals supplied including, but not limited to, boiler treatment, water treatment, materials in neutralizing tanks and grease interceptors, glycol, refrigerants, fuel oil, and fire extinguishing agents.

1.13 CLEANING MECHANICAL EQUIPMENT BEFORE USE
.1 Clean interior and exterior of all systems including strainers.

1.14 RECORD DRAWINGS
.1 One (1) set of white prints and one (1) set of reproducibles will be provided for record drawing purposes. Maintain project "as-built" record drawings and accurately record significant deviations from the Contract Documents, caused by site condition or Contract change. Mark changes on white prints in "RED". At the completion of the projects, and prior to final inspection, neatly transfer "as-built" corrections and notations to reproducible transparencies, and submit to the Engineer for review.
.2 Record drawings shall show inverts at the beginning and end of main storm and sanitary branches, and at the exit from the building. The dimensions off column centre lines shall also be indicated.

1.15 RENOVATIONS
.1 Co-ordinate the removal or shutdown of existing services with the Owner or the Owner's representative. Indicate intent to remove and/or disconnect existing services or equipment, and receive an affirmative written reply prior to start of such work.
.2 The drawings do not necessarily show all existing piping, ducts, or equipment. Where such items are not shown to be reused or relocated, the Contractor, upon confirmation that such items are redundant shall remove them. All equipment removed shall be brought to the attention of the Owner, or his representative, who shall take possession of such items. If the Owner or his representative deems such equipment redundant, the Contractor shall remove and dispose of such items at his own cost.
.3 Maintain services to, and reconnect all equipment, ducts and pipes that remain should such services be disrupted during the renovation work.
.4 It is assumed that all pipe, duct and equipment being retained is safe and adequate. Should the Contractor discover faulty or questionable material, equipment or workmanship, he shall notify the Engineer for further instructions.

PRODUCTS

2.1 GENERAL – ACCESS DOORS
.1 All equipment and system components requiring servicing, inspection or adjusting must be easily accessible. Where equipment may be required to be removed for repair or servicing adequate access must be provided. Specifically this shall include but is not limited to controllers, controlled devices, before and after coils, filters, fans, automatic dampers, at fire dampers and fresh air and exhaust.
.2 Where equipment or system components are concealed in furred ceilings or in walls or partitions access doors will be supplied by the Mechanical Trade Contractor for installation under the section erecting walls and ceilings.
.3 All openings shall be sufficient size for both removal and maintenance of the concealed equipment, and shall be a minimum size of 610 mm x 610 mm (24" x 24") for body access and 305 mm x 305 mm (12" x 12") for hood access.
.4 Access doors are not required where there is a removable acoustic tile ceiling.
.5 The Mechanical Trade Contractor shall arrange with the General Contractor to install any additional panels found necessary during the course of construction.
.6 Doors shall open 180 degrees, have rounded safety corners, concealed hinges, anchor straps and screwdriver cam locks.
.7 Fire rated access doors shall be used where fire rated walls and ceilings must be penetrated.

2.2 DUCT ACCESS DOORS
.1 Access doors shall be minimum 610mm x 610mm (24"x24") for person size entry and 300mm x 300mm (12"x12") for service entry. Provide 100mm x 100mm (4"x4") quick opening access doors for inspection at volume dampers. Access door will be provided at all fire dampers, O/A & E/A plenums, before filters, coils, and any device requiring maintenance or observation. Insulated access panels will be provided where ducts are insulated.
.2 Access doors under 610 mm x 610 mm (24"x 24") will have at least two heavy duty hinges in conjunction with two heavy duty sash type latches. Access doors 610 mm x 610 mm (24"x 24") and over shall be installed with at least three heavy duty hinges, two heavy duty latches, and one pull.

2.3 MANUFACTURER'S EQUIPMENT NAMEPLATES
.1 Provide on each piece of equipment a metal nameplate, mechanically fastened with raised or recessed letters.
.2 Include registration plates (e.g. pressure vessel, Underwriters' Laboratories and CSA approval) as required by respective agency and as specified. Indicate capacity/size, equipment model, manufacturer's name, serial number, voltage, cycle, phase and power of motors, all factory supplied.
.3 Locate nameplates so that they are easily read. Do not insulate or paint over plates.

2.4 SYSTEM NAMEPLATES
.1 Provide laminated plastic plates with black face and engraved with minimum 25mm (1") high white lettering.
.2 Fasten nameplates securely in a conspicuous place. Where nameplates can not be mounted on cool surface, provide standoffs.
.3 Identification to be identical to the equipment tags used on the drawings. Where applicable identify service or areas or zone of building served.

2.5 DUCT IDENTIFICATION
.1 Use 50 mm (2") high black stencilled letters, spray painted on ductwork or insulation covering ductwork.
.2 Identification to include service of duct and related system, for example "AHU-1 Supply", "EF-2 Washroom Exhaust", etc., with directional flow arrow.

2.7 DUCTWORK
.1 General:
.1 All ductwork and hangers shall be constructed to ASHRAE and SMACNA low pressure duct construction standards.
.2 The duct construction is based on a maximum of 2" w.g. static pressure in the ducts.
.3 Alternate construction and reinforcing may be used provided it meets the same rigidity class that the following specification complies with.
.2 Rectangular Ductwork:
.1 Rectangular duct shall be galvanized steel.
.2 Reinforcing must be attached to the duct within 2" of the corners and elsewhere at 48" centres maximum. Attachment may be spot welds, rivets or screws.
.3 Hanger rods must be attached to the shelf angle within 2" of the duct on both sides.
.4 For ducts 20" and smaller, 1" wide strap hangers extending down two sides of the duct and a minimum of 6" under the bottom of the duct may be used instead of trapeze angers.
.5 Strap hangers must be attached to the duct a maximum of 2" from the corner and at maximum of 48" centres.
.6 Longitudinal joints shall be Pittsburg locked or Button punch snap lock and shall meet SMACNA Low Pressure Duct Construction Standards.
.7 Ducts 18" wide and larger shall be cross broken or beaded. Beading shall be provided a maximum of 6" from joints and at a maximum spacing of 12".
.8 On ducts which will be under negative pressure ducts will be cross broken for inward deflection.
.9 Hangers shall be the same material as the duct.
.3 Round Duct:
.1 Round ductwork shall be galvanized steel of the following U.S. Standard gauges.
.1 Duct Diameter: 3" – 8", spiral duct gauge 28", plain duct gauge 24"
.2 Duct Diameter: 9" – 14", spiral duct gauge 26", plain duct gauge 24"
.3 Duct Diameter: 15" – 26", spiral duct gauge 24", plain duct gauge 22"
.2 On concealed ducts up to 16" diameter longitudinal joints are permitted, in accordance with SMACNA Type RL4 or SMACNA Type RL5.
.3 Concealed round ducts over 16" diameter and all exposed round ducts shall be factory fabricated conduit consisting of helically would galvanized iron strips with spiral lock seams. Fittings for these conduits shall be fabricated of 20 gauge galvanized sheet steel with butt welded seams of standard dimensions.
.4 Transverse joints beaded crimp joints with at least 1" lap to accommodate screws at 15" centres or a minimum of 3 per joint.
.5 Long radius elbows shall be used where space permits. Where 90deg. Take-offs are necessary, conical T's shall be used.
.4 Mechanical Joint Ductwork:
.1 In lieu of the construction specified for galvanized rectangular ductwork, transverse joints may be made using a mechanical joint system.
.2 Installation shall be in accordance with manufacturers' recommendations.
.3 All gaskets shall have adhesive on both sides.
.4 Acceptable Products: Ductmate 25R for up to 30_, Ductmate 35R for 31_ and larger or Nexus G and J with neoprene gaskets and HM572 sealant for bolted assemblies.

2.8 DUCT SEALERS AND TAPES
.1 Duct sealers will consist of woven fabric material coated with a sealant which will be:
.1 Water resistant.
.2 Compatible with duct materials.
.3 Suitable for the service involved.
.4 Meet ULC S102 (1975).
.5 Flame spread ratings of 25 and maximum smoke developed rating of 50.
.6 Non toxic.
.2 Acceptable Products: Hardcast #321, Trans Continental Tough-Bond, Flexmaster Ductbond, Bakor Duck-Seal.

2.9 FLEXIBLE CONNECTIONS
.1 Flexible connections shall be as follows:
.1 Heavy glass fabric double coated with neoprene.
.2 Non-combustible.
.3 Weatherproof and air tight.
.4 Resistant to acids, grease, alkaline, oil and gasoline.
.5 Acceptable for temperatures of up to 93oC.
.2 The flexible connections will be pre-assembled of 24 gauge galvanized metal clinched by means of a double lock seam to each side of the fabric.
.3 Acceptable Products: Duro Dyne, Neoprene.

2.10 BALANCING DAMPERS
.1 Single Blade Dampers:
.1 Of same material as duct, but one sheet metal thickness heavier. V-groove stiffened.
.2 Size and configuration to recommendations of SMACNA, except maximum height 4" as indicated.
.3 Locking quadrant with shaft extension to accommodate insulation thickness.
.4 Inside and outside nylon or bronze end bearings.
.5 Channel frame of same material as adjacent duct, complete with angle stop.
.2 Multi-blade Dampers:
.1 Factory manufactured of material compatible with duct.
.2 Opposed Blade: Configuration, metal thickness and construction to recommendations of SMACNA.
.3 Maximum Blade Height: 4".
.4 Bearings: Pin in bronze bushings or self-lubricating nylon.
.5 Linkage: Shaft extension with locking quadrant.
.6 Channel frame of same material as adjacent duct, complete with angle stop.

2.11 DAMPERS
.1 Minimum 12 gauge extruded aluminum frames and air foil blades. Frames shall be 4" deep. Blades shall be 16 gauge and shall not exceed 6" wide or 4ft long. Modular maximum size is 4ft x 4ft. Multiple sections shall have stiffening mullions and jack shafts.
.2 Extruded synthetic rubber blade and frame seals.
.3 Aluminum and corrosion resistant zinc plated steel linkage located out of the air stream.
.4 Celcon inner bearing in a polycarbonate outer bearing complete with a 2" shaft..
.5 Leakage shall not exceed 0.6% of rated air flow at 10" w.g. across damper.
.6 Pressure drop shall not exceed 0.036" w.g. at 1000 fpm face velocity for a 24" x 24" damper.
.7 Standard of Acceptance: Tamco Series 1000, Nailor Industries, Ruskin.

2.12 HEAT RECOVERY VENTILATOR
.1 Casing: Constructed of 20 ga galvanized steel and insulated throughout with foil faced fire retardant material.
.2 Heat exchanger: polypropylene core with leackage @ less than 1%.
.3 Drain pans: sloped drain pan with recessed bottom drains. Drain connection to be piped to nearest floor drain.
.4 Fans: DWDI, forward curved, and internally vibration isolated.
.5 Filters: disposable, non-woven, pleated cotton medium efficiency.
.6 Motors: OPD with permanently lubricated bearings, c/w thermal overload protection.
.7 Electrical: Power Supply 120/1/60
.8 Controls: factory mounted microprocessor operating on 115/1/60. Unit to be comlpete with remote wall mounted Model Xtra # 202746.
.9 Accessories: XTRA remote mounted wall control, remote fan switch, and recirculating defrost.

2.13 BREECHING
.1 Supply and install breeching from the Furnace to the stack. Breeching shall be made of 16 gauge galvanized sheet metal, complete with Barometric relief damper connection, temperature indicators, etc. and all necessary cleanout openings.
.2 All breeching connections to be made at 45 degrees

2.14 CHIMNEYS
.1 Pre-insulated, double walled, metal chimney of the size indicated on the drawings.
.2 Chimney to be 3 ft. high measured above roof line.
.3 Chimney to have a stainless steel inner casing, (aluminumized steel / Type 316 stainless steel) outer casing and to be complete with all necessary supports, guy wires, drains, etc..
.4 Concealment for period by others.
.4 Standard of Acceptance: Selkirk

2.15 FUEL OIL PIPE
.1 Pipe:
.1 Steel: To ASTM A53, Schedule 40, continuous weld or ERW.
.2 Copper: Type L, soft copper, in long lengths for final connection to burner.
.2 Pipe Coating:
.1 Bituminous Paint: To suit application and in accordance with manufacturers recommendations.
.3 Jointing Material:
.1 Steel Fittings: Socket weld.
.2 Copper Fittings: Silfos.
.4 Fittings:
.1 Steel:
.1 Steel: Butt-welding to ANSI/ASME-B16.9.
.2 Unions: Malleable iron, brass to iron, ground seat, screwed, to ASTM A47M.
.2 Copper: Copper fittings.
.3 Oil fill and vent pipes to the tank shall be galvanized steel supplied in accordance with the Underwriters Regulations.

2.16 FUEL OIL VALVES
.1 Gate Valves: 50 mm and Under, Socket Weld.
.1 Rising Stem: To MSS-SP-80, Class 125, 860 kPa (125 psi), bronze body, solid wedge disc.
.2 Acceptable Material: Kitz 24, Crane, Jenkins.
.2 Globe Valves: 50 mm and Under, Socket Weld.
.1 To MSS-SP-80, Class 125, 860 kPa (125 psi), bronze body, threaded over bonnet, renewable composition disc suitable for oil service.
.2 Lockshield Handles: As indicated.
.3 Acceptable Material: Kitz 03, Crane, Jenkins.
.3 Ball Valves: 50 mm and Under, Socket Weld.
.1 Bronze body, screwed ends, TEF seal, hard chrome ball, 4137 kPa (600 psi), WOG.
.4 Swing Check Valve: 50 mm and Under, Socket Weld.
.1 To MSS-SP-80, Class 125, 860 kPa (125 psi), bronze body, bronze swing disc, threaded cap, regrindable seat.
.2 Acceptable Material: Kitz 22, Crane, Jenkins.

2.17 FUEL OIL FILTER
.1 Replaceable cartridge type as recommended by oil burner manufacturer.
.2 Furnish a spare filter for each burner.

2.18 FUEL OIL TANK (DOUBLE BOTTOM, STEEL)
.1 Installation Contractor to make necessary application to the Nova Scotia Department of the Environment for registration to tank and to give all necessary notices to DOE prior to installation.
.2 Steel tank conforming to ASTM A1011 c/w female threaded tappings for fill pipe, vent pipe and floats on top of tank. Tank is to bear a ULC S602 label and be c/w bottom supply fuel tapping.
.3 Fabricated for operation at atmospheric pressure.
.4 External Surface: washed and phosphated
.5 External Finish: Grey electrostatic powder paint.
.6 Concrete tank pad (by General Contractor) shall be minimum 305mm (12") thick, length and width extending 457mm (18") beyond tank dimensions. Pad to contain two layers of 13mm (1/2") rebar running both ways at 305mm (12") centres. Concrete to be a minimum 1818kg (4000 lb.) test.
.7 The Mechanical contractor shall fill the tank with oil once the project is complete and leave all in readiness at time of turnover to owner.
.8 Standard of Acceptance: AFL Tank Manufacturing.
.9 Acceptable Alternatives: Stenpro, Clemmer, Dugas Fab, Gilfab, Audet Soudre

2.19 GRILLES, REGISTERS AND DIFFUSERS
.1 All grilles, diffusers and registers shall be of type and size indicated on drawings and shall be complete with O.B. damper unless otherwise noted.
.2 Diffusers installed in rough usage areas, such as gymnasiums, field houses, etc., shall be complete with security chains.
.3 All grilles and diffuses shall have "off white" baked enamel finish.
.4 Door grilles shall be equal to Titus T700.
.5 Acceptable Products: Titus, Carnes, Anemostat, Nailor Industries, or E.H. Price.

2.20 AIR BALANCE
.1 Air and water balance shall be done by the same Balancing Sub-Contractor to AABC and NEBB Standards.
.2 The Balancing Sub-Contractor will completely familiarize himself with the air distribution systems at the time of Tender and will report to the Sheet Metal Contractor any and all areas where he feels additional dampers or other control devices are necessary for him to do a complete and thorough job. The cost for these additional dampers is the responsibility of the Sheet Metal Contractor.
.3 The Balancing Sub-Contractor shall include the cost to supply and install additional sheaves and pulleys as may be necessary to balance the air systems to the values indicated on the drawings.
.4 Test and balance all air supply and exhaust systems. Balancing must be performed by trained personnel with records kept on each trial balance.
.5 Balancing shall be accomplished by means of Pitot tube traverse on all main and branch ducts. Fan speeds and dampers shall be adjusted until proper air quantities are obtained. Individual dampers behind registers and diffusers shall only be used for f fine tuning.
.6 Each outlet shall be adjusted by a "flow hood", anemometer, velometer readings to provide quantities. Each supply outlet shall be adjusted to provide proper throw and distribution in accordance with requirements.
.7 Upon completion of the balancing, supply the Engineer with three (3) complete reports which shall include air quantities at each outlet. Reports shall be submitted on 213mm x 275mm (8 ½" x 11") sheets bound in a separate hard cover, three ring binder. A table of contents shall be included, pages numbered and each system shall be separated by an appropriately labelled divider.
.8 The report shall include schematic diagrams of each supply, return and exhaust system showing locations of static pressure readings, pitot tube traverses and balancing and splitter damper settings.
.9 Acceptable Contractors: HEPA Atlantic and Scotia Air Balance.

2.22 HOT AIR FURNACE
.1 Packaged hot air furnace. Unit shall come with forced draft burner and all necessary controls (internally wired). The entire assembly shall meet C.S.A. requirements. The units shall be completely factory tested. The units shall be constructed in strict accordance with the ASME requirements.
.2 Each hot air furnace shall be furnished complete with fibreglass insulation and protected by a steel jacket painted with a heat resistant enamel.
.3 The furnace shall be equipped with an operating temperature control and a high temperature limit control with manual reset. Controls shall be 110/1/60. Unit to be complete with a control transformer if required
.4 Unit to be designed for >80% efficiency when fired with #2 fuel oil.
.5 Burner shall operate on the LO-HI-LO-OFF principle and shall start on low fire.
.6 Warranty: one (1) year limited warranty on parts, ten (10) year limited warranty on the castings against corrosion, and ten (10) year limited warranty on the castings against damage from stress conditions by boiler operation not exceeding 81F between boiler water inlet and outlet temperatures.
7 Standard of Acceptance: Metromatic, Rheem, Granby

2.23 FUEL OIL PUMP
.1 Pump set shall be complete with one cUL Listed fire safety shut off valve at Assembly inlet (as per CSA) one BS Series cast iron basket type suction strainer with 60 mesh stainless steel screens, UL listed (1) by-pass relief valves, CRN Listed; full port ball type isolating valves at unit inlet & outlet to isolate each pump, cUL listed; (1) lift type check valves (each pump outlet) CRN listed; (1) in line type check valves(each pump inlet) CRN listed; one combination high/low pressure switch (common discharge) MET/CSA Listed; one flow sensing switch (at common discharge header to activate lag/stand by pump), UL listed; one full port ball type isolating shut off valve mounted at the common discharge header, cUL listed; ULC listed flex hose mounted at common discharge header, (1) CRN listed liquid filled pressure guages with needle type isolating valves; (1) CRN listed liquid filled compound suction guages with needle type isolating valves; all necessary piping (sechdule 80) to allow for a complete simplex assembly.
.2 Standard of Acceptance: Albany Pump Company model FOSIM/03GS/BS

2.24 FLEXIBLE DUCT INSULATION
.1 Flexible duct insulation will be fibre glass, formed into a flexible blanket, having a nominal density of 12kg/m3 (0.75 lb/ft3).
.2 The insulation will be furnished with a factory applied foil-scrim-kraft facing consisting of aluminum foil reinforced with fibre glass yarn mesh and laminated to 18 kg (8 lb.) chemically treated fire resistant kraft.
.3 Stainless steel wire, 18 gauge, Type 304, dead soft annealed.
.4 Galvanized wire, 15 gauge, annealed.
.5 Stainless steel mesh, hexagonal mesh, 20 gauge, Type 204.
.6 Galvanized mesh, hexagonal mesh, 15 gauge, galvanized annealed.
.7 Aluminum straps, will be 13 mm x 0.51 mm (2" x 0.02").
.8 Stainless steel straps, will be 13 mm x 0.51 mm (2" x 0.02"), Type 304, dead soft.
.9 Lagging adhesive, will be Permastik 2001 or Sealfast 30.36.
.10 Vapour barrier mastic, will be Benjamine Foster 8207 or Flintkote 23004.
.11 Products of the following manufacturers are acceptable: Fibreglass Canada Schuller, Knauf Fibre Glass, Manson, Bakor, Premier Refractories (Ceramic Fibre), Johns Manville

2.25 RIGID DUCT INSULATION
.1 Rigid duct insulation will be rigid fiberglass board, having a minimum density of 6.0lb./cu. ft.
.2 Rigid duct insulation vapor jacket will be factory applied foil-scrim-kraft facing consisting of aluminum foil reinforced with fiberglass yarn mesh and laminated to 6lb. chemically treated fire resistant kraft.

EXECUTION

3.1 ACCESS DOORS
.1 Ensure that equipment is clearly within view and accessible for operating, inspecting, adjusting, servicing without the need for special tools. Specifically this shall include but is not limited to controllers, controlled devices, before and after coils, filters, fans, automatic dampers, at fire dampers, fresh air and exhaust plenums, and the bottom of duct risers
.2 Duct access doors will be provided at all fire dampers, fresh air and exhaust plenums, before filters, coils, and any device requiring maintenance or observation.
.3 Insulated access panels will be provided there the ducts are to be insulated.

3.2 NAMEPLATES
.1 Locate in conspicuous location to facilitate easy reading and identification from operating floor.
.2 Provide for nameplates on hot and/or insulated surfaces.
.3 Do not paint, insulate or cover in any way.

3.3 LOCATION OF IDENTIFICATION ON DUCTWORK SYSTEMS
.1 On long straight runs in open areas at not more than 15 m (50ft) intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.
.2 Adjacent to each change in direction.
.3 At least once in each room through which piping or ductwork passes.
.4 On both sides of visual obstruction or where run is difficult to follow.
.5 On both sides of separations such as walls, floors, partitions.
.6 Where system is installed in pipe chases, ceiling spaces, galleries, other confined spaces, at entry and exit points, and at each access opening.
.7 At beginning and end points of each run and at each piece of equipment in run.
.8 At point immediately upstream of major manually operated or automatically controlled valves, dampers, etc. Where this is not possible, place identification as close as possible, preferably on upstream side.
.9 Identification to be easily and accurately readable from usual operating areas and from access points.
.10 Position of identification to be approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.4 FLEXIBLE DUCT INSULATION
.1 Cut insulation slightly longer than the circumference of the duct to ensure full thickness at corners.
.2 Tightly stretch edges with staples and cover with a 76mm (3") wide strip of pressure sensitive aluminum foil tape.
.3 On ducts 457mm (18") and wider the insulation will be secured to the bottom of the ducts by means of welded pins and speed clips. Cut pins flush after the clip has been applied.
.4 Seal all joints and penetrations of the vapour barrier, including locations where it is penetrated by securing pins, with 76mm (3") pressure sensitive aluminum foil tape.

3.5 DUCTWORK
.1 Ductwork at all other locations where moisture may collect, shall be welded or made suitably water tight. At these places ductwork shall be sloped towards a low point where a 1.1/4" drain with a deep seal trap shall be provided, discharging through a copper pipe to a funnel floor drain.
.2 At each main branch take-off and in such other locations where required to properly balance the air distribution system, furnish and install volume dampers which shall be provided with damper regulators. Where regulators are mounted on insulated ducts the regulator shall be mounted on top of the insulation.
.3 A balancing damper shall be installed in all branches off the main trunk duct. Additional dampers shall be installed in any short branches leading to supply or return outlets. In all cases, sufficient dampers shall be installed in the branches so that the dampers at the diffusers are used for "fine tuning" only.
.4 Ductwork shall be free from pulsation or objectionable noises. Should these defects appear, they shall be corrected by replacing or reinforcing the work as directed by the Engineer at the site and without charge.
.5 The dimensions of any duct must be as indicated on the drawings, except wherever any construction impediment or requirement renders such dimensions impossible, in which case it must be altered to give an effective cross sectional area equal to that which could have been obtained from the original at no cost to the Owner. Where conflicts occur with other trades, the Architect reserves the right to make changes in site and locations without extra cost.
.6 Install ductwork in accordance to ceiling height schedules indicated on General Construction Drawings; consult with other trades and in conjunction with them, establish necessary space requirements for each trade, so as to maintain required headroom.
.7 Install duct elbows having a throat radius 1.1/2 times the diameter or fabricated with square throats and backs, fitted with duct turns. Duct turns shall be fabricated with blades of approved construction.
.8 All vertical ducts in shafts shall be rigidly supported with steel angles supplied and installed by this Contractor. In no case shall angles be less than 38mm (1.1/2") x 38mm (1.1/2") x 6.35mm (1/4").
.9 All duct joints shall be coated with duct sealer applied according to manufacturer's recommendations before assembling.
.10 Where ducts are shown passing through fire separations and at the floor, there shall be provided a continuous 38mm (1.1/2") x 38mm (1.1/2") x 6.35mm (1/4") galvanized angle iron frame which shall be bolted to the construction and made air tight to the same by applying caulking compound. Sheet metal at these locations shall be bolted to the angle iron.
.11 All ductwork shall be securely hung from the building structure using approved hangers.
.12 Round Ductwork:
.1 Where space permits round ducts of equal air carrying capacity may be used in place of rectangular ducts.
.2 Long radius elbows shall be used where space permits. Where space is limited use maximum radius possible.
.3 90 degree branch take-offs shall be made with conical "T"'s.
.4 Where space permits branch 45 degree conical branch take-offs shall be used.
.5 Balancing dampers shall be provided in all take-offs from mains or branch mains.

3.6 DUCT SEALERS AND TAPES
.1 Surfaces will be cleaned and treated in accordance with manufacturer's recommendations.
.2 Sealer will be spread on one side of the tape. The tape will be wrapped around the area to be sealed (activated side to the metal) and overlapped 50mm(2"). The exposed side of the tape will then be covered with sealer.

3.7 RIGID DUCT INSULATION
.1 Rigid duct insulation with canvas covering and lagging will be used on exposed ducts.
.2 Insulation will be applied with edges tightly butted and sealed with a 3" wide strip of the vapor barrier material, applied with compatible adhesive.
.3 The insulation will be applied on stick clips or pins welded to the duct & secured with speed washers. Maximum spacing of pins will be 1 pin per square foot.
.4 Penetrations of the vapor barrier will be patched with a strip of vapor barrier material.
.5 Duct insulation and vapor barrier, where applicable, shall be continuous through walls and floor openings except at fire dampers.
.6 Where more than one thickness of insulation is required stagger both longitudinal and horizontal joints.
.7 Insulation to be 2" thick for temperatures below 50°F (such as O/A plenums & ductwork) and 1" thick for temperatures above 50°F.
.8 All canvas insulation jackets to be complete with two coats of lagging adhesive.

3.8 FLEXIBLE CONNECTIONS
.1 Where shown on the drawings and on the inlet and outlet connections of each fan and outlet of each unit, there shall be installed a flexible connection. Flexible connections shall provide a minimum 3" of fabric between the metal ends whether the equipment is on or off and a ground strap.
.2 Flexible ductwork shall not have more than a 15° change in direction. For changes in direction more than 15° use rigid ductwork for the change (provide sheet metal elbows at air terminal units).

3.9 BALANCING DAMPERS
.1 Install balancing dampers in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
.2 Install balancing dampers where indicated on the drawings. In addition to locations indicated, balancing dampers are to be installed at all tee's in main ducts, branch take-offs from main ducts and in all branch ducts to grilles, diffusers and terminal devices.
.3 Runouts to Registers and Diffusers: Install single blade dampers located as close as possible to main ducts.
.4 Neck mounted balancing dampers are only to be installed where indicated.
.5 All dampers are to be vibration free and supported at both ends.

3.10 FANS
.1 All units will be provided with suitably sized spring type vibration isolators to limit the vibration transmission to the structure to 5%.
.2 Units suspended from the structure will be provided with suitably sized hanger rods and channel iron will be provided to distribute the weight of the units over an appropriate number of joists. Hangers to use a nut and a lock-nut at the bolted connections to equipment and structure.
.3 Fans will be mounted in such a manner so that maximum space is available for access to all parts requiring periodic maintenance. Co-ordinate with all other trade Contractors to ensure that maximum access is maintained.

3.11 GRILLES, REGISTERS AND DIFFUSERS
.1 All grilles and registers shall be supplied and installed by this Sub-Contractor. All door grilles will be supplied by this Sub-Contractor and installed by the Millwork or Hollow Metal Sub-Contractor.
.2 All diffusers, grilles and registers shall be free of fluttering, chattering and vibration. A felt or sponge rubber gasket shall be provided behind each outlet and inlet and adequate fastening provided to prevent leaking and dirt streaks between the outlet or inlet and the duct 'all or ceiling.

GENERAL NOTES

IT IS THE CONTRACTORS RESPONSIBILITY TO CHECK AND VERIFY THAT ALL DIMENSIONS AND SIZES ARE CORRECT, AND TO REPORT IN WRITING ANY ERRORS OR OMISSIONS TO THE ENGINEER PRIOR TO PROCEEDING WITH WORK. AVOID SCALING OF DRAWING ,EXCEPT AS PERMITTED BY ENGINEER . READ THE DRAWINGS IN CONJUNCTION WITH ALL ARCHITECTURAL, ELECTRICAL, MECHANICAL, STRUCTURAL, AND COMPLETE SPECIFICATIONS. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THE NATIONAL BUILDING CODE OF CANADA 2010. THESE DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AND SEALED BY THE ENGINEER.

NOTES

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NO.	DESCRIPTION	Y - M - D
4.	ISSUED FOR TENDER	16-10-26
3.	REVISED FOR 95% REVIEW	16-04-14
2.	ISSUE FOR 95% REVIEW	16-03-11
1.	ISSUE FOR INFORMATION	16-02-10

REVISIONS

SEAL

REGISTERED PROFESSIONAL ENGINEER
DATE
D.L. PARKINSON
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PROVINCE OF NOVA SCOTIA

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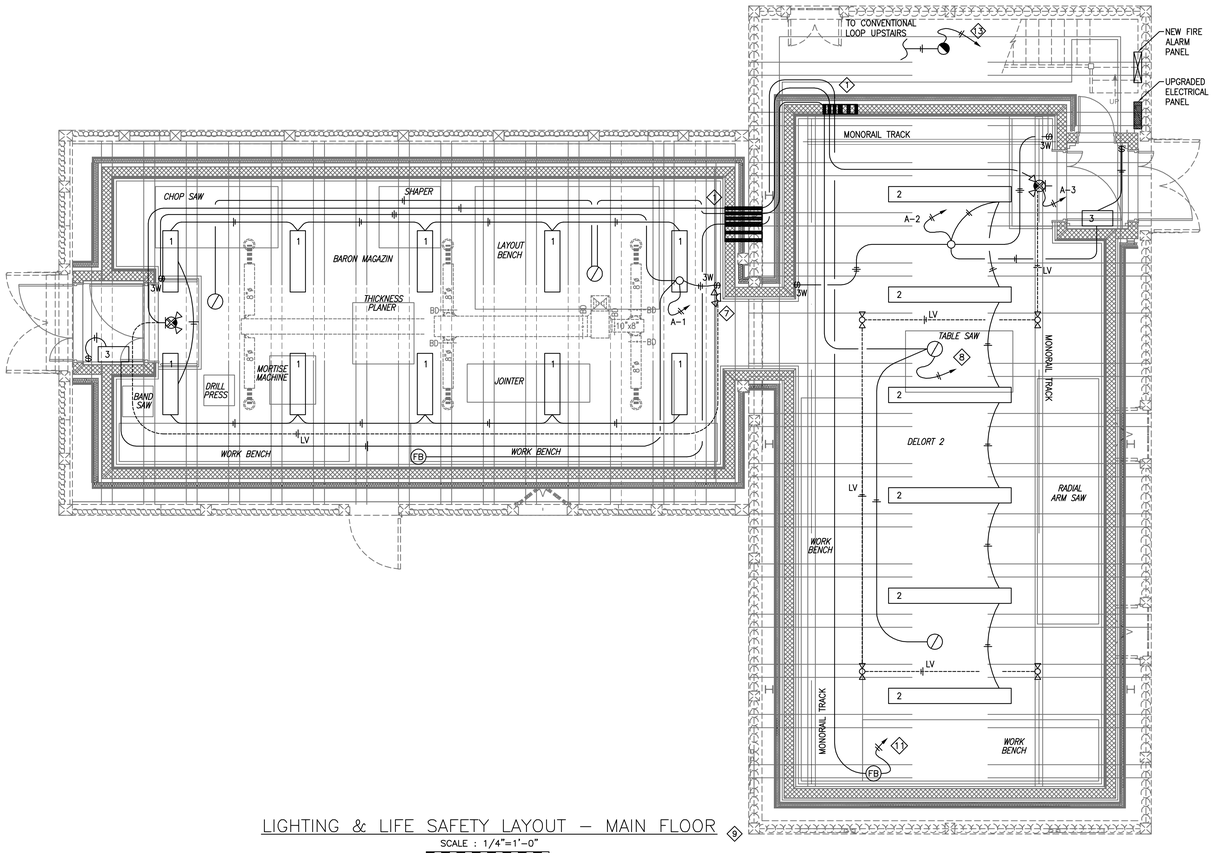
PROJECT
CARPENTRY MILL SHOP
Fortress of Louisbourg
Louisbourg, N.S.

DRAWING
VENTILATION SPECIFICATIONS

DRAWN BY	B.W.R
CHECKED BY	D.L.P
SCALE	AS NOTED
DATE	OCT, 2016

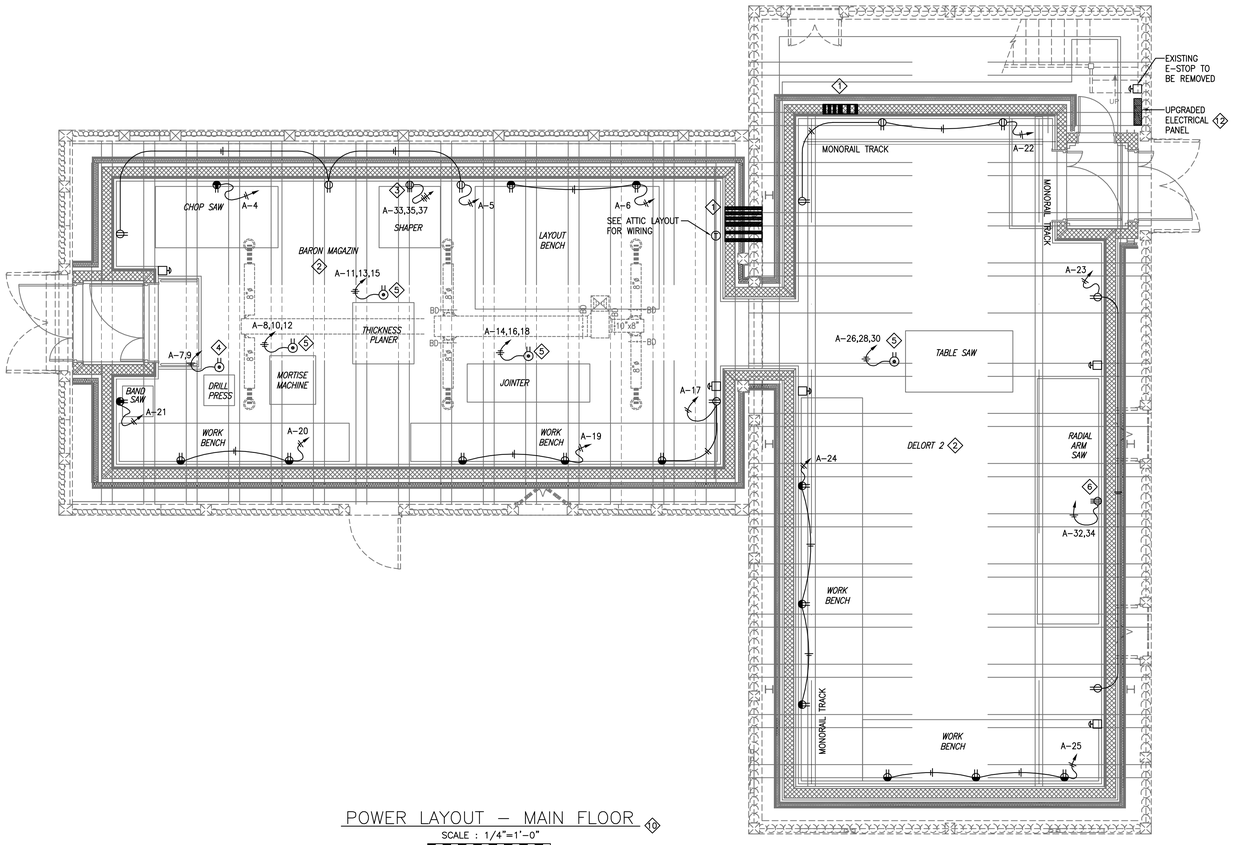
ONSA CAD FILE	DRWG.
15-573	M-753



LIGHTING & LIFE SAFETY LAYOUT – MAIN FLOOR ⑨

SCALE : 1/4"=1'-0"

0 1 2 3 4 5 6 7 8



POWER LAYOUT – MAIN FLOOR ⑩

SCALE : 1/4"=1'-0"

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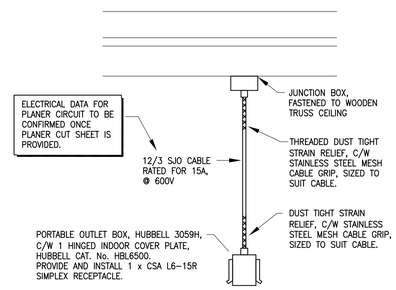
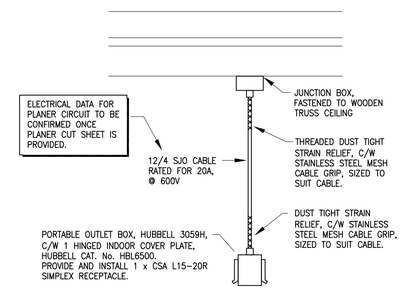


TYPICAL OVERHEAD RECEPTACLE A / E101

SCALE : N.T.S.



TYPICAL OVERHEAD RECEPTACLE B / E101

SCALE : N.T.S.

LUMINAIRE LEGEND

TYPE	DESCRIPTION	MANUFACTURER'S CATALOGUE NO.	LAMP(S)	REMARKS
	WALL MOUNTED, SINGLE FACE, SELF CONTAINED EXIT LIGHT C/W 2 LED EMERGENCY LIGHTING HEADS	AIMLITE #CSRP1272-1M-2MD-6LA-WHT-120V	2 – 6W LED's	UNIT C/W 12VDC, SEALED LEAD BATTERIES RATED 72 WATTS FOR 1/2 HOUR.
	CEILING MOUNTED EMERGENCY LIGHTING FIXTURE, DOUBLE HEAD, REMOTE MOUNTED ONTO BOTTOM OF WOODEN TRUSS	AIMLITE #RMMD-2-12VDC-6LA-WHT	2 x 6W LED's	-------
	WALL MOUNTED EMERGENCY LIGHTING FIXTURE, DOUBLE HEAD. REMOTE MOUNTED, 7'-6" A.F.F. UNLESS INDICATED OTHERWISE.	AIMLITE #RMMD-2-12VDC-6LA-WHT	2 – 6W LED's	--------
1	1' X 4' – CHAIN-HUNG INDUSTRIAL LED FIXTURE	METALUX #4ILED-LD4-9W-N-FL-UNV-L840-CD1	LED 4000K	UNITS TO BE CHAIN HUNG AND PARALLEL TO THE BOTTOM OF NEW SURFACE-MOUNTED DUCT. UNIT C/W FROSTED ACRYLIC LENS.
2	1' X 8' – CEILING SURFACE MOUNTED INDUSTRIAL LED FIXTURE	METALUX #8ILED-LD4-18W-N-FL-UNV-L840-CD1	LED 4000K	UNITS TO BE CHAIN HUNG ABOVE MONORAIL TRACK AS HIGH AS PRACTICAL. UNIT C/W FROSTED ACRYLIC LENS.
3	2' LONG – WALL MOUNTED "DIRECT/ INDIRECT" LED FIXTURE C/W ACRYLIC LENS	METALUX #2BCLED-LD4-28SL-F-UNV-L835-CD1-U	LED 3500K	UNIT TO BE SUITABLE FOR ROW MOUNTING. MOUNT AS HIGH AS PRACTICAL ABOVE DOOR HEIGHTS.

ELECTRICAL LEGEND

- BRANCH CIRCUIT FEEDER RUN CONCEALED IN CEILINGS AND WALLS. NUMBER OF SOLID STROKES INDICATES QUANTITY OF POWER CONDUCTORS. DASHED STROKES INDICATE SPECIAL GROUNDING CONDUCTORS WHERE REQUIRED. SEE ELECTRICAL SPECIFICATIONS FOR WIRING METHODS AND CONDUCTOR SIZES.
- A–5 — LED LIGHT FIXTURE ON CIRCUIT "5" FROM PANEL "A". FIXTURE CONTROLLED FROM LOW VOLTAGE SWITCH "a". FIXTURE TYPE "1" AS PER LIGHT FIXTURE LEGEND.
- DUPLEX U–GROUND RECEPTACLE SURFACE WALL MOUNTED 18" A.F.F. C/W COVERPLATE, UNLESS INDICATED OTHERWISE.
- SAME AS ABOVE BUT SURFACE WALL MOUNTED 6" ABOVE WORK PLANE, OR 46" A.F.F., UNLESS INDICATED OTHERWISE.
- DUPLEX U–GROUND RECEPTACLE, "TEE–SLOT" CSA5–20R CONFIGURATION, SURFACE WALL MOUNTED 6" ABOVE WORK PLANE, OR 46" A.F.F., UNLESS INDICATED OTHERWISE.
- SPECIALTY RECEPTACLE OF CHARACTERISTICS AS INDICATED ON DRAWINGS.
- CORD DROP RECEPTACLE AS NOTED. REFER TO ELECTRICAL NOTES AND DETAILS.
- EXIT LIGHT, WALL–MOUNTED, SINGLE FACED, WITH DIRECTIONAL ARROWS AS INDICATED. REFER TO LUMINAIRE LEGEND.
- DOUBLE HEAD EMERGENCY LIGHTING REMOTE UNIT, WALL & CEILING MOUNTED RESPECTIVELY. REFER TO LUMINAIRE LEGEND.
- ADDRESSABLE CEILING MOUNTED SMOKE DETECTOR.
- CEILING–MOUNTED HEAT DETECTOR.
- (FB) FIRE ALARM SIGNAL BELL MOUNTED UP INSIDE OPEN ROOF TRUSS SYSTEMS IN PUBLIC AREAS AND AT 84" A.F.F. IN NON–PUBLIC AREAS.
- M HP — MOTOR SERVICE DISCONNECT SWITCH WITH THE NUMBER OF POLES AS INDICATED. UNIT TO BE MOUNTED ADJACENT TO THE MOTOR AND BE EQUAL TO BYRANT #30100 SERIES.

GENERAL NOTES

1. ALL ELECTRICAL RACEWAYS WHICH PENETRATE THROUGH SOUNDPROOF CONCRETE SLAB SHALL BE INSTALLED C/W FIREPROOF CAULKING AT PENETRATIONS. COORDINATE WITH GENERAL CONTRACTOR.

2. CEILING SURFACE–MOUNTED HVAC EQUIPMENT SHOWN FOR INFORMATION PURPOSES ONLY, CONFIRM WITH MECHANICAL.

3. THE REMOVAL OF EXISTING REDUNDANT POWER WIRING, FIRE ALARM WIRING, ETC. TO BE INCLUDED IN THE PRICE OF THE CONTRACT. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SCOPING OUT EXISTING CONDITIONS OF THE SITE.

ELECTRICAL NOTES

INDICATED BY THE ⟨1⟩ SYMBOL ON THE DRAWINGS. (I.E. ⟨1⟩ INDICATES NOTE 1)

NOTE 1: CONDUIT CHASE FOR ALL ELECTRICAL SERVICES TO 'BARON MAGAZIN' AND 'DELORT 2'. 2 x 2"C FOR RECEPTACLES / POWER OUTLETS, 1"C FOR LIGHTING, 1"C FOR FIRE ALARM WIRING, 1"C FOR EXIT / EMERGENCY LIGHTING. CHASE TO BE MOUNTED 84" A.F.F..

NOTE 2: ALL WALL–MOUNTED RECEPTACLES IN BOTH SOUND–PROOF AREAS TO BE SURFACE MOUNTED, WIRING TO BE RUN IN SURFACE–MOUNTED EMT CONDUIT.

NOTE 3: PROVIDE AND INSTALL CSA L15–30R SIMPLEX RECEPTACLE, MOUNTED 12" ABOVE WORK PLANE.

NOTE 4: REFER TO DETAIL A/E101.

NOTE 5: REFER TO DETAIL B/E101.

NOTE 6: PROVIDE AND INSTALL CSA L6–20R SIMPLEX RECEPTACLE, MOUNTED 12" ABOVE WORK PLANE.

NOTE 7: REMOTE HEAD TO BE WALL MOUNTED 6" ABOVE DOOR.

NOTE 8: WIRE AND TERMINATE NEW FIRE ALARM DEVICES TO NEW I.D.C. CIRCUIT, TO BE TERMINATED TO NEW FIRE ALARM PANEL.

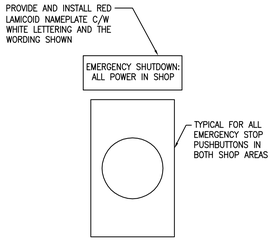
NOTE 9: SUGGESTED RACEWAY ROUTING SHOWN IN LAYOUT.

NOTE 10: WIRING SHOWN IN POWER LAYOUT FOR CIRCUITING PURPOSES ONLY. CONTRACTOR IS RESPONSIBLE FOR MANAGEMENT OF RACEWAYS WITHIN SOUNDPROOF SHOPS IN ACCORDANCE WITH SPECIFICATIONS.

NOTE 11: WIRE AND TERMINATE NEW FIRE ALARM DEVICES TO NEW N.A.C. CIRCUIT, TO BE TERMINATED TO NEW FIRE ALARM PANEL.

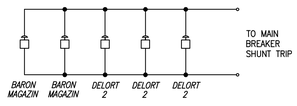
NOTE 12: EXISTING PANEL AND ASSOCIATED FEEDER FROM ADJACENT BUILDING TO BE UPGRADED AS SPECIFIED IN PANEL SCHEDULE. EXISTING FEEDER TO BE RE–TERMINATED TO NEW PANEL.

NOTE 13: WIRE AND TERMINATE NEW FIRE ALARM DEVICES TO NEW CONVENTIONAL I.D.C. CIRCUIT, TO BE TERMINATED TO NEW FIRE ALARM PANEL.



LAMICOID DETAIL: EMERGENCY STOP

SCALE : N.T.S.



WIRING DETAIL: EMERGENCY STOP

SCALE : N.T.S.

GENERAL NOTES

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NOTES

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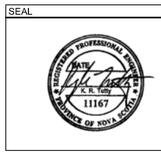
NO.	DESCRIPTION	Y - M - D
4.	ISSUED FOR TENDER	16-11-21
3.	REVISED FOR 95% REVIEW	16-04-14
2.	ISSUE FOR 95% REVIEW	16-03-11
1.	ISSUE FOR INFORMATION	16-02-10

REVISIONS

SEAL



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PROJECT

CARPENTRY MILL SHOP

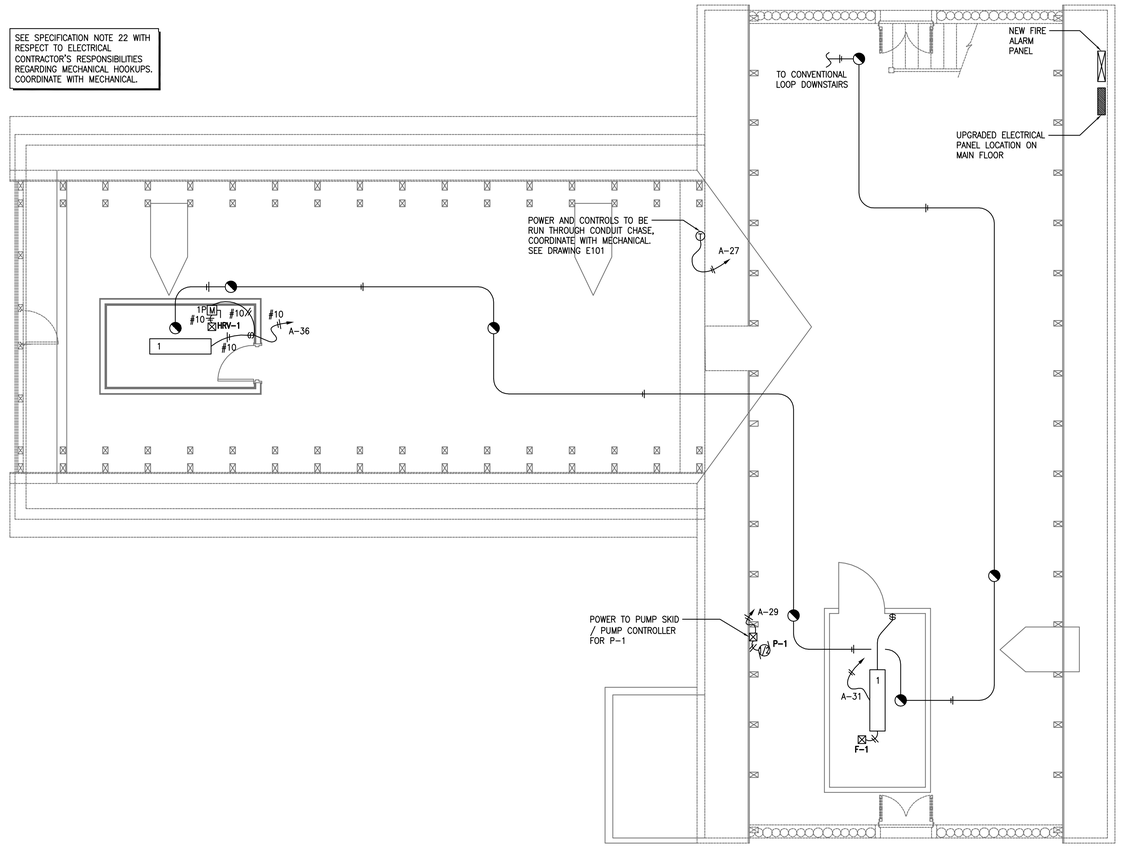
Fortress of Louisbourg
Louisbourg, N.S.

DRAWING
ELECTRICAL:
- LIGHTING
- POWER
- FIRE ALARM
- EXIT / EMERGENCY LIGHTING

DRAWN BY	KRT
CHECKED BY	CLB
SCALE	AS NOTED
DATE	NOV, 2016

ONSA CAD FILE	DRWG.
15-573	E-101

SEE SPECIFICATION NOTE 22 WITH RESPECT TO ELECTRICAL CONTRACTOR'S RESPONSIBILITIES REGARDING MECHANICAL HOOKUPS. COORDINATE WITH MECHANICAL.



FIRE ALARM & MECHANICAL HOOKUPS LAYOUT – ATTIC

SCALE : 1/4"=1'-0"

0 1 2 3 4 5 6 7 8

Panel:	Confirm Name with Owner			**Mounting:**	Surface			
Location:	Delort 2			**Feeder:**	4C#4/0AWG+4BOND-2-1/2"C (100' Run)			
Type:	Cutler-Hammer P1aB4A2-42			**Frame:**	BAB			
Size:	48"H x 20"W x 5.75"D							
Rating:	225A 120/208V 3-Phase 4-Wire							
No.	**Brk.**	**Description**	**Load**	**Phase**	**Load**	**Description**	**Brk.**	**No.**
1	15/1P	Lighting - Baron Magazin	600	A	600	Lighting - Delort 2	15/1P	2
* 3	15/1P	Exit / Emergency Lighting	300	B	500	Chop Saw	20/1P	4
5	15/1P	General Shop Receptacles	600	C	400	General Shop Receptacles	15/1P	6
7	15/2P	Drill Press	1,000	A	1,000	***	***	8
9	***	***	1,000	B	1,000	Mortise Machine	20/3P	10
11	***	***	1,000	C	1,000	***	***	12
13	20/3P	Thickness Planar	1,000	A	1,000	***	***	14
15	***	***	1,000	B	1,000	Jointer	20/3P	16
17	15/1P	General Shop Receptacles	400	C	1,000	***	***	18
19	15/1P	General Shop Receptacles	400	A	400	General Shop Receptacles	15/1P	20
21	20/1P	Band Saw	1,000	B	600	General Shop Receptacles	15/1P	22
23	15/1P	General Shop Receptacles	400	C	600	General Shop Receptacles	15/1P	24
25	15/1P	General Shop Receptacles	600	A	1,000	***	***	26
27	30/1P	Electronic Thermostat	200	B	1,000	Table Saw	20/3P	28
29	15/1P	Pump Controller / Pump P-1	500	C	1,000	***	***	30
31	15/1P	Furnace	200	A	1,000	Radial Arm Saw	20/2P	32
33	***	***	2,000	B	1,000	***	***	34
35	30/3P	Shaper	2,000	C	300	HRV-1 & HRV Room Lights	15/1P	36
37	***	***	2,000	A	200	Fire Alarm Panel	15/1P	38
39	20/1P	Spare	0	B	0	Spare	15/1P	40
41	15/1P	Spare	0	C	0	Spare	15/1P	42
		Phase "A" Total kVA	11.00		9.20	**Phase "C" Total kVA**		
		Phase "B"			10.60	**Total kVA**		

Notes:

* - Indicates Breaker To Be Complete With Handle Locking Device.

ELECTRICAL NOTES

INDICATED BY THE ◇1 SYMBOL ON THE DRAWINGS. (I.E. ◇1 INDICATES NOTE 1)

NOTE 1: WIRE AND TERMINATE NEW FIRE ALARM DEVICES TO NEW CONVENTIONAL I.D.C. CIRCUIT, TO BE TERMINATED TO NEW FIRE ALARM PANEL.

FIRE ALARM SYSTEM SPECIFICATIONS

1 THE FIRE ALARM SYSTEM SHALL BE A COMPLETE, ELECTRICALLY SUPERVISED, NON-CODED, CLASS 'B', SINGLE STAGE, ADDRESSALE FIRE ALARM SYSTEM C/W SOME CONVENTIONAL, HARD WIRED ZONES. EQUIPMENT AND ACCESSORIES FURNISHED UNDER THIS CONTRACT SHALL BE THE STANDARD PRODUCTS OF A SINGLE MANUFACTURER. ALL EQUIPMENT SHALL BE LISTED BY A NATIONALLY RECOGNIZED FIRE TESTING LABORATORY.

2 THIS PANEL SHALL BE INTERCONNECTED TO ASSOCIATED FIRE ALARM PANELS LOCATED IN ADJACENT BUILDINGS THROUGHOUT THE SITE.

3 FIRE ALARM SYSTEM COMPONENTS SHALL BE AS FOLLOWS:
- MAIN FIRE ALARM PANEL:- EDWARDS #EST-3 ADDRESSABLE CONTROLLER C/W ONE ZONE CARD SUITABLE FOR UP TO 8 CONVENTIONAL HARD WIRED ZONES.
- SIGNAL BELLS – EDWARDS #MB6-24.
- CEILING MOUNTED, CONVENTIONAL, HARD WIRED, ZONED SMOKE DETECTORS – EDWARDS PHOTO-ELECTRIC #EC-300 C/W BASE.
- CEILING MOUNTED, ADDRESSABLE, COMBINATION PHOTO-ELECTRIC SMOKE AND HEAT DETECTOR – EDWARDS #SIGA-PHS C/W BASE.

4 THE FIRE ALARM SYSTEM SHALL BE COMPLETE WITH, BUT NOT NECESSARILY LIMITED TO, THE FOLLOWING:
- CENTRAL PROCESSOR BASED CONTROL UNIT WITH FRONT VIEWING WINDOW ANNUNCIATOR.
- ALARM RECEIVER C/W 1 INITIATION LOOP.
- AUDIBLE SIGNAL CONTROL C/W 1 SIGNAL CIRCUITS.
- COMMON CONTROL WITH THE FOLLOWING FUNCTIONS:
  - LAMP SUPERVISION
  - RESET
  - TROUBLE INDICATION
  - SUBSEQUENT ALARMS
  - MANUAL SIGNAL SILENCE
  - SIGNAL SILENCE INHIBITOR
  - TWO SETS OF AUXILIARY RELAY CONTACTS
- MASTER POWER SUPPLY C/W TVSS PROTECTION.
- STANDBY POWER SUPPLY CONSISTING OF SEALED, MAINTENANCE FREE BATTERIES AND ASSOCIATED CHARGER.
- EST NETWORK CARD.

5 ALL FIRE ALARM SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH CAN4-S524-M91 FIRE ALARM SYSTEM STANDARD.

6 THE ENTIRE FIRE ALARM SYSTEM SHALL BE CERTIFIED AND VERIFIED BY THE MANUFACTURER'S INDEPENDENT TESTING AGENCY. THE COST FOR THESE SERVICES SHALL BE CARRIED BY THE CONTRACTOR IN HIS TENDER SUBMISSION.

7 ALL FIRE ALARM SYSTEM WIRING SHALL BE MINIMUM AC-90 RATED CABLE CONCEALED IN WOOD FRAME CONSTRUCTION. ALL CONDUCTORS SHALL BE COPPER, SIZED AS FOLLOWS:
- #12AWG FOR FIRE ALARM SIGNAL DEVICES.
- #14AWG FOR FIRE ALARM INITIATION ZONE WIRING. #18AWG "ALARM-TEC" CABLE C/W 105°C INSULATION CAN BE USED IN LIEU OF AC-90 CABLE PROVIDED IT IS: a) USED ONLY FOR THE WIRING OF INITIATION DEVICES; b) HAS A GROUND CONDUCTOR; AND c) HAS A RED ARMOUR.

ELECTRICAL SPECIFICATIONS AND NOTES

1 ALL ELECTRICAL MATERIALS INTRODUCED TO THE PROJECT SHALL BE NEW AND CSA APPROVED FOR THEIR RESPECTIVE USE AND SUPPLIED THROUGH AN AUTHORIZED DISTRIBUTOR.

2 ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE 23rd. EDITION, 2015, AND ALL LOCAL ORDINANCES AND BYLAWS.

3 THIS CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, FEES, AND TAXES ASSOCIATED WITH THE ELECTRICAL WORK AND HE SHALL ALLOW FOR THE SAME IN HIS TENDER SUBMISSION.

4 THIS CONTRACTOR SHALL SUPPLY ALL MATERIALS, EQUIPMENT, AND LABOUR NECESSARY FOR THE INSTALLATION OF THE ELECTRICAL WORKS, COMPLETE IN EVERY RESPECT AS SHOWN ON THE DRAWINGS AND/OR AS OUTLINED IN THESE SPECIFICATIONS.

5 THIS CONTRACTOR SHALL GUARANTEE ALL WORK FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE BY THE OWNER AND HE SHALL MAKE GOOD ANY DEFECTS DURING THE PERIOD OF WARRANTY AT NO EXPENSE TO THE OWNER.

6 THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO HIS TENDER SUBMISSION AND FAMILIARIZE HIMSELF WITH EXISTING GRADES, FINISHES, SURFACES, CONSTRUCTION, SERVICES, ETC. HE SHALL ALLOW FOR THE SAME IN HIS TENDER SUBMISSION.

7 AFTER AWARD OF TENDER, THIS SUCCESSFUL CONTRACTOR SHALL SUBMIT COPIES OF ALL PERTINENT DRAWINGS TO THE VARIOUS INSPECTION AUTHORITIES, ALL FOR THEIR INFORMATION AND/OR APPROVAL. THIS SHALL BE DONE PRIOR TO COMMENCEMENT OF THE WORK. THE DRAWINGS WILL BE PROVIDED BY THE ENGINEER AT NO COST TO THE CONTRACTOR.

8 PRIOR TO THE ORDERING OF ELECTRICAL EQUIPMENT, THIS CONTRACTOR SHALL SUBMIT ELECTRONIC COPIES OF SHOP DRAWINGS TO THE ENGINEER FOR THE SAME, ALL FOR REVIEW. EQUIPMENT SHALL NOT BE RELEASED FOR SHIPMENT UNTIL THIS REVIEW HAS BEEN OBTAINED.

9 AT EACH LOCAL OUTLET, DEVICE, FIXTURE, ETC. INSTALL A STANDARD OUTLET BOX GALVANIZED INSIDE AND OUT. THIS CONTRACTOR SHALL ALLOW FOR THE RELOCATION OF ANY OUTLET UP TO 10 FEET HORIZONTALLY FROM WHERE SHOWN AT NO COST TO THE CLIENT PROVIDED HE HAS BEEN NOTIFIED SO PRIOR TO ROUGH-IN OF THE SAME. SURFACE-MOUNTED BOXES INSTALLED BELOW 10' A.F.F. SHALL BE CAST 'FS/FD' TYPE.

10 120 VOLT TOGGLE SWITCHES SHALL BE RATED 15A OR 20A AS SHOWN AND EQUIVALENT TO HUBBELL #1200-IV SERIES. DUPLEX RECEPTACLES SHALL BE RATED 15A OR 20A AS SHOWN ON DRAWINGS AND EQUIVALENT TO HUBBELL #5262-IV AND #5362-IV RESPECTIVELY. 15A-250V-2P-3W TWIST LOCK AND 20A-250V-2P-3W TWIST LOCK SIMPLEX RECEPTACLES SHALL BE EQUIVALENT TO HUBBELL #HBL4560 AND #HBL2320 RESPECTIVELY. 20A-250V-3P-4W TWIST LOCK AND 30A-250V-3P-4W TWIST LOCK SIMPLEX RECEPTACLES SHALL BE EQUIVALENT TO HUBBELL #HBL2420 AND #HBL2720 RESPECTIVELY. COVERPLATES SHALL BE EEMAC 12 RATED IN SHOP AREAS.

11 JOINTS IN BRANCH CIRCUIT WIRING SHALL BE MADE USING WIRE CONNECTORS EQUAL TO "IDEAL" COLOUR-CODED WING NUTS.

12 ALL WIRING SHALL BE INSTALLED IN EMT CONDUIT WITHOUT EXCEPTION, C/W ALL NECESSARY FITTINGS AND HARDWARE. ALL CABLES SHALL BE INSTALLED AS HIGH AS PRACTICAL IN WOODEN TRUSS SYSTEMS AND HIDDEN FROM VIEW AS MUCH AS PRACTICAL. CABLES SHALL BE INSTALLED ON THE SQUARE AND BE PLUMB WITH BUILDING LINES. CABLES SHALL BE STRAPPED AND SECURED TO THE BUILDING STRUCTURE WITH STEEL STRAPS EVERY 5' OR FRACTION THEREOF, AND WITHIN 1' OF EVERY JUNCTION BOX, OUTLET BOX, AND PULL BOX. ALL CABLE CONNECTORS SHALL BE STEEL BODY TYPE.

13 ALL CONNECTORS TO MECHANICAL EQUIPMENT SHALL BE MADE USING LIQUID-TIGHT FLEXIBLE CONDUIT C/W STEEL BODY, WATER-TIGHT CONNECTORS.

14 ALL CABLES, CONDUITS, PULL BOXES, JUNCTION BOXES, AND OUTLET BOXES SHALL BE SUPPORTED INDEPENDENT OF EXISTING PIPES, CONDUITS, EQUIPMENT, OR THE WORK OF OTHER TRADES. CONDUITS AND CABLES SHALL NOT LAY DIRECTLY ON, NOR TAKE THEIR SUPPORT FROM, SUSPENDED CEILING SYSTEMS. KEEP ALL CABLES AND CONDUITS A MINIMUM OF 6" AWAY FROM HEATING AND HOT WATER LINES.

15 ALL CONDUCTORS SHALL BE COPPER, STRANDED, MINIMUM #12 AWG, C/W RW-90 XLPE INSULATION. ALL CONDUCTORS USED IN BRANCH CIRCUIT WIRING ARE TO BE IDENTIFIED AT EACH END IN ALL PANELS AND OUTLET BOXES WITH PANDUIT "PLD" SERIES TAGS WITH THEIR RESPECTIVE CIRCUIT NUMBERS. ALL STRANDED CONDUCTORS ARE TO BE TWISTED TOGETHER TO FORM A SINGLE CONDUCTOR TO ENSURE A RELIABLE MECHANICAL TERMINATION WHEN TERMINATED UNDER A LUG OR SET SCREW.

16 ALL PHASE CONDUCTORS UP TO AND INCLUDING #2 AWG AND NEUTRALS, BONDS AND GROUND CONDUCTORS UP TO AND INCLUDING #3/0 AWG SHALL BE COLOR CODED AS FOLLOWS:
- PHASE 'A' – RED
- PHASE 'B' – BLACK
- PHASE 'C' – BLUE
- NEUTRAL – WHITE
- BOND – GREEN
- GROUND – GREEN

17 MOUNTING HEIGHTS AS NOTED ARE TO THE CENTER LINE OF THE OUTLET OR DEVICE.

18 SPECIFIC MANUFACTURERS' NAMES ARE SO NOTED ONLY TO ESTABLISH A STANDARD OF ACCEPTABLE QUALITY. OTHER MANUFACTURERS ARE ACCEPTABLE AS ALTERNATES PROVIDED THEY MEET OR EXCEED THIS ESTABLISHED STANDARD. FINAL ACCEPTANCE OF AN ALTERNATE'S STANDARD OF QUALITY SHALL REST SOLELY WITH THE ENGINEER.

19 ALL REVISED PANEL DIRECTORIES ARE TO BE TYPE-WRITTEN, COMPLETE, AND SHALL ACCURATELY DESCRIBE THE LOAD SERVICED BY EACH BRANCH CIRCUIT BREAKER. ALL PANELS, DISCONNECT SWITCHES, TRANSFORMERS, RECEPTACLES, AND MAJOR EQUIPMENT SHALL BE PERMANENTLY IDENTIFIED WITH LAMICOID NAMEPLATES, POP-RIVETED TO EQUIPMENT ENCLOSURES. SELF-ADHESIVE TYPE NAMEPLATES ARE NOT ACCEPTABLE.

20 ALL CUTTING OF SURFACES TO INCORPORATE NEW WIRING IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. ALL PATCHING AND MAKING GOOD OF SURFACES IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL EXERCISE CAUTION IN KEEPING SUCH CUTTING TO A REASONABLE MINIMUM. CONFLICTS BETWEEN CONTRACTORS REGARDING UNDUE OR EXCESSIVE CUTTING AND PATCHING WILL BE ARBITRATED BY THE ENGINEER OR ARCHITECT WHOSE DECISION SHALL BE FINAL.

21 DURING CONSTRUCTION AND AT THE COMPLETION OF THE PROJECT, THE SITE SHALL BE LEFT NEAT, TIDY, AND FREE OF DEBRIS.

22 ALL POWER WIRING AND CONTROL WIRING ASSOCIATED WITH THE MECHANICAL SYSTEMS OF THIS PROJECT SHALL BE PERFORMED BY THE ELECTRICAL CONTRACTOR BUT ONLY TO THE LIMITS OF WHAT IS ACTUALLY SHOWN ON THE ELECTRICAL DRAWINGS.

23 THE CONTRACTOR SHALL MAINTAIN PROJECT "AS-BUILT" RECORD DRAWINGS AND ACCURATELY RECORD SIGNIFICANT DEVIATIONS FROM THE CONTRACT DOCUMENTS CAUSED BY SITE CONDITIONS OR CONTRACT CHANGES. MARK CHANGES ON WHITE PRINTS IN RED.

GENERAL NOTES

IT IS THE CONTRACTORS RESPONSIBILITY TO CHECK AND VERIFY THAT ALL DIMENSIONS AND SIZES ARE CORRECT, AND TO REPORT IN WRITING ANY ERRORS OR OMISSIONS TO THE ENGINEER PRIOR TO PROCEEDING WITH WORK. AVOID SCALING OF DRAWING ,EXCEPT AS PERMITTED BY ENGINEER . READ THE DRAWINGS IN CONJUNCTION WITH ALL ARCHITECTURAL, ELECTRICAL, MECHANICAL,STRUCTURAL, AND COMPLETE SPECIFICATIONS. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THE NATIONAL BUILDING CODE OF CANADA 2010. THESE DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AND SEALED BY THE ENGINEER.

NOTES

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NO.	DESCRIPTION	Y - M - D
4.	ISSUED FOR TENDER	16-11-21
3.	REVISED FOR 95% REVIEW	16-04-14
2.	ISSUE FOR 95% REVIEW	16-03-11
1.	ISSUE FOR INFORMATION	16-02-10

REVISIONS

SEAL

REGISTERED PROFESSIONAL ENGINEER PROVINCE OF NOVA SCOTIA
K.R. Tutty
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PROJECT

CARPENTRY MILL SHOP

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DRAWING

ELECTRICAL:
- MECHANICAL HOOKUPS
- SPECIFICATIONS

DRAWN BY	KRT
CHECKED BY	CLB
SCALE	AS NOTED
DATE	NOV, 2016

ONSA CAD FILE	DRWG.
15-573	E-102