

| NORTH                           |  |
|---------------------------------|--|
| LEGEND:                         |  |
| G                               | NATURAL GAS LINE ON GRADE  |
| ——— G ———                       | NATURAL GAS LINE ABOVE/BELOW GRADE   |
|                                 | PRESSURE REDUCING VALVE  |
| BDD                             | BACK DRAFT DAMPER  |
|                                 | MANUAL BALANCING DAMPER  |
|                                 | TURNING VANES  |
|                                 | ACOUSTIC INSULATION  |
|                                 | THERMAL INSULATION   |
|                                 | FLEXIBLE DUCT CONNECTION   |
| X                               | SUPPLY/MAKE-UP/OUTSIDE/COMBUSTION AIR DUCT SHAFT   |
|                                 | RETURN/EXHAUST/RELIEF AIR DUCT SHAFT   |
| $\boxtimes$                     | SUPPLY/MAKE-UP/OUTSIDE/COMBUSTION AIR DUCT   |
|                                 | RETURN/EXHAUST/RELIEF AIR DUCT   |
| $\Theta \otimes$                | ROUND SUPPLY DUCT RISER UP/DOWN  |
| • •                             | ROUND RETURN/EXHAUST/RELIEF AIR RISER UP/DOWN  |
| T                               | THERMOSTAT   |
| $\bigoplus$                     | HUMIDISTAT   |
| \$                              | SWITCH   |
| **                              | EQUIPMENT DESIGNATION  |
| TYPE  NECK 2X  FLOW  SIZE/THROW | GRILLE/DIFFUSER TYPE  NECK SIZE  QUANTITY OR NUMBER OF  FLOW RATE (CFM)  FACE SIZE OR THROW  GRILLE OR  GRILLE OR  DIFFUSER  DESIGNATION |
| TYPE SIZE OUTPUT                | RADIATION UNIT DESIGNATION   |
|                                 | TAGS/NOTES DESIGNATION   |

FOR HVAC DRAWINGS

\M1.0|M1.0/ SCALE: 1/16" = 1'-0"

DESIGN

## DRAWING NOTES: (##)

- EXISTING GAS METER/PRV SERVING EXISTING BUILDING. VERIFY EXACT LOCATION ON SITE AND WITH UTILITY.
- 2. NEW GAS FIRED AIR HANDLING UNITS (60 MBH INPUT) AND AHU-2 (69 MBH INPUT). TOTAL ADDITION TO NATURAL GAS LOAD = 129 MBH.
- 3. TIE NEW 1" GAS LINE INTO EXISTING EXTERIOR LINE DOWNSTREAM OF METER/PRV. RUN NEW GAS PIPING IN CEILING SPACE OF EXISTING BUILDING AS
- 4. DROP NEW 1" GAS LINE INTO NEW CDAWLODACE DOLLTE NEW DIDING IN NEW

## MECHANICAL SPECIFICATION:

.1 VISIT JOBSITE PRIOR TO BIDDING. DRAWINGS INDICATE APPROXIMATE LOCATION OF VAPOUR SEAL DUCT INSULATION PF385, 3/4 LB/CU.FT. DENSITY. PROVIDE EXISTING MECHANICAL EQUIPMENT AND SERVICES. VERIFY EXACT LOCATIONS OF EXISTING MECHANICAL FOUIPMENT AND SERVICES AND ALLOW FOR NECESSARY RELOCATING OF NOTED SERVICES (OR RECONNECTION TO EXISTING SERVICES) TO SUIT NEW CONSTRUCTION

.2 ALL WORK SHALL CONFORM TO MANITOBA BUILDING CODE AND LOCAL AUTHORITIES APPLY FOR OBTAIN AND PAY FOR ALL NECESSARY PERMITS .3 COORDINATE INSTALLATION WITH ALL RELATED TRADES, ARCHITECTURAL DRAWINGS, INTERIOR DESIGN PLANS AND REFLECTED CEILING PLANS. VERIFY ALL DIMENSIONS AND LOCATIONS OF EXISTING EQUIPMENT AND SERVICES PRIOR TO PROCEEDING WITH WORK.

.4 SUBMIT SHOP DRAWINGS FOR ALL EQUIPMENT TO THE CONTRACT ADMINISTRATOR. .5 PROVIDE ONE YEAR GUARANTEE FOR ALL EQUIPMENT. .6 ALL CONNECTIONS TO EXISTING BUILDING MECHANICAL SERVICES SHALL BE COORDINATED WITH THE CONTRACT ADMINISTRATOR. .7 ALL NECESSARY CUTTING AND PATCHING SHALL BE PERFORMED BY COMPETENT SUBCONTRACTORS TO SATISFACTION OF THE CONTRACT ADMINISTRATOR. .8 REFER TO SPECIFICATIONS FOR REQUIREMENTS REGARDING PROJECT PHASING, WORKING HOURS, SHUT-DOWN PROCEDURES, ACCESS, ETC .9 PROVIDE SEPARATE PRICES AS INDICATED ON DRAWINGS

.10 PROVIDE MILCOR ACCESS DOORS IN DRYWALL CEILINGS AND WALLS FOR ACCESS TO MECHANICAL EQUIPMENT. MINIMUM SIZE 24" X 18". .11 PRIOR TO DRILLING HOLES AND/OR OPENINGS IN EXISTING STRUCTURE, CONTRACTOR SHALL RETAIN SERVICES OF NATIONAL TESTING LABORATORIES LIMITED TO LOCATE AND MARK ALL STRUCTURAL REINFORCING STEEL LOCATED IN AREA WHERE CUTTING OR DRILLING IS PROPOSED. AT NO TIME SHALL REINFORCING STEEL BE CUT WITHOUT PRIOR WRITTEN APPROVAL FROM STRUCTURAL ENGINEER QUALIFIED AND LICENSED TO PRACTICE IN PROVINCE OF MANITOBA. NO HOLES OR OPENINGS WILL BE PERMITTED WITHIN AREA OF STRUCTURAL DROP PANELS LOCATED AT

.12 ALL INTERIOR SPACE POWER HAMMERING, DRILLING AND OTHER NOISY WORK SHALL BE PERFORMED BETWEEN HOURS OF 6:00 P.M. AND 8:00 A.M. .13 BIDS SHALL BE BASED ON THE USE OF SPECIFIED EQUIPMENT, UNLESS ACCEPTANCE FOR THE USE OF SUBSTITUTES HAS BEEN OBTAINED IN ACCORDANCE MANUFACTURER'S OPERATING AND MAINTENANCE INSTRUCTIONS FOR ALL EQUIPMENT REQUIRING MAINTENANCE. REVIEW INSTRUCTIONS WITH THE CONTRACT ADMINISTRATOR TO ENSURE A THOROUGH UNDERSTANDING OF THE EQUIPMENT AND ITS OPERATION. 15 PROVIDE A MARK-UP OF THE CONTRACT DRAWINGS FOR RECORD "AS-BUILT" DRAWINGS, REVISED AS REQUIRED TO SHOW ANY CHANGES FROM THAT ORIGINALLY

.16 PROVIDE AS-BUILT DRAWING ON AUTOCAD, COMPLETE WITH DISK PAID FOR BY THE CONTRACTOR. LL DUCTWORK AND PIPING TO BE INSTALLED STRAIGHT, PARALLEL TO THE BUILDING WALLS.

.18 WHERE PIPES OR DUCTS GO THROUGH AN EXTERIOR ROOF OR WALL, THEY SHOULD BE BOXED-IN, FLASHED AND WATERPROOFED. ALLOW FOR EXPANSION AND CONTRACTION OF PIPE. .19 PIPE HANGERS SHALL BE GRINNELL FIG. 65 FOR STEEL PIPE AND FIG. CT65

FOR COPPER PIPE ALL WITH FIG. 140 THREADED ROD ATTACHED TO FIG. 117

EXPANSION CASE SET IN HOLES DRILLED IN CONCRETE, OR ATTACHED TO FIG. 225 OR 227 CLAMP ATTACHED TO JOISTS OR BEAMS OF PIPES, DUCTS, ETC. TO MAINTAIN INTEGRITY OF FIRE SEPARATIONS AS PER MANUFACTURER'S PUBLISHED RECOMMENDATIONS. .21 INSTALLATION OF WORK SHALL BE COORDINATED WITH THE CONTRACTOR AND SHALL BE SCHEDULED SO AS NOT TO ENDANGER OR DISTURB THE USERS OF THE

BUILDING. SHUTDOWN OF EXISTING BUILDING SYSTEMS SHALL BE COORDINATED WITH THE CONTRACT ADMINISTRATOR. 22 ALL WIRING FOR EQUIPMENT SPECIFIED HEREIN SHALL BE BY THE ELECTRICAL SUBCONTRACTOR, UNLESS OTHERWISE NOTED. .23 CONTRACTOR SHALL REVIEW ALL EQUIPMENT REQUIRING ELECTRICAL HOOK-UP WITH ELECTRICAL CONTRADOR .1 TH????CTOR AND ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT. ENSURE PROPER ELECTRICAL CHARACTERISTICS ARE DETERMINED FOR ALL AFFECTED AND RELATED WORK

.24 PRIOR TO INSTALLATION OF THE CEILING, NOTIFY THE CONTRACT ADMINISTRATOR AND ARRANGE FOR A FINAL REVIEW OF THE WORK. FOR UNDERTAKING THIS REVIEW, THE FOLLOWING SHALL BE COMPLETED: .1 ALL SYSTEMS TO BE FULLY OPERATIONAL, AS-BUILT DRAWINGS SUPPLIED AND

WRITING) IS REQUIRED TO BE GIVEN TO THE CONSULTANTS PRIOR TO REVIEWS BEING IN MATERIALS OR WORKMANSHIP, WITHIN THE SPECIFIED WARRANTY PERIOD, UNDERTAKEN. .2 ALL DEFICIENCIES SHALL BE COMPLETED WITHIN TWO (2) WEEKS OF AN AGREED PERIOD OF TIME AFTER FINAL REVIEW AND A LETTER SHALL BE SUBMITTED TO THE

CONSULTANT WITHIN THAT TIME ADVISING OF SUCH. FAILURE TO COMPLETE WORK MAY RESULT IN WORK BEING DONE BY THE OWNER AND THE COSTS DEDUCTED FROM 2.0 INSULATION .1 ALL EXHAUST DUCTS FOR DISTANCE OF 6'-0" BACK FROM WALL OR ROOF

OUTLET TO HAVE 2" FIBERGLAS RFFRK. .2 OUTSIDE AIR DUCTWORK TO HAVE 2" FIBERGLAS RFFRK REINFORCED FOIL FACE FASTENERS TO BOTTOM SURFACE OF DUCT BY IMPALING ON WELDED PINS ON 12" CENTRES. SPOT ADHESIVE ON 12" CENTRES ON ALL SIDES OF DUCTWORK. APPLY INSULATION WITH EDGES TIGHTLY BUTTED TOGETHER AND SECURED WITH 100% COVERAGE OF 3M NO. 17. DUCTWORK LOCATED ON THE ROOF, PROVIDE OVERWRAP OF 45 MIL THICK. REINFORCED "FIRESTONE ULTRAPLY 78" OR EQUAL. SEAL ALL SEAMS AS RECOMMENDED BY MATERIAL MANUFACTURER. PRIOR TO MATERIAL INSTALLATION, PINS, METAL FASTENERS AND OTHER SHARP EDGES OR POINTS SHALL BE BENT AWAY FROM OVERWRAP OR CUT OR GROUND OFF, TO ENSURE THAT OVERWRAP WILL NOT BE PUNCTURED. PROVIDE SLIGHT PEAK ALONG TOP CENTRE

LINE SO MOISTURE WILL RUN OFF. .3 ACOUSTIC INSULATION ON SUPPLY DUCTWORK, WHERE SHOWN ON THE DRAWINGS, SHALL BE 1" THICK FIBREGLASS RIGID COATED DUCT LINER. THE DUCT SIZES SHOWN .6 UNIT SPECIFIC COLOR CODED WIRING DIAGRAMS SHALL MATCH THE UNIT COLOR ON THE DRAWING REPRESENTS THE FINAL INTERNAL SIZE REQUIRED. IMPALE ON WELDED STUDS SPACED 16" O.C. PAINT BREAKS AND JOINTS WITH BF-60-30N FIRE RETARDANT MASTIC. COAT EXPOSED EDGES WITH ADHESIVE. PROJECTING FASTENERS AND ENDS CUT OFF VERTICALLY FLUSH. .4 INSULATE CONDITIONED AIR DUCTWORK WITH 2" FIBERGLAS RFFRK FLEXIBLE DUCT PERIODIC CHECKING OR MAINTENANCE SHALL BE THROUGH HINGED ACCESS DOORS INSULATION INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

3.0 PLUMBING 1 PROVIDE LABOUR, MATERIAL, EQUIPMENT AND SERVICES NECESSARY FOR AND INCIDENTAL TO SUPPLY AND INSTALLATION OF SYSTEMS SHOWN ON DRAWINGS. GENERALLY THIS SHALL INCLUDE: GAS PIPING SYSTEM GAS PIPING

SERVICE INCLUDING PRESSURE REGULATOR. THE COST OF THIS SERVICE SHALL BE DOOR 1/2 INCH THICK. 1 1/2 I B. DENSITY FIBERGI ASS INSUI ATION. INCLUDED IN THE COST OF THIS CONTRACT GAS PIPING SHALL BE BLACK STEEL PIPE, EQUAL TO ASTM A-53 SCHEDULE 40 WITH 150 LB STANDARD BLACK MALLEABLE IRON SCREWED FITTINGS. ALL WORK SHALL COMPLY WITH C.S.A. B149.1-00 CODE. COMPLETE WITH MANITOBA DEPARTMENT OF LABOUR GAS NOTICES, AND SHALL BE PERFORMED BY FULLY QUALIFIED GAS FITTERS AND/OR WELDERS LICENSED TO PRACTICE IN THE PROVINCE

4.0 OUTSIDE SERVICES

.3 BED PIPING ON SAND ON UNDISTURBED EARTH.

WATER SERVICE PIPE SHALL BE TYPE 'K' SOFT COPPER. SEWER PIPE SHALL BE PVC PIPE WITH BELL AND SPIGOT WITH RUBBER GASKET

.4 BACKFILL EXCAVATION WITH WELL COMPACTED GRANULAR SAND AND GRAVEL CONFORMING TO SPEC. WBX-3. 5 CONFIRM SIZE, DEPTH AND LOCATION OF ALL SERVICES WITH CITY OR UTILITY .6 WATER MAIN TO BE FLUSHED AND CHLORINATED AFTER INSTALLATION. 5.0 VENTILATION

DUCTWORK .1 GALVANIZED IRON SCHEDULE: MAX. SIDE GAUGES (USSG) BRACING UP TO 24" 24 NONE

25 TO 30" 24 1" X 1" X 1/8" ANGLE, 4' FROM JOINT. 31 TO 40" 22 1" X 1" X 1/8" ANGLE,

4' FROM JOINT. ROUND DUCT UP TO 19" 26 NONE .2 OUTDOOR DUCTWORK TO BE TWO GAUGES HEAVIER THAN INDICATED Ipar .1 TH????N SCHEDULES NOTED ABOVE. CONSTRUCT DUCT SO THAT TOP OF DUCT SLOPES 1:24 MINIMUM TO ENSURE THAT WATER DOES NOT COLLECT ON TOP. .3 WHERE DUCT WIDTH EXCEEDS 18" IN LARGEST DIMENSION, STIFFEN BY BREAKING SHEETS DIAGONALLY. .4 DUCT SIZES SHOWN ARE INSIDE DIMENSIONS. IF DUCTS ARE ACOUSTICALLY LINED,

OUTSIDE DUCT SIZE TO BE INCREASED TO SUIT. DUCTWORK SHALL BE CONSTRUCTED AS RECOMMENDED IN ASHRAE GUIDE. .6 SEAL ALL JOINTS AIRTIGHT WITH DURO-DYNE S-2 DUCT SEALER OR EQUAL, IN STRICT ACCORDANCE WITH MANUFACTURER'S PUBLISHED RECOMMENDATIONS. PRIOR TO APPLICATION, DUCTWORK TO BE DRY AND FREE OF GREASE, ETC. USE 1/4" BEAD OF MATERIAL ALONG JOINTS. MATERIAL, WHEN DRY, TO HAVE 1/8" DEPTH EXTENDING 1" ON EACH SIDE OF JOINT OR SEAM.

.7 ALL DUCTWORK LOCATED OUTDOORS SHALL HAVE SEAMS AND JOINTS SEALED WITH GREY TREMCO 555 ACRYLIC SEALANT APPLIED WITH GUN AND LEVELLED WITH PUTTY KNIFE. USE MATERIAL IN ACCORDANCE WITH MFG. PRINTED RECOMMENDATIONS. .3 CONDENSER COILS SHALL BE COPPER TUBES WITH ALUMINUM FINS .8 WHERE DUCTWORK CONFLICTS WITH MECHANICAL PIPING AND IT IS NOT POSSIBLE TO DIVERT DUCTWORK OR PIPING TO STAY WITHIN ALLOWABLE SPACE LIMITATIONS, PROVIDE DUCT EASEMENTS. EASEMENTS NOT REQUIRED ON PIPES 100MM (4") AND SMALLER OUTSIDE DIMENSION, UNLESS THIS EXCEEDS 20% OF DUCT AREA. HANGERS AND STAYS IN DUCTWORK TO BE PARALLEL TO AIR FLOW. IF EASEMENT EXCEEDS 20 % OF DUCT AREA. DUCT TO BE SPLIT INTO TWO DUCTS WITH ORIGINAL DUCT AREA BEING MAINTAINED. EASEMENTS TO BE APPROVED BY CONSULTANT BEFORE

.9 SIZE ROUND DUCTS, INSTALLED IN PLACE OF RECTANGULAR DUCTS, FROM ASHRAE TABLE OF EQUIVALENT RECTANGULAR AND ROUND DUCTS. .10 PRIOR TO FABRICATION OF DUCTWORK, CHECK ALL CEILING SPACES AND HEIGHTS FOR CONFLICTION WITH OTHER TRADES. .11 DUCT AND EQUIPMENT SUPPORTS, HANGERS AND INSERTS

.1 SUPPORT HORIZONTAL DUCTS ON MAXIMUM 8'-0" CENTRES BY NON-PERFORATED FOR THE POSITIVE DRAINAGE OF CONDENSATE. GALV. STEEL, RIVETTED STRAP FOR DUCTWORK 36" (EITHER DIMENSION) OR LESS, AND MINIMUM 1" X 1" X 1/8" GALV. IRON PASSING UNDER DUCTS 37" OR OVER (EITHER DIMENSION) WITH 3/8" DIAM. THREADED RODS SUSPENDING ANGLES FROM .2 FOR INSERTS IN EXISTING CONCRETE, USE HILTI H.K.D. STEEL ANCHORS. .12 MANUAL VOLUME DAMPERS TO BE #16 GA. GALV. STEEL, STIFFENED. DAMPERS HARDWARE TO BE DURO-DYNE KS-145, KS-385 OR KS-12 AS RECOMMENDED BY

.13 PROVIDE INSULATED ACCESS DOORS AT ALL FIRE DAMPERS, AIR VALVES AND WHERE NOTED. .14 DIFFUSERS, GRILLES AND REGISTERS .1 CEILING SUPPLY DIFFUSERS - E.H. PRICE SPD SQUARE PLAQUE TYPE DIFFUSERS

TO HAVE BAKED ENAMEL FINISH. 2 CEILING EXHAUST REGISTERS - E.H. PRICE C80 TO BE C/W CHANNEL BORDER, TO FIT T-BAR CEILING. REGISTER TO MATCH LAY-IN TILE CEILINGS. .3 CEILING RELIEF AND RETURN AIR GRILLES — SAME AS ABOVE.

.4 LOW NOISE CEILING EXHAUST FANS TO BE GREENHECK EXHAUST FANS C/W REMOVABLE FAN-MOTOR ASSEMBLY, DIRECT DRIVE, ACOUSTIC LINED PLENUM, INLET GRILLE. FAN SPEED SPECIFIED MAXIMUM ACCEPTABLE. .5 NEW BYPASS BOXES SHALL BE SET FOR MAXIMUM CFM QUANTITY OF CONNECTED DIFFUSERS. MINIMUM CFM QUANTITY FOR INTERIOR ZONE BOXES SHALL BE SET AT 10 % AND FOR EXTERIOR ZONE BOXES SHALL BE SET AT 30% OF MAXIMUM CFM

.6 FLEXIBLE AIR DUCTS SHALL CONFORM TO UL-181, NFPA 90A AND SHALL HAVE A FIRE RATING TO SUIT WALL RATING. USE MAXIMUM OF 18" LENGTH STRAIGHT RUN EACH BOOT CONNECTION TESTING AND BALANCING

AIR SYSTEMS SHALL BE BALANCED AND TESTED BY AN INDEPENDENT AIR BALANCE AGENCY (AABC) TO PROVIDE AIR QUANTITIES AS SHOWN. PROVIDE AIR BALANCE REPORT FOR RÉVIEW BY THE CONSULTANT. SUBMIT TWO COPIES FOR .2 AIR HANDLING UNITS:

PRODUCT DATA: INCLUDE MANUFACTURER'S TECHNICAL DATA FOR EACH MODEL INDICATED, INCLUDING RATED CAPACITIES OF SELECTED MODEL CLEARLY INDICATED FURNISHED SPECIALTIES; ACCESSORIES; AND INSTALLATION AND STARTUP

.20 PROVIDE FIRESTOPPING FOR ALL OPENINGS IN FIRE SEPARATIONS FOR PASSAGE .2 SHOP DRAWpar .1 TH????INGS: DETAIL EQUIPMENT ASSEMBLIES AND INDICATE DIMENSIONS, WEIGHTS, LOADINGS, REQUIRED CLEARANCES, METHOD OF FIELD ASSEMBLY, COMPONENTS, AND LOCATION AND SIZE OF EACH FIELD CONNECTION. DETAIL MOUNTING, SECURING, AND FLASHING OF ROOF CURB TO ROOF STRUCTURE. INDICATE COORDINATING REQUIREMENTS WITH ROOF MEMBRANE SYSTEM. .1 WIRING DIAGRAMS: DETAIL WIRING FOR POWER, SIGNAL, AND CONTROL SYSTEMS AND DIFFERENTIATE BETWEEN MANUFACTURER-INSTALLED AND FIELD-INSTALLED

> ? QUALITY ASSURANCE .1 REFRIGERATION SYSTEM TO COMPLY WITH ASHRAE 15, "SAFETY CODE FOR MECHANICAL REFRIGERATION. .2 ENERGY EFFICIENCY RATIO: EQUAL TO OR GREATER THAN PRESCRIBED BY ASHRAE 90.1, "ENERGY EFFICIENT DESIGN OF NEW BUILDINGS EXCEPT LOW-RISE

RESIDENTIAL BUILDINGS

THE CONTRACTOR SHALL ARRANGE WITH MANITOBA HYDRO FOR REVISION TO GAS ... 12 ALL ACCESS DOORS SHALL HAVE AN INTERNAL METAL LINER TO PROTECT THE

3 WARRANTY GENERAL WARRANTY .2 SPECIAL WARRANTY: A WRITTEN WARRANTY, EXECUTED BY THE MANUFACTURER OPERATING AND MAINTENANCE MANUALS SUBMITTED. TWO (2) DAYS NOTIFICATION (IN AND SIGNED BY THE CONTRACTOR, AGREEING TO REPLACE COMPONENTS THAT FAIL PROVIDED MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLATION, OPERATION, AND MAINTENANCE HAVE BEEN FOLLOWED.

> .4 FXTRA MATERIALS .1 FURNISH EXTRA MATERIALS DESCRIBED BELOW THAT MATCH PRODUCTS INSTALLED, ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE, AND ARE IDENTIFIED WITH LABELS DESCRIBING CONTENTS.

FILTERS: ONE SET OF FILTERS FOR EACH UNIT. .5 ROOFTOP UNITS (AHU-1, AHU-2) DESCRIPTION: FACTORY ASSEMBLÉD AND TESTED; DESIGNED FOR ROOF OR SLAB

INSTALLATION; AND CONSISTING OF COMPRESSORS, CONDENSERS, EVAPORATOR COILS, CONDENSER AND EVAPORATOR FANS, REFRIGERATION AND TEMPERATURE CONTROLS, GAS HEATER, FILTERS, AND DAMPERS. 2 CONSTRUCTION: UNIT SHALL BE COMPLETELY FACTORY ASSEMBLED, PIPED AND WIRED AND

SHIPPED IN ONE SECTION. UNIT SHALL BE SPECIFICALLY DESIGNED FOR OUTDOOR APPLICATION WITH A ULLY WEATHERPROOF CABINE CABINET SHALL BE CONSTRUCTED ENTIRELY OF G90GALVANIZED STEEL WITH THE EXTERIOR CONSTRUCTED OF 20 GAUGE OR HEAVIER MATERIAL. .4 PAINT FINISH SHALL BE CAPABLE OF WITHSTANDING AT LEAST 2000 HOURS, WITH NO VISIBLE CORROSIVE EFFECTS, WHEN TESTED IN A SALT SPRAY AND FOG ATMOSPHERE IN ACCORDANCE WITH ASTM B 117-95 TEST PROCEDURE. 5 THE UNIT ROOF SHALL BE SLOPED OR CROSS-BROKEN TO ASSURE DRAINAGE CODED WIRING AND WILL BE PROVIDED IN BOTH POINT-TO-POINT AND LADDER FORM. .7 DIAGRAMS SHALL ALSO BE LAMINATED IN PLASTIC AND PERMANENTLY AFFIXED INSIDE THE CONTROL COMPARTMENT. .8 ACCESS TO FILTERS, BLOWER, HEATING SECTION, AND OTHER ITEMS NEEDING WITH QUARTER TURN LATCHES. DOOR FASTENING SCREWS ARE NOT ACCEPTABLE. ACCESS DOORS SHALL HAVE STAINLESS STEEL HINGES AND FULL PERIMETER .10 ALL OPENINGS THROUGH THE BASE PAN OF THE UNIT SHALL HAVE UPTURNED FLANGES OF AT LEAST 1/2" IN HEIGHT AROUND THE OPENING THROUGH THE BASE

.11 AIR SIDE SERVICE ACCESS DOORS SHALL HAVE RAIN BREAK OVERHANGS.

.13 THE INTERIOR AIR SIDE OF THE CABINET SHALL BE ENTIRELY INSULATED ON ALL EXTERIOR PANELS WITH 1 INCH THICK, 1 1/2 LB. DENSITY FIBERGLASS .14 UNIT SHALL HAVE DECALS AND TAGS TO INDICATE UNIT LIFTING AND RIGGING,

SERVICE AREAS AND CAUTION AREAS. INSTALLATION AND MAINTENANCE MANUALS SHALL BE SUPPLIED WITH EACH UNIT. CABINET OPTIONS INCLUDE

.1 BASE PAN INSULATION FOR UNITS NOT MOUNTED ON A CURB. 2 UNIT SHALL BE FURNISHED WITH 304 STAINLESS STEEL DRAIN PANS. .4 SUPPLY FANS:

.1 BLOWER(S) SHALL BE ENTIRELY SELF CONTAINED ON A SLIDE DECK FOR SERVICE AND REMOVAL FROM THE CABINET. .2 ALL BELT DRIVE BLOWER(S) SHALL HAVE BACKWARD INCLINED AIRFOIL

3 ADJUSTABLE V-BELT DRIVE SHALL BE PROVIDED WITH A MINIMUM RATING OF 140par .1 TH????% OF THE MOTOR NAMEPLATE BRAKE HORSEPOWER WHEN THE ADJUSTABLE PULLEY IS AT THE MINIMUM RPM. .4 BLOWERS, DRIVES AND MOTORS SHALL BE DYNAMICALLY BALANCED. .5 OUTSIDE AIR OPTIONS:

SHALL BE A FULLY MODULATING, ENTHALPY CONTROLLED ECONOMIZER WITH MULTISTAGE INTEGRATED ECONOMIZER AND COMPRESSOR OPERATION FOR MAXIMUM BENEFIT. THE ECONOMIZER SHALL CONSIST OF A MOTOR OPERATED OUTDOOR AIR DAMPER AND RETURN AIR DAMPER ASSEMBLY CONSTRUCTED OF EXTRUDED ALUMINUM, HOLLOW CORE, AIR FOIL BLADES WITH RUBBER EDGE SEALS AND ALUMINUM END SEALS. DAMPER BLADES SHALL BE GEAR DRIVEN AND DESIGNED TO HAVE NO MORE THAN 25 CFM OF LEAKAGE PER SQ. FT. OF DAMPER AREA WHEN SUBJECTED TO 2 IN. W.G. AIR PRESSURE DIFFERENTIAL ACROSS THE DAMPER. DAMPER MOTOR SHALL BE SPRING RETURN TO ENSURE CLOSING OF OUTDOOR AIR DAMPER DURING PERIODS OF UNIT SHUT DOWN OR POWER FAILURE. 6 CONDENSER OPTIONS:

AIR COOLED CONDENSER SECTION: 1 THE CONDENSING SECTION SHALL BE EQUIPPED WITH VERTICAL DISCHARGE AXIAL FLOW DIRECT DRIVE FANS. DIRECT DRIVE FANS SHALL BE DIRECTLY CONNECTED TO AND SUPPORTED BY THE MOTOR SHAFT 2 THE CONDENSER COILS SHALL BE SLOPED AT LEAST 30 DEGREES TO PROTECT THE COILS FROM DAMAGE

MECHANICALLY BONDED TO THE TUBES. .4 CONDENSER COILS TO BE SIZED FOR A MINIMUM OF 10°F OF REFRIGERANT .7 FILTERS: 2-INCH- THICK, FIBERGLASS, THROWAWAY WITH AN ASHRAE EFFICIENCY OF 30%.

.8 EVAPORATOR COILS .1 EVAPORATOR COILS SHALL BE COPPER TUBE WITH ALUMINUM FINS MECHANICALLY BONDED TO THE TUBES. 2 EVAPORATOR COILS SHALL HAVE GALVANIZED STEEL END CASINGS. 3 EVAPORATOR COILS SHALL HAVE EQUALIZING TYPE VERTICAL TUBE HEADERS. .4 EVAPORATOR COILS SHALL BE FURNISHED WITH A THERMOSTATIC EXPANSION

.2 EVAPORATOR COIL DRAIN PAN(S) SHALL BE FABRICATED OF 304 STAINLESS

.5 EVAPORATOR COILS SHALL BE FURNISHED WITH A DOUBLE SLOPED DRAIN PAN

9 REFRIGERATION SYSTEM COMPRESSORS SHALL BE SCROLL TYPE WITH INTERNAL THERMAL OVERLOAD PROTECTION AND MOUNTED ON THE COMPRESSOR MANUFACTURER'S RECOMMENDED RUBBER VIBRATION ISOLATORS. EACH COMPRESSOR SHALL HAVE INDEPENDENT 2 COMPRESSORS SHALL BE MOUNTED IN AN ISOLATED COMPARTMENT TO PERMIT

COMPARTMENT IS OPEN

.3 COMPRESSORS SHALL BE ISOLATED FROM THE BASE PAN AND SUPPLY AIR TO AVOID ANY TRANSMISSION OF NOISE FROM THE COMPRESSOR INTO THE BUILDING .4 SYSTEM SHALL BE EQUIPPED WITH THERMOSTATIC EXPANSION VALVE TYPE REFRIGERANT FLOW CONTROL .5 SYSTEM SHALL BE EQUIPPED WITH AUTOMATIC RESET LOW PRESSURE AND MANUAL RESET HIGH PRESSURE REFRIGERANT CONTROLS. UNIT SHALL BE EQUIPPED WITH SCHRADER TYPE SERVICE FITTINGS ON BOTH THE

OPERATION OF THE UNIT WITHOUT AFFECTING AIR FLOW WHEN THE DOOR TO THE

HIGH SIDE AND LOW PRESSURE SIDES OF THE SYSTEM. 7 UNIT SHALL BE FOUIPPED WITH REFRIGERANT LIQUID LINE DRIFRS .8 UNIT SHALL BE FULLY FACTORY CHARGED WITH REFRIGERANT.

2 UNIT SHALL OPERATE ON R-410A REFRIGERANT. I AHU-2: UNIT SHALL HEAT USING NATURAL GAS AND BE EQUIPPED WITH A MODULATING GAS VALVE, ADJUSTABLE SPEED COMBUSTION BLOWER AND STAINLESS STEEL TUBULAR HEAT EXCHANGER. THE HEAT EXCHANGER SHALL HAVE A 25 YEAR NON PRO-RATED WARRANTY. THE COMPLETELY FACTORY MOUNTED GAS HEATING ASSEMBLY SHALL BE CAPABLE OF OPERATING AT ANY FIRING RATE BETWEEN 100% AND 30% OF RATED CAPACITY THE COMBUSTION AIR AND GAS FIRING RATE SHA BOTH BE CAPABLE OF MODULATION. A DISCHARGE AIR SENSOR SHALL BE PROVIDED FOR FIELD INSTALLATION IN THE SUPPLY AIR DUCTWORK TO SENSE THE DISCHARGE AIR TEMPERATURE. THE DISCHARGE AIR SETPOINT SHALL BE ADJUSTED AT THE ELECTRONIC CONTROLLER WITHIN THE ROOFTOP UNIT CONTROL COMPARTMENT.

HOT GAS BYPASS SHALL BE PROVIDED ON THE FIRST REFRIGERANT CIRCUIT.

DIMENSIONS; REQUIRED CLEARANCES; SHIPPING, INSTALLED, AND OPERATING WEIGHTS; .2 AHU-1: UNIT SHALL HEAT USING NATURPOR .1 TH????AL GAS FUEL AND WITH TWO (2) STAGES OF HEAT CAPACITY. UNIT SHALL BE PROVIDED WITH A GAS HEATING FURNACE CONSISTING OF AN ALUMINIZED STEEL HEAT EXCHANGER WITH MULTIPLE CONCAVITIES, AN INDUCED DRAFT BLOWER AND AN ELECTRIC PRESSURE SWITCH TO LOCKOUT THE GAS VALVE UNTIL THE COMBUSTION CHAMBER IS PURGED AND COMBUSTION AIR FLOW IS ESTABLISHED. UNIT SHALL BE PROVIDED WITH A GAS IGNITION SYSTEM CONSISTING OF AN ELECTRONIC IGNITOR TO A PILOT SYSTEM, WHICH WILL BE CONTINUOUS WHEN THE HEATER IS OPERATING, BUT WILL SHUT OFF THE PILOT WHEN HEATING IS NOT REQUIRED. UNIT SHALL HAVE GAS SUPPLY PIPING ENTRANCES IN THE UNIT BASE FOR THROUGH THE CURB GAS PIPING AND IN THE OUTSIDE CABINET WALL FOR ACROSS THE ROOF GAS PIPING. THE GAS HEAT EXCHANGER SHALL CARRY A 15 YEAR NON PRO-RATED WARRANTY. 6.0 CONTROLS

1 PROVIDE THREE HARD COVER COPIES OF INFORMATION PERTAINING TO TEMPERATURE CONTROL SYSTEM FOR OWNER'S PERMANENT RECORD. INCLUDE SCHEMATIC DRAWINGS AND CONTROL SEQUENCE WRITE-UPS OF ALL CONTROL 2 PROVIDE ALL LABOUR, MATERIAL, PLANT, TOOLS, EQUIPMENT, AND SERVICES NECESSARY AND REASONABLY INCIDENTAL TO COMPLETION OF TEMPERATURE

CONTROLS SYSTEMS AS NOTED HEREIN AND/OR SHOWN ON DRAWINGS. 3 ALL NEW WORK RELATED TO NEW AND EXISTING CONTROLS SHALL BE PERFORMED BY A QUALIFIED CONTROLS SUBCONTRACTOR. .4 PROVIDE COMPLETE SYSTEM OF AUTOMATIC CONTROLS FOR SYSTEMS INDICATED. 5 PROVIDE ALL NECESSARY DAMPERS, DAMPER OPERATORS, THERMOSTATS, VALVES, VALVE OPERATORS, CONTROLLERS, INDICATION, RELAYS, CUMULATORS, POSITIONERS. PNEUMATIC ELECTRIC SWITCHES, SOLENOID VALVES, SWITCHES, CLOCKS, TRANSFORMERS, ETC., TO MAKE COMPLETE AND OPERABLE SYSTEM. .6 MECHANICAL SUB-CONTRACTOR TO DISTRIBUTE AND MOUNT ALL PIPE

MECHANICAL CONTRACTOR TO DISTRIBUTE AND MOUNT ALL MOTORIZED DAMPERS IN THEIR RESPECTIVE LOCATIONS. .8 ELECTRICAL TO SUPPLY AND INSTALL ALL CONDUIT, WIRE AND CONNECTIONS FROM DISTRIBUTION PANELS TO LINE SIDE OF MAGNETIC STARTERS AND THERMAL OVERLOAD SWITCHES, AND FROM LOAD SIDE OF STARTERS AND SWITCHES TO

ELECTRIC RELAYS, CONNECTIONS AND OTHER DEVICES REQUIRED FOR CONTROL CIRCUIT WIRING FOR SYSTEMS AS SPECIFIED HEREIN WHETHER LINE OR LOW VOLTAGE ELECTRICAL WIRING SHALL BE INSTALLED IN CONFORMANCE WITH CSA, ULC, MANITOBA BUILDING CODE AND DIVISION 16 ELECTRICAL REQUIREMENTS. O CONTROL AIR PIPING SHALL BE HARD DRAWN COPPER IN ALL EXPOSED LOCATIONS. POLYETHYLENE TUBING MAY BE SUBSTITUTED FOR COPPER IN THE FOLLOWING APPLICATIONS. NEW HORIZONTAL CONTROL TUBING SHALL BE SUPPORTED IN CEILING SPACE FROM U/S OF FLOOR SLAB USING PROPER CLIPS OR HANGERS SPACED AT 40" O.C. MAXIMUM. NEW VERTICAL CONTROL TUBING FROM WALL THERMOSTATS SHALL RUN DIRECTLY UP TO HORIZONTAL PIPING IN CEILING SPACE WITH NO FITTING CONNECTIONS MADE IN THESE VERTICAL RUNS. .1 IN EXPOSED AREAS SINGLE TUBE MAY BE USED IN LENGTHS OF 3 FT. OR LESS. 2 IN CONCEALED AREAS INCLUDING CEILING SPACE. INDIVIDUAL TUBING TO BE FIXED TO BUILDING STRUCTURE .11 SEQUENCES OF OPERATION

.9 CONTROL CONTRACTOR SHALL SUPPLY AND INSTALL ALL CONDUIT, WIRE,

.1 PACKAGED OUTDOOR AHU-1 & AHU-2 CONTROL SEQUENCE: .1 UNOCCUPIED MODE: UNIT TO CYCLE ON/OFF TO MAINTAIN THERMOSTAT SETPOINT. ECONOMIZER DAMPERS TO BE FULLY CLOSED. HEATING AND OR COOLING SHALL CYCLE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT.

2 OCCUPIED MODE: UNIT SHALL RUN CONTINUOUSLY. UNIT MOUNTED OUTSIDE AIR AND RETURN AIR DAMPER ALONG WITH BAROMETRIC RELIEF AIR DAMPER SHALL MODULATE TO MAINTAIN SETPOINT MIXED AIR TEMPERATURE. HEATING AND OR COOLING SHALL CYCLE AS REQUIRED TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT. UNIT MOUNTED CO2 SENSOR SHALL OVERRIDE MIXED AIR CONTROL TO MAINTAIN CO2 AT OR BELOW SETPOINT. .2 SINGLE DUCT BY-PASS BOX CONTROL

COOLING MODE - COOL AIR SUPPLIED IN DUCT SYSTEM (BELOW 75°F. 24°C).NIC C .1 THE CHANGEOVER THERMISTOR SENSES COOL AIR IN THE BY-PASS BOX AND SIGNALS THE ROOM THERMOSTAT TO CONTROL THE COLD AIR SUPPLY.URpar .1

.2 ON A RISE IN ROOM TEMPERATURE, THE THERMOSTAT ENERGIZES THE ACTUATOR. THE ACTUATOR SLOWLY ROTATES THE DAMPER SHAFT COUNTER-CLOCKWISE TO INCREASE THE COLD AIR TO THE ROOM. .3 ON A FALL IN ROOM TEMPERATURE, THE THERMOSTAT REVERSES THE ABOVE ACTION. THE ACTUATOR SLOWLY ROTATES THE DAMPER SHAFT CLOCKWISE TO DECREASE COLD AIR TO THE ROOM. .4 IF THE ROOM TEMPERATURE CONTINUES TO FALL, THE THERMOSTAT ACTIVATES, AS THE CASE MAY BE, THE CONTROL RELAY OF THE ELECTRIC PERIMETER HEATING. .2 HEATING MODE - WARM AIR SUPPLIED IN DUCT SYSTEM (ABOVE 78°, 26°). THE CHANGEOVER THERMISTOR SENSES ROOM AIR IN THE BY-PASS BOX AND

DECREASE THE HEATING AIR IN THE ROOM. .3 ON A FALL IN ROOM TEMPERATURE THE THERMOSTAT REVERSES THE ABOVE ACTION. THE ACTUATOR SLOWLY ROTATES THE DAMPER SHAFT COUNTER- CLOCKWISE TO INCREASE HEATING AIR TO THE ROOM. .4 IF THE ROOM TEMPERATURE CONTINUES TO DROP, THE THERMOSTAT ACTIVATES, AS THE CASE MAY BE, THE CONTROL RELAY OF THE ELECTRIC PERIMETER HEATING.

ACTURATOR. THE ACTUATOR SLOWLY ROTATES THE DAMPER SHAFT CLOCKWISE TO

SIGNALS THE ROOM THERMOSTAT TO CONTROL THE HEATING AIR SUPPLY.

.2 ON A RISE IN ROOM TEMPERATURE, THE THERMOSTAT ENERGIZES THE

**GENERAL NOTES:** 

COORDINATE EXACT ROUTING OF NEW NATURAL GAS LINE WITH UTILITY AND CONTRACT ADMINISTRATOR.

2. AHU-1 =  $6'-2'' \times 3'-6''$ , 832 LBS, MOUNTED ON PAD C/W VIBRATION ISOLATORS. AHU-2 =  $6'-6'' \times 5'-0''$ , 875 LBS MOUNTED ON STAND ON PAD C/W VIBRATION ISOLATORS.

EXISTING GAS METER MAY REQUIRE REPLACEMENT DUE TO ADDITIONAL



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CONTRACT DRAWING SIGNED AND SEALED BY I.D. KELLY, P. ENG MAY 10, 2006

HE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DATUMS AND LEVELS RIOR TO COMMENCEMENT OF WORK AND IS HELD RESPONSIBLE FOR REPORTING ANY DISCREPANCY OR OMISSION TO THE CONTRACT

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MECHANICAL SITE PLAN & **SPECIFICATIONS** 

ADDITION TO 770 ROSS AVENUE

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DAS APRIL 18, 2006 AS NOTED

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