1. GENERAL

1.1. PROVIDE A COMPLETE OPERATIONAL MECHANICAL SYSTEM AS DESCRIBED HEREIN, AND IN COMPLETE ACCORDANCE WITH APPLICABLE CODES AND STANDARDS. THE SCOPE OF WORK SHALL INCLUDE, BUT NOT LIMITED TO, THE PROVISION OF ALL LABOUR, MATERIALS, TOOLS AND EQUIPMENT REQUIRED FOR THE INSTALLATION, TESTING AND COMMISSIONING OF THE COMPLETE MECHANICAL SYSTEM.

1.2. THE DRAWINGS AND SPECIFICATIONS ARE A GUIDE TO ESTABLISHING QUALITY OF EQUIPMENT, MATERIALS, WORKMANSHIP AND PERFORMANCE. DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY TO ONE ANOTHER, BUT IN THE EVENT OF A DISCREPANCY THE MORE STRINGENT SHALL PREVAIL. ANY DISCREPANCY BETWEEN DRAWINGS AND SPECIFICATIONS LEAVING IN DOUBT THE TRUE INTENT OF WORK SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.

1.3. THE TERM "PROVIDE" SHALL MEAN TO SUPPLY AND INSTALL.

1.4. REFERENCES TO "ENGINEER" IN THIS DOCUMENT SHALL MEAN STANTEC CONSULTING LTD.

1.5. BEFORE SUBMITTING THEIR TENDER, THE CONTRACTOR SHALL EXAMINE THE SITE AND EXISTING CONDITIONS AFFECTING THE WORK UNDER THIS CONTRACT. THE CONTRACTOR SHALL CONFIRM THAT THE WORK SHOWN AND DESCRIBED HEREIN CAN BE COMPLETED WITHOUT ADDITIONAL CHARGES IMMEDIATELY FOLLOWING THE AWARD OF CONTRACT.

1.6. THE MECHANICAL SYSTEM SHALL COMPLY WITH THE REQUIREMENTS OF APPLICABLE CODES AND STANDARDS AS ADOPTED BY AUTHORITIES HAVING JURISDICTION, ALL REVISIONS AND AMENDMENTS THERETO, AND ANY OTHER CODES THAT MAY BE APPLICABLE. THE CONTRACTOR SHALL PAY FEES, OBTAIN PERMITS REQUIRED, AND OBTAIN INSPECTIONS AND APPROVALS REQUIRED FROM THE AUTHORITIES HAVING JURISDICTION.

1.7. PROVIDE A WRITTEN GUARANTEE STATING THAT MATERIALS AND WORKMANSHIP PROVIDED UNDER THIS CONTRACT SHALL BE REMAIN FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE OF THE COMPLETED WORK, AND FURTHER THAT ANY DEFECTS THAT BECOME APPARENT DURING THE GUARANTEE PERIOD WILL BE CORRECTED AT NO ADDITIONAL COST.

1.8. WORK SHALL BE EXECUTED IN A WORKMANLIKE MANNER AND SHALL HAVE AN ACCEPTABLE APPEARANCE WHEN COMPLETED. WORKMANSHIP SHALL BE IN ACCORDANCE WITH RECOGNIZED TRADE STANDARDS. EMPLOY ONLY TRADESPEOPLE HAVING VALID PROVINCIAL TRADE CERTIFICATES RELATED TO THEIR WORK.

1.9. MATERIALS USED SHALL BE NEW AND OF THE BEST QUALITY AVAILABLE. EQUIPMENT AND MATERIALS SHALL CONFORM TO FLAME SPREAD AND SMOKE DEVELOPED RATINGS AS REQUIRED BY THE APPLICABLE LOCAL AND NATIONAL BUILDING CODES.

1.10. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION DIRECTIONS.

1.11. THE CONTRACTOR SHALL BE FAMILIAR WITH SCOPE OF WORK AND SHALL COOPERATE WITH THE OWNER SO THAT THE WORK WILL NOT CONFLICT WITH DAY-TO-DAY OPERATIONS. ANY CONFLICTS OR DEFAULTS WHICH ARISE DURING THE CONSTRUCTION PERIOD MUST BE RESOLVED IMMEDIATELY. COMPLY WITH OWNER SPECIFIC WORKPLACE REGULATIONS AND REQUIREMENTS.

1.12. MAKE ANY NECESSARY CHANGES NECESSARY TO ACCOMMODATE THE WORK OF OTHER TRADES AND NOTE SUCH CHANGES ON THE RECORD DRAWINGS.

1.13. PROVIDE GENERAL, LIABILITY AND VEHICLE INSURANCE COVERAGE FOR THE DURATION OF THE WORK. PROVIDE INSURANCE CERTIFICATES WHEN REQUESTED.

1.14. WORK AREAS SHALL BE MAINTAINED IN A CLEAN AND SAFE CONDITION TO THE SATISFACTION OF THE OWNER AND ENGINEER.

1.15. EXISTING ITEMS WHICH NEED TO BE REMOVED, AND WHICH HAVE A REASONABLE SALVAGE VALUE, SUCH AS FANS AND MOTORS, AIR TERMINALS, PLUMBING FIXTURES, AND VALVES, SHALL BE CAREFULLY REMOVED AND HANDED OVER TO THE OWNER. HANDING OVER TO THE OWNER INCLUDES MOVING TO OWNER'S DESIGNATED STORAGE PLACE ON SITE. THESE ITEMS SHALL NOT BECOME THE PROPERTY OF THE CONTRACTOR. THE OWNER HAS FIRST RIGHT TO THE SALVAGED EQUIPMENT. OBTAIN A WRITTEN RECEIPT FROM THE OWNER DETAILING EACH OF THE ITEMS HANDED OVER.

1.16. EXISTING ITEMS NOT REQUIRED BY THE OWNER SHALL BE REMOVED FROM THE SITE.

1.17. PATCH AND MAKE GOOD EXISTING SURFACES WHERE DISTURBED BY THE WORK, TO "AS GOOD OR BETTER" CONDITION. USE MATERIALS THAT ARE COMPATIBLE WITH THE EXISTING MATERIALS.

1.18. BE RESPONSIBLE FOR ALL WORK IDENTIFIED OR IMPLIED BY THE DRAWINGS AND SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO:

1.18.1. INSTALLATION AND COMMISSIONING OF SYSTEMS, INCLUDING THE EQUIPMENT PROVIDED BY THE OWNER WHERE NOTED.

1.18.2. BALANCING THE AIR SYSTEMS.

1.18.3. MAKE PROVISIONS FOR EASY ACCESS FOR AIR BALANCER.

1.18.4. REVISION AND TESTING OF THE HEATING, VENTILATION, PLUMBING AND SPRINKLER AND CONTROLS SYSTEM IN THE AREA.

1.18.5. DISPOSAL OF UNUSED MATERIAL.

1.18.6. BE RESPONSIBLE FOR THE PERFORMANCE AND COMMISSIONING OF EQUIPMENT SUPPLIED AND INSTALLED FOR THE PROJECT (INCLUDING ALL EQUIPMENT SUPPLIED BY THE OWNER WHERE APPLICABLE).

2. STANDARD OF ACCEPTANCE

2.1. MEANS THAT ITEM NAMED AND SPECIFIED BY MANUFACTURER AND/OR EQUIPMENT MODEL NUMBER CONFORMS TO SPECIFICATIONS AND SETS STANDARD REGARDING PERFORMANCE, QUALITY OF MATERIAL AND WORKMANSHIP AND WHEN USED IN CONJUNCTION WITH A REFERENCED STANDARD, SHALL BE CONSIDERED TO SATISFY THE STANDARD.

2.2. WHERE TWO OR MORE MANUFACTURERS ARE LISTED, THE MANUFACTURER'S NAME SHOWN UNDERLINED OR SHOWN WITH A MODEL NAME AND/OR NUMBER, WAS USED IN PREPARING THE DESIGN. PROJECT BIDS MAY BE BASED ON ANY ONE OF THOSE NAMED, PROVIDED THAT THEY MEET EVERY ASPECT OF THE DRAWINGS AND SPECIFICATIONS.

2.3. WHERE OTHER THAN THE UNDERLINED MANUFACTURER OR NAMED MANUFACTURER IS SELECTED OR APPROVED, CONTRACTOR SHALL COVER THE COST OF ANY RESULTING WORK (BOTH UNDER THIS DIVISION AND OTHER DIVISIONS) AND ANY NECESSARY REDESIGN OF INSTALLATION OR STRUCTURE. SUBMIT REDESIGN DRAWINGS FOR REVIEW WITH SHOP DRAWINGS. MAINTAIN INSTALLATION, ACCESS AND SERVICING CLEARANCES. REDESIGN DRAWINGS SHALL BE TO SCALE AND OF A STANDARD EQUAL TO THE PROJECT DRAWINGS.

2.4. WHERE TWO OR MORE ITEMS OF EQUIPMENT AND/OR MATERIAL, OF THE SAME TYPE, ARE REQUIRED, PROVIDE PRODUCTS OF A SINGLE MANUFACTURER.

2.5. A VISIBLE MANUFACTURER'S NAMEPLATE SHALL INDICATE MANUFACTURER'S NAME, MODEL NUMBER, SERIAL NUMBER, CAPACITY DATA, ELECTRICAL CHARACTERISTICS AND APPROVAL STAMPS.

3. ADDITION OF ACCEPTABLE MANUFACTURERS

3.1. MATERIAL/PRODUCTS CONSIDERED TO SATISFY THE SPECIFICATION, BUT OF A MANUFACTURER OTHER THAN THOSE NAMED IN THE SPECIFICATION MAY BE SUBMITTED TO THE ENGINEER FOR CONSIDERATION NOT LATER THAN FIVE (5) WORKING DAYS PRIOR TO PROJECT TENDER CLOSING DATE.

3.2. ADDITION OF MANUFACTURER'S NAMES TO THE SPECIFICATIONS WILL BE IN WRITING BY THE ENGINEER.

4. EXISTING SERVICES

4.1. CONFIRM LOCATIONS AND ROUTINGS OF EXISTING SERVICES WHICH MIGHT BE AFFECTED BY THE WORK. PROTECT EXISTING AND REPAIR ANY DAMAGE CAUSED BY ANY WORK PERFORMED. ACCOMMODATE WORK CHANGES IN LOCATION AND ROUTING AS MAY BE NECESSARY.

5. CUTTING & PATCHING

5.1. BE RESPONSIBLE FOR CUTTING, PATCHING, DIGGING, AND CORING REQUIRED TO ACCOMMODATE THE MECHANICAL SERVICES. CORRECT AND REPAIR TO MATCH THE ORIGINAL CONDITION.

5.2. VERIFY THE LOCATION OF EXISTING BUILDING SERVICES AND STRUCTURAL REINFORCEMENT WITHIN EXISTING ROOF, FLOORS AND WALLS PRIOR TO CUTTING. CUTTING OF STRUCTURAL BUILDING COMPONENTS SHALL ONLY TAKE PLACE UPON THE RECEIPT OF SPECIFIC WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER. REPAIRS TO EXISTING SERVICES DAMAGED AS A RESULT OF CUTTING IS INCLUDED IN THIS SECTION OF THE WORK.

6. MISCELLANEOUS METAL

6.1. INCLUDE MISCELLANEOUS STEEL WORK AS OUTLINED IN THE SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO SUPPORT OF EQUIPMENT.

6.2. STEEL WORK SHALL BE PRIME COATED, READY FOR PAINT FINISH.

7. ACCESSIBILITY

7.1. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR ADJUSTMENT, INSPECTION, OPERATION AND MAINTENANCE.

8. ARCHITECTURAL ACCESS DOORS

8.1. INSTALL AT CONCEALED DAMPERS, TRAPS, UNIONS, VALVES, WATER HAMMER ARRESTORS, SPECIAL EQUIPMENT, AND TRAP PRIMERS.

8.2. LOCATE ACCESS DOORS SO THAT CONCEALED ITEMS ARE READILY ACCESSIBLE FOR ADJUSTMENT, OPERATION AND MAINTENANCE.

8.3. DO NOT LOCATE ACCESS DOORS IN FEATURE WALL OR CEILING CONSTRUCTION WITHOUT THE PRIOR APPROVAL OF THE ENGINEER. LOCATE IN SERVICE AREAS WHEREVER POSSIBLE.

9. GUARDS AND COVERS

9.1. PROVIDE REMOVABLE PROTECTIVE GUARDS ON ALL EXPOSED V-BELT DRIVES AND SHAFT COUPLINGS IN ACCORDANCE WITH LOCAL SAFETY REGULATION AND WORKER'S COMPENSATION BOARD REQUIREMENTS.

9.2. REMOVABLE ACCESS COVERS SHALL BE PROVIDED FOR EQUIPMENT INSTALLED UNDER THIS PROJECT.

10. LUBRICATION OF EQUIPMENT

10.1. LUBRICATE EQUIPMENT PRIOR TO BEING OPERATED, EXCEPT SEALED BEARINGS, WHICH SHALL BE CHECKED.

10.2. USE THE LUBRICANT RECOMMENDED BY THE MANUFACTURER FOR THE SERVICE FOR WHICH THE EQUIPMENT IS SPECIFIED.

11. ESCUTCHEONS

11.1. PROVIDE ESCUTCHEONS ON PIPES PASSING THROUGH FINISHED WALLS, FLOORS AND CEILINGS.

11.2. ESCUTCHEONS SHALL BE CHROME PLATED OR STAINLESS STEEL SUITABLE FOR DIMENSIONS OF PIPING AND INSULATION.

12. PAINTING

12.1. CLEAN EXPOSED BARE METAL SURFACES SUPPLIED UNDER THIS SCOPE OF WORK REMOVING ALL DIRT, DUST, GREASE AND MILLSCALE. APPLY AT LEAST ONE COAT OF CORROSION RESISTANT PRIMER PAINT TO SUPPORTS AND EQUIPMENT FABRICATED FROM FERROUS METAL. PAINT EXPOSED DUCTS, EQUIPMENT AND SUPPORTS WITH TWO FINISHING COATS OF PAINT; COLOR TO BE AS DIRECTED BY THE ARCHITECT OR OWNER.

12.2. PAINT PIPE HANGERS AND EXPOSED SLEEVES, IN EXPOSED AREAS, WITH A RUST INHIBITING PRIMER, AS THEY ARE INSTALLED.

12.3. REPAINT MARRED FACTORY FINISHED EQUIPMENT SUPPLIED UNDER THIS SCOPE OF WORK, TO MATCH THE ORIGINAL FACTORY FINISH.

13. PENETRATION OF FIRE SEPARATIONS

13.1. SEAL PIPE AND DUCT PENETRATIONS THROUGH FIRE SEPARATIONS WITH "3M FIRE BARRIER" SYSTEM OR EQUAL ULC LISTED SYSTEM.

14. PENETRATION OF SOUND AND PRESSURE SEPARATIONS

14.1. SEAL PIPE AND DUCT PENETRATIONS THROUGH SOUND AND/OR PRESSURE SEPARATIONS TO MINIMIZE NOISE TRANSFER AND/OR AIR LEAKAGE.

15. SYSTEMS COMMISSIONING, VERIFICATION AND DEMONSTRATION

15.1. BE RESPONSIBLE FOR THE PERFORMANCE AND COMMISSIONING OF EQUIPMENT PROVIDED UNDER THIS SCOPE OF WORK. COMMISSIONING IS THE PROCESS OF ADVANCING THE INSTALLATION FROM THE STAGE OF STATIC COMPLETION TO FULL WORKING ORDER TO SPECIFIED REQUIREMENTS. IT IS THE ACTIVATION OF THE COMPLETED INSTALLATION

15.2. IN CONSULTATION WITH THE GENERAL CONTRACTOR, ENSURE THAT SUFFICIENT TIME IS ALLOWED AND FULLY IDENTIFIED ON THE CONSTRUCTION SCHEDULE FOR THE PROPER COMMISSIONING OF MECHANICAL SYSTEMS.

15.3. COMMISSIONING IS CONCLUDED WHEN MECHANICAL SYSTEMS HAVE BEEN BALANCED AND THE INSTALLATION IS IN FULL WORKING ORDER AND ACCEPTABLE FOR USE. THE WORK WILL INCLUDE THE FOLLOWING:

15.3.1. BALANCING OF THE AIR SYSTEMS AS SPECIFIED.

15.3.2. SET UP AIR DIFFUSERS, REGISTERS AND GRILLES FOR OPTIMUM DISTRIBUTION/COMFORT.

15.3.3. PLUG AIR PRESSURE AND FLOW MEASURING HOLES.

15.3.4. ADJUST VIBRATION ISOLATORS FOR OPTIMUM PERFORMANCE.

15.3.5. VERIFICATION OF TIGHT CLOSURE OF OUTSIDE AND EXHAUST AIR DAMPERS.

15.3.6. VERIFICATION AND CERTIFICATION OF OPERATION OF ALL FIRE DAMPERS.

15.3.7. VERIFICATION AND CERTIFICATION OF THE SEALING OF MECHANICAL PENETRATIONS THROUGH FIRE SEPARATIONS (RATED & NON-RATED) AND SOUND OR PRESSURE SEPARATIONS.

15.3.8. VERIFICATION OF WATER TIGHTNESS OF ROOF AND EXTERIOR WALL PENETRATIONS.

15.3.9. VERIFICATION THAT COIL DRAIN PANS ARE CLEAN AND OPERATE AS INTENDED.

15.3.10. VERIFICATION THAT EQUIPMENT IS NOT SHORT CYCLING.

15.3.11. VERIFICATION OF OPERATION OF MECHANICAL RELATED FIRE ALARM FUNCTIONS.

15.3.12. SET UP AUTOMATIC CONTROL DAMPERS AND AUTOMATIC TEMPERATURE AND AIR CONTROL DEVICES.

15.3.13. TESTING AND VERIFICATION OF THE BUILDING AUTOMATION SYSTEM FUNCTIONALITY.

15.3.14. SET UP AND TEST ALARM AND PROTECTIVE DEVICES.

15.3.15. OBTAIN AND REVIEW TREND LOGS FOR CONTROL POINTS. SUBMIT TREND LOGS TO ENGINEER WITH DETAILED COMMENTS AFTER VERIFICATION OF PROPER OPERATION OF CONTROL SEQUENCES.

15.4. AT THE CONCLUSION OF COMMISSIONING, DEMONSTRATE THE OPERATION OF THE SYSTEMS TO THE ENGINEER AND THEN TO THE OWNER'S OPERATING STAFF.

15.5. AT THE COMPLETION OF THE COMMISSIONING, TESTING, BALANCING AND DEMONSTRATION SUBMIT THE FOLLOWING TO THE ENGINEER:

15.5.1. A LETTER CERTIFYING THE WORK SPECIFIED UNDER THIS CONTRACT IS COMPLETE, CLEAN AND OPERATIONAL IN ACCORDANCE WITH THE SPECIFICATION AND DRAWINGS.

15.5.2. COMPLETED COPIES OF COMMISSIONING CHECK LISTS PLUS COPIES OF START-UP REPORTS FROM SPECIALTY CONTRACTORS AND VENDORS.

15.5.3. "AS-BUILT" RECORD DRAWINGS, AS SPECIFIED.

15.6. THE VERIFICATION PROCESS SHALL INCLUDE INSTRUCTIONAL SEMINARS TO DEMONSTRATE SYSTEMS AND TO EXPLAIN THE OPERATION OF EACH. THE INSTRUCTION SHALL INCLUDE THE FOLLOWING:

15.6.1. EASE OF ACCESS PROVIDED THROUGHOUT FOR SERVICING COILS, FILTERS, MOTORS, DRIVES, FUSIBLE LINK FIRE DAMPERS, CONTROL DAMPERS AND DAMPER OPERATORS.

15.6.2. OPERATION OF EQUIPMENT AND SYSTEMS UNDER EACH MODE OF OPERATION AND FAILURE, INCLUDING:

15.6.2.1. BUILDING AUTOMATION SYSTEM CONTROL FEATURES.

15.6.2.2. AIR CONDITIONERS AND REFRIGERATION SYSTEMS.

15.6.2.3. PUMPS, FANS, HEATERS, UNIT HEATERS AND COILS.

15.7. AFTER DEMONSTRATION OBTAIN THE OWNER'S SIGNATURE CERTIFYING THAT THE DEMONSTRATION HAS BEEN PERFORMED AND COMPLETED TO THEIR SATISFACTION.

16. SUBSTANTIAL PERFORMANCE REQUIREMENTS

16.1. BEFORE THE ENGINEER IS REQUESTED TO MAKE AN INSPECTION FOR SUBSTANTIAL PERFORMANCE OF THE WORK:

16.1.1. COMMISSION SYSTEMS AND PROVE OUT ALL COMPONENTS, INTERLOCKS AND SAFETY DEVICES.

16.1.2. SUBMIT A LETTER CERTIFYING THAT WORK (INCLUDING CALIBRATION OF INSTRUMENTS AND BALANCING OF SYSTEMS) IS COMPLETE, OPERATIONAL, CLEAN AND REQUIRED SUBMISSIONS HAVE BEEN COMPLETED.

16.2. THE WORK WILL NOT BE CONSIDERED TO BE READY FOR USE OR SUBSTANTIAL PERFORMANCE UNTIL THE FOLLOWING REQUIREMENTS HAVE BEEN MET:

16.2.1. LIFE SAFETY ITEMS ARE COMPLETED AND FULLY FUNCTIONAL.

16.2.2. REPORTED DEFICIENCIES HAVE BEEN CORRECTED.

16.2.3. TESTING AND BALANCING COMPLETED.

16.2.4. OPERATING AND MAINTENANCE MANUALS COMPLETED.

16.2.5. "AS BUILT" RECORD DRAWING READY FOR REVIEW.

16.2.6. SYSTEM COMMISSIONING HAS BEEN COMPLETED AND HAS BEEN VERIFIED BY ENGINEER.

16.2.7. DEMONSTRATIONS TO THE OWNER HAVE BEEN COMPLETED.

17. OPERATING & MAINTENANCE MANUALS

17.1. INSTRUCT THE BUILDING OPERATORS IN THE OPERATION AND PREVENTATIVE MAINTENANCE OF EACH PIECE OF EQUIPMENT AND SYSTEM SUPPLIED AND INSTALLED. COMPLETE AND TURN OVER DOCUMENTATION PRIOR TO SUBSTANTIAL PERFORMANCE.

17.2. THE CONTRACTOR SHALL SUPPLY FINAL AND PRELIMINARY COPIES OF THE EQUIPMENT DATA AND MAINTENANCE MANUALS IN ELECTRONIC (PDF) FORMAT. THE PRELIMINARY COPY REFERRED TO ABOVE SHALL INCLUDE ONLY THE SYSTEMS DESCRIPTIONS, OPERATING AND MAINTENANCE INSTRUCTIONS AND SHALL BE DELIVERED TO THE ENGINEER FOR REVIEW AND COMMENT NO LATER THAN ONE (1) MONTH PRIOR TO THE DATE OF SUBSTANTIAL PERFORMANCE.

18. SYSTEMS BALANCING

18.1. ADJUST DUCT AND TERMINAL BALANCE DAMPERS, ADJUSTABLE AIR TURNING DEVICES AND ADJUST OR CHANGE DRIVE SHEAVES TO BALANCE SUPPLY, RETURN AND EXHAUST AIR SYSTEMS TO PROVIDE THE DESIGN AIR QUANTITIES (WITHIN +/-5%) AT EACH OUTLET AND INLET AND TO MAINTAIN THE DESIGN RELATIONSHIP BETWEEN THE SUPPLY AND EXHAUST AIR SYSTEM QUANTITIES. REFER TO THE DRAWINGS FOR AIR QUANTITIES.

18.2. ADJUST ALL AIR TERMINALS TO OBTAIN THE OPTIMUM AIR DISTRIBUTION PATTERN.

18.3. ADJUST ALL AIR FLOW AND PRESSURE SENSING DEVICES.

18.4. INCLUDE BALANCE REPORTS FOR INCLUSION INTO THE MANUALS.

19. SHOP DRAWINGS

19.1. THE CONTRACTOR SHALL PROVIDE ELECTRONIC (PDF) COPIES OF SHOP DRAWINGS OF ALL EQUIPMENT FOR THE ENGINEER'S REVIEW. SUBMIT CLEAR AND DESCRIPTIVE CONTROL SEQUENCES PRIOR TO INSTALLATION.

20. AS-INSTALLED RECORD DRAWINGS

20.1. MAINTAIN ONE SET OF RECORD DRAWINGS AT THE SITE. CLEARLY MARK IN RED ANY CHANGES OR DEVIATIONS FROM THE ORIGINAL DESIGN INTENT. RECORD ALL CHANGES TO THE WORK AS THE INSTALLATION PROGRESSES.

20.2. AT THE COMPLETION OF THE WORK, CERTIFY THE DRAWING AS BEING ACCURATE, UPDATE THE IFC DRAWINGS TO REFLECT THE CHANGES, AND MARK THE DRAWING AS "AS-BUILT", AND SEND TO THE ENGINEER UPON SUBSTANTIAL PERFORMANCE OF THIS CONTRACT.

21. IDENTIFICATION

21.1. EACH PIPING SYSTEM SHALL BE COLOUR CODED FOR IDENTIFICATION AND LABELED WITH THE SYSTEM IDENTIFICATION CODE LETTERS, INCLUDING TEMPERATURE AND PRESSURE, IF APPLICABLE, AND DIRECTIONAL FLOW ARROWS.

21.1.1. IDENTIFY ALL NEW PIPING TO EXISTING BUILDING IDENTIFICATION STANDARDS.

21.1.2. IDENTIFY PIPING ADJACENT TO VALVES AND WHERE VALVES ARE IN SERIES AT NO MORE THAN 2M INTERVALS. IDENTIFY PIPING AT LEAST ONCE IN EACH ROOM AND AT 15M MAXIMUM SPACING IN OPEN AREAS.

21.1.3. IDENTIFY PIPING BOTH SIDES WHERE PIPING PASSES THROUGH WALLS, PARTITIONS AND FLOORS. IDENTIFY PIPING AT POINT OF ENTRY AND LEAVING EACH PIPE CHASE AND/OR CONFINED SPACE. IDENTIFY PIPING ACCESSIBLE AT EACH ACCESS OPENING.

21.1.4. IDENTIFICATION LABELS MAY BE STENCILED, IDENTIFICATION ARROWS LABELS AND LETTERS MAY BE VINYL CLOTH (BRADY B500) OR VINYL FILM (BRADY B946), WITH ADHESIVE COMPATIBLE WITH THE SURFACE TEMPERATURE.

21.1.5. IDENTIFICATION COLOUR BANDS FOR PRIMARY AND SECONDARY COLOUR TO INDICATE THE TYPE AND DEGREE OF HAZARD SHALL BE APPLIED TO OVERLAP A MINIMUM OF 50MM. BANDS SHALL BE BRADY B550 VINYL CLOTH TAPE OR BRADY B946 VINYL TAPE, WITH ADHESIVE COMPATIBLE WITH THE SURFACE TEMPERATURE.

21.1.6. COMPLY WITH ASME A13.1 COLOUR STANDARDS UNLESS NOTED OTHERWISE.

21.2. EACH PIECE OF EQUIPMENT SHALL BE IDENTIFIED WITH ITS EQUIPMENT SCHEDULE IDENTIFICATION, E.G. ENERGY RECOVERY VENTILATOR ERV-1, COOLING COIL CC-1, DUCT MOUNTED HEATING COIL DHC-1.

21.2.1. PROVIDE LAMINATED PLASTIC PLATES WITH BLACK FACE AND WHITE CENTRE OF MINIMUM SIZE 90MM X 40MM X 2.5MM ENGRAVED WITH 12MM HIGH LETTERING. USE 25MM HIGH LETTERING FOR MAJOR EQUIPMENT.

21.2.2. APPLY NAMEPLATES SECURELY IN CONSPICUOUS PLACES, ON COOL SURFACES.

21.3. SECURE 6MM SELF-ADHESIVE COLOURED DOTS TO THE CEILING, TO IDENTIFY THE LOCATION OF ACCESS TO EQUIPMENT CONCEALED ABOVE THE CEILING.

22. SPARE PARTS

22.1. PROVIDE SPARE PARTS FOR THE OWNER AS FOLLOWS:

22.1.1. ONE SET OF V-BELTS FOR EACH NEW PIECE OF EQUIPMENT.

22.1.2. ONE SET OF FILTER MEDIA FOR EACH FILTER OR FILTER BANK INSTALLED.

23. VIBRATION ISOLATION

23.1. PROVIDE VIBRATION ISOLATION ON ALL MOTOR DRIVEN EQUIPMENT WITH MOTORS OF ½ HP AND GREATER POWER OUTPUT (AS INDICATED ON THE MOTOR NAMEPLATE) AND ON PIPING AND DUCTWORK, AS SPECIFIED HEREIN. FOR EQUIPMENT LESS THAN ½ HP, PROVIDE NEOPRENE GROMMETS AT THE SUPPORT POINTS.

24. DUCTWORK AND ACCESSORIES

24.1. GALVANIZED STEEL, LOCK FORMING QUALITY. ALL DUCTWORK TO BE CONSTRUCTED, BRACED, CONNECTED AND JOINTED ACCORDING TO ASHRAE AND SMACNA.

24.2. SNAPLOCK SEAMS AND CRIMP JOINTS ARE NOT ACCEPTABLE.

24.3. ALL DUCT JOINTS, INDOOR AND OUTDOOR, SHALL BE COMPLETELY SEALED TO A CLASS A SEAL WITH AN APPROVED SEALANT. SEALANTS SHALL MEET ACCEPTABLE SMOKE AND FLAME SPREAD RATINGS.

24.4. FLEXIBLE DUCT

24.4.1. PROVIDE MAXIMUM OF 4 FT OF FLEXIBLE CONNECTION FOR FINAL CONNECTIONS TO DIFFUSERS ONLY. DO NOT USE FLEX FOR MORE THAN A 90 DEGREE CHANGE OF DIRECTION.

24.4.2. WHERE FLEXIBLE DUCTWORK IS USED, PROVIDE FACTORY FABRICATED INSULATED FLEX, AS FOLLOWS:

24.4.2.1. FLEXIBLE VINYL COATED STEEL HELIX BONDED TO INNER DUCT LINER. FIBROUS GLASS THERMAL

Stantec

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Legend

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ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
Stantec Consulting Ltd.
No. 1301

PROVINCE OF MANITOBA
B.A. HAUGH
2025-06-04
REGISTERED PROFESSIONAL ENGINEER

Client/Project

WINNIPEG TRANSIT MAINTENANCE FACILITY OFFICE REDEVELOPMENT

421 OSBORNE ST. SOUTH, WINNIPEG, MB

Title

MECHANICAL SPECIFICATIONS

Project No.	Scale	
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Drawing No.	**Sheet**	**Revision**
M-002	2 of 16	0