MECHANICAL SPECIFICATIONS

1. Reference Standards
   1.1. National Building Code, and Provincial Amendments (NBC)
   1.2. National Plumbing Code, and Provincial Amendments (NPC)
   1.3. Applicable Municipal By-Laws
   1.4. ASHRAE standards
   1.5. SMACNA standards
   1.6. NFPA standards
   1.7. CSA B149 Natural Gas and Propane code

2. General Requirements
   2.1. It is the intent of these drawings to provide for a complete and fully operating system in accordance with all applicable codes. Notwithstanding that the drawings may not cover each and every item required for the complete mechanical installation, the mechanical contractor shall supply all labour, materials, tools, equipment, and transportation necessary for the complete installation of the mechanical system on-site.
   2.2. The Contractor is to ensure that delivery time of all mechanical equipment does not cause a delay in the scheduling of this project. Notify the engineer if any problems arise.
   2.3. Employ only tradespeople with proper licenses for the work.
   2.4. Drawings are diagrammatic and approximate to scale. The contract documents establish scope, materials and quality and are not a comprehensive bill of materials, or detailed installation instructions.
   2.5. Co-operate with other sections and trade disciplines as required for the completion of the total work. These drawings are to be read in conjunction with architecture, structural, electrical and landscaping drawings. Report any discrepancies to engineer.
   2.6. Electrical Unit heaters, baseboard heaters and forced flow heaters are to be supplied and installed by electrical contractor.
   2.7. All fire-rated assemblies must be maintained. See architectural drawing and/or code summary page for the location of fire-rated assemblies.
   2.8. Confirm all new equipment loadings and support requirements with structural engineer prior to installation.
   2.9. Conform to manufacturer’s installation instructions, details, and procedures for equipment installations and start-up.
   2.10. When connecting to existing systems or equipment, contractor is to immediately notify engineer of any deficiencies with the existing systems or any conditions with respect to the existing system that would impact the operation of the newly installed services or systems.

3. Equals for Equipment
   3.1. Equals for all equipment and fixtures will be considered, with engineer’s approval.
   3.2. Submit request for equals to engineer with the following information:
       3.2.1. Name of item on drawings for which the equal is being requested,
       3.2.2. Make and model of equal,
       3.2.3. Performance information showing that performance is equal to original item,
       3.2.4. Electrical requirements of equal,
       3.2.5. Confirmation of compliance with minimum efficiency standards as set out in MECB.
4. Shop Drawings
   4.1. Submit 2 sets of shop drawings for review for the following items:
       4.1.1. Air handlers, furnaces, air make-up units, and unit heaters,
       4.1.2. Fans,
       4.1.3. Heat recovery ventilators,
       4.1.4. Air monitoring devices,
       4.1.5. Water heaters,
       4.1.6. Pumps,
       4.1.7. Plumbing fixtures,
       4.1.8. Duct and pipe insulation,
       4.1.9. Specialty equipment and controls.
   4.2. The engineers review does not relieve the contractor from responsibility to provide and install materials and equipment in accordance with the design intent of the drawings. All dimensions and suitability for site conditions are the responsibility of the contractor. All electrical characteristics and requirements must be coordinated with the electrical contractor.
   4.3. Equipment is not to be purchased prior to shop drawing approval.

5. Permits, Certificates and Fees
   5.1. It is the contractor’s responsibility to obtain all required permits and pay all associated fees.

6. Project Record Drawings
   6.1. At the conclusion of the job, the contractor is to submit to the engineer a marked-up set of drawings including any changes to the initial design including revisions, site instructions, and accepted equals.

7. Maintenance Manuals
   7.1. Provide building owner with operation and maintenance manual for all equipment installed and a set of the record drawings.

8. Site Inspections
   8.1. Where certification is to be provided by DGH Engineering for building code compliance the following site inspections will be required during construction. The contractor is to notify DGH Engineering at least 4 working days prior to each visit.
       8.1.1. Underground plumbing prior to cover up
       8.1.2. Plumbing Rough-in
       8.1.3. HVAC Rough-in
       8.1.4. Final

9. Electrical Contractor
   9.1. Electrical contractor to supply and install electrical unit heaters, forced flow heaters, and baseboard heaters.
   9.2. Electrical contractor to install wiring for all controls, as directed by mechanical contractor.
   9.3. Building is classified as dry location. Refer to electrical drawings for full classification details. All equipment shall meet electrical classification requirements. Report any conflicts to the engineer.
10. Controls
10.1. Mechanical contractor or controls contractor retained by mechanical contractor to provide controls for mechanical system as described in mechanical plans for a fully operational mechanical system.
10.2. Mechanical contractor is responsible to provide all ancillary devices required for a fully functioning HVAC system meeting applicable codes. This includes interlock, air proofing switches, current sensing switches, relays, contactors, etc. Motor starters are to be provided by electrical contractor.
10.3. AHU and RTU units to have fans run continuously at CFM values listed in specification tables.
10.4. Direct fired AMU to be double interlocked to associated exhaust fan or fans. That is if AMU fan does not run correctly the exhaust fan shuts down, and if exhaust fan does not run correctly the AMU shuts down.
10.5. Kitchen ventilation systems must be interlocked to the cooking equipment. Special requirements for operation in the event of a fire are required. See details on plans.
10.6. Where an HRV is associated with an AHU, the AHU fan must be interlocked with the HRV operation. That is when the HRV is activated the AHU fan must also run.
10.7. Mechanical contractor to supply and install all low voltage wiring for controls.
10.8. Mechanical contractor to coordinate with electrical contractor to install all line voltage controls. Wire to be supplied and installed by electrical contractor.
10.9. Mechanical contractor to program all thermostat schedules and time clocks to match owner/occupant daily occupied schedule plus 30 minutes before and after.
10.10. Where an AHU is provided a fresh air duct and control damper, the control damper is to be interlocked to the associated exhaust fan.

11. Drain, Water and Vent (Sewer and Sanitary) Piping
11.1. Install in accordance with NPC.
11.2. Piping to be PVC DWV.
11.3. Combustible piping shall be fire-stopped with an approved ULC listed assembly meeting the required duration where it passes through a fire rated membrane. See architectural drawings for locations of fire rated assemblies.
11.4. Slope to be 2% unless otherwise noted.
11.5. All vent penetrations through roof must be 3 inch.
11.6. Piping system is to be pressure tested.

12. Water Piping
12.1. Install in accordance with NPC.
12.2. Piping to be Copper or PEX.
12.3. Combustible piping shall be fire-stopped with an approved ULC listed assembly meeting the required duration where it passes through a fire rated membrane. See architectural drawings for locations of fire rated assemblies.
12.4. Testing
   12.4.1. Pressure test water lines, repair defective materials and joints, and retest lines.
12.5. Sterilization
   12.5.1. Sterilize water lines and flush entire system prior to putting system into operation.
12.6. All fixture connections are ½ inch, except urinals are ¾ inch.
12.7. Showers must be protected by pressure and temperature compensating valve.
12.8. Isolate equipment, fixtures and branches with gate or ball valves.
12.9. All cold water piping to be insulated with ½ inch preformed flexible elastomeric, closed cell insulation.
12.10. All domestic hot water piping on systems without heat traps to be insulated with 1 inch insulation for pipes 2 inch and smaller, 1.5 inch insulation for pipes more than 2 inch, and 2.5 inch insulation for pipes in unconditioned space or outside. Insulation to be pre-formed flexible elastomeric, closed cell or jacketed fiberglass insulation. Insulation must be tested to ASTM C 335/C 335M. Systems with heat traps require insulation at inlet and outlet of hot water tank. Refer to detail for clarification.
12.11. All hose bibs must have vacuum breakers.
12.12. Exterior hose bibs are to be of the non-freezing type.
13. Plumbing Fixtures
   13.1. LAV: Vanity mount, vitreous china, comes with single handle faucet (or automatic valve for assembly occupancies). Lavatory faucet discharge must be limited to 1.5 gpm (5.7 L/min) when tested in accordance with ASME A 112.18.1/CAN CSA-B125 “Plumbing Supply Fittings” and CAN/CSA – B125.3 “Plumbing Fittings”. Confirm barrier-free fixture requirements with Architect.
   13.2. WC: Floor mount, vitreous china toilet comes with tank and seat. Confirm barrier-free fixture requirements with Architect.
   13.3. SK: Stainless steel double basin sink, counter mount, comes with single handle faucet with integral sprayer.
   13.5. HB: Exterior, frost-free, recessed hose bib / wall hydrant with locking cover and vacuum breaker.
   13.6. TUB: Residential fiberglass soaker tub, with push button drain. Supply shower surround, curtain rod, shower head, and pressure / temperature protected valve. Shower faucet discharge must be limited to 1.75 gpm (6.6 L/min) when tested in accordance with ASME A 112.18.1/CAN CSA-B125 “Plumbing Supply Fittings” and CAN/CSA – B125.3 “Plumbing Fittings”.
   13.7. WS: Supply recessed wall cabinet for washing machine drain and hot and cold water supply.
   13.8. HUB: Standard 2-inch hub drain.
   13.9. FD: Heavy-duty floor drain with strainer capable of withstanding standard vehicle traffic.
   13.10. All fixture selections for residential suites and common areas shall be coordinated with and confirmed by the building Architect and Owner.
   13.11. Floor drains to be installed near all water fixtures such as laundry, furnaces, HRV, and HWT.
   13.12. All fixture model selections shall be coordinated with the architect.
14. Piping in plenum spaces to be non-combustible and rated for the application. Copper, Cast iron, Plenum rated PVC are acceptable.
15. Gas Piping
   15.1. System to comply with CSAB149.1.
   15.2. Gas piping to be iron pipe. Contractor to notify engineer if alternative piping materials are requested.
   15.3. Provide pressure regulators from high pressure to low pressure at each appliance or as shown on the plan.
   15.4. Provide bollards around meter where potential for vehicle collisions exist.
16. Ducting
   16.1. Ducting to be installed to SMACNA Construction Standards.
   16.2. Minimum gauge of non-reinforced ducting to be as follows:
      16.2.1. For Round Ducting:
         16.2.1.1. 14 inch diameter or less = 28 Gauge
         16.2.1.2. 15 inch diameter – 26 inch diameter = 26 Gauge
         16.2.1.3. 27 inch diameter – 36 inch diameter = 24 Gauge
         16.2.1.4. 37 inch diameter – 50 inch diameter = 22 Gauge
         16.2.1.5. 51 inch diameter – 60 inch diameter = 20 Gauge
         16.2.1.6. greater than 60 inch diameter = 18 Gauge
      16.2.2. For Rectangular Ducting:
         16.2.2.1. 12 inch or less = 26 gauge
         16.2.2.2. 13 inch – 29 inch = 24 gauge
         16.2.2.3. Greater than 30 inch = requires reinforcements
      16.2.3. Ducting gauges to be reduced with proper reinforcement as per SMACNA duct construction standards.
   16.3. All ducts joints to be sealed with mastic duct sealant.
   16.4. Insulate all cold fresh air ducts with 1.5” of external foil faced fiberglass insulation.
   16.5. Insulate all supply air ducts with 1” of external foil faced fiberglass insulation. Note that self-contained mechanical HVAC systems in residential suites do not require insulation on supply air ducts.
   16.6. Insulate all exhaust ducts passing through unheated spaces with 1.5” of external foil faced fiberglass insulation.
   16.7. Styrofoam Insulation is not to be used on ducting installed inside building.
   16.8. Ducting sizes are to conform to those shown on the drawings whenever possible. Where structural conditions require the shape to be modified, ducts must have the same cross-sectional area as those indicated on drawings. Width of duct shall not be more than six times the depth except with special approval.
   16.9. On completion balance all air distribution systems and devices to within 10% of airflow listed on plans. Provide report on results to Engineer. Provide and install all means and materials necessary to balance the air distribution system. Provide flexible duct connections to all fans and air handlers to reduce noise transmitted through ducting system.
   16.10. Provide acoustic insulation inside ductwork as indicated or not less than three equivalent duct diameters from either side of the air moving device.

17. Fire Dampers
   17.1. Fire dampers are to be installed where ducts pass through fire rated assemblies. See architectural drawings for locations of fire rated assemblies. Install all dampers to manufactures specifications. Install inspection ports for all fire dampers.
   17.2. Fire dampers to be dynamic type.

18. Air Filters
   18.1. Air filters for all AHU, RTU, or AMU be MERV 11 rating or better.
   18.2. Air filter sized to be as follows:
      18.2.1. 1 – 1.5 ton = 16 inch x 16 inch x 1 inch thick
      18.2.2. 2 ton = 20 inch x 16 inch x 1 inch thick
      18.2.3. 3 ton = 25 inch x 20 inch x 1 inch thick
      18.2.4. 4 ton = 25 inch x 20 inch x 4 inch thick
      18.2.5. 5 ton = 24 inch x 24 inch x 4 inch thick
      18.2.6. Larger than 5 ton = 4 inch thick, sized for 500 fpm.

19. Fire Fighting
   19.1. Provide firefighting sprinkler system designed to NFPA 13 to be installed by licensed sprinkler contractor. Stamped engineered plans to be provided by sprinkler contractor. Submit plans to mechanical engineer for review.
   19.2. Provide standpipe system designed to NFPA 14 by licensed sprinkler contractor. Stamped engineered plans to be provided by sprinkler contractor. Submit plans to mechanical engineer for review.
20. Identification
   20.1. All pumps, motors, fans, piping and other mechanical equipment are to be labeled with permanent tags referenced to the drawings.
   20.2. All control switches are to be labeled with the identification of the device that they control and the control function.

21. Cutting and Patching
   21.1. Unless otherwise stipulated, the mechanical contractor shall be responsible for cutting, patching, and make good all openings required for the mechanical services.

22. Flashing
   22.1. Supply and install proper flashing where ducts and other mechanical parts pass through weather and/or waterproof walls, floors and roofs. Install all flashing as per manufacturer’s instructions or as directed by engineer.
   22.2. Fresh air ducts shall have exterior weather hoods with screens unless otherwise stipulated.
   22.3. Exhaust ducts shall terminate outside with weather hoods with screens unless otherwise stipulated.