Part 1 General

1.1 SCOPE OF WORK

.1 In general terms the scope of work includes all of the mechanical work required for two existing pre-fabricated buildings, and relocation and renovation of an existing garage on to an existing foundation. This shall include but not necessarily limited to the following:

.1 Provision of new Plumbing services.
.2 Provision of new Ventilation and Air supply systems.
.3 Provision of new Heating/Cooling systems.
.4 Provision of new Stand-alone Control systems.
.5 Start-up and commissioning of all equipment and systems.

.2 The Mechanical work shall include all labour, materials, equipment, and tools required to install, test and place into operation a complete and fully operational Mechanical System consisting of the various sub-systems as described in, but not necessarily limited to, the items in the following sections and equipment schedules:

.1 Section 21 05 01, Common Work Results for Mechanical
.2 Section 22 05 00, Common Work Results for Plumbing
.3 Section 22 11 16, Domestic Water Piping
.4 Section 22 13 17, Drain, Waste, Vent Piping – Cast Iron and Copper
.5 Section 22 13 18, Drain, Waste, Vent Piping – Plastic
.6 Section 23 05 00, Common Work Results for HVAC
.7 Section 23 05 05, Installation of Pipe Work
.8 Section 23 05 29, Hangers and Supports
.9 Section 23 05 48, Sound and Vibration Isolation
.10 Section 23 05 93, Testing and Balancing
.11 Section 23 07 13, Insulation for Ducting
.12 Section 23 07 15, Insulation for Piping
.13 Section 23 08 00, Cleaning and Start-up of Piping Systems
.14 Section 23 31 00, Air Distribution
.15 Section 25 05 05, Controls and Control Sequences

1.2 REFERENCES

.1 Division 1 of this Specification.

1.2 DESIGN NOISE LEVELS

.1 The maximum design noise levels for this project shall be as per ASHRAE Standards.

.2 All equipment, components and systems shall be selected and installed with the intent of not exceeding these noise levels.

Where the equipment, components and systems fail to meet the noise level criteria, modifications shall be made as required, at no additional cost to the Departmental Representative.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.2 Drawings to show:

.1 Mounting arrangements.

.2 Operating and maintenance clearances.

.3 Drawings and product data accompanied by:

.1 Detailed drawings of bases, supports, and anchor bolts.

.2 Acoustical sound power data, where applicable.

.3 Points of operation on performance curves.

.4 Manufacturer to certify current model production.

.5 Certification of compliance to applicable codes.

.4 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

.1 Operation and maintenance manual approved by, and final copies deposited with, Consultant before final inspection.

.2 Operation data to include:

.1 Control schematics for systems including environmental controls.

.2 Description of systems and their controls.

.3 Description of operation of systems at various loads together with reset schedules and seasonal variances.

.4 Operation instruction for systems and component.

.5 Description of actions to be taken in event of equipment failure.

.6 Valves schedule and flow diagram.

.7 Colour coding chart.

.3 Maintenance data to include:

.1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.

.2 Data to include schedules of tasks, frequency, tools required and task time.

.4 Performance data to include:

.1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.

.2 Equipment performance verification test results.

.3 Special performance data as specified.

.4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.5 Approvals:

.1 Submit 2 copies of draft Operation and Maintenance Manual to Consultant for approval. Submission of individual data will not be accepted unless directed by Consultant.

.2 Make changes as required and re-submit as directed by Consultant.

.6 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.7 Site records:

.1 Consultant will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.8 As-Built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Consultant for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.9 Submit copies of as-built drawings for inclusion in final TAB report.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Furnish spare parts as follows:

.1 One set of packing for each pump.

.2 One casing joint gasket for each size pump.

.3 One head gasket set for each heat exchanger.

.4 One glass for each gauge glass.

.5 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.

.3 Provide one set of special tools required to service equipment as recommended by manufacturers.

.4 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 REQUESTS FOR USE OF SUBSTITUTE EQUIPMENT

.1 In accordance with Section 01 61 00.

1.8 COORDINATION

.1 The Contractor shall be responsible for the complete coordination amongst all trades, including timing, completion, deliveries, interference of building components and sequencing of the trades.

.2 The Contractor shall coordinate the Mechanical and Electrical sub-contractors to ensure compatibility of the system components.

.3 The Contractor shall coordinate the Mechanical and Electrical sub-contractors to ensure access to control panels on mechanical equipment for the purpose of completing fire alarm panel connections.

.3 The Contractor shall coordinate all trades to ensure that access doors and panels are of the same manufacturer, and of a style appropriate for the intended use.

1.9 TEMPORARY AND TRIAL USAGE

.1 Permanent systems and/or equipment shall not be used during construction period, without Consultant's written permission.

.2 The Departmental Representative has the privilege of trial usage of mechanical systems, or parts thereof, for the purpose of testing and learning the operational procedures.

.3 Assist in the trial usage over a length of time, as deemed reasonable by the Engineer, at no extra cost, and do not waive any responsibility because of trial usage.

.4 Trial usage shall not be construed as acceptance by the Departmental Representative.

.5 Provide and pay for all testing required on the system components where, in the opinion of the Engineer, Manufacturer's ratings or specified performance is not being achieved.

.6 Equipment used during construction period to be thoroughly cleaned and overhauled. Replace worn or damaged parts so equipment is in perfect condition, to entire satisfaction of the Consultant and Departmental Representative. All air filters shall be routinely inspected. Filters shall be cleaned and/or replaced depending on filter type during period in which ventilation units are being used for temporary heat and/or commissioning of system. Contractor to be responsible for and pay all costs for air filter cleaning service. Filters to operate between pressure drops noted in filter manufacturer's catalogue.

.7 Temporary use of equipment shall in no way relieve Contractor of providing twelve month guarantee on all equipment used. This guarantee period shall commence as of date of final acceptance of building by Departmental Representative as interpreted by Consultant.

Part 2 Products And Materials

NOT USED

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.

.1 Inform Consultant of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 PAINTING REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 90 00 - Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged.

3.3 SYSTEM CLEANING

.1 Clean interior and exterior of all systems including strainers.

.2 Vacuum the interior of ductwork and air handling units exposed to construction dust/debris.

3.4 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.5 DEMONSTRATION

.1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.2 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.7 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION