SPECIFICATION

INTERIOR AND EXTERIOR RENOVATIONS

Resolute Bay, Nunavut

CONSTRUCTION

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Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises the interior and exterior renovations of two houses and minor exterior renovations of a facility building in Rankin Inlet, Nunavut. This work includes; labour, materials and shipping of materials, in accordance with the contract documents and as further described herein.

1.2 SCOPE OF WORK

.1 House – 1 - V397

- .1 Remove existing windows and replace
- .2 Remove drywall around windows and insulation and replace
- .3 Adjust exterior siding to allow for window to be installed correctly
- .4 Remove and replace all lights with LED lighting
- .5 Remove existing ceiling in centre module and repair AVB
- .6 Install new exhaust fans in bathrooms
- .7 Install new condensate pump for HRV
- .8 Install new arctic vents for exhaust fans and HRV exhausts and supplies.

.2 House 2 – V399

- .1 Remove existing windows and replace
- .2 Remove drywall around windows and insulation and replace
- .3 Adjust exterior siding to allow for window to be installed correctly
- .4 Remove and replace all lights with LED lighting
- .5 Remove existing ceiling in centre module and repair AVB
- .6 Install new exhaust fans in bathrooms
- .7 Install new condensate pump for HRV
- .8 Install new arctic vents for exhaust fans and HRV exhausts and supplies.

.3 Detachment – V006

- .1 Remove and repair exterior of detached garage.
- .2 Add bollards to exterior of detachment.
- **.3** Removal and Replacement of Carpeting in various rooms in detachment. **Contractor is responsible to move the furniture in and out of all of the rooms.**
- **.4** Install new gate system between bull Pen and exit corridor.
- **.5** Electrical
  - .1 Remove and replace existing 12V battery packs
  - .2 Remove existing exit signs and install new.
  - .3 Install new emergency light remote heads (LED)

.4 FUEL TANK REPAIR AND REPLACEMENT

- .1 V397 – Residence – Remove and replace tank

.2 V399 – Residence – Remove and replace tank

.3 V006 – Repair Tank Piping

1.3 SITE VERIFICATION

Upon award of the contract contractor is to schedule a site trip to site verify all sizes and dimensions. No additional fees will be considered for materials brought onto site of the wrong size.

1.4 PRICING

.1 Supply separate prices for the following

.1 House V397

.2 House V399

.3 Detachment V006

.4 Fuel Tank Replacement

1.5 WINDOW BLINDS

.1 Standard of Acceptance:

.1 Levelor Roller Blackout blinds, c/w cassette valence, clutch control system, color to be contemporary blackout white.

.2 Sunproject dual shade, c/w 1 sun shade and 1 blackout shade, color to be from manufacturers standard set.

1.6 WORK SEQUENCE

.1 Buildings will remain occupied during the renovation.

.2 Co-ordinate Progress Schedule with Departmental Representative, Consultant and Local Commander

.3 Maintain fire access/control at all times.

.4 The work on the facility building will be done in phases one phase being completed and certified prior to the second phase being started.

1.7 PROTECTION OF REMAINING FIXTURES AND CABINETRY

.1 The contractor is to document photo the condition of the existing cabinetry and fixtures at takeover of the area of work and supply a digital copy to the consultant.

.2 The contractor is responsible for the protection of all damage caused during the construction process and it will be the responsibility of the contractor to make good to the acceptance of the Project Manager and Consultant.

1.8 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for storage, and for access to allow:

.1 Owner Occupancy

.2 Work by other Contractors

.3 Public Usage

.2 Keep clear products or equipment which may **interfere** with operation of Building or other contractors.

.3 Assume responsibility for the protection and safekeeping of products under this contract.

.4 Co-ordinate use of premises under direction of Consultant and Departmental Representative.

.5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract as required.

.6 Ensure safe practices and work area to prevent injury or damage to portions of existing work which remain.

.7 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Consultant.

1.9 OWNER OCCUPANCY

.1 Houses will be occupied during construction.

.2 Co-Operate with Owner in scheduling operations to minimize conflict and to facilitate owner usage.

1.10 EXISTING SERVICES

.1 Notify Consultant and utility companies of intended interruption of services and obtain required permission. Pay fees and obtain certificates and permits required.

.2 Where Work involves breaking into or connecting to existing services, give 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.

.3 Provide alternative routes for personnel and vehicular traffic (if required).

.4 Establish location and extent of service lines in area of work before starting Work. Notify Consultant of findings.

.5 Submit schedule to and obtain approval from Consultant and building operations for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services when directed by Consultant or as required to maintain critical building and tenant systems.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, inform consultant and owner prior to capping off in manner approved by authorities having jurisdiction.

.10 Record locations on as-built drawings of maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures

1.11 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Change Orders.
.7 Other Modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Other documents as specified.

1.12 CODES AND STANDARDS

.1 Materials shall be new and work shall conform to the minimum applicable standards of the Canadian General Standards board, the Canadian Standards Association, The National Building Code of Canada 2010, and all applicable Territorial and Municipal codes, and all standards listed below. In the case of conflict or discrepancy the most stringent requirement shall apply.

.2 Meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

.1 Notify, utility companies, Consultant, of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

1.5 SPECIAL REQUIREMENTS

.1 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

.2 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.3 Keep within limits of work and avenues of ingress and egress.

1.6 SECURITY CLEARANCES

.1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will be required to enter premises.

1.7 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not allowed on the property.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Project Supplementary Conditions

1.2 CASH ALLOWANCES

.1 Include in Contract Price specified cash allowances.

.2 Cash allowances, unless otherwise specified, cover net cost to Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing Work.

.3 Contract Price, and not cash allowance, includes Contractor's Contractor's overhead and profit in connection with such cash allowance.

.4 Contract Price will be adjusted by written order to provide for excess or deficit to each cash allowance.

.5 Where costs under a cash allowance exceed amount of allowance, Contractor will be compensated for excess incurred and substantiated plus allowance for overhead and profit as set out in Contract Documents.

.6 Include progress payments on accounts of work authorized under cash allowances in Consultant's monthly certificate for payment.

.7 Amount of each allowance, for Work specified in respective specification Sections is as follows:

.1 Include an allowance of:

.1 V397 - $2,500.00 for purchase of light fixtures.

.2 V399 - $2,500.00 for purchase of light fixtures

1.3 CONTINGENCY ALLOWANCE

.1 Include in Contract Price contingency allowance as follows

.1 $26,000.00 - V397, V99 and V006 for unforeseen conditions

.2 $10,000.00 - Fuel Tank Project

.2 Do not include in Contract Price, additional contingency allowances for products, installation, overhead or profit.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ON-SITE DOCUMENTS

.1 Contract Documents

.2 Specifications

.3 Addenda

.4 Reviewed shop drawings

.5 Change orders

.6 Other modifications in contract

.7 Field test reports

.8 Copy of approved Work Schedule

.9 Manufacturers installation and application instructions

.10 Labour conditions and wage schedules

.11 Project Record Documents (for as-built purposes)

.12 Codes and Standards listed in 01 11 00

1.2 ADMINISTRATIVE

.1 Attend project meetings throughout the progress of the work at the call of Consultant.

.2 Provide physical space and make arrangements for meetings.

.3 Consultant will record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.4 Consultant will reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, affected parties not in attendance, Project Manager, and Contractor.

.5 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

.1 After award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. Meeting will be held at the location and time designated by the departmental representative

.2 Departmental Representative, Engineer and Consultant, Contractor, major Subcontractors, will be in attendance. Others may be in attendance at the discretion of the departmental representative or the Contractor. Representatives of the local Building Manager may also be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 2 days before meeting.

.4 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

.3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.5 Delivery schedule of specified equipment.

.6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.8 Owner provided products.

.9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures

.10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals

.11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.12 Monthly progress claims, administrative procedures, photographs, hold backs.

.13 Appointment of inspection and testing agencies or firms.

.14 Insurances, transcript of policies.

.5 Comply with Departmental Representative’s allocation of mobilization areas of site; for field offices and sheds, for access, traffic and parking facilities.

.6 During construction coordinate use of site and facilities through Departmental Representatives procedures for intra-project communications: submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.

.7 Comply with instruction of consultant for use of Temporary utilities and construction facilities.

.8 Coordinate field engineering and layout work with consultant.

1.4 PROGRESS MEETINGS

.1 During course of Work at the discretion of the Consultant and Departmental Representative.

.2 Representatives of the Contractor, major Subcontractors involved in the work and other as required and decided upon by the Departmental Representative or Contractor are to be in attendance. Contractor to notify all sub-contractors.

.3 Consultant will notify contractor min 5 days prior to meetings

.4 Consultant to record minutes of meetings and circulate to attending parties and affected parties not in attendance within 5 days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.
.2 Review of Work progress since previous meeting.
.3 Field observations, problems, conflicts.
.4 Problems which impede construction schedule.
.5 Review of off-site fabrication delivery schedules.
.6 Corrective measures and procedures to regain projected schedule.
.7 Revision to construction schedule.
.8 Progress schedule, during succeeding work period.
.9 Review submittal schedules: expedite as required.
.10 Maintenance of quality standards.
.11 Review proposed changes for affect on construction schedule and on completion date.
.12 Other business.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by RCMP to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Construction Progress Schedule to be Completed in Microsoft Project or Similar Software.

.3 Plan to complete Work in accordance with prescribed milestones and time frame.

.4 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.5 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 SUBMITTALS

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

.2 Submit to Consultant within 5 working days of Award of Contract as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Consultant within 5 working days of receipt of acceptance of Master Plan.

1.4 PROJECT MILESTONES

1.5 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Consultant will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

1.7 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.8 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in imperial units.

.4 Where items or information is not produced in imperial units converted values are acceptable.

.5 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's, Consultant's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.

.10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in the Territory of Nunavut, Canada.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 14 days for Consultant's review of each submission.

.5 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.6 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Property Manager's, Engineer's, Consultant's review, distribute copies.

.10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Consultant and Engineer may reasonably request.

.11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant and Engineer.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant and Engineer

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic or 6 copies of manufacturers instructions for requirements requested in specification Sections and as requested by Consultant and Engineer.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit 6 copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant and Engineer.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit 6 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant and Engineer

.17 Delete information not applicable to project.

.18 Supplement standard information to provide details applicable to project.

.19 If upon review by Consultant and Engineer, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.20 The review of shop drawings by and Consultant is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or

omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Consultants business address.

.3 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.6 Make changes in samples which Consultant may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 NOT USED

.1 Not Used.

Part 2 Execution

2.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 Northwest Territories & Nunavut

.1 The Workers Compensation Act latest edition.

1.2 SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant or authority having jurisdiction, as required.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

1.3 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.4 MEETINGS

.1 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.

1.5 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements .

1.6 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.7 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.8 COMPLIANCE REQUIREMENTS

.1 Comply with The Workers Compensation Act, Workplace Safety Regulation, Northwest Territories and Nunavut WSCC - Workers Safety & Compensation Commission.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.9 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise RCMP verbally and in writing.

1.10 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Consultant.

1.11 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant.

.2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

1.12 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify consultant and Project Manager.

.2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Consultant and Project Manager.

.3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Consultant and Project Manager.

1.3 BUILDING SMOKING ENVIRONMENT

.1 No smoking permitted.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 INSPECTION

.1 Allow Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant, instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.2 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies may be engaged by consultant for purpose of inspecting and/or testing portions of Work.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Project Manager or Consultant at no cost to Property Manager or Consultant. Pay costs for retesting and re-inspection.

1.3 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURES

.1 Notify appropriate agency and Consultant in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

1.6 REPORTS

.1 Submit electronic copies of inspection and test reports to Consultant.

.2 Provide copies to subcontractor of work being inspected or tested.

1.7 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

.2 Construct in locations acceptable to Consultant.

.3 Prepare mock-ups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.8 MILL TESTS

.1 Submit mill test certificates as requested.

1.9 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

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

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.3 WATER SUPPLY

.1 Water is available for use by the contractor provided by the Building Owner

1.4 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating as required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

- .1 Facilitate progress of Work.
- .2 Protect Work and products against dampness and cold.
- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
- .5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 21 degrees C in areas where construction is in progress.

.5 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Permanent heating system of building, to be used when available. Be responsible for damage to heating system if use is permitted.

.7 On completion of Work for which permanent heating system is used, replace filters, clean furnaces and power vacuum all ductwork inform Consultant of completion.

.8 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.

.9 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

.10 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.5 TEMPORARY POWER AND LIGHT

.1 Power is available for use by the contractor provided by the Building Owner.

.2 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of consultant provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

1.6 TEMPORARY COMMUNICATION FACILITIES

.1 Contractor to furnish own Temporary phone, Fax and e-mail.

1.7 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978(R2003), Douglas Fir Plywood.

.3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

.4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.2 SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by contractor, number of trailers used, avenues of ingress/egress to fenced are and details of fence installation

.2 Indicate use of supplemental or other staging area.

.3 Provide construction facilities in order to execute work expeditiously.

.4 Remove from site all such work after use.

1.4 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.5 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work or impede the operation of the detachment.

.2 Adequate parking must be maintained for public and building occupant access. This area is already defined and is not to be used for contractor parking.

.3 Provide and maintain adequate access to project site.

1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials Required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.7 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.8 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Remove materials resulting from demolition as soon as possible from site.

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International)

.1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.3 DUST TIGHT SCREENS

.1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

1.4 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.5 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles

1.6 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with property manager and detachment commander locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Project Manager and/or Consultant reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Project Manager based upon requirements of Contract Documents.

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Consultant.

.9 Touch-up damaged factory finished surfaces to Consultants satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Project Manager will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Consultant reserves the right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with the Consultant, whose decision is final.

1.8 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

.1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation inform Consultant if there is interference. Install as directed by Consultant.

1.10 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Engineer of conflicting installation. Install as directed.

1.12 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Engineer.

1.15 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

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

.2 Submit written request in advance of cutting or alteration which affects:

- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements. Note: Fire panel will alarm when hot cutting is done. Owner and building tenants requires notice when shutting down fire alarm system to do work. When alarm is off, contractor will provide fire watch.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.3 Include in request:

- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.2 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.3 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.11 At penetration of fire rated wall, ceiling or floor construction, completely seal voids with firestopping material in accordance with Section 07 8400 – Firestopping, full thickness of the construction element

.12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

.13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site, unless approved by Consultant.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Dispose of waste materials and debris off site.

.6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris including that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site, unless approved by Consultant.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.

.9 Clean lighting reflectors, lenses, and other lighting surfaces.

.10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.14 Remove dirt and other disfiguration from exterior surfaces.

.15 Clean and sweep roofs, gutters, areaways, and sunken wells.

.16 Sweep and wash clean paved areas.

.17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.18 Clean roofs, downspouts, and drainage systems.

.19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Dispose of waste and separate waste materials for recycling as per requirements of local authorities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and Subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Inspection.

.2 Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.

.4 Certificates required by Fire Commissioner, Utility companies HRDC Labour Programs-Fire Protection, Engineering Services and Local Authorities have been submitted.

.5 Operation of systems have been demonstrated to Owner's personnel.

.6 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by Consultant and Contractor. If Work is deemed incomplete by Consultant, complete outstanding items and request reinspection.

1.2 CLEANING

.1 In accordance with Section 01 74 11 – Cleaning.

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with local authorities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 Not Used

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

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

.2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.3 Copy will be returned after final inspection, with Consultant comments.

.4 Revise content of documents as required prior to final submittal.

.5 Two weeks prior to Substantial Performance of the Work, submit to the Consultant, four final copies of operating and maintenance manuals in English.

.6 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.7 Furnish evidence, if requested, for type, source and quality of products provided.

.8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.9 Pay costs of transportation.

.10 Supply one electronic and 5 copies of equipment manuals for all new items installed under this project

1.2 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 Provide scaled CAD files in dwg format on CD.

1.3 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

.6 Training: refer to Section 01 79 00 - Demonstration and Training.

1.4 AS-BUILTS AND SAMPLES

.1 Maintain, at site for Consultant one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 All copies of the documents must be turned over to consultant, **NO** copies may be maintained by the General Contractor or Trades.

1.5 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.

.15 Additional requirements: as specified in individual specification sections.

1.6 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.7 SPARE PARTS

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site; place and store.

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.8 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification sections.

.2 Provide items with tags identifying their associated faction and equipment.

.3 Deliver to site; place and store

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listing in Maintenance Manual

1.9 MAINTENANCE MATERIALS

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site; place and store.

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.10 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to site; place and store.

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.11 STORAGE, HANDLING AND PROTECTION

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.12 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Property Manager and Consultant for approval.

.3 Warranty management plan to include required actions and documents to assure that Property Manager receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to Property Manager for approval prior to each monthly pay estimate.

.6 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at 10 month post-construction warranty inspections.

.5 Procedure and status of tagging of equipment covered by extended warranties.

.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.9 Respond in a timely manner to oral or written notification of required construction warranty repair work.

.10 Written verification will follow oral instructions. Failure to respond will be cause for the property manager to proceed with action against Contractor.

1.13 PRE-WARRANTY CONFERENCE

.1 Meet with Consultant, to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by Consultant.

.2 Consultant will establish communication procedures for:

.1 Notification of construction warranty defects.

.2 Determine priorities for type of defect.

.3 Determine reasonable time for response.

.3 Provide name, telephone number and address of licensed and bonded company that is authorized to initiate and pursue construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.14 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Property Manager or Consultant.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.
.2 Model number.
.3 Serial number.
.4 Contract number.
.5 Warranty period.
.6 Inspector's signature.
.7 Construction Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Equipment and systems.

.2 Materials and finishes.

.3 Spare parts.

.4 Maintenance manuals.

.5 Special tools.

.6 Storage, handling and protection.

1.2 RELATED SECTIONS

.1 Section 017800 - Closeout Submittals.

.2 Section 014500 - Quality Control.

1.3 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports.

.15 Additional requirements: As specified in individual specification sections.

1.4 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Building Envelope: include copies of drawings of building envelope components, illustrating the interface with similar or dissimilar items to provide an effective air, vapour and thermal barrier between indoor and outdoor environments. Include an outline of requirements for regular inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.

.5 Additional Requirements: as specified in individual specifications sections.

1.5 SPARE PARTS

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site; place and store.

.4 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.6 MAINTENANCE MATERIALS

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site; place and store.

.4 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.7 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to site; place and store.

.4 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.8 STORAGE, HANDLING AND PROTECTION

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of final inspection.

.2 Owner will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.

1.2 QUALITY CONTROL

.1 When specified in individual Sections require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.3 SUBMITTALS

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

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Consultant approval.

.3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Give time and date of each demonstration, with list of persons present.

1.4 CONDITIONS FOR DEMONSTRATIONS

.1 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.5 PREPARATION

.1 Verify that conditions for demonstration and instructions comply with requirements.

.2 Verify that designated personnel are present.

1.6 DEMONSTRATION AND INSTRUCTIONS

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the designated location.

.2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.

.3 Review contents of manual in detail to explain aspects of operation and maintenance.

.4 Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 This section is limited to portions of the Building Management Manual (BMM) provided to Departmental Representative by Contractor.

.2 Acronyms:

.1 BMM - Building Management Manual.
.2 HVAC - Heating, Ventilation and Air Conditioning.
.3 PI - Product Information.
.4 PV - Performance Verification.
.5 TAB - Testing, Adjusting and Balancing.
.6 WHMIS - Workplace Hazardous Materials Information System.

1.2 GENERAL REQUIREMENTS

.1 Standard letter size paper 216 mm x 279mm.

.2 Binders: vinyl hard covered, 3" "D" ring,(not "O" ring) loose leaf sized, with spine pocket. Identify contents of each binder on spine

.3 Methodology used to facilitate updating.

.4 Drawings, diagrams and schematics to be professionally developed.

.5 Electronic copy of data to be in a format accepted and approved by Property Manger (PDF).

1.3 APPROVALS

.1 Prior to commencement, co-ordinate requirements for preparation, submission and approval with Property Manager.

1.4 GENERAL INFORMATION

.1 Provide Consultant the following for insertion into appropriate Part and Section of BMM:

.1 Complete list of names, addresses, telephone and fax numbers of contractor, sub-contractors that participated in delivery of project - as indicated in Section 1.2 of BMM.

.2 Summary of architectural, structural, fire protection, mechanical and electrical systems installed and commissioned - as indicated in Section 1.4 of BMM.

.1 Including sequence of operation as finalized after commissioning is complete as indicated in Section 2.0 of BMM.

.3 Description of building operation under conditions of heightened security and emergencies as indicated in Section 2.0 of BMM.

.4 System, equipment and components Maintenance Management System (MMS) identification - Section 2.1 of BMM..

.5 Information on operation and maintenance of architectural systems and equipment installed and commissioned - Section 2.0 of BMM.

.6 Information on operation and maintenance of fire protection and life safety systems and equipment installed and commissioned - Section 2.0 of BMM.

.7 Information on operation and maintenance of mechanical systems and equipment installed and commissioned - Section 2.0 of BMM.

.8 Operating and maintenance manual - Section 3.2 of BMM.

.9 Final commissioning plan as actually implemented.

.10 Completed commissioning checklists.

.11 Commissioning test procedures employed.

.12 Completed Product Information (PI) and Performance Verification (PV) report forms, approved and accepted by Property Manager.

.13 Commissioning reports.

1.5 CONTENTS OF OPERATING AND MAINTENANCE MANUAL

.1 For detailed requirements refer to Section 01 78 00 - Closeout Submittals.

.2 Consultant to review and approve format and organization within 2 weeks of award of contract.

.3 Include original manufactures brochures and written information on products and equipment installed on this project.

.4 Record and organize for easy access and retrieval of information contained in BMM.

.5 Include completed PI report forms, data and information from other sources as required.

.6 Inventory directory relating to information on installed systems, equipment and components.

.7 Approved project shop-drawings, product and maintenance data.

.8 Manufacturer's data and recommendations relating: manufacturing process, installation, commissioning, start-up, O&M, shutdown and training materials.

.9 Inventory and location of spare parts, special tools and maintenance materials.

.10 Warranty information.

.11 Inspection certificates with expiration dates, which require on-going re-certification inspections.

.12 Maintenance program supporting information including:

.1 Recommended maintenance procedures and schedule.

.2 Information to removal and replacement of equipment including, required equipment, points of lift and means of entry and egress.

1.6 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES

.1 Provide RCMP supporting documentation relating to installed equipment and system, including:

- .1 General:
  - .1 Finalized commissioning plan.
  - .2 WHMIS information manual.
  - .3 Approved "as-built" drawings and specifications.
  - .4 Procedures used during commissioning.
  - .5 Cross-Reference to specification sections.
- .2 Architectural and structural:
  - .1 Inspection certificates, construction permits.
- .3 Fire prevention, suppression and protection:
  - .1 Test reports.
  - .2 Smoke test reports.
  - .3 PV reports.
- .4 Mechanical:
  - .1 Installation permits, inspection certificates.
  - .2 Piping pressure test certificates.
  - .3 Ducting leakage test reports.
  - .4 TAB and PV reports.
  - .5 Copies of posted instructions.
- .5 Electrical:
  - .1 Installation permits, inspection certificates.
  - .2 TAB and PV reports.
  - .3 Electrical work log book.
  - .4 Charts and schedules.
  - .5 Locations of cables and components.
  - .6 Copies of posted instructions.

1.7 LANGUAGE

.1 English and French Language to be in separate binders.

1.8 IDENTIFICATION OF FACILITY

.1 When submitting information to Departmental Representative for incorporation into BMM, use following system for identification of documentation:

- .1 To be supplied to successful contractor.

1.9 USE OF CURRENT TECHNOLOGY

.1 Use current technology for production of documentation. Emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980(R1998), Code of Practice for Safety in Demolition of Structures.

1.2 SUBMITTALS

.1 Submit shop drawings in accordance with Sections 01 33 00 - Submittal Procedures 01 00 10 - General Instructions.

1.3 SITE CONDITIONS

.1 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Consultant immediately.

.1 Do not proceed until written instructions have been received from Consultant.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 PREPARATION

.1 Inspect site with Consultant and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

3.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

3.3 SALVAGE

.1 Refer to demolition drawings and specifications for items to be salvaged for reuse.

.2 Items to be stored in weather tight enclosure to ensure that no damaged is caused prior to re-installation

3.4 SITE REMOVALS

.1 Remove items as indicated.

3.5 DEMOLITION

.1 Remove parts of existing building to permit new construction.

.2 Trim edges of partially demolished building elements to tolerances as defined by Consultant to suit future use.

3.6 DISPOSAL

.1 Dispose of removed materials, except where specified otherwise, in accordance with authority having jurisdiction.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 American Conference of Governmental Industrial Hygienists (ACGIH), Bioaerosols Assessment and Control 1999.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 New York City Department of Health - Bureau of Environmental and Occupational Disease Epidemiology's Guidelines on the Assessment and Remediation of Fungi in Indoor Environment 2000

.4 United States Department of Labor Occupational Safety and Health Administration (OSHA)

.1 29 CFR 1910.134 - Respiratory Protection.

.2 29 CFR 1910.1200 - Hazard Communication.

.5 United States Environmental Protection Agency (EPA), Mould Remediation in Schools and Commercial Buildings, 2001.

1.2 DEFINITIONS

.1 Authorized Visitors: Engineers, Consultants or designated representatives, and representatives of regulatory agencies.

.2 Cleaning solution: detergent solution.

.3 Competent person: Departmental Representative Consultant DCC Representative individuals who can demonstrate that mould remediation training has been obtained, is capable of identifying existing microbial hazards in workplace and selecting appropriate control strategy for microbial exposure.

.4 Contractor: remediation contractor providing demolition and removal services as defined in specification.

.5 Fibre Reinforced Polyethylene Sheet: rip-proof fibre reinforced polyethylene sheeting with added fibre reinforced adhesive tape along edges.

.6 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.7 HVAC: heating ventilating and air-conditioning systems which serve occupied areas. Includes but is not limited to air handling units, duct work, terminal boxes and vents.

.8 Mould contaminated work area: specific area or location where actual work is being performed or other areas of facility where it has been determined that it may be hazardous to public health as result of mould remediation.

.9 Occupied Area: areas of building or work site that is outside mould contaminated work area.

.10 PPE: Personnel Protection Equipment.

.11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have a minimum of six litres capacity for work.

1.3 REGULATORY REQUIREMENTS

.1 Comply with regulations in effect at time work is performed. In case of conflict among these requirements or with these specifications the more stringent requirement applies. If no regulations exist, follow guidelines most widely accepted by recognized professional organizations such as occupational hygienists, health professionals or environmental engineers as listed in paragraph 1.2 Referenced Standards.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit Provincial and/or local requirements for Notice of Project form.

.2 Submit proof of Contractors Liability Insurance for dealing with hazardous materials.

.3 Submit Workers Compensation Board status and transcription of insurance.

.4 Submit proof of attendance in form of certificate that supervisory personnel have trained in asbestos and/or mould remediation course, approved by DCC Representative Consultant Departmental Representative. Minimum of one supervisor for every ten trained workers.

1.5 CLOSEOUT SUBMITTALS

.1 Maintain general log to provide permanent record of project. Maintain logs and other required documentation as part of permanent project file.

.2 Daily log must be available for inspection upon request by Departmental Representative Consultant DCC Representative.

.3 Visitor log must be available for inspection upon request by DCC Representative Departmental Representative Consultant.

1.6 INSTRUCTION AND TRAINING

.1 Before commencing work, provide Departmental Representative Consultant DCC Representative proof that worker had instruction and training in potential heath hazards of mould exposure, handling of hazardous materials, in personal hygiene including protective clothing, in entry and exit from Mould Contaminated Work Area, and in use of disposal procedures including building materials. This training can be performed as part of a program to comply with requirements of the OHSA Hazard Communication Standard (29 CFR 1910.1200) equivalent.

.2 Instruction and training related to respirators includes at minimum:

- .1 Fitting of equipment.
- .2 Inspection and maintenance of equipment.
- .3 Disinfecting of equipment.
- .4 Limitations of equipment.

.3 Instruction and training must be provided by designated construction safety advisor.

1.7 WORKER PROTECTION

.1 Respirators suitable for protection against mould and acceptable to Provincial Authority having jurisdiction Non-powered disposable filter-type respirator of type full-face air purifying respirators (APR) equipped with replaceable HEPA filter cartridges, personally issued to work and marked as to efficiency and purpose.

.2 Gloves and eye protection.

.3 Disposable paper coveralls including head covering.

.4 Ensure that no person required to enter Mould Contaminated Work Area has facial hair that affects seal between respirator and face.

.5 Eating, drinking and chewing are not permitted in Mould Contaminated Work Area.

.6 Before leaving Mould Contaminated Work Area, dispose of protective clothing as waste as specified.

.7 Ensure workers wash hands and face after leaving Mould Contaminated Work Area. Facilities for washing are located as indicated on drawings.

1.8 VISITOR PROTECTION

.1 Protective clothing and approved respirators Non-powered disposable filter-type respirator of type full face to be worn by Authorized Visitors to Mould Contaminated Work Area.

.2 Instruct Authorized Visitors in use of protective clothing, respirators, and procedures.

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Mould contaminated work area.

1.9 HOURS OF WORK

.1 Typical work schedule - performwork after normal working hours and/or on weekends. Include in Contract Sum additional costs due to this requirement. Be available to work continuously from beginning to end of project.

Part 2 Products

2.1 MATERIALS

.1 Drop Sheets: fibre reinforced polyethylene 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Disposal bags: dust-tight 0.15 mm clear polyethylene waste bags.

.3 Wetting Agent: water to mist mould-containing material.

.4 Cleaning solution: detergent solution for damp wipe and/or mop.

.5 Fibre reinforced adhesive tape: used in sealing joints of fibre reinforced polyethylene sheets and for attachment of fibre reinforced polyethylene sheet to finished and unfinished surfaces. Fibre reinforced adhesive tape must be capable of adhering under both dry and wet conditions.

.6 Materials: provide materials such as fibre reinforced polyethylene sheeting, lumber, nails and hardware necessary to construct and dismantle barriers that isolate Mould Contaminated Work Area.

2.2 TOOLS AND EQUIPMENT

.1 Tools and equipment: suitable for use with microbial contamination and must be able to withstand de-contamination.

.2 Personnel protective equipment (protective clothing, personal respiratory filter cartridges, HEPA air filters, etc.): to be provided in sufficient quantities for duration of project.

.3 Vacuum cleaners: equipped with HEPA filters.

.4 Ladders and/or scaffolds: adequate length, strength and sufficient quantity to support work schedule.

.5 Exhaust air fan systems: equipped with HEPA filters and be capable of providing sufficient exhaust air to create a minimum pressure differential of 5 to 7 Pa and to allow sufficient flow of air through area.

Part 3 Execution

3.1 PREPARATION OF MOULD CONTAMINATED WORK AREA

.1 Mould Contaminated Work Area and areas adjacent and around area to be unoccupied. Vacating is recommended in case of infants (less than12 months old), elderly people, persons having undergone recent surgery, immune suppressed people or people with chronic inflammatory lung diseases.

.2 One supervisor for every ten trained workers is required.

.3 Approved supervisor must remain within Mould Contaminated Work Area at all times during disturbance, removal or other handling of mould-contaminated materials.

.4 Turn off HVAC systems prior to starting remediation work to prevent contamination and dust dispersal to other areas of building.

.5 Seal off windows, doorways, skylights, ducts, grilles, diffusers and other openings between Mould Contaminated Work Area and uncontaminated areas outside Mould Contaminated Work Area with fibre reinforced polyethylene sheeting and fibre reinforced adhesive tape to minimize migration of contaminants to other parts of building.

.6 Clean movable objects within proposed Mould Contaminated Work Area using HEPA filtered vacuum equipment, damp wipe surfaces and remove such objects from Mould Contaminated Work Area to a secure and clean area.

.7 Clean fixed objects within proposed Mould Contaminated Work Area using HEPA filtered vacuum, damp wipe surfaces and cover with one layer of fibre reinforced polyethylene sheeting securely fastened with fibre reinforced adhesive tape.

.8 Remove visible dust from surfaces in Mould Contaminated Work Area where dust is likely to be disturbed during course of mould remediation work. Use HEPA vacuum and damp wipe the area.

.9 Do not use compressed air to clean up or remove dust from any surface.

.10 Erect critical barriers around perimeter of Mould Contaminated Work Area before remediation using single layer of 0.15 mm fibre reinforced polyethylene sheeting extending from floor slab to as close as possible to underside of above floor slab. Seal gaps due to ductwork, piping conduits with layer of 0.15 mm fibre reinforced polyethylene sheeting. For larger areas, a steel or wooden stud frame can be erected and fibre reinforced polyethylene sheeting attached to it.

.11 Use 0.15 mm fibre reinforced drop sheets tightly sealed with fibre reinforced adhesive tape over flooring in work areas.

.12 Ensure thatcontainment area is under negative pressure. Use HEPA filtered fan exhausted outside of Mould Contaminated Work Area to create negative pressure.

.13 In smaller easily contained areas, use HEPA vacuum cleaner nozzle within enclosure. Locate vacuum canister outside enclosure.

.14 Before beginning work, at each access to contaminated work area, install warning signs in both official languages in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used: 'CAUTION MOULD HAZARD AREA (25 mm)/NO UNAUTHORIZED ENTRY (19 mm)/WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm)/BREATHING MOULD DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)'.

.15 Do not begin remediation work until barriers are inspected and authorization is given by Consultant.

3.2 MICROBIAL REMEDIATION

.1 If remediation procedures are expected to generate dust or visible concentration of fungi is heavy (blanket as opposed to patchy coverage), then it is recommended that Maximum Precautions Section 02 85 00.03for Mould Remediation be followed using full containment.

.2 Use sprayer (low-velocity, fine-mist) to mist (not wet) materials containing mould to be scraped. Perform work to reduce dust creation to lowest levels practicable.

.3 Non-porous and semi-porous materials can be cleaned using the cleaning solution and reused depending on depth to which microbial growth has penetrated substrate. Wood to be discarded if fungal growth has affected its soundness.

.4 Porous materials insulation wallboards with more than 1 square metre of mould contamination and/or dampness to be removed, discarded and replaced.

.5 Porous materials identified as lightly contaminated that can be cleaned by washing damp wiping can be reused, but to be discarded and replaced if possible.

.6 Dispose of contaminated building materials as specified.

.7 During mould remediation, should Consultant Departmental Representative suspect contamination of areas outside enclosed Mould Contaminated Work Area, contractor to stop remediation work and immediately decontaminate affected areas. Eliminate causes of such contamination. Prohibit unprotected individuals from entering these contaminated areas until air and swab sampling and a visual inspection determines areas are free from contamination.

.8 Notify Departmental Representative Consultant of mould contaminated material discovered during work and not apparent from drawings, specifications or report pertaining to work. Do not disturb such material pending instructions from Consultant Departmental Representative.

3.3 REPAIR AND CLEAN-UP

.1 During Mould Remediation and immediately after completion of mould remediation, clean enclosure starting within top of enclosure and working down to floor. Clean areas using HEPA vacuum and/or by damp mopping with cleaning solution.

.2 Performrestoration of designated Mould Contaminated Work Area as specified.

.3 Leave areas dry and visibly free from contamination, debris and dust.

.4 After clean-up within barrier dismantle, barrier and dispose of as specified.

.5 Perform final thorough clean-up of work areas and adjacent areas affected by work using HEPA vacuum and/or damp mopping with cleaning solution.

3.4 WASTE DISPOSAL

.1 Place debris and mould-containing waste in doubled-bagged dust-tight 0.15 mm fibre reinforced clear polyethylene waste bags. Treat drop sheets and disposable protective clothing as waste; fold these items to contain dust, and place in plastic bags. Securely seal bags.

.2 Cover large items that have heavy mould growth with fibre reinforced polyethylene sheeting and sealed with fibre reinforced adhesive tape before they are removed from enclosure.

.3 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum prior to removal from Mould Contaminated Work Area.

.4 Remove waste bags from site and dispose. There is no special requirements for disposal of mouldy materials, as such they can be disposed of in landfill.

3.5 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

.1 Return objects moved to temporary locations to their location. Ensure objects are cleaned before been moved into cleaned areas.

.2 Remount objects removed to former positions.

.3 Re-establish mechanical and electrical systems to proper working order. Install new filters into HVAC systems serving the affected area as part of remediation.

3.6 FINAL CLEARANCE

.1 Consultant and/or Departmental Representative to conduct thorough visual inspection to detect visible accumulations of dust or bulk materials remaining in work area. Should dust, debris, microbial contamination, or residue be detected repeat cleaning, until area meets approval.

.2 Before and after work, take air samples inside of Mould Contaminated Work Area enclosures in accordance with recommended guidelines.

.3 Perform final air monitoring of Mould Contaminated Work Area provided area has passed visual inspection and an appropriate settling period of 12 hours has passed. If air monitoring results are deemed unacceptable by Departmental Representative and/or Consultant areas are to be re-cleaned with HEPA vacuum and damp wiped until levels are found to be acceptable by Consultant and/or Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 06 10 00, 061500, 061753.

1.2 REFERENCES

.1 American National Standards Institute/National Particleboard Association (ANSI/NPA)

.1 ANSI/NPA A208.1-2009, Particleboard.

.2 ASTM International

.1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.

.3 ASTM C578-11a, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

.4 ASTM C1289-11, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.5 ASTM C1396/C1396M-11, Standard Specification for Gypsum Board.

.6 ASTM D1761-06, Standard Test Methods for Mechanical Fasteners in Wood.

.7 ASTM D5055-11, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.

.8 ASTM D5456-11, Standard Specification for Evaluation of Structural Composite Lumber Products.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-11.3-M87, Hardboard.

.2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.3 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction and amendment.

.4 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.

.4 CSA International

.1 CAN/CSA-A123.2-03(R2008), Asphalt Coated Roofing Sheets.

.2 CAN/CSA-A247-M86 (R1996), Insulating Fiberboard.

.3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.4 CSA O112.9-10, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).

.5 CSA O121-08, Douglas Fir Plywood.

.6 CAN/CSA O122-06(R2011), Structural Glued-Laminated Timber.

.7 CSA O141-05(R2009), Softwood Lumber.

.8 CSA O151-09, Canadian Softwood Plywood.

.9 CSA O153-M1980 (R2008), Poplar Plywood.

.10 CSA O325-07, Construction Sheathing.

.11 CSA O437 Series-93(R2011), Standards on OSB and Waferboard.

.12 CAN/CSA-Z809-08, Sustainable Forest Management.

.5 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.6 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2010.

.7 Sustainable Forestry Initiative (SFI)

.1 SFI-2010-2014 Standard.

.8 The Truss Plate Institute of Canada

.1 Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses 2007.

.9 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

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 for wood products and accessories 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 Territory of Nunavut, Canada.

1.4 QUALITY ASSURANCE

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

.3 Sustainable Standards Certification:

.1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

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

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 FRAMING STRUCTURAL AND PANEL MATERIALS

.1 Description:

.1 Sustainability Characteristics:

.1 Lumber, Finger Jointed Lumber, Glulam, I-Joists, Trusses, SCL, CAN/CSA-Z809 or FSC or SFI certified.

.2 Plywood. Particleboard OSB urea-formaldehyde free, CAN/CSA-Z809 or FSC or SFI certified.

.2 Lumber: softwood, S4S, moisture content 19% (S-dry) or less in accordance with following standards:

.1 CSA O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 Glulam in accordance with Structural Glued-Laminated Timber CAN/CSA-O122.

.4 Wood I-joists in accordance with Prefabricated Wood I-Joists ASTM D5055.

.5 Light-frame trusses in accordance with "Truss Design and Procedures for Light Metal Connected Wood Trusses", The Truss Plate Institute of Canada.

.6 Structural Composite Lumber (SCL) in accordance with ASTM D5456.

.7 Framing and board lumber: in accordance with NBC.

.8 Furring, blocking, nailing strips, grounds, rough bucks, curbs, fascia backing and sleepers:

.1 Board sizes: "Standard" or better grade.

.2 Dimension sizes: "Standard" light framing or better grade.

.3 Post and timbers sizes: "Standard" or better grade.

.9 Plywood, OSB and wood based composite panels: to CSA O325.

.10 Douglas fir plywood (DFP): to CSA O121, standard construction.

.11 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.12 Poplar plywood (PP): to CSA O153, standard construction.

.13 Interior mat-formed wood particleboard: to ANSI/NPA 208.1.

.14 Mat-formed structural panelboards (OSB wafer): to CAN O437.

.15 Insulating fiberboard sheathing: to CAN/CSA-A247 CAN/ULC-S706.

.16 Glass fibre board sheathing: non-structural, rigid, faced, fiberglass, insulating exterior sheathing board.

.17 Gypsum sheathing: to ASTM C1396/C1396M.

2.2 ACCESSORIES

.1 Exterior wall sheathing paper: to CAN/CGSB-51.32

.2 Polyethylene film: to CAN/CGSB-51.34, Type 1, 0.15 mm thick.

.3 Roll roofing: to CAN/CSA A123.2, Type S.

.4 Air seal: closed cell polyurethane or polyethylene.

.5 Sealants: in accordance with Section 07 92 00 - Joint Sealants.

.6 Subflooring adhesive: to CAN/CGSB-71.26, cartridge loaded.

.7 General purpose adhesive: to CSA O112.9.

.8 Nails, spikes and staples: to CSA B111.

.9 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.10 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

.11 Joist hangers: minimum 1 mm thick sheet steel, galvanized ZF001 coating designation. Hangers to be sized by truss manufacturer.

.12 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Consultant.

.13 Fastener Finishes:

.1 Galvanizing: to ASTM A123/A123M, ASTM A653, use galvanized fasteners for exterior work and treated lumber.

.14 Wood Preservative:

.1 Preservative Coating: in accordance with manufacturer's recommendations for surface conditions:

.1 Preservative: VOC limit 350 g/L maximum to SCAQMD Rule 1113.

.2 Coatings: VOC limit 350 g/L maximum to SCAQMD Rule 1113.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product 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 PREPARATION

.1 Treat surfaces of material with wood preservative, before installation.

.2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.

.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.3 MATERIAL USAGE

.1 Roof sheathing:

.1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, square edge, 12.5 mm thick.

.2 Exterior wall sheathing:

.1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, square edge, 12.5 mm thick.

.3 Subflooring:

.1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, T and G edge, 19 mm thick.

3.4 INSTALLATION

.1 Install members true to line, levels and elevations, square and plumb.

.2 Construct continuous members from pieces of longest practical length.

.3 Install spanning members with "crown-edge" up.

.4 Select exposed framing for appearance. Install lumber panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.5 Install subflooring combined subfloor and underlay with panel end-joints located on solid bearing, staggered at least 800 mm.

.1 In addition to mechanical fasteners, floor panels secure floor subflooring to floor joists using glue and screws. Place continuous adhesive bead in accordance with manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt.

.6 Install all wall sheathing in accordance with manufacturer's printed instructions.

.7 Install all roof sheathing in accordance with requirements of NBC.

.8 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.

.9 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.

.1 Align and plumb faces of furring and blocking to tolerance of 1:600.

.10 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.11 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.

.12 Install sleepers as indicated.

.13 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

.14 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.15 Countersink bolts where necessary to provide clearance for other work.

.16 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.5 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.

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by rough carpentry installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

- .1 ANSI A208.1-99, Particleboard.
- .2 ANSI A208.2-02, Medium Density Fibreboard (MDF).
- .3 ANSI/HPVA HP-1-2004, Standard for Hardwood and Decorative Plywood.

.2 American Society for Testing and Materials International (ASTM)

- .1 ASTM E1333-96(2002), Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.

.3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)

- .1 Architectural Woodwork Quality Standards Illustrated, 8th edition, Version 1.0 2003.

.4 Canada Green Building Council (CaGBC)

- .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

.5 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-11.3-M87, Hardboard.

.6 Canadian Plywood Association (CanPly)

- .1 The Plywood Handbook 2005.

.7 Canadian Standards Association (CSA International)

- .1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
- .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA O121-M89(R2003), Douglas Fir Plywood.
- .4 CAN/CSA O141-91(R1999), Softwood Lumber.
- .5 CSA O151-04, Canadian Softwood Plywood.
- .6 CSA O153-M1980(R2003), Poplar Plywood.
- .7 CSA Z760-94, Life Cycle Assessment.

.8 Forest Stewardship Council (FSC)

- .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.9 National Hardwood Lumber Association (NHLA)

- .1 Rules for the Measurement and Inspection of Hardwood and Cypress 1998.

.10 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2005.

.11 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)

.1 SCAQMD Rule 1113-04, Architectural Coatings.

.2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

.12 Underwriters Laboratories of Canada (ULC)

.1 CAN4-S104-80(R1985), Standard Method for Fire Tests of Door Assemblies.

.2 CAN4-S105-85(R1992), Standard Specification for Fire Door Frames, meeting the Performance Required by CAN4-S104.

1.2 SUBMITTALS

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

.2 Shop Drawings Submittals: in accordance with Section 01 33 00 - Submittal Procedures .

.1 Indicate details of construction, profiles, jointing, fastening and other related details.

.2 Indicate materials, thicknesses, finishes and hardware.

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

.1 Submit duplicate samples: sample size 150 x 150 mm or 150 mm long unless specified otherwise of panel materials.

1.3 QUALITY ASSURANCE

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.1 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements .

.1 Protect materials against dampness during and after delivery.

.2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

Part 2 Products

2.1 LUMBER MATERIAL

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 AWMAC custom grade, moisture content as specified.

.4 Forest Stewardship Council (FSC) certified.

.2 Machine stress-rated lumber is acceptable.

.3 Hardwood lumber: moisture content 8% or less in accordance with following standards:

.1 National Hardwood Lumber Association (NHLA).

.2 AWMAC custom grade, moisture content as specified.

.4 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.

.5 Wood screws: plain, type and size to suit application.

.6 Splines: wood.

Part 3 Execution

3.1 INSTALLATION

.1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

.3 Form joints to conceal shrinkage.

3.2 CONSTRUCTION

.1 Fastening:

.1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.

.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.2 Standing and running trim:

.1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.

.2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.

.3 Make joints in baseboard, where necessary using a 45 degrees scarf type joint.

.4 Install door and window trim in single lengths without splicing.

3.3 SCHEDULES

.1 All Window Casings to be replaced and be:

.1 Metrie – Model MP411 Casing – 15.9 x 76.2 Primed Finger Joint Pine

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.

.2 Canadian General Standards Board (CGSB)

.1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).

.2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).

.4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.

.5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 General Services Administration (GSA) - Federal Specifications (FS)

.1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 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 for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Manufacturer's product to describe:

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Samples:

.1 Submit samples of each type of material and colour.

.2 Cured samples of exposed sealants for each colour where required to match adjacent material.

.4 Manufacturer's Instructions:

.1 Submit instructions to include installation instructions for each product used.

1.3 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.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

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

.3 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

.1 Ambient Conditions:

.1 Proceed with installation of joint sealants only when:

.1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.

.2 Joint substrates are dry.

.3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.2 Joint-Width Conditions:

.1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.

.2 Conform to manufacturers recommended installation conditions for applications of sealants

.3 Ventilate area of work by use of portable supply and exhaust fans.

Part 2 Products

2.1 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.

.3 Where sealants are qualified with primers use only these primers.

.4 All sealants to be used in accordance with manufacturers recommended applications

.5 It remains the contractors responsibility to verify compatibility of the sealant with the substrate, primers, backer rods and weather conditions prior to installation.

.1 Bring any discrepancies with the above to the attention of the project manager.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Exterior joints in horizontal wearing (concrete) surfaces: Polyurethane, semi-self-levelling, moisture curing, non-staining, non-bleeding, colour as selected.

.1 ASTM C920
.2 Single Component
.3 Pourable
.4 Class – Cyclic Movement - 100/50
.5 CAN/CGSB – 19.13-M87
.6 Acceptable Product: Vulkem 45 SSL – Tremco Sealants, or approved equivalent.

.2 General exterior use: Silicone, neutral cure ultra-low modulus, moisture curing, nonstaining, nonbleeding, colour as selected.

.1 ASTM C920
.2 Single Component
.3 Non-Sag
.4 Class – Cyclic Movement - 100/50
.5 Class ‘A’
.6 ASTM C1248, C1382, E84
.7 CAN/CGSB – 19.13-M87
.8 Acceptable Product: Spectrem 1 – Tremco Sealants, or approved equivalent.

.3 Glazing: Silicone, neutral cure, medium modulus, colour as selected.

.1 ASTM C920
.2 Single Component
.3 Non-Sag
.4 Class – Cyclic Movement - 50
.5 Class 'A'
.6 ASTM C1248
.7 CAN/CGSB – 19.13-M87
.8 Acceptable Product: Spectrem 2 – Tremco Sealants, or approved equivalent.

.4 Air-Barrier to Window air-seal sealant: Silyl-terminated polyether polymer (STPe), moisture cure, medium modulus.

.1 Compatible with Air-Barrier system.
.2 ASTM C920
.3 Single Component
.4 Non-Sag
.5 Class – Cyclic Movement - 25
.6 Class 'A'
.7 Acceptable Product: Bakor HE925 BES, or approved equivalent.

.5 General interior use: painted gypsum, painted concrete, painted concrete block: Acrylic latex, colour as selected.

.1 Low VOC.
.2 Single Component
.3 Non-Sag
.2 Class – Cyclic Movement - 12.5
.3 Class 'A'
.4 CAN/CGSB 19-GP-14M
.5 Acceptable Product: Tremflex 834 – Tremco Sealants, or approved equivalent.

.6 Plumbing fixtures and general washroom / kitchen (wet-area) usage: sinks, tubs, urinals, water-closets, vanities: Silicone, acetoxy, moisture curing, with fungicide.

.1 ASTM C920
.2 Single Component
.3 Non-Sag
.4 Class – Cyclic Movement – 25
.5 Class 'A'
.6 CAN/CGSB – 19.13-M87
.7 Acceptable Product: Tremsil 200 – Tremco Sealants, or approved equivalent.

.7 Acoustical Sealant: to ASTM C919: Synthetic rubber, single-component, non-skinning, non-hardening.

.1 Single Component

.2 Non-Sag

.3 Class – Cyclic Movement – N/A

.4 CAN/CGSB 19.21 M87

.5 Acceptable Product: Acoustical Sealant – Tremco Sealants, or approved

.8 Preformed compressible and non-compressible back-up materials:

.1 Polyethylene, urethane, neoprene or vinyl foam:

.1 Extruded open closed cell foam backer rod.

.2 Size: oversize 30 to 50 %.

.2 Neoprene or butyl rubber:

.1 Round solid rod, Shore A hardness 70.

.3 High density foam:

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.4 Bond breaker tape:

.1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.

.2 Primer: in accordance with sealant manufacturer's written recommendations.

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 joint sealants installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant:

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing:

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

3.7 CLEANING

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

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

.2 Clean adjacent surfaces immediately.

.3 Remove excess and droppings, using recommended cleaners as work progresses.

.4 Remove masking tape after initial set of sealant.

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

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

PART 1 – GENERAL

1.1 SCOPE OF WORK

.1 This specification applies to buildings included in Part 9 of the National Building Code. This includes buildings of 3 stories or less used for residential occupancy.

.2 Remove and dispose of existing windows.

.3 Provide labour, material, equipment and services necessary and incidental to the general replacement of the windows. Replace window components as described herein.

1.2 REFERENCES

All reference standards shall be current issue or latest revision at the date of building permit issue. This specification refers to the following standards, specifications or publications:

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.

.2 CAN/CGSB-12.8-97, Insulating Glass Units.

.3 SMA 1201R-2002 Specification for Insect Screens for Windows, Sliding Doors and Swinging Doors..

.4 CAN/CGSB-12.1-M, Tempered or Laminated Safety Glass

.5 CAN/CGSB-12.11-M, Wired Safety Glass

.6 CAN/CGSB-12.20-M, Structural Design of Glass for Buildings

.2 Canadian Standards Association (CSA) International

.1 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.

.2 CSA A440S1-09, Canadian Supplement to AAMA/WDMA/CSA 101/1.S.2/A440, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.

.3 CAN/CSA-A440.4-07(R2012), Window, Door, and Skylight Installation

.4 CAN/CSA-A440.2/A440.3-09, Fenestration energy performance/User guide to CSA A440.2, Fenestration energy performance.

.5 CAN/CSA-Z91-02(R2013), Health and Safety Code for Suspended Equipment Operations.

.6 CAN/CSA-Z809-08(R2013), Sustainable Forest Management.

1.3 PERFORMANCE REQUIREMENTS

.1 Design frames in exterior walls to accommodate expansion and contraction within services temperature range of -40°C to 40°C.

.2 Window air tightness to meet the rating of A3 when tested in accordance with CAN/CSA-440 windows.

.3 Window water tightness shall meet the B5 rating when tested in accordance with CAN/CSA-440 windows.

.4 Structural performance shall incorporate minimum design pressure (DP) of 1440Pa with a maximum deflection of 1/175 of the span when tested in accordance with CAN/CSA-440 Windows.

.5 Wind load resistance for window shall meet the C3 rating or better when tested in accordance with CAN/CSA-A440 Windows.

.6 Performance requirement for ease of operation shall be 60 N to initiate movement and 30 N to maintain motion.

.7 The window condensation temperature index of the frame (I_f) shall be 77 or better and temperature index of the glass (I_g) shall be 77 or better when tested in accordance with CAN/CSA-A440 Windows.

.8 The fixed and operable window thermal transmittance U-Value shall be less than 1.7 W/(m^2x°C) when tested in accordance with AAMA 1503.1 and CAN/CSA-A440.2.

.9 Windows shall meet or exceed minimum requirements as listed in CAN/CSA-A440 Windows, Table 27.

.10 Windows shall satisfy egress requirements as detailed in the National Building Code and shall conform to the local Code Authorities having jurisdiction.

.11 Insect screens to be provided for all vent windows; Rating S1 as per Table 4, CSA A440.

.12 Resistance to Forced Entry: F20.

.13 Windows shall conform to the requirements of CSA A440, latest applicable edition. Prior to contract award, the low bidder shall provide the Owner with test reports for the proposed new windows completed by an independent technical source, tested to CSA A440.2 or AAMA 1503 or NFRC Certified Products Listing. A CPD or model number shall be provided.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.

.2 Indicate materials and details in full scale for head, jamb, mullion, sill and sash details, profiles of components, interior and exterior trim, junction between combination units, elevation of units, installation methods, anchorage details, fasteners, caulking, internal drainage details, description of accessories and related components. Indicate location of manufacturer's nameplates.

.3 The Contractor shall supply window shop drawings showing window and glass sizes in addition to screen placement and anchorage. Locking mechanisms for windows shall also be shown. Prior to review by the Owner/Consultant, shop drawings shall be firstly reviewed by the General Contractor.

.4 Provide manufacturer’s fabrication dimensions for all window components (cut sheets) for all window types and configurations.

.5 Provide a list of all window parts, including manufacturers names, extruder name and window series, and current sources of components.

.6 Indicate on shop drawings, dimensions, relation to construction of adjacent work, air and vapour seal with adjacent construction materials, component anchorage and locations, anchor methods, shim methods and materials, and hardware installation details. Include also opening dimensions, frames opening tolerances and affected related work and installation requirements. Provide shop drawings for anchor and shim methods and materials, sealed by an engineer registered in the Territory of Nunavut.

1.5 NOT USED

1.6 QUALIFICATIONS

.1 Manufacturer and installers are to be specialized in the manufacturing and installation respectively of fiberglass window system with a minimum of three years each of documented experience.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Protect pre-finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.8 SAMPLES

.1 Prior to use in this project, upon request by the Owner, a minimum 300 mm x 300 mm (12”x12”) corner sample of windows shall be submitted to the Owner and Consultant for approval.

.2 Include frame, sash, sill, interlock, glazing and weather-proofing method, insect screens, surface finish and all hardware.

1.9 MAINTENANCE DATA

.1 Provide three (3) copies of operation and maintenance data, including cleaning instructions, for all windows and frames.

1.10 MAINTENANCE MATERIALS

.1 Prior to the completion of the Contract, the Contractor must supply the following maintenance materials to a representative of RCMP:

.1 5% of each size of operable sash complete with hardware and glazing (minimum 1)

.2 5% of each size of screen (minimum 1)

.3 5% of all locks, crank hardware, rollers, guides, drain caps and other miscellaneous hardware.

1.12 WARRANTY

.1 Provide written warranty for a period of one year from the date of substantial completion for any defects relating to complete installation and workmanship.

.2 Provide written warranty against defects and malfunction, against material or manufacturing defects under normal usage for a period of twenty (20) years from the date of substantial performance.

.3 Provide written warranty for glazing seal against failure of the hermetic seal for a period of ten (10) years from the date of substantial performance. Date of manufacture to be unobtrusively marked on the interior right hand corner of each unit and shall be not more than one month prior to the date of installation.

.4 Provide written lifetime warranty for all operating hardware.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 All windows by the same manufacturer, with sash and main frames of a type and size to suit the job conditions. General Contractor to verify site conditions prior to manufacturing

of windows. Each window location to be site measured as rough opening dimensions may vary.

.2 Isolate aluminum from the following components, by means of isolation pad or coating:

.2 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.3 Concrete, mortar and masonry.

.3 Exterior caulking shall be Dow Corning 795 high grade neutral cure silicone, or approved alternate as authorized by the Consultant and approved by window manufacturer. Colour shall match that of the material to which it is applied.

.4 All frames to be factory fabricated and shall be fully assembled before shipping to site.

.5 Mounting screws shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.

.6 Anchorage materials: non-corrosive.

.7 Weathering and glazing gaskets shall be extruded, black, closed cell or dense elastomer of durometer appropriate to the function.

.8 Glazing tapes shall be macro-polyisobutylene, highly adhesive and elastic with built in shim.

.9 Provide FIBERGLASS mullion caps, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and contraction, including building deflections. Where mullion joint requires special condition provide alternate proposals, engineering, and other documentation to ensure integrity of the mullion joint. Provide reinforcing mullion plates at every joint secured to frames by screws.

.10 Hardware for locking mechanism shall not impact air leakage performance.

.11 All windows to be supplied with insect screens and all required/specified hardware, friction fit within operable windows.

.12 Screen frame: baked on enamel finish, extruded aluminum complete with corner keys and retainer spline. Casement and awning screen to include integral perimeter flange. Screens removable to the inside only.

.13 Screens: aluminum or galvanized or Fiberglass mesh.

.14 Jamb extensions: 18 mm (¾") FIBERGLASS jamb extensions to suit wall thickness. Jamb extensions to have factory edge adjacent to casings. End caps not permitted.

.15 Casings or finish trim: solid wood (or approved equal), minimum width to suit site conditions.

.16 Weather-stripping: compression type seal against sash, single weather seal at exterior.

2.2 SEALANT MATERIALS

.1 Caulking subcontractor must seal joints between windows and adjacent surfaces with sealant, in accordance with Specification Section 079200.

.2 Window manufacturer will provide written confirmation to the Consultant that the sealant materials are acceptable for use and will have no adverse affect on the window aesthetics, operation or long-term performance.

2.3 WINDOW TYPES

.1 All windows to be full frame replacements complete with brick mould and jamb extensions.

.2 PICTURE WINDOW

.1 Dry glazed interior stops, sealed unit to be removable to interior.

.3 SINGLE OPERATOR HORIZONTAL SLIDING WINDOW (GLIDER)

.1 Locking Hardware: Die cast housing cam lock complete with adjustable strike.

.2 Rolling Hardware: one pair dual brass, nylon or Lubex rollers.

.3 Sash track to include tapered block insert to increase contact pressure at meeting rail.

.4 SINGLE OPERATOR VERTICAL SLIDING WINDOW (SINGLE HUNG)

.1 Locking Hardware: Die cast housing cam lock complete with adjustable strike.

.2 Sash Balance: Adjustable Spiral Balance or Dual opposing stainless steel coil constant force sash balance.

.3 Sash pulls to be integral to sash extrusion or designated handle secured through a minimum of two FIBERGLASS walls. Sash pulls integrated with glazing stops not acceptable.

.4 Pivot bars to be fastened through two FIBERGLASS walls or one wall and screw boss, using FIBERGLASS screws.

.5 CASEMENT WINDOW

.1 Locking Hardware: Die cast multi point lever lock complete with die cast adjustable mushroom head rollers and keepers. Minimum 2 point lock on all sashes.

.2 Operating Hardware: Roto gear dual arm operator using sill mounting *or* flange mounting with reinforcing back plate. High-pressure zinc die cast housing and steel base plate, hardened steel drive worm and gear arm.

.6 AWNING WINDOW

.1 Locking Hardware: Die cast lock. Minimum two locks on all sashes.

.2 Operating Hardware: Roto gear scissor arm operator *or* roto gear pivot shoe operator. High-pressure zinc die cast housing and steel base plate, hardened steel drive worm and gear arm.

2.4 GLASS AND GLAZING MATERIALS

.1 Glaze windows in accordance with CAN/CSA-A440. Insulating glass units must carry Insulating Glass Manufacturers Association of Canada (IGMAC) Certification and be identified with IGMAC, the name of the manufacturer, the location where the units were made and the year of manufacture. Units must comply with the latest edition of CAN/CGSB 12.8, Insulating Glass.

.2 Glazing must have a written ten (10) year warranty against failure of the seal.

.3 Windows to be triple glazed, insulated glass (minimum ½" air space incorporating Argon

fill) and at the discretion of the Owner, incorporate Solarban 70XL low emissivity coating on surface 3. Other acceptable coatings : Cardinal LoE 366.

.4 Glazing thickness to be in accordance with Table A-9.6.1.3.(1) A for Hourly Wind Pressure (HWP) less than 0.55 kPa, in Appendix A, National Building Code, 2010.

.5 All glazing to incorporate Super Spacer Architectural S-Class foam tape glazing spacer or approved equal.

.6 Common area glazing units for both interior and exterior shall utilize glass conforming to CAN/CGSB-12.1-M, Tempered or Laminated Safety Glass or CAN/CGSB-12.11-M, Wired Safety Glass.

2.5 ACCESSORIES

.1 Brick mould and brick mould extensions to be manufactured from extruded FIBERGLASS profiles; matching frame nominal wall thickness. Type as detailed on drawings. Colour to be selected by Owner.

.2 Jamb, sill and head extensions to be made from cellular FIBERGLASS. Size, color and configuration of extensions as shown on drawings and as required on site.

2.6 FABRICATION

.1 Fabricate in accordance with CSA-A440 supplemented as follows:

.2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm (0.06”) for units with a diagonal measurement of 1800 mm (71”) or less and plus or minus 3 mm (0.12”)for units with a diagonal measurement over 1800 mm. (71”).

.3 Frame face dimensions detailed are maximum permissible sizes.

.4 Manufacturer’s nameplates on windows are not acceptable.

.5 Brace frames to maintain squareness and rigidity during shipment and installation.

.6 Finish steel clips and reinforcement to be galvanized with 380 g/m^2 zinc coating to CSA G164.

.7 Fabricate framing from extrusions of size and shape shown on shop drawings.

.8 All framing joints shall be accurately machined, assembled, and sealed to provide neat weather tight connections.

.9 Coupling mullions shall be designed to provide a functional split to permit modular construction and allow for thermal expansion.

.10 Glass stops shall be lock-in screwless type.

.11 Elastomeric seal gasket shall be installed around the full perimeter of glass and sealed at the corners with silicone sealant.

.12 Air seal gasket must have adhesion with silicone sealant.

.13 All FIBERGLASS joints to be "welded corner" construction, frames and sashes.

.14 Drain hole covers for FIBERGLASS windows to be rigid or manufacturer to provide one extra hinged cover per window.

.15 Brick moulds and jamb extension to be installed using arrowhead slots, sealed and mechanically fastened to main frame.

.16 Provide horizontal and vertical galvanized steel or aluminum reinforcement as required to

achieve structural requirements as specified.

.17 Vertical and Horizontal sliding windows: sash and frame meeting rails to be reinforced with aluminum or galvanized steel channel, as required to meet structural requirements as specified.

.18 All windows within a tolerance of ±6 mm (± ¼") shall be fabricated to one dimension.

PART 3 - EXECUTION

3.1 WORKMANSHIP

.1 Install in accordance with CSA-A440.4 supplemented with installation instructions in this specification and manufacturers recommendations. Conflict between installation instructions in this specification and manufacturers instructions must be brought to the attention of the Owner and Consultant prior to installation.

3.2 PREPARATION

.1 All window sizes and measurements shall be taken from the jobsite. The Contractor shall check and verify all site dimensions, on an individual basis, prior to fabrication of windows. The Contractor shall not make any claim to the Owner for mis - measured or improperly measured work.

.2 Remove existing sash, tracks, frames, interior and exterior trims and discard off site. Relocate when possible on a daily basis.

.3 Examine openings into which windows are to be installed to ensure that it is satisfactory before commencement of work. Notify Owner of any rot, damage or deterioration that is evident prior to proceeding with the Work.

.4 Furr out existing openings to achieve ½" maximum shim space. All furring set into the original opening shall be bedded in acoustic sealant.

.5 Move furniture and appliances 4ft from the window and remove window coverings as required, to gain access to window area. The Owner will make arrangements to move fragile items.

3.3 INSTALLATION

.1 All Work shall be completed according to applicable CGSB standards and best industry practice.

.2 Windows shall be installed, glazed and adjusted by experienced personnel in accordance with the manufacturer's instructions and approved shop drawings.

.3 In addition to the manufacturer's installation instructions, the following installation procedures shall be followed:

.1 Fill the space between the window and the rough opening with specified low expansion urethane foam. Note that foam must not be used as a structural load bearing connection meant to resist lateral wind loads.

.2 Maintain continuous air and vapour barriers throughout the assembly, primarily in line with the inside pane of glass and heel bead of glazing compound.

.3 Ensure that the sheet air barrier membrane is adequately adhered to the indicated surfaces prior to the window installation.

.4 Drain water entering joints, condensation occurring in glazing channels or migrating moisture occurring within the system, to the exterior by a weep drainage network.

.5 The system is to accommodate without damage to the components or deterioration of the seals, movement between the window and the perimeter framing.

.4 All items in this section shall be set in their correct location and shall be set level, square, plumb and at proper elevations and in alignment with other work.

.5 Set window into opening plumb and square. Provide temporary shims at window sides and head to ensure proper alignment of window during fastening. Shim along sill at corners, at all vertical mullions and other locations as required to achieve shims at maximum 600 mm (24 inches) o/c.

.6 All windows to be mechanically fastened through side jambs and head, adjacent to shims. Do not fasten through sill. Fastening to be 150-300mm (6-12 inches) from each corner and at maximum 600mm (24 inches) o/c. All screw holes through FIBERGLASS to be predrilled; holes to be 2mm larger than screw diameter. Fasten with minimum #8 stainless steel pan head screws, length sufficient to penetrate framing material a minimum of 35mm (1½ "). Screws to be concealed at all possible locations. Exposed screws to be capped.

.7 Remove shims from side jambs and head of window.

.8 All existing flashing and drip mouldings to be replaced. Refer to detail drawings.

.9 Replace, at no extra cost to the Owner, all glass cracked or broken during the Work of this contract, or otherwise damaged prior to substantial performance. Any breakage due to improper setting and installation shall be replaced by the Contractor, at no extra cost to the Owner, for a period of one year following substantial performance.

.10 Adjust operating sashes and ventilators, screens, hardware and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts if necessary. Refer to manufacturer's instruction sheets.

.11 The Contractor shall ensure that damage done to the interior and exterior finishes, caused by the removal of existing windows, is kept to a minimum. The Contractor will be responsible to repair any damage caused, and to provide and finish any fillers required to fill between surface of new window and the existing surface of the exterior skin of the structure. The cost incurred to do this work will be considered as incidental to the Contract and will not be paid for separately.

3.4 CAULKING

.1 Seal joints between windows and exterior finish. Use foam backer rod to achieve 2:1 width:depth joint ratio.

.2 Apply sealant in accordance with Section 07 92 00 Joint Sealants.

3.5 RESTORATION OF INTERIOR AND EXTERIOR FINISHES

.1 Any and all finishes removed or damaged by the removal of the existing windows or installation of the new windows shall be repaired or replaced to original condition.

.2 All window casings to be replaced with new solid wood casings, minimum width to satisfy site conditions. Casings to be primed/painted or stained/varnished with as many coats as necessary to provide quality finish. Finish color to be selected by the Owner.

.3 The Contractor will be responsible for the removal and re-installation of existing window coverings. The cost for doing this will be considered as incidental to the contract. Reinstall all rails, rods, drapery, drapery tracks, blinds or any other window treatments removed to necessitate the installation of the new windows.

.4 The existing tenant-owned air-conditioners shall be removed, and back to tenant, and re-installed, custom-fitted, to the new window unit.

3.6 FINAL CLEANING

.1 Every piece of glass shall bear the manufacturer's names, type and thickness of the glass. Leave all labels on the glass until they have been inspected and approved by the owner. Labels shall not be removed until final cleaning; leaving no glue residue that may remain after the removal of the label.

.2 Protect installed windows from damage during construction. Protect new window units from incidental damages resulting from plaster, cement, stucco or other harmful contaminants. Do not apply masking tape, adhesives or other chemicals directly to window components. Consult with window manufacturer for product compatibility.

.3 All window components including glazing, shall be thoroughly cleaned, all imperfections corrected and all damaged glass replaced in accordance with manufacturer's instructions at the completion of the project.

.4 Clean the work area, remove and dispose of construction debris from site in accordance with all local regulations and bylaws on a daily basis.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM F1066-04, Standard Specification for Vinyl Composition Floor Tile.

.2 ASTM F1344-04, Standard Specification for Rubber Floor Tile.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-25.20-95, Surface Sealer for Floors.

.2 CAN/CGSB-25.21-95, Detergent-Resistant Floor Polish.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.

.3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit duplicate tile in size specified, base, nosing, feature strips, treads, edge strips 300 mm long.

.4 Closeout Submittals:

.1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.4 ENVIRONMENTAL REQUIREMENTS

.1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees C for 48 hours before, during and for 48 hours after installation.

1.5 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide 12 m^2 of each colour, pattern and type flooring material required for this project for maintenance use.

.3 Extra materials from same production run as installed materials.

.4 Identify each container of floor tile and each container of adhesive.

.5 Deliver to occupant, upon completion of the work of this section.

.6 Store where directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 MICROTONE Raised Round Disk Pattern RTSP RD - Speckled Rubber Tile (SV-1) – Resilient Rubber Tile Flooring with the following physical characteristics:

.1 Complies with requirements for ASTM F 1344 Standard Specification for Rubber Floor Tile, Class 1-B.

.2 Manufactured from a homogeneous composition of 100% synthetic rubber.

.3 Overall thickness: 1/8”.

.4 Tile size: 24" x 24" (61 cm x 61 cm).

.5 ASTM D 2240 Standard Test Method for Rubber Property—Durometer Hardness: Not less than 85 Shore A.

.6 ASTM D 3389 Standard Test Method for Coated Fabrics Abrasion Resistance: < 1.00 gram weight loss.

.7 ASTM D 2047, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring: Exceeds Federal Standards and A.D.A. requirements for slip-resistant.

.8 ASTM F 970, Standard Test Method for Static Load Limit – passes at 250 PSI.

.9 ASTM E 648, Standard Test method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source – Class 1.

.10 Johnsonite offers a RESTART reclamation program for returning jobsite scrap.

.11 SCS FloorScore® Certified and meets California Specifications Section 01250.

.12 Phthalate, chlorine and halogen free.

.13 NSF-332 Gold Certified.

.14 Johnsonite facilities are ISO 9001 and ISO 14001 Certified.

.15 Color from Manufacturers standard range.

.2 Underlayment:

.1 Underlayment plywood 1/4” (As per manufacturers instructions)

.3 Finish:

.1 Factory prefinished.

.4 Primers and adhesives: waterproof recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.

.1 Flooring adhesives:

.1 As per manufacturers instructions

.5 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.

.6 Metal edge strips: aluminum extruded, smooth, mill finish polished with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.

.7 Resilient stair tread: Johnsonite Rubber stringers and risers Texture BMTR – Color to be chosen from manufacturers standard group.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSPECTION

.1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer.

3.3 SUB-FLOOR TREATMENT

.1 Remove existing resilient flooring.

.2 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.

.3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

.4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

.5 Install underlayment

3.4 TILE APPLICATION

.1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.

.2 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.3 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.

.4 Install flooring as per manuf. instrucitons

.5 Cut tile and fit neatly around fixed objects.

.6 Install feature strips and floor markings where indicated. Fit joints tightly.

.7 Install flooring in pan type floor access covers. Maintain floor pattern.

.8 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.9 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.

.10 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.5 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 Remove excess adhesive from floor, base and wall surfaces without damage.

.3 Clean, seal and wax floor and base surface to flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.

3.7 PROTECTION

.1 Protect new floors from until final waxing.

.2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual, 2004.

.2 MPI - Maintenance Repainting Manual, 1998.

1.2 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures 01 00 10 - General Instructions.

.2 Product Data:

.1 Submit product data and instructions for each paint and coating product to be used.

.2 Submit product data for the use and application of paint thinner.

.3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures 01 00 10 - General Instructions.

.4 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Submit manufacturer's installation and application instructions.

1.3 STORAGE AND HANDLING

.1 Storage and Protection:

.1 Provide and maintain dry, temperature controlled, secure storage.

.2 Store materials and supplies away from heat generating devices.

.3 Store materials and equipment in well ventilated area within temperature as recommended by manufacturer.

.2 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

.4 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

1.5 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces continuously during and after painting process. Run ventilation system 24 hours per day during installation, and provide continuous ventilation for 7 days after completion of application of paint.

.2 Co-ordinate use of existing ventilation system with Property Manager and ensure its operation during and after application of paint as required.

.3 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.

.2 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.

.3 Additional application requirements:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Property Manager such that painted surfaces will have dried and cured sufficiently before occupants are affected.

Part 2 Products

2.1 MATERIALS

.1 Provide paint materials for paint systems from single manufacturer.

.1 Acceptable Manufacturers: Sherwin Williams, Benjamin Moore, Pittsburgh Paints.

.2 Conform to latest MPI requirements for all painting work including preparation and priming.

.3 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual "Approved Product" listing.

.4 Use MPI listed materials having minimum E2 rating where indoor air quality (odour) requirements exist.

2.2 COLOURS

.1 Colour schedule will be based upon selection of 2 base colours and two accent colours.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site, in accordance with manufacturer's written instructions. Obtain written approval from Consultant for tinting of painting materials.

.2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.3 Thin paint for spraying in accordance with paint manufacturer's instructions.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

.2 Gloss level ratings of painted surfaces as indicated and as noted on Finish Schedule.

2.5 EXTERIOR PAINTING

.1 Concrete Vertical Surfaces: (including horizontal soffits)

.1 EXT 3.1A - Latex semi gloss finish.

.2 Concrete Masonry Units: smooth and split face block and brickEXT 4.2A - Latex semi gloss finish.

.3 Structural Steel and Metal Fabrications: columns, beams, joists and miscellaneous metal.

.1 EXT 5.1D - Alkyd semi gloss finish.

.4 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).

.1 EXT 5.3B - Alkyd semi gloss finish.

.5 Dimension Lumber: columns, beams, exposed joists, underside of decking, siding, fencing, etc.

.1 EXT 6.2B - Waterborne solid colour stain finish.
.2 EXT 6.2C - Alkyd semi gloss finish.
.3 EXT 6.2L - Semi-transparent stain finish.

.6 Dressed Lumber: doors, door and window frames, casings, battens, smooth facias, etc.

.1 EXT 6.3B - Alkyd semi gloss finish do not use flat finish on doors.
.2 EXT 6.3C - Solid colour stain finish do not use in high contact areas or on doors.
.3 EXT 6.3D - Semi-transparent stain finish do not use on doors.

2.6 INTERIOR PAINTING

.1 Structural Steel and Metal Fabrications: columns, beams, joists and miscellaneous metal.

.1 INT 5.1E Alkyd - semi gloss finish.

.2 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).

.1 INT 5.3C - Alkyd semi gloss finish (over cementitious primer).

.3 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock" type material, etc.

.1 INT 9.2A - Latex semi gloss finish (over latex sealer).
.2 INT 9.2C - Alkyd semi gloss finish (over latex sealer).
.3 INT 9.2M - Institutional low odour/low VOC semi gloss finish.

Part 3 Execution

3.1 GENERAL

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

.2 Perform preparation and operations for interior painting in accordance with MPI - Architectural Painting Specifications Manual and MPI - Maintenance Repainting Manual except where specified otherwise.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to RCMP Property Manager and General Contractor damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.3 PREPARATION

.1 Protection:

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by RCMP Property Manager or Consultant.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.2 Surface Preparation:

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of RCMP Property Manager.

.3 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual specific requirements and coating manufacturer's recommendations.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.

.8 Touch up of shop primers with primer as specified.

.9 Do not apply paint until prepared surfaces have been accepted by Consultant

3.4 APPLICATION

.1 Method of application to be as approved by Consultant. Conform to manufacturer's application instructions unless specified otherwise.

.2 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.3 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.4 Sand and dust between coats to remove visible defects.

.5 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

3.5 SCHEDULE

.1 Paint all new interior casings with 1 coat primer and 2 coats semi gloss paint. Color to match existing trim color.

.2 Re-Paint as required to repair damage caused by window removal and installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Aluminum Association, Inc. (AAI)

.1 AAI DAF45-03, Designation System for Aluminum Finishes.

.2 ASTM International Inc.

.1 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated, (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM B32-04, Standard Specification for Solder Metal.

.3 ASTM B456-03, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.

.2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.

.3 CGSB 31-GP-107Ma-90, Non-Inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.

.4 CGSB 41-GP-6M-1983, Sheets, Thermosetting Polyester Plastics, Glass Fibre Reinforced. Reaffirmation of September 1976.

.4 Canadian Standards Association (CSA International)

.1 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.2 CSA W47.2-M1987(R2008), Certification of Companies for Fusion Welding of Aluminum.

.3 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

.4 CSA W59.2-M1991(R2003), Welded Aluminum Construction.

.5 Canadian Sheet Steel Building Institute (CSSBI)

.1 CSSBI SSF 6-1995, Sheet Steel Facts #6, Metallic Coated Sheet Steel for Structural Building Products-July 1995.

.6 Green Seal Environmental Standards

.1 Standard GS-11-2008, 2nd Edition, Paints and Coatings.

.2 Standard GS-36-00, Commercial Adhesives.

.7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.8 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - February 2004.

.1 MPI #76, Quick Dry Alkyd Metal Primer.

.2 MPI #96, Quick Dry Enamel Gloss.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer’s installation instructions and warranty requirements.

1.3 ACTION SUBMITTALS

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

.2 Shop Drawings:

.1 Submit shop drawings and catalogue sheets.

.2 Indicate materials, thicknesses, sizes, finishes, colours, construction details, removable and interchangeable components, electrical components specifications and power loads, wiring terminal box locations, lamp centres and overlaps, access panels, mounting methods, schedule of signs.

.3 Submit drawn-to-scale details for individually fabricated or incised lettering indicating word and letter spacing.

.3 Samples:

.1 Submit duplicate representative sample of each type sign, sign image and mounting method including, but not limited to: graphics, cast letters, sign box installation method, channel letters, and wall plates fixed mounting installation method.

1.4 INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature panel signage or components, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for illuminated signs for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.6 QUALITY ASSURANCE

.1 Welding Certification in accordance with CSA W47.2.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

Part 2 Products

2.1 MATERIALS

.1 Aluminum extrusions: to designation AA 6063-T5 AA 6006-T5.

.2 Sheet aluminum: anodizing quality.

.3 Prefinished sheet aluminum: plain utility sheet with manufacturer applied baked enamel finish.

.4 Electrical components: CSA approved.

.5 Welding materials: to CSA W59.

.6 Solder: to ASTM B32, Type Sn50.

.7 Self-stick foam tape: 1.6 mm thick, 352.4 kg/m^3 density polyurethane open-cell foam tape for sign purposes, with synthetic self-stick adhesive on both sides.

.1 Width: to suit sign sizes.

.8 Bituminous paint: to MPI EXT 5.4D.

2.2 TANK SIGNAGE

.1 Screen print on steel or aluminum with reflective sheeting finish.

.1 WHIMIS Label 1202 10 ¾" x 10 ¾"

.2 Spill Report sign 10" x 14"

.3 No Smoking Sign 10" x 14"

.2 U-Channel post: Hot dipped galvanized rolled high tensile steel, length to suit, prepuce with 10 mm holes at 25 mm orc.

.3 Tamper-proof bolts and nuts: steel zinc plated bolts with cone shaped fluted aluminum nuts.

2.3 FABRICATION

.1 Fabricate signs in accordance with details, specifications and shop drawings.

.2 Build units square, true, accurate to size, free from visual or performance defects.

.3 Fit and securely join sections to obtain tight, closed joints.

.4 Allow for thermal movement without distortion of components.

.5 Exposed fasteners permitted where indicated where approved by Consultant and to be inconspicuous and same color and finish as base material or as noted.

.6 Polish exposed edges of metal to smooth, slightly convex profile.

.7 Do steel welding to CSA W59 and aluminum welding to CSA W59.2.

.1 Finish exposed welds flush and smooth.

.8 Apply bituminous paint to aluminum in contact with dissimilar metals, concrete or masonry.

.9 Manufacturer's nameplates on sign surface permitted in non-visible locations in completed work.

Part 3 Execution

3.1 INSTALLATION

.1 Manufacturer's Instructions: compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

.2 Erect and secure signs plumb and level at elevations indicated.

.3 Comply with sign manufacturer's installation instructions and approved shop drawings.

.4 Mechanical attachment:

.1 To concrete or solid masonry: use lag screws and expansion bolts or screws and fibre plugs, as appropriate for stresses involved.

.2 To hollow masonry: use toggle bolts or equivalent.

.3 To steel: use bolts with nut and lock washers, self-tapping screws.

.1 Do steel welding to CSA W59 and aluminum welding to CSA W59.2.

.2 Finish exposed welds flush and smooth.

.4 To wood: use screws.

.5 Secure into framing members behind stud walls or above ceilings.

.6 Mechanical fasteners on exterior: non-staining, non-ferrous type.

.7 Fabricate special fasteners as required for installation conditions.

.8 Mechanical fasteners and methods of attachment subject to Consultant's approval.

.1 Obtain Consultant’s approval before fixing to structural steel.

.5 Adhesive attachment:

.1 Use self-stick adhesive foam tape to manufacturer's instructions to fix sign and prevent "rocking".

.2 Keep tape maximum 1.6 mm from edges.

3.2 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.3 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Leave signs clean.

.3 Remove debris from interior of sign boxes.

.4 Touch up damaged finishes.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 231113 Fuel Oil Piping.

1.2 SUBMITTALS

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

.2 Shop drawings; submit drawings stamped and signed by professional engineer registered or licensed in Territory of Nunavut, Canada, for steel stands and rebar. See structural drawings.

.3 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.4 Shop drawings and product data accompanied by:

- .1 Points of operation on performance curves. (Pumps)
- .2 Manufacturer to certify current model production.
- .3 Certification of compliance to applicable codes. (valves, tanks, filters etc.)

.5 Closeout Submittals

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance manual approved by, and final copies deposited with Consultant before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Operation instruction for systems and component.
  - .4 Description of actions to be taken in event of equipment failure.
  - .5 Valves schedule and flow diagram.
  - .6 Colour coding chart.
- .4 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.
- .5 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. (i.e. tank and pie testing.)

.6 Approvals:

.1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative and 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 Departmental Representative or Consultant.

.7 Additional data:

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

.8 Site records:

.1 Consultant will provide 1set 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 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.

.9 As-built drawings:

.1 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).

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

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

1.3 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 MAINTENANCE

.1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals 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.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 024199 - Demolition for Minor Works.

.2 Dispose of waste as per local regulations.

Part 2 Execution

2.1 PAINTING REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 10 – Painting.

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

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

2.2 CLEANING

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

2.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and Section 23 11 13 – Fuel Oil Piping and submit report as described in PART 1 - SUBMITTALS.

.1 Pneumatic testing of tank.

.2 Pressure test of piping.

.3 Hydrostatic test of tank.

2.4 PROTECTION

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Pipe and pipe fittings.

.2 Valves.

.3 Fuel oil storage tanks.

.4 Accessories.

1.2 RELATED SECTIONS

.1 Section 01 10 13 - Summary of Work

.2 Section 01 20 13 - Price and Payment Procedures

.3 Section 01 33 00 - Administrative Requirements.

.4 Section 01 61 00 - Common Product Requirements.

.5 Section 01 78 10 - Execution Requirements.

.6 Section 08 31 13 - Access Doors And Frames.

.7 Section 09 91 10 - Painting.

.8 Section 23 05 16 - Piping Expansion Compensation.

.9 Section 23 05 29 - Supports And Anchors.

.10 Section 23 05 53 - Mechanical Identification.

.11 Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

.12 Section 31 23 18 - Trenching.

.13 Section 31 23 23 - Backfilling.

1.3 REFERENCES

.1 ANSI B31.1 - Power Piping.

.2 ANSI B31.4 - Liquid Petroleum Transportation Piping Systems.

.3 ANSI B31.9 - Building Service Piping.

.4 API Spec 12P - Fibreglass Reinforced Plastic Tanks.

.5 API 650 - Welded Steel Tanks for Oil Storage.

.6 API 2000 - Venting Atmospheric and Low Pressure Storage Tanks.

.7 ASME - Boiler and Pressure Vessel Code.

.8 ASME SEC IX - Welding and Brazing Qualifications.

.9 ASME B16.3 - Malleable Iron Threaded Fittings.

.10 ASME B16.18 - Cast Copper Alloy Solder-Joint Pressure Fittings.

.11 ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings

.12 ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.

.13 ASME B36.10 - Welded and Seamless Wrought Steel Pipe.

.14 ASTM A53/A53M - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

.15 ASTM A234/A234M - Piping Fittings of Wrought-Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

.16 ASTM B88 - Seamless Copper Water Tube.

.17 AWS A5.8 - Filler Metals for Brazing and Braze Welding.

.18 AWWA C105 - Polyethylene Encasement for Ductile Iron Pipe Systems.

.19 CSA B139.2-15 Installation code for oil-burning equipment for residential and small commercial buildings

.20 CAN/ULC –S670 Standard for Aboveground non-metallic tanks for fuel oil and other combustible liquids

.21 CAN/ULC –S670, 677, 652, 601, 602, 653, or 655

.22 Factory Mutual Class 7440 – fusible links

.23 NFPA 30 - Flammable and Combustible Liquids Code.

.24 NFPA 31 - Installation of Oil-Burning Equipment.

.25 ULC/ORD –C842 Guide for the Investigation of Valves for Flammable and Combustible Liquids.

.26 ULC/ORD –C536 Flexible Metallic Hose

.27 UL 80 - Steel Tanks for Oil-Burner Fuel.

.28 UL 142 - Steel Aboveground Tanks for Flammable and Combustible Liquids.

.29 UL 1316 - Glass Fibre Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol Gasline Mixtures.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Procedures for submittals.

.2 Product Data: Provide data on pipe materials, pipe fittings, valves and accessories. Provide manufacturers catalogue information. Indicate valve data and ratings.

.3 Shop Drawings: Indicate tanks, system layout, pipe sizes, location, and elevations. For fuel oil tanks, indicate dimensions and accessories including manholes and hold down straps.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Procedures for submittals.

.2 Certificates: Certify that tanks/pumps/valves meet or exceed specified requirements.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

.1 Section 01 78 10: Procedures for submittals.

.2 Project Record Documents: Record actual locations of piping system, storage tanks, and system components.

.3 Maintenance Data: Include installation instructions, spare parts lists.

.4 Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

.1 Welding Materials and Procedures: Conform to ASME Code.

.2 Welders Certification: To ASME SEC IX and CSA.

.3 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

.4 Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

.5 Valves: Manufacturer's name and pressure rating marked on valve body.

.6 Piping, flanges, unions, couplings: Manufacturer's name and pressure rating marked on body.

1.8 REGULATORY REQUIREMENTS

.1 Conform to CSA B139.2-15 and CSA B139.2-15 for installation of fuel oil system.

.2 Provide certificate of compliance from authority having jurisdiction indicating approval of installation of fuel oil system.

.3 Products Requiring Electrical Connection: Listed and classified by CSA as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Protect piping and fittings from soil and debris with temporary end caps and closures. Maintain in place until installation.

1.10 WARRANTY

.1 Section 01 78 10.

.2 Provide thirty-year manufacturer warranty for oil tank against defects and corrosion.

1.11 EXTRA MATERIALS

.1 Section 01 78 10.

.2 Provide two repacking kits for each size valve.

.3 Provide two oil filters for each boiler or furnace.

.4 Provide dipstick and water finding paste.

.5 Provide spill kit for each tank.

Part 2 Products

2.1 ABOVE GROUND PIPING

.1 Copper Tubing: ASTM B88M, Type K,L,M, hard drawn.

.1 Fittings: ASME B16.18, cast copper alloy or ASTM B16.22 wrought copper and bronze.

.2 Joints: AWS A5.8 Classification BCuP-3 or BCuP-4 silver braze.

.2 Copper Tubing: ASTM B88M, Type K,L, annealed.

.1 Fittings: ASME B16.26, cast bronze.

.2 Joints: Flared.

.3 Steel Pipe: ASTM A53 or ASME B36.10, Schedule 40 black.

.1 Fittings: ASTM B16.3, malleable iron, or ASTM A234/A234M, wrought carbon steel and alloy steel welding type.

.2 Joints: NFPA 30, threaded or welded to ASME 16.3 or ASME 16.39.

.4 No compression fittings. No union requiring packing or gaskets. No right and left couplings. No solder or braze materials with a MP<538C.

.5 Pipe jointing compound – CAN/ULC-S642. Suitable for fuel oil.

2.2 PIPE HANGERS AND SUPPORTS

.1 Hangers for Pipe Sizes 15 to 40 mm, Carbon steel, adjustable swivel, split ring.

.2 Hangers for Pipe Sizes 50 mm and Over: Carbon steel, adjustable, clevis.

.3 Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

.4 Wall Support for Pipe Sizes to 80 mm: Cast iron hook.

.5 Vertical Support: Steel riser clamp.

.6 Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

.7 Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.3 FLANGES, UNIONS, AND COUPLINGS

.1 Pipe Size 50 mm and Under:

.1 Ferrous pipe: 1034 kPa (150 psi) malleable iron threaded unions.

.2 Copper tube: 1034 kPa (150 psi) bronze unions with brazed joints. No solder or braze materials with a MP<538C.

.2 Pipe jointing compound – CAN/ULC-S642. Suitable for fuel oil.

2.4 BALL VALVES (BV-1)

.1 Manufacturer: Kitz 68A

.2 Other acceptable manufacturers offering equivalent products:

.1 Morrison Bros.

.2 Toyo

.3 Substitutions: [Refer to Section 01 62 00.]

.3 Class 600 WOG, bronze, full bore, forged brass ball, brass gland and PTFE Teflon seats, steel lever handle, solder or threaded ends.

.4 Exterior valves suitable for cold temperatures to -40C (-40F).

.5 Conforms to ULC/ORD-C482.

2.5 CHECK VALVES (CV-1)

.1 Manufacturer: Beckett Model 12430, 12440

.2 Other acceptable manufacturers offering equivalent products:

.1 Morrison Bros.

.2 Kitz Fig 22

.3 Substitutions: [Refer to Section 01 62 00.]

.3 MSS SP-80, Class 125, bronze body and cap, bronze swing disc, threaded ends.

2.6 FLEXIBLE CONNECTORS (FC-1)

.1 Manufacturer: OPW Model Stainless Steel Flex Connectors.

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: [Refer to Section 01 62 00.]

.3 Bronze inner hose and braided exterior sleeve, suitable for temp rating -40F to 105F. Max operating pressure 1375kPa (200 psi) CWP.

.4 ULC/ORD C536 Flexible Metallic Hose.

2.7 DEAERATOR (DA-1)

.1 Manufacturer: Westwood Products: Tigerloop Ultra with screw-on oil filter

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: Not permitted.

.3 Temp rating -7C to 40C (20F-105F). Max operating pressure 55 kPa (8psi). Max nozzle capacity 75.8 L/min (20GPH).

2.8 FUSIBLE LINKS (FL-1)

.1 Manufacturer: Firomatic.

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: Not permitted.

.3 Max temp rating 74C (165F).

.4 ULC 842 listed.

2.9 TANK WHISTLE (TW-1)

.1 Manufacturer: Beckett.

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: [Refer to Section 01 62 00.]

.3 Lockable, with screen on vent cover.

2.10 FILL CAP (FC-1)

.1 Manufacturer: Beckett Speed Fill.

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: [Refer to Section 01 62 00.]

.3 Zamak casting, lockable, cap chained to fill opening.

2.11 FILL BOX (FB-1)

.1 Manufacturer: Morrison 517 Series 3-1/2 Gallon AST Spill Containers.

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: [Refer to Section 01 62 00.]

.3 3 1/2 gallon (13.25 liters) capacity

.4 Hinged cover lockable with a padlock

.5 Body: 16 gauge spun steel, powder coated white

.6 Cover: 16 gauge steel, powder coated white

2.12 SPILL KITS (SK-1)

.1 Manufacturer:. SPC Oil Only Spill Kits (Economy and 55Gal drum)

.2 Other acceptable manufacturers offering equivalent products:

.1 Enpac

.2 Substitutions: [Refer to Section 01 62 00.]

.3 Residences: 5Gal capacity

.4 Detachments: 20Gal capacity.

2.13 VENT CAPS (VC-1)

.1 Manufacturer: Beckett. Model: Zinc-plated mushroom vent cap.

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: [Refer to Section 01 62 00.]

.3 Zinc plated cast iron, with screen.

2.14 LEVELOMETER (LI-1)

.1 Manufacturer: K TECH LEVELOMETER Model Midget Model 277 Pneumatic Indicator

.2 Other acceptable manufacturers offering equivalent products:

.1 King Tank Gauges.

.2 Rocket Wireless Gauge.

.3 Substitutions: [Refer to Section 01 62 00.]

.3 ULC/ORD-C180-97 listed.

2.15 OIL FILTER

.1 Manufacturer: Canadian General Filters

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: [Refer to Section 01 62 00.]

.3 Suitable for oil burner.

2.16 WARM-UP PIPE (WP-1,2)

.1 Shop manufactured. See sketch SK-1 in Appendix A.

.2 WP-1: Schedule 40 pipe, 250mm (10”) dia., 600mm (24”) long, 31L.

.3 WP-2: Schedule 40 pipe, 100mm (4”) dia., 600mm (24”) long, 5L.

.4 With 25mm (1”) drain valve and air bleed valvc. (BV-1)

2.17 ABOVEGROUND FUEL STORAGE TANKS (T-1)

.1 Manufacturer: Vilco D252.

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: Not permitted.

.3 Tank: CAN/ ULC-S670, double wall, fibreglass, oval with integral molded support feet, tappings for accessories, threaded connections.

.4 Capacity: 1136 L. (250 gallons).

2.18 INDOOR DOUBLE-WALL STORAGE TANKS (T-2)

.1 Manufacturer: Steelcraft.

.2 Other acceptable manufacturers offering equivalent products:

.1 DTE Industries

.2 Clemmersteel

.3 Roth

.4 Regal Tanks

.5 Substitutions: [Refer to Section 01 62 00.].

.3 Tank: CAN/ ULC-S602, double wall steel construction, tappings for accessories, threaded connections. Vacuum monitored, or contained type designed to contain at least 100% of tank volume with monitoring (as per CSA B139.1.1-15 Section 6.2). Sizes as per schedule.

2.19 FUEL OIL PUMPS

.1 Manufacturer: Viking Model FH-432X.

.2 Other acceptable manufacturers offering equivalent products:

.1 Substitutions: Not permitted.

.3 Casing: Bronze, rated for 860 kPa (125 psi) working pressure with integral pressure relief valve.

.4 Impeller: Bronze gears, positive displacement.

.5 Drive: Direct connected with flexible coupling.

.6 Accessories: Adjustable pressure control valve, bleed valve, mechanical seal.

.7 ULC listed for fuel oil.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 10 13: Verification of existing conditions before starting work.

.2 Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

.1 Ream pipe and tube ends. Remove burrs.

.2 Remove scale and dirt, on inside and outside, before assembly.

.3 Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

.1 Install to manufacturer's instructions, stamped drawings, and CSA B139.2-15.

.2 Provide non-conducting dielectric connections wherever jointing dissimilar metals.

.3 Install piping using fittings manufactured to ANSI standards. Provide threaded fittings, except use welded fittings where piping is concelad.

.4 Route piping in orderly manner and maintain gradient.

.5 Install piping to conserve building space and not interfere with use of space.

.6 Group piping whenever practical at common elevations.

.7 Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

.8 Provide clearance for installation of insulation and access to valves and fittings.

.9 Provide access where valves and fittings are not exposed. [Coordinate size and location of access doors with Section 08 31 13.]

.10 Where pipe support members are welded to structural building framing, scrape, brush clean, weld, and apply one coat of zinc rich primer.

.11 Where pipe travels through buildings walls, use pipe sleeves or wrap pipe with two layers or pipe wrap.

.12 Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting. Refer to Section 09 91 10.

.13 Identify piping systems including underground piping. refer to Section 23 05 53.

.14 Install valves with stems upright or horizontal, not inverted.

.15 Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

.16 Test system in accordance with CSA B139.1-15 and authority having jurisdiction. Isolate tank from piping during tests. Clean strainers and filters after testing and provide new filter upon handover.

3.4 FUEL TANK INSTALLATION

.1 Install tanks and associated piping to manufacturer's instructions, stamped drawings, and CSA B139.2-15.

.2 Test tank as per manufacturer’s instructions. Upon delivery, perform pneumatic testing as per manufacturer’s instructions.

.3 Mount aboveground tanks on foundation or stands as indicated on drawings.

.4 Clean and flush day tank/warming tank prior to delivery to site. Seal until pipe connections are made.

.5 Fill tanks at project turn-over with appropriate fuel. Do not transfer oil from old tank to new tank. At first fill, perform hydrostatic test of tank as per CSA B139.2-15 section 6.9.

.6 Ensure level gauges have leak-proof and vapour-proof connections. Calibrate level gauges.

END OF SECTION

Mould and Moisture Assessment Report Stantec

Mould and Moisture Assessment

RCMP Housing Units
Resolute Bay, NU

Prepared for:
NW-CMB Asset Management
RCMP
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December 22, 2016

MOULD AND MOISTURE ASSESSMENT

Revision	Date	Author		Quality Check		Independent Review	
00	Dec. 16, 2016	Sparky Murphy	SM	Paul W	PRW	Rob Robinson	RR
01	Dec. 22, 2016	Sparky Murphy	SM			Rob Robinson	RR

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List of Appendices

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was commissioned by the Royal Canadian Mounted Police (RCMP) to conduct a mould and moisture assessment of the Accommodations Building located in Resolute, NU.

The primary purpose of the assessment is to identify the extent of mould growth observed by occupants in the building to allow for the remediation of mould-impacted building materials. Further, Stantec was to review the condition of damaged building materials and to provide recommendations for the restoration of the building structure to prevent further damage and associated mould growth.

The site work was performed by Sparky Murphy November 29-30, 2016. This report outlines the findings of the assessment.

1.1 SCOPE OF WORK

- A review of available historical building information was not completed as no reports or building drawings were provided.
- A room-by–room visual assessment of all room spaces, including crawlspaces, pipe shafts, domestic water lines, and underlay roofing for mould-impacted building materials;
- An interview with the most recent building occupants;
- Documentation of moisture content of a sampling of building materials with evidence of suspected mould growth and/or moisture using a non-intrusive moisture meter. The moisture meter was used as a diagnostic tool only;
- Intrusive assessments in areas where suspect mould and/or moisture was observed to permit visual observation inside wall and ceiling cavities;
- Collection of 3 tape-lift samples of building materials exhibiting suspect mould growth, for submission to an independent NVLAP-accredited laboratory for analysis;
- Collection of 9 mould air samples (spore-traps), for submission to an independent NVLAP-accredited laboratory for analysis;
- Investigation and assessment of the potential impact of humidity levels with respect to the HVAC system influencing the levels of moisture and condensation observed on interior finishings.
- A determination if the current construction design needs to be altered to correct existing moisture problems. The assessment also considered lifestyle issues, moisture sources, and ventilation effectiveness; and,
- Documentation of existing conditions within and outside the subject building, including site photographs.

1.2 LIMITATIONS OF SURVEY

The information and observations contained within this report are based on visual assessments of the interior surfaces of the building (i.e., walls, ceilings, and floors), as well as laboratory analysis.

The conclusions given in this report are based on data obtained during the assessment and can only be extrapolated to an undefined limited area surrounding the sample locations.

1.2.1 Site-Specific Limitations

The roof was not accessed at the time of the assessment due to snow accumulation.

1.3 BUILDING DESCRIPTIONS

The mould and moisture assessment was completed for two residential buildings located in the town of Resolute Bay, NU.

Each single-storey building is composed of three (3) pre-fabricated modular units that were transported and assembled on site. Each unit is constructed of pre-engineered and typical wood framing elements, as well as corrugated metal exterior siding and roofing. Each structure is elevated approximately 1.2 meters from the ground by adjustable jack stands. Interior finishes include gypsum board walls and ceilings; and laminate flooring. Both buildings consist of kitchen and living areas; three bedrooms; two washrooms; a utility room; a pantry; and a laundry area.

The utility services, including a boiler system, hot water tank and a septic holding tank, are housed in external sea containers located to the side of each building. The boiler systems supply in-floor hydronic heating to each building. The air quality and ventilation in each building is regulated by a Heat Recovery Ventilator (HRV) and a humidifier that are located in the ceiling space above the pantry.

For the context of this report, the building with the blue roof will be referred to as 'Building A,' while the building with the red roof will be referred to as 'Building B' (Appendix D – Site Map). The three bedroom areas in each building are referred to as Bedroom 1, Bedroom 2, and Bedroom 3 (see page C.3 for floor plan).

2.0 INDUSTRY STANDARDS AND GUIDELINES

The scope of work and assessment are based on the recommendations provided in the following documents:

- *Mould Guidelines for The Canadian Construction Industry,* Canadian Construction Association – 82, 2004
- *Mould Abatement Guidelines,* Environmental Abatement Council of Ontario, Edition 2, 2010
- *Guidelines on Assessment and Remediation of Fungi in Indoor Environment,* New York City Department of Health and Mental Hygiene, November 2008
- *Bioaerosols: Assessment and Control,* American Conference of Governmental Industrial Hygienists (ACGIH), 1999
- *Fungal Contamination in Public Buildings: Health Effects and Investigation Methods,* Federal-Provincial Committee on Environmental and Occupational Health, 2004
- *Field Guide for the Determination of Biological Contaminants in Environmental Samples,* American Industrial Hygiene Association (AIHA), 1996
- *Clean-Up Procedures for Mould in Houses,* Canada Mortgage and Housing Corporation (CMHC), 2004
- *Standard and Reference Guide for Professional Water Damage Restoration – IICRC S500,* Institute of Inspection, Cleaning and Restoration Certification, 2006
- *Standard and* Reference *Guide for Professional Mould Remediation – IICRC S520,* Institute of Inspection, Cleaning and Restoration Certification, 2008

3.0 INVESTIGATIVE METHODOLOGY

3.1 ASSESSMENT

An inspection of the accessible surfaces of the subject areas was completed by Stantec to identify areas where suspect mould was most likely to proliferate (i.e., areas where water damage/staining was visible on building material surfaces). Intrusive assessments were conducted where mould growth was observed and presumed to exist within wall and ceiling spaces. Air testing for mould was conducted throughout the subject building (refer to **Table 1** for findings), and tape lift sampling was also undertaken in a selected area to assess the presence and extent of mould growth on the material where the sample was collected from (refer to **Table 2**).

3.2 SAMPLING

During the assessment, both tape lift sampling and air sampling were conducted, in addition to thermal imaging and assessment of surface moisture.

Samples were analyzed by Paracel Laboratories Ltd. (Paracel) of Ottawa. Paracel is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) and the National Institute of Standards and Technology (NIST), Standard Services Division, National Voluntary Laboratory Accreditation Program (NVLAP) for environmental and Indoor Air Quality (IAQ) tests.

The air sampling was conducted in general accordance with the procedures described in the American Industrial Hygienists Association's *Field Guide for the Determination of Biological Contaminants in Environmental Samples* and Stantec Standard Operating Procedures.

3.2.1 Non-Culturable Air Samples

Non-culturable (spore trap) air sampling was conducted using Zefon Air-O-Cell sampling cassette and a Zefon Bio-Pump® Plus air sampler. The cassette is a sampling device designed for the rapid collection and analysis of airborne fungal spores. The Zefon Bio-Pump® Plus operates by drawing air at a fixed flow rate for a known duration into the sampler and particles in the air are impacted onto a cassette. The sampling was completed for a five minute period at each location and operated at a recommended flow rate of 15 liters/minute, as per manufacturer's specifications. One (1) reference sample was collected for background mould concentrations and genus comparison.

3.2.2 Tape Lift Samples

The tape lift samples were collected using Zefon Biotape. A slide with adhesive tape was placed directly onto the suspect surface and light pressure was applied in order to transfer any mould spores and related structures onto the sticky surface of the slide. The slide was then sealed into a

plastic case and delivered to the laboratory for analysis.

3.2.3 Thermal Imaging Camera

Thermal imaging was conducted with the FLIR B400 InfraRed Camera, equipped with a 25° infra red (IR) lens. The B400 provides high resolution IR images at 320x240 or 76,800 pixels. It is auto ranging from -20 to 350°C with an accuracy of ± 2.0%. This advanced model thermal imager is ideal for review of building air leakage and insulation assessment.

3.2.4 Moisture Meter

Moisture levels in building materials were measured using a Delmhorst BD-10 moisture meter. This analog instrument instantly captures moisture content in wood, drywall, cement, and other building materials. It displays moisture values against current environmental conditions between 6 and 40%.

4.0 SUMMARY OF ASSESSMENT FINDINGS

4.1 GENERAL CONDITIONS

In general, both buildings presented similar conditions with respect to the findings of the mould and moisture assessment. Photographs highlighting significant findings have been provided in **Appendix A**.

4.1.1 Windows

In each building, there are a total of five (5) windows; one (1) in each of the three (3) bedrooms and two (2) in the kitchen area. The windows are casement style with triple Insulated Glass Units (IGU). The windows in both buildings all showed signs of water damage and mould, resulting from humidity condensing at the window surface, and possible water intrusion at the sills. Photographs of the windows, that were presented to Stantec from the building occupants, showed the progression from water damage to mould growth (Photo 1 – Photo #6). The damaged MDF sill and gypsum board around all of the windows had been removed by a contractor prior to the start of the assessment (Photo #7 - Photo #10). Polyethylene plastic sheeting and tape were used to cover the affected areas. As mould impacted materials are disturbed, the spores are likely to become airborne. Mould spores are likely to persist and proliferate under the right conditions if; the work area is not contained during the remediation process; and if impacted materials are not removed to at least 30 cm beyond visual contamination.

At the time of assessment, the materials observed to be impacted by mould and water damage included the remaining Medium-Density Fiberboard (MDF) window sill, insulation, wood strapping and the gypsum board below the windows (Photo #11 - Photo #12). In general, the remaining gypsum board around the windows did not indicate excessive moisture when tested with a moisture meter. Significant ice build-up was observed on the window in Bedroom 3 of Building A, as shown in Photo #7.

The exterior walls were observed to be constructed from gypsum board, 38 mm wood strapping with stone wool insulation, an impermeable Air Vapour Barrier (AVB), 140 mm wood studs with stone wool insulation, and corrugated metal siding. The sheathing material of the exterior wall assembly could not verified at the time of assessment. This type of wall assembly is expected to provide adequate thermal resistance and maintain a 25°C temperature difference. Thermographic scans of the areas around the windows did not indicate any significant thermal leaks in the wall assembly (Photo #13 and Photo #14).

4.1.2 Ventilation

Several observations were made that indicate poor performance of the ventilation systems in each building. The ventilation of each building is regulated by an HRV and a humidifier that are

in the ceiling space above the pantry.

Of concern, was the inline duct pre-heaters for the HRV fresh air supply. The preheater in Building B was observed to have ice built up on the bottom of the unit (Photo #15). The insulation around the duct was observed to be saturated when tested with the moisture meter. Mould was observed to be present on the edge of the drywall at the access hole where the pre-heater located in the closet of Bedroom 2.

Many of the vents on the exterior of the buildings were observed to be affected by blowing snow and ice accumulation. In particular, the exhaust vents to the HRV system were observed to have ice in and below the vent (Photo #16).

It was also noted that several of the HRV and humidifier controls indicated service was required. An HRV is intended to transfer heat energy between a supply fresh air, and the moist, stale air being exhausted. A limited ability to regulate humidity levels and provide proper air exchange in the buildings can contribute to conditions that are favorable of mould growth and poor air quality.

The relative humidity in Building A, which was unoccupied at the time of inspection, was observed to be 31%. A range between 10%-30% indoor relative humidity is expected in this type of climate.

4.1.3 Walls and Ceilings

Damaged gypsum board and paint were observed in each building in the laundry and bathroom areas (Photo #17 - Photo #19). Signs of water or moisture damage, including staining and bubbling paint, were observed above the shower on the walls separating the bathroom and laundry areas in each building. Bubbling paint and cracked gypsum board were also noted on the walls and above the interior and exterior doorways in each laundry room. Stantec was notified by building occupants that water intrusion was observed at the ceiling level of the wall separating bathroom and laundry areas. The occurrence was limited to a single time period during spring thaw. No elevated moisture levels were detected in these building materials at the time of inspection. Further investigation of the ceiling and wall structures would be required to determine the extent of any water damage, sources of water intrusion and any mould growth that may present.

Water staining was also observed to be present in both buildings on the AVB and insulation between the rafters in the attic spaces. This observation was limited to visual assessment in the accessible areas above the utility room and pantry.

4.2 AIR SAMPLING

Air samples are interpreted by means of comparison of indoor concentrations and mould types to outdoor concentrations and mould types. In general, the concentrations and mould types identified indoors should be similar to outdoor levels and types. This rank order assessment of comparing indoor samples against outdoor samples has been recommended by the American Council of Governmental Industrial Hygienists (ACGIH) Bioaerosols committee since 1989 and has been part of the practice in Government of Canada assessments since 1986. Differences in the concentrations and mould types found in indoor air samples may indicate the presence of a mould amplifier in the building. However, many factors can lead to increase indoor concentrations. This can be disturbance of normal dust and dirt by walking across surfaces, pet activity, poor ventilation, and outdoor conditions.

4.2.1 Air Samples

During the assessment, a total of nine (9) spore trap samples were collected. Four (4) were collected in each subject building, and one (1) outdoor sample was collected for background mould concentrations and genus comparison.

Table 1 summarizes sample identification, locations and interpretation of analytical results, and is to be read in conjunction with the laboratory analytical results provided in **Appendix B**. Samples labeled 1-4 refer to Building A, while samples labeled 5-8 refer to Building B.

Table 4-1: Non-Culturable Air Sample Results

Sample Number	Building Location	Total Raw Count	Total Fungal Element Concentration (elements/m³)	Interpretation of Analytical Results
29-AS-01	Building A Bedroom 1	76	2913	Elevated levels of *Aspergillus/Penicillium-like* spores were identified. *Cladosporium* spores were identified in low concentrations.
29-AS-02	Building A Bedroom 2	251	9622	Elevated levels of *Aspergillus/Penicillium-like* spores were identified. *Cladosporium* and *Chaetomium* spores were identified in low concentrations.
29-AS-03	Building A Kitchen	112	4293	Elevated levels of *Aspergillus/Penicillium-like* spores were identified. *Chaetomium* spores were identified in low concentrations.
29-AS-04	Building A Bedroom 3	86	3297	Elevated levels of *Aspergillus/Penicillium-like* spores were identified.
29-AS-05	Building B Kitchen	162	6210	Elevated levels of *Aspergillus/Penicillium-like* spores were identified. *Cladosporium, Chaetomium and basisiospores* were identified in low concentrations.
29-AS-06	Building B Bedroom 1	159	6095	Elevated levels of *Aspergillus/Penicillium-like* spores were identified.
29-AS-07	Building B Bedroom 2	309	236900	Elevated levels of *Aspergillus/Penicillium-like* spores were identified.
29-AS-08	Building B Bedroom 3	328	50293	Elevated levels of *Aspergillus/Penicillium-like* spores were identified.
29-AS-09	Outdoors	ND	NA	Outdoor air expected to be lower given winter weather conditions.

Key:
ND - No fungal propagules detected, below limit of detection (LOD).
NA - Not applicable; calculations cannot be performed on non-numerical data.

4.3 TAPE LIFT SAMPLES

Four (4) tape lift samples were collected from the subject building. Results of the analyses are noted in **Table 2**, below.

Table 4-2: Tape Lift Sample Laboratory Analysis Results

Sample Number	Building Room Location	Rationale for Sampling	Summary of Fungal Identification
29-TL-01	Building A Kitchen Window sill	Black staining on gypsum board paper	*Alternaria* NOS spores *Aspergillus/Penicillium* **Fungal growth indicated.**
29-TL-02	Building A Bedroom 2 Window sill	Black staining on wood framing under window	*Chaetomium spores* *pigmented mycelial fragments* *Chaetomium spp.* *Aspergillus/Penicillium-like spores* *Ulocladium spores* **Fungal growth indicated.**
29-TL-03	Building B Kitchen Window sill	Black staining on wood framing under window	*pigmented mycelial fragments* *Chaetomium spores* *Aspergillus/Penicillium-like spores* *bacteria Low* *Ulocladium spores* **Fungal growth indicated.**

Based on the results of the laboratory analysis, mould growth was identified by all three (3) tape lift samples collected.

A copy of the laboratory Certificate of Analysis is provided in **Appendix B**. A summary of the impacted building materials has been provided in an occurrence report in **Appendix C**.

5.0 CONCLUSIONS

Based on the observations made during the assessment and on laboratory analysis, Stantec makes the following conclusions:

- Elevated concentration of indoor moulds were noted in both buildings. Contributors to the higher indoor concentrations would include occupant activities that disturb normal settled dust (many of the noted moulds are ubiquitous and can be expected in indoor air), recent disturbance of building materials near the windows and pet activity.

- Laboratory analysis and visual observations indicate mould growth is present on the surfaces tested in the subject buildings, and is a likely contributor to amplification in the air.

- The ventilation system (HRV) has several issues that should be addressed to ensure adequate performance, a regulated climate, and mitigate mould growth in the subject buildings.

- The selection of MDF as a window framing and jamb material is unfortunate as the product is not durable when exposed to moisture from condensation and supports mould growth.

- The occupancy load for the type of construction is considered at the upper limit for managing the IAQ. Two adults, three children and dogs introduce considerable amounts of moisture into the environment. Without effective ventilation, moisture and mould concerns are inevitable.

6.0 RECOMMENDATIONS

6.1 BUILDING CONDITION ASSESSMENT

Based on the findings and conclusions made during the assessment, Stantec makes the following recommendations:

6.1.1 Windows

- Replace the MDF and wood jambs around the windows with a non-porous material such as vinyl.
- Ensure the AVB is sealed to the window frame.
- Caulk and install 150 mm counter flashing around the exterior of all windows to increase the travel distance for fine snow and prevent ingress of moisture.
- Clean and apply a mould resistant coating to wooden structural elements around the window that are susceptible to moisture damage.
- As a temporary measure and during extreme cold weather, direct a fan or air stream across the window surface whenever possible to minimize condensation.
- Consider installation of low volume fans or supplemental air ducts above the windows to provide an air curtain which will prevent condensation build-up.

6.1.2 Ventilation

- Replace existing exterior air intake and exhaust vent covers with a 'gooseneck' style that will prevent blowing snow from entering the ducts.
- Remove and replace any saturated duct insulation around the pre-heaters.
- Have a qualified technician inspect and service all ventilation equipment including pre-heaters, HRV's and humidifiers to ensure each unit is functioning properly and balanced accordingly; occupants should be trained in the proper operation and limitations of each unit.
- Remove all manual controls from the bathroom HRV exhaust fan. Timers should be replaced with a humidistat. Install supplementary bathroom exhaust fans that are controlled by a humidistat.

6.1.3 Walls and Ceilings

- At locations where water or moisture damage is apparent, remove all damaged drywall to the extent of the visible impact. Clean and replace building materials with mould resistant products.
- A further assessment is required to determine the condition of the corrugated metal roofing and to identify any source of water intrusion.
- Further intrusive testing of the ceiling and wall structures is required to determine any other sources of water intrusion and any mould growth that may present.
- Any water or moisture damaged building materials should be removed and replaced.

6.2 MOULD ASSESSMENT

Based on the findings and conclusions made during the assessment, Stantec makes the following recommendations:

- The impacted porous building materials (as noted below, gypsum board, vapour barrier, sills and jambs) around the windows should be removed following procedures as per *Mould Guidelines for The Canadian Construction Industry,* Canadian Construction Association – 82, 2004.
- Remove the impacted gypsum board and MDF around the windows, extending wall cuts to 0.5 m beyond the visually contaminated area and dispose as construction waste;
- Remove any wet and mould-impacted material within the wall cavity (vapour barrier, insulation);
- Use fans and dehumidifiers to dry out wet building materials following proper cleaning (wood studs);
- Clean the remaining building materials, including studs and gypsum board, with an anti-microbial solution. Allow to dry and then HEPA vacuum the area;
- Remaining areas: As airborne mould has been identified throughout the subject buildings, all surrounding surfaces throughout should be damp wiped, and the areas should undergo a thorough cleaning, included vacuuming with a HEPA vacuum.

Moisture control should be implemented throughout the subject building. The *Mould Guidelines for the Canadian Construction Industry* recommend the following initiatives in order to control moisture and mould:

- Repair moisture infiltration into the subject building prior to installation or re-instatement of building materials;
- Minimize the exposure of interior building products to exterior conditions;

- Protect stored materials from moisture;
- Minimize or otherwise manage moisture accumulation within the buildings;
- Prevent spillage of water within the buildings;
- Maintain the integrity of the building envelope components through ongoing monitoring and inspections;
- Reject wet or mouldy materials.

7.0 CLOSURE

This report has been prepared for the sole benefit of the RCMP. The report may not be used by any other person or entity without the express written consent of Stantec Consulting Ltd. and the RCMP.

Any use which a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Some of the information presented in this report was provided through existing documents and through interviews. Although attempts were made, whenever possible, to obtain confirmatory sources of information, Stantec Consulting Ltd. in certain instances has been required to assume the information provided is accurate.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Conclusions presented in this report should not be construed as legal advice.

The conclusions presented in this report represent the best technical judgment of Stantec Consulting Ltd. based on the data obtained from the work. The conclusions are based on the site conditions encountered by Stantec Consulting Ltd. at the time the work was performed at the specific inspection and/or sampling locations, and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on building construction and conditions, weather, building usage and other factors. In addition, analysis has been carried out for mould on a limited number of samples, and it should not be inferred that other mould species are not present. Due to the nature of the assessment and the limited data available, Stantec Consulting Ltd. cannot warrant against undiscovered environmental liabilities.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

We trust that the above is satisfactory for your purposes at this time. Should you have any questions or concerns, or require additional information, please do not hesitate to contact the undersigned at your convenience.

This report was prepared by Sparky Murphy. It was reviewed by Paul Walkington and Rob Robinson.

Regards,

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Appendix A

SITE PHOTOGRAPHS

Photo #1 – Water damage on the Bedroom 2 window of Building B prior to assessment.

Photo #2 – Mould growth on the Bedroom 2 window sill of Building B prior to assessment.

Photo #3 – Water damage on the kitchen window of Building B prior to assessment.

Photo #4 – Water damaged MDF and staining on kitchen wall of Building B prior to assessment.

Photo #5 – Mould and water damaged MDF sill on kitchen window of Building B prior to assessment.

Photo #6 – Mould damaged drywall below kitchen window of Building B prior to assessment.

Photo #7 – Bedroom 3 window in Building A.

Photo #8 – Kitchen window in Building A.

Photo #9 – Kitchen window in Building B.

Photo #10 – Bedroom 2 window in Building B.

Photo #11 – Water damaged gypsum board, wood at the kitchen window sill of Building A.

Photo #12 – Mould growth on the wood at the Building A, Bedroom 2 window sill.

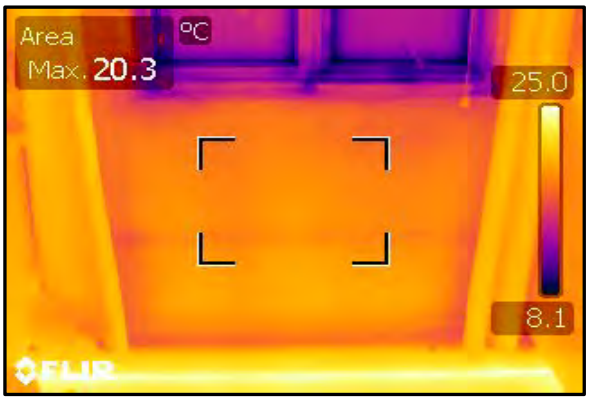

Photo #13 – Thermographic scan of the kitchen window/wall assembly Building B.

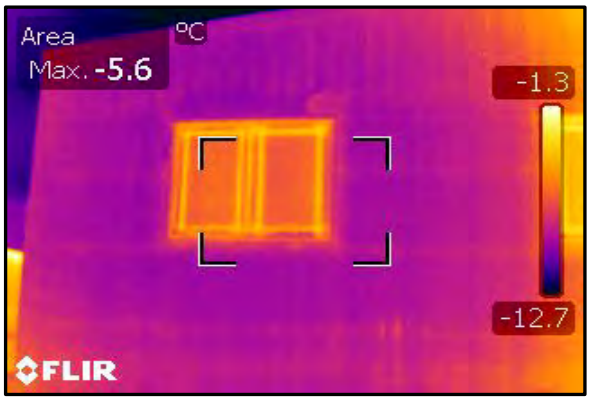

Photo #14 –Exterior thermographic scan of a window/wall assembly.

Photo #15 – Ice on the bottom the HRV pre-heater in Building B.

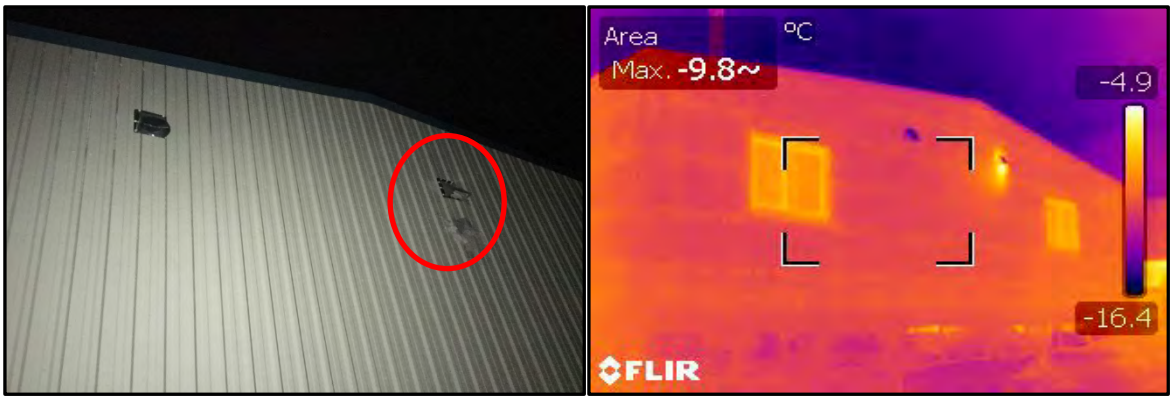

Photo #16 – HRV fresh air intake (left) and exhaust vent (right); note the frost build up on and below the exhaust vent.

Photo #17 – Bubbled paint and water staining above on the wall above the shower in Building B.

Photo #18 – Cracked gypsum board and bubbled paint above the exterior doorway in the laundry room Building B.

Photo #19 – Water stained paint above the shower in the bathroom above of Building A.

Appendix B

LABORATORY ANALYTICAL REPORT

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

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Certificate of Analysis

Stantec Consulting Ltd. (Ottawa)

1331 Clyde Avenue Suite 400
Ottawa, ON K1B 1A7
Attn: Sparky Murphy

Client PO:
Project: 163302236.200
Custody:

Report Date: 13-Dec-2016
Order Date: 7-Dec-2016

Order #: 1650210

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1650210-01	29-AS-01/ Unit 1 Bedroom 1
1650210-02	29-AS-02/ Unit 1 Bedroom 2
1650210-03	29-AS-03/ Unit 1 Kitchen
1650210-04	29-AS-04/ Unit 1 Bedroom 3
1650210-05	29-AS-05/ Unit 2 Kitchen
1650210-06	29-AS-06/ Unit 2 Bedroom 1
1650210-07	29-AS-07/ Unit 2 Bedroom 2
1650210-08	29-AS-08/ Unit 2 Bedroom 3
1650210-09	29-AS-09/ Outside

Approved By:

Emma Diaz
Senior Analyst

PARACEL LABORATORIES LTD.

Order #: 1650210

Certificate of Analysis

Client: Stantec Consulting Ltd. (Ottawa)

Client PO:

Report Date: 13-Dec-2016

Order Date: 7-Dec-2016

Project Description: 163302236.200

Microscopic - Air-O-Cell

Paracel I.D.	Sample Date	Media Expiry Date	Background Debris**	% of Trace	LOD (Cts/m³)	Sample Volume(L)	Total Cts/m³	Propagule Identification	Cts/m³	% of Total	Counts*
1650210-01	29-Nov-16	2017-09	Moderate	35	38	75	**2913**	**Client ID: 29-AS-01/ Unit 1 Bedroom 1**			
								Aspergillus/Penicillium-like spores	2722	93	71
								Cladosporium spores	115	4	3
								pigmented mycelial fragments	38	1	1
								unidentified spore	38	1	1
1650210-02	29-Nov-16	2017-09	Low	35	38	75	**9622**	**Client ID: 29-AS-02/ Unit 1 Bedroom 2**			
								Aspergillus/Penicillium-like spores	9468	98	247
								pigmented mycelial fragments	77	1	2
								Chaetomium spores	38	<1	1
								Cladosporium spores	38	<1	1
1650210-03	29-Nov-16	2017-09	Moderate	35	38	75	**4293**	**Client ID: 29-AS-03/ Unit 1 Kitchen**			
							[M-CL, Z-01]	*Aspergillus/Penicillium-like* spores	4255	99	111
								Chaetomium spores	38	1	1
1650210-04	29-Nov-16	2017-09	Low	35	38	75	**3297**	**Client ID: 29-AS-04/ Unit 1 Bedroom 3**			
								Aspergillus/Penicillium-like spores	3182	97	83
								smuts, myxomycetes, *Periconia* spores	77	2	2
								unidentified spore	38	1	1
1650210-05	29-Nov-16	2017-09	Moderate	35	38	75	**6210**	**Client ID: 29-AS-05/ Unit 2 Kitchen**			
								Aspergillus/Penicillium-like spores	5750	93	150
								Chaetomium spores	192	3	5
								pigmented mycelial fragments	192	3	5
								basidiospores	38	1	1
								Cladosporium spores	38	1	1
1650210-06	29-Nov-16	2017-09	Moderate	35	38	75	**6095**	**Client ID: 29-AS-06/ Unit 2 Bedroom 1**			
								Aspergillus/Penicillium-like spores	6095	100	159
1650210-07	29-Nov-16	2017-09	High	2	767	75	**236900**	**Client ID: 29-AS-07/ Unit 2 Bedroom 2**			
								Aspergillus/Penicillium-like spores	236900	100	309
								unidentified spore	NA	NA	Trace
1650210-08	29-Nov-16	2017-09	Moderate	9	153	75	**50293**	**Client ID: 29-AS-08/ Unit 2 Bedroom 3**			
								Aspergillus/Penicillium-like spores	50293	100	328
								Cladosporium spores	NA	NA	Trace
1650210-09	29-Nov-16	2017-09	Trace	35	38	75	**NA**	**Client ID: 29-AS-09/ Outside**			
								ND	NA	NA	ND

**Counts - Definitions:*
Trace = 2 propagules or less noted per trace
Low = occupying < 10% of microscopic field
Moderate = 11-30% of microscopic field
High = > 31% of microscopic field

***Background Debris - Definitions:*
Low = occupying < 10% of microscopic field
Moderate = 11-30% of microscopic field
High = > 31% of microscopic field

Certificate of Analysis

Client: Stantec Consulting Ltd. (Ottawa)

Client PO:

Report Date: 13-Dec-2016

Order Date: 7-Dec-2016

Project Description: 163302236.200

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	Analysis Date
Microscopic Fungal - Air-O-Cell	ASTM D7391-09	Ottawa West Lab	13-Dec-16

Qualifier Notes

Sample Qualifiers :

M-CL: Spore clusters were reported that were not consistent with the deposition over the rest of the trace. This may result in artificially high counts for a particular propagule.

Z-01: 1 spore cluster (26) was reported.

Work Order Revisions / Comments

Information on common indoor/outdoor fungi may be found on our website at the link below; however, interpretation of the results is the responsibility of the client.

Paracel Species Ecology List

Report Notes:

ND - No fungal propagules detected, below limit of detection (LOD).

NA - Not applicable; calculations cannot be performed on non-numerical data.

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Ottawa, ON K1B 1A7
Attn: Sparky Murphy

Client PO:
Project: 163302236.200
Custody:

Report Date: 13-Dec-2016
Order Date: 7-Dec-2016

Order #: 1650219

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1650219-01	29-TL-01/Residence 1 Kitchen Window B sill
1650219-02	29-TL-02/Residence 1 Bedroom 2 Window si
1650219-03	29-TL-03/Residence 2 Kitchen Window B sill

Approved By:

Emma Diaz
Senior Analyst

Certificate of Analysis

Client: Stantec Consulting Ltd. (Ottawa)

Client PO:

Report Date: 13-Dec-2016

Order Date: 7-Dec-2016

Project Description: 163302236.200

Microscopic - Tape Lift

Sample I.D.	*Sample Date*	*Background Debris***	*Propagule Summary*	*Relative Amount**
1650219-01	29-Nov-16	Moderate	**Client Sample Name:29-TL-01/Residence 1 Kitchen Window B sill**	
			Aspergillus/Penicillium-like spores	Moderate
			unidentified spore	Moderate
			bacteria	Low
			pigmented mycelial fragments	Low
1650219-02	29-Nov-16	Low	**Client Sample Name:29-TL-02/Residence 1 Bedroom 2 Window sill**	
			Chaetomium spores	High
			pigmented mycelial fragments	High
			Chaetomium spp.	Moderate
			Aspergillus/Penicillium-like spores	Low
			Ulocladium spores	Low
1650219-03	29-Nov-16	Moderate	**Client Sample Name:29-TL-03/Residence 2 Kitchen Window B sill**	
			pigmented mycelial fragments	High
			Chaetomium spores	Moderate
			Aspergillus/Penicillium-like spores	Low
			bacteria	Low
			Ulocladium spores	Low

**Relative Amount:*
Trace = 2 propagules or less noted per mm² of tape surface
Low = 2-10 propagules noted per mm²
Moderate = 11-100 propagules noted per mm²
High = > than 101 propagules noted per mm²

***Background Debris - Definitions:*
Low = occupying < 10% of microscopic field
Moderate = 11-30% of microscopic field
High = > 31% of microscopic field

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	Analysis Date
Microscopic Fungal - Tape Lifts	In House - Tape Lift	Ottawa West Lab	13-Dec-16

Qualifier Notes

None

Certificate of Analysis

Report Date: 13-Dec-2016

Client: **Stantec Consulting Ltd. (Ottawa)**

Order Date: 7-Dec-2016

Client PO:

Project Description: 163302236.200

Work Order Revisions / Comments

Information on common indoor/outdoor fungi may be found on our website at the link below; however, interpretation of the results is the responsibility of the client.

Paracel Species Ecology List

Report Notes:

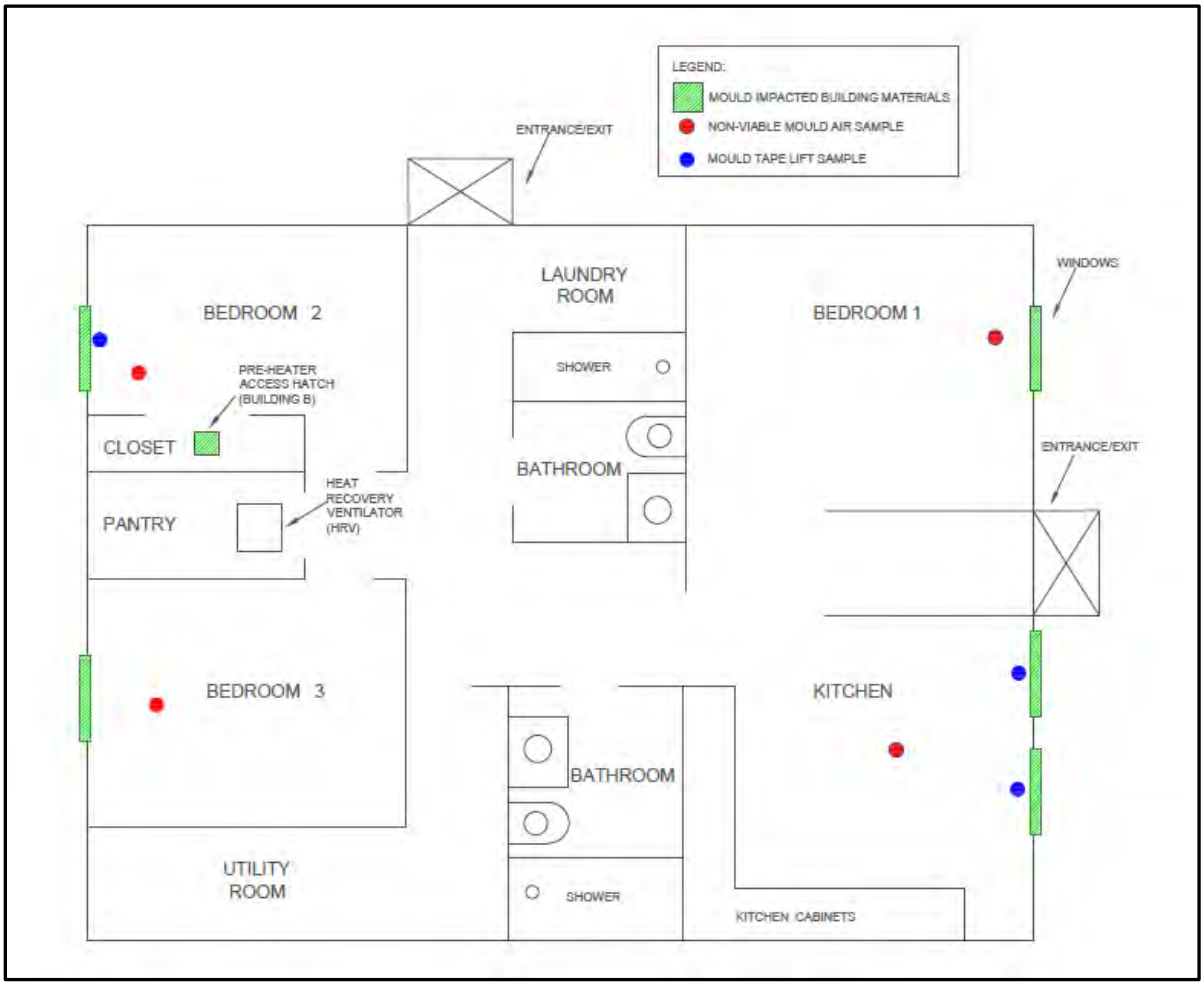
ND - No fungal propagules detected, below limit of detection (LOD).

NA - Not applicable; calculations cannot be performed on non-numerical data.

Appendix C

OCCURRENCE REPORT

Summary of Mould, Water and Moisture Impacted Areas					
Building	**Room**	**Location (s)**	**Assessment**	**Indicator**	**Impacted Material (s)**
Building A Building B	Kitchen, Bedrooms 1-3	Windows	Water damage, mould	Black staining	Gypsum board, MDF window sill and jamb, insulation, wood strapping/sill
Building A Building B	Bathroom	Walls and ceiling above shower	Water/moisture damage	Bubbling paint; water staining	Gypsum board
Building A Building B	Laundry	Walls and ceilings; around interior and exterior doorways	Water/moisture damage (non-conclusive)	Bubbling paint; cracked gymsum board	Gypsum board
Building B	Bedroom 2	Access hatch to pre-heater in closet	Water damage, mould	Black staining	Gypsum board, duct insulation



Note: Floor plan is based on a field sketch and is not to drawn to scale. Exact locations and details are approximated.

Appendix D

SITE MAP

Building A refers to the blue roof building.

Building B refers to the red roof building.

EXISTING DRAWINGS

RCMP HOUSING

Resolute Bay, Nunavut
Canada

Date: April 24th, 2011

Issued for permit

TABLE OF CONTENT

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11-032 RCMP HOUSING RESOLUTE BAY, NUNAVUT

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DRAWN BY: RR

VERIFIE BY: JM

APPROVED BY: SR

SEAL: Ordre des architectes du Québec — SHELDON M. REICH ARCHITECTE

DRAWING TITLE

SITE PLAN

SCALE: 1" = 40'-0"

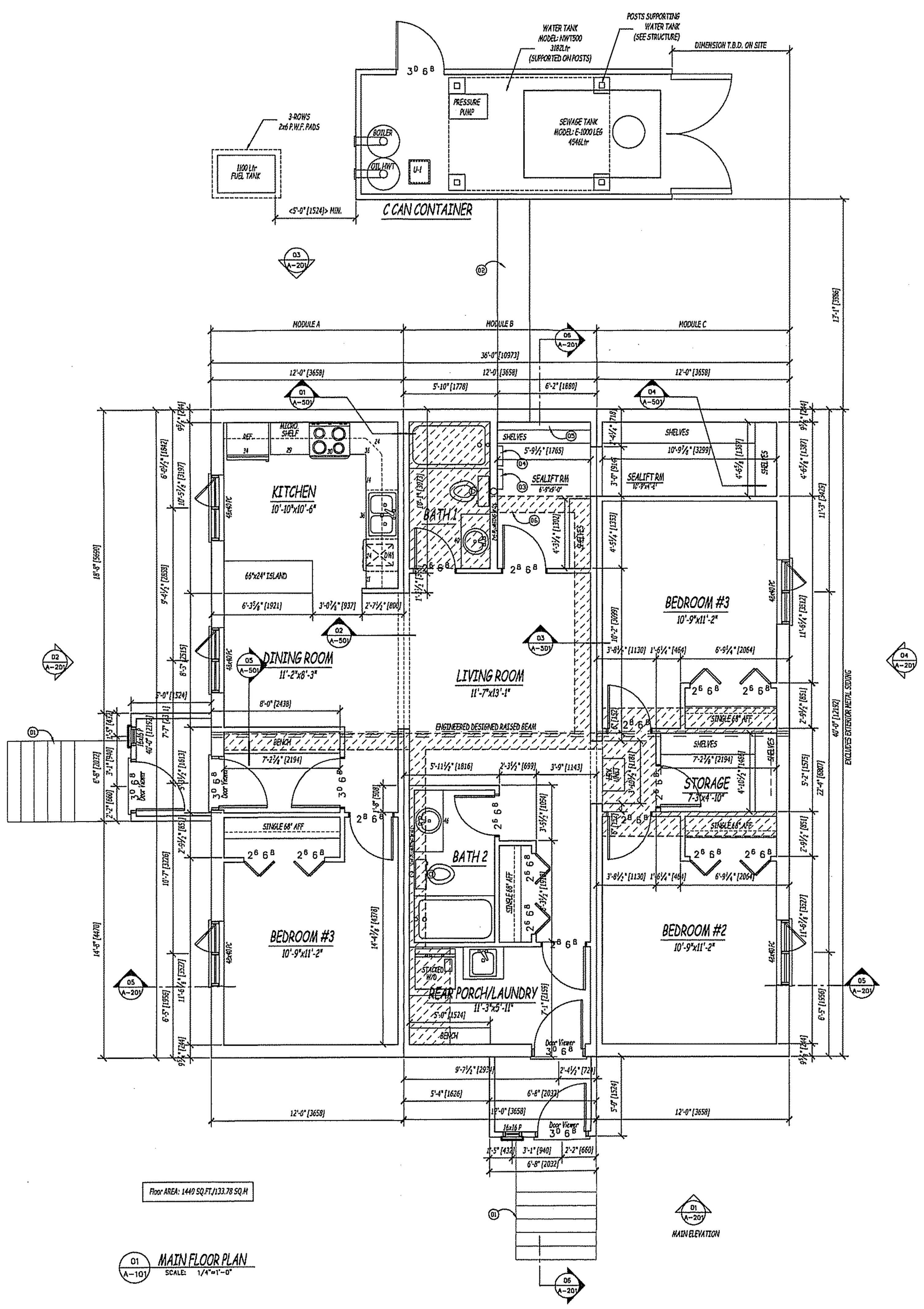
DATE: MARCH 16 2011

PROJECT NO.: 11-032

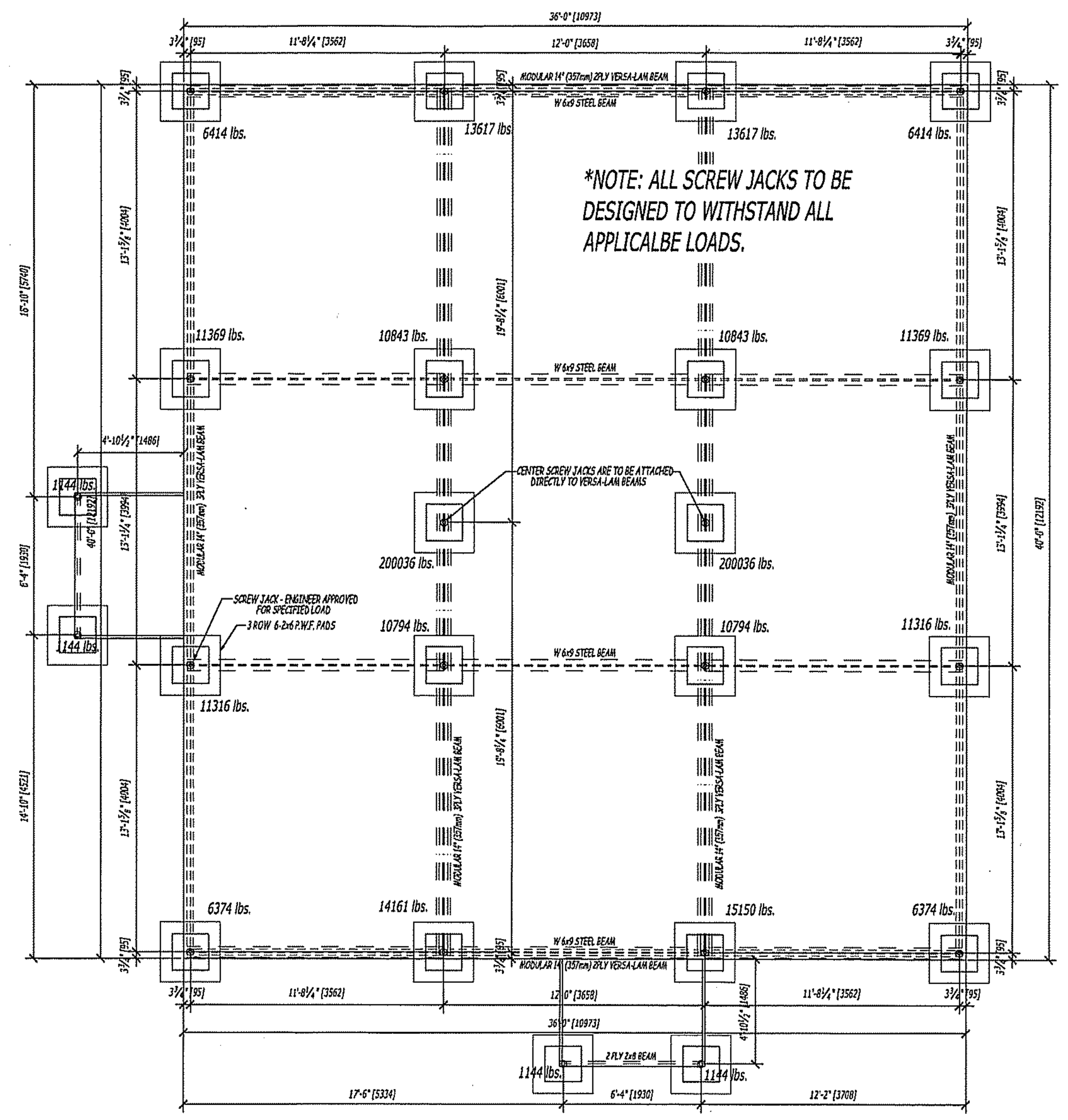
DRAWING NO.: A-100

REV.: -

11-032 RCMP HOUSING RESOLUTE BAY, NUNAVUT



01 MAIN FLOOR PLAN
SCALE: 1/4"=1'-0"



02 SCREW JACK LAYOUT
SCALE: 1/4"=1'-0"

LEGEND

PROPOSED BULKHEAD OR DROPPED CEILING TO CONCEAL MECH/ELECT. SERVICES

GENERAL NOTES

1. WRAP WITH SELF ADHESIVE MEMBRANE ALL M/E PENETRATIONS THRU WALL / FLOOR / ROOF POLYETHILENE VAPOR BARRIERS
2. OVERLAP VAPOUR BARRIER 4" AND SEAL WITH ACOUSTICAL SEALANT ALL WALL / FLOOR / ROOF INTERFACES
3. ALL WINDOWS RO BE TRIPLED GLAZED SEALED UNITS WITH ARGON FILLED CAVITY AND DUAL LOW E COATINGS WITH FIBREGLASS FRAMING (SEE SPEC.)
4. ALL EXTERIOR DOORS TO BE INSULATED STEEL DOORS (SEE SPEC.)

NOTES

01 METAL GRATED ENTRY STAIRS C/W "DECKORATOR" HANDRAIL SYSTEM
02 INSULATED HORIZONTAL PLUMBING STACK (SEE DETAIL 06/A501)
03 ELECTRICAL PANEL C/W CONDUIT DROPPED DOWN
04 COMMUNICATION PANEL C/W CONDUIT DROPPED DOWN
05 IN-FLOOR HEATING MANIFOLD (SEE MECH.)
06 ADJUST LOCATION OF BULKHEAD TO ACCOMMODATE PIPE / CONDUIT PASSAGE

RCMP HOUSING

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DRAWN BY: NR

VERIFIE BY: JM

APPROVED BY: SR

SEAL: Ordre des architectes du Québec — SHELDON M. REICH ARCHITECT

DRAWING TITLE

FLOOR PLAN
SCREW JACK LAYOUT

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

DATE: MARCH 16 2011

PROJECT NO.: 11-032

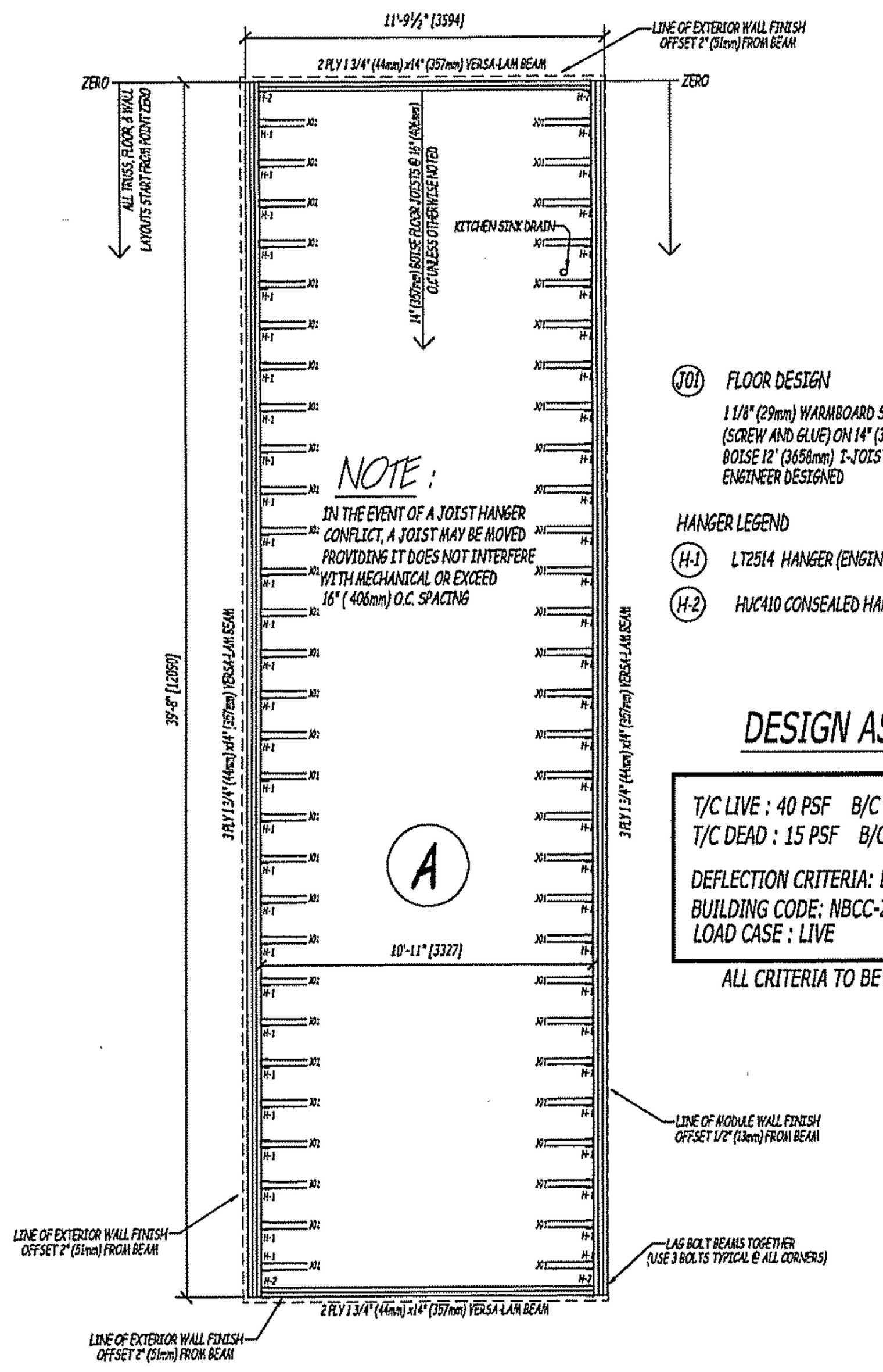
DRAWING NO.: A-101

REV.: -

11-032 RCMP HOUSING RESOLUTE BAY, NUNAVUT

GENERAL NOTES

1. REFER TO MECHANICAL / ELECTRICAL DRAWINGS FOR FLOOR CUTOUTS



NOTE :
IN THE EVENT OF A JOIST HANGER CONFLICT, A JOIST MAY BE MOVED PROVIDING IT DOES NOT INTERFERE WITH MECHANICAL OR EXCEED 16" (406mm) O.C. SPACING

(J01) FLOOR DESIGN
1 1/8" (29mm) WARMBOARD SUBFLOOR (SCREW AND GLUE) ON 14" (357mm) BOISE 12' (3658mm) I-JOISTS @ 16" (406mm) O.C. ENGINEER DESIGNED

HANGER LEGEND
(H-1) LT2514 HANGER (ENGINEER TO CONFIRM)
(H-2) HUC410 CONSEALED HANGER (ENGINEER TO CONFIRM)

DESIGN ASSUMPTIONS

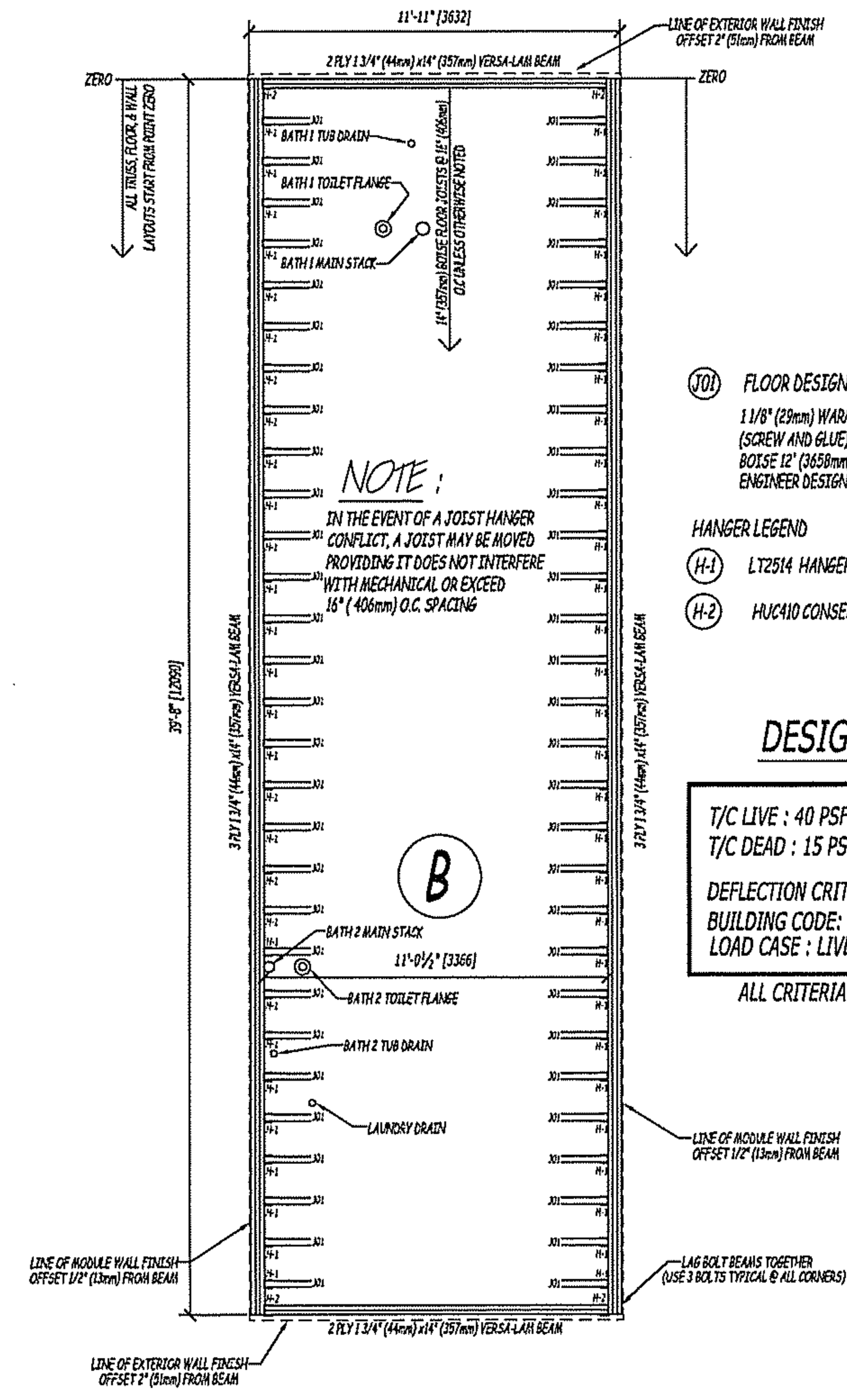
T/C LIVE : 40 PSF B/C LIVE : 0 PSF
T/C DEAD : 15 PSF B/C LIVE : 5 PSF

DEFLECTION CRITERIA: L/480 LIVE L/240 TOTAL
BUILDING CODE: NBCC-2005 (LIMIT STATES DESIGN)
LOAD CASE : LIVE

ALL CRITERIA TO BE CONFIRMED BY ENGINEER

*NOTE: THIS FLOOR JOIST LAYOUT IS FOR SPACING AND DIMENSIONS ONLY. ALL BEAMS, DETIALS, AND HANGERS ARE TO BE VERIFIED AND/OR OVERIDED BY ENGINEERED DESIGNED PLANS.

BEAM&JOIST LAYOUT
01 / A-102 MODOULE A
SCALE: 1/4"=1'-0"



NOTE :
IN THE EVENT OF A JOIST HANGER CONFLICT, A JOIST MAY BE MOVED PROVIDING IT DOES NOT INTERFERE WITH MECHANICAL OR EXCEED 16" (406mm) O.C. SPACING

(J01) FLOOR DESIGN
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HANGER LEGEND
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(H-2) HUC410 CONSEALED HANGER (ENGINEER TO CONFIRM)

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T/C DEAD : 15 PSF B/C LIVE : 5 PSF

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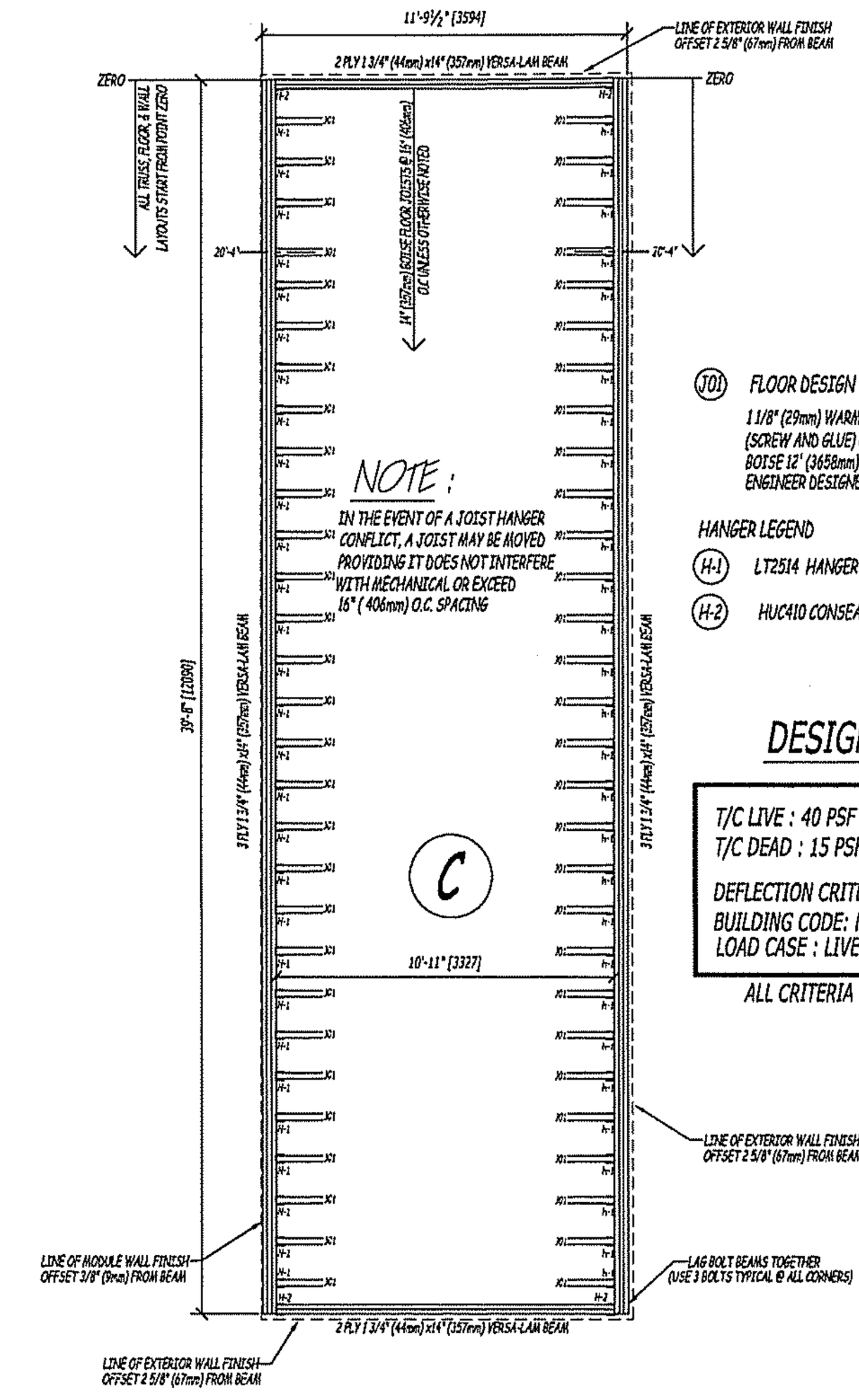
BUILDING CODE: NBCC-2005 (LIMIT STATES DESIGN)
LOAD CASE : LIVE

ALL CRITERIA TO BE CONFIRMED BY ENGINEER

*NOTE: THIS FLOOR JOIST LAYOUT IS FOR SPACING AND DIMENSIONS ONLY. ALL BEAMS, DETIALS, AND HANGERS ARE TO BE VERIFIED AND/OR OVERIDED BY ENGINEERED DESIGNED PLANS.

BEAM&JOIST LAYOUT
02 / A-102 MODOULE B
SCALE: 1/4"=1'-0"



NOTE :
IN THE EVENT OF A JOIST HANGER CONFLICT, A JOIST MAY BE MOVED PROVIDING IT DOES NOT INTERFERE WITH MECHANICAL OR EXCEED 16" (406mm) O.C. SPACING

(J01) FLOOR DESIGN
1 1/8" (29mm) WARMBOARD SUBFLOOR (SCREW AND GLUE) ON 14" (357mm) BOISE 12' (3658mm) I-JOISTS @ 16" (406mm) O.C. ENGINEER DESIGNED

HANGER LEGEND
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(H-2) HUC410 CONSEALED HANGER (ENGINEER TO CONFIRM)

DESIGN ASSUMPTIONS

T/C LIVE : 40 PSF B/C LIVE : 0 PSF
T/C DEAD : 15 PSF B/C LIVE : 5 PSF

DEFLECTION CRITERIA: L/480 LIVE L/240 TOTAL
BUILDING CODE: NBCC-2005 (LIMIT STATES DESIGN)
LOAD CASE : LIVE

ALL CRITERIA TO BE CONFIRMED BY ENGINEER

*NOTE: THIS FLOOR JOIST LAYOUT IS FOR SPACING AND DIMENSIONS ONLY. ALL BEAMS, DETIALS, AND HANGERS ARE TO BE VERIFIED AND/OR OVERIDED BY ENGINEERED DESIGNED PLANS.

BEAM&JOIST LAYOUT
03 / A-102 MODOULE C
SCALE: 1/4"=1'-0"

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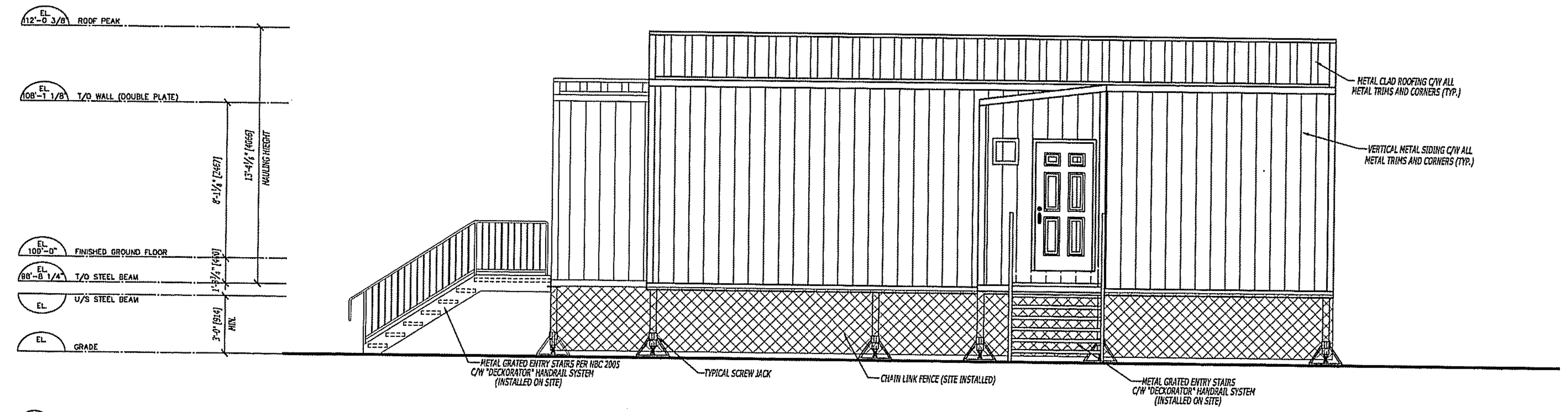
DRAWN BY: NR
VERIFIE BY: JM
APPROVED BY: SR

SEAL: Ordre des architectes du Québec — SHELDON M. REICH ARCHITECT

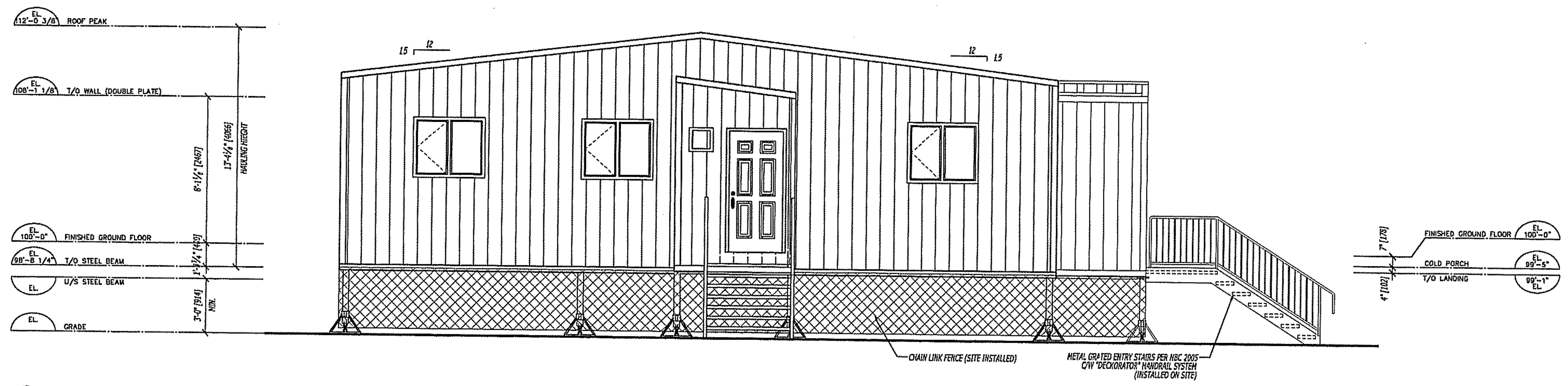
DRAWING TITLE: BEAM AND JOIST LAYOUT

SCALE: 1/4" = 1'-0"
DATE: MARCH 16 2011
PROJECT NO.: 11-032
DRAWING NO.: A-102
REV.: -

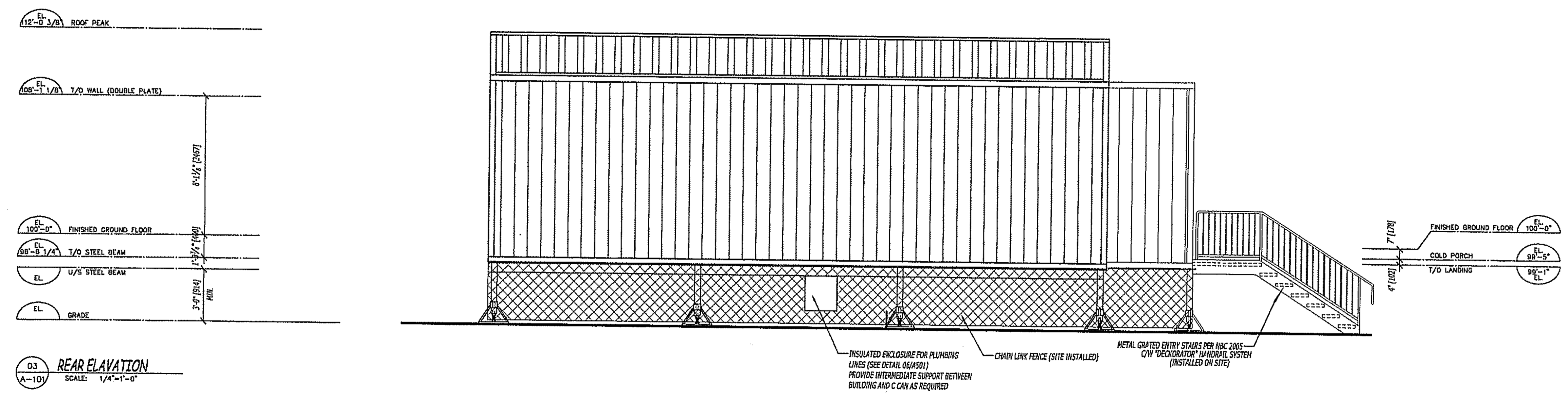
11-032 RCMP HOUSING RESOLUTE BAY, NUNAVUT



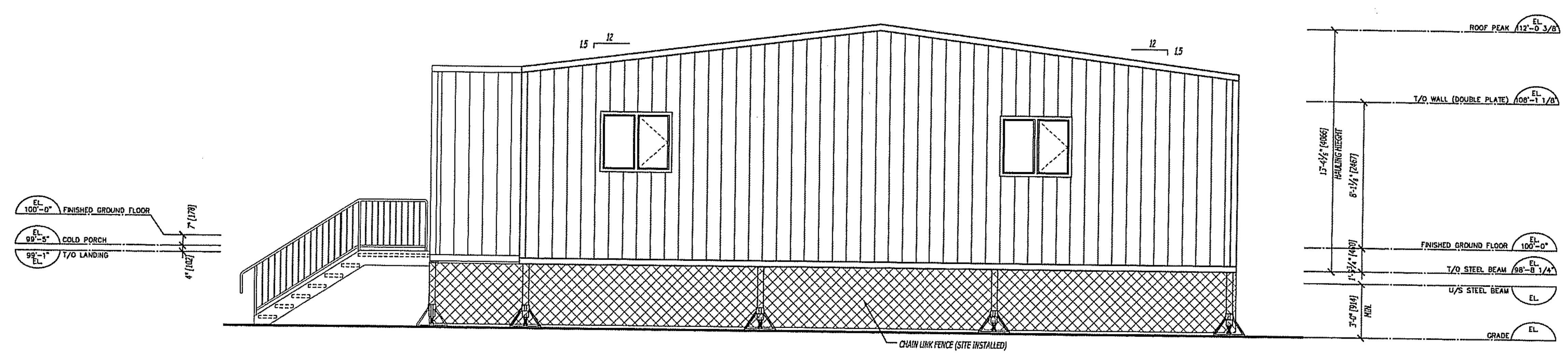
01 A-101 **FRONT ELEVATION** SCALE: 1/4"=1'-0"



02 A-101 **LEFT ELEVATION** SCALE: 1/4"=1'-0"



03 A-101 **REAR ELEVATION** SCALE: 1/4"=1'-0"



04 A-101 **RIGHT ELEVATION** SCALE: 1/4"=1'-0"

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VERIFIE BY: JM

APPROVED BY: SR

SEAL: Ordre des architectes du Québec — SHELDON M. REICH ARCHITECT

DRAWING TITLE: ELEVATIONS

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

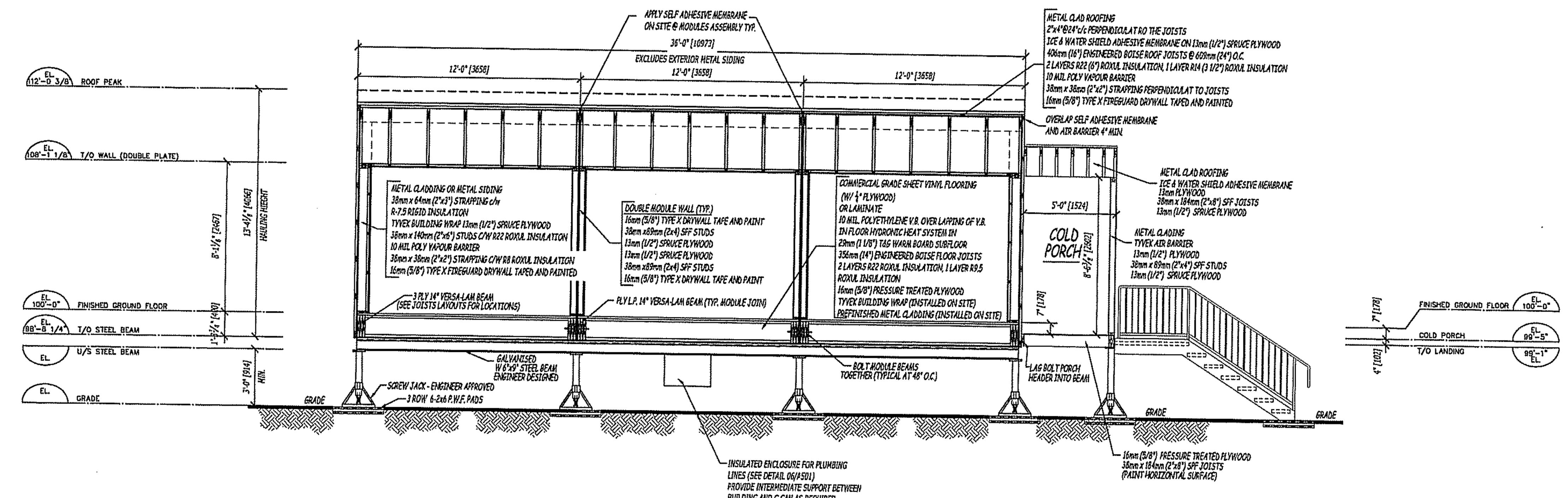
DATE: MARCH 16 2011

PROJECT NO.: 11-032

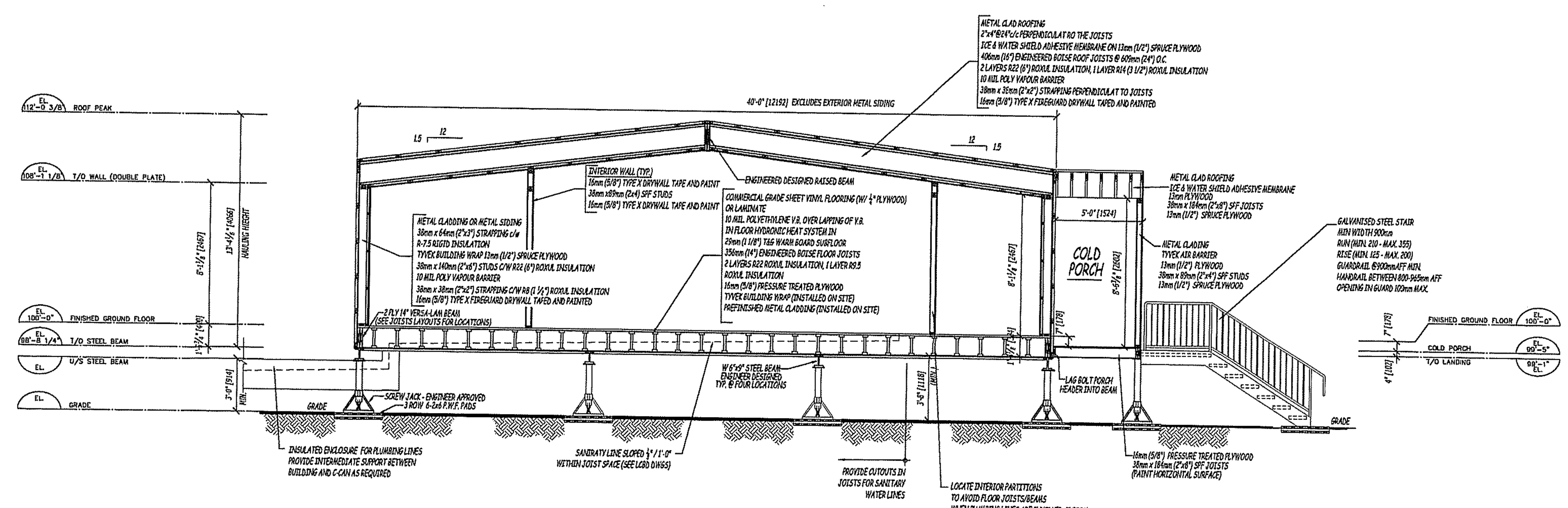
DRAWING NO.: A-201

REV.: -

11-032 RCMP HOUSING RESOLUTE BAY, NUNAVUT



05 A-101 **BUILDING SECTION A**
SCALE: 1/4"=1'-0"



06 A-101 **BUILDING SECTION B**
SCALE: 1/4"=1'-0"

RCMP HOUSING

Resolute Bay, Nunavut
Canada

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architectes

Client

Electrical/Mechanical

exp

REVISIONS

No.	Date	Description	By
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-	2011-04-14	ISSUED FOR COORDINATION	AR

DISTRIBUTION

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DRAWN BY
NR

VERIFIE BY
JM

APPROVED BY
SR

Ordre des architectes du Québec — SHELDON M. REICH, ARCHITECTE

DRAWING TITLE

SECTIONS

SCALE
1/4" = 1'-0"

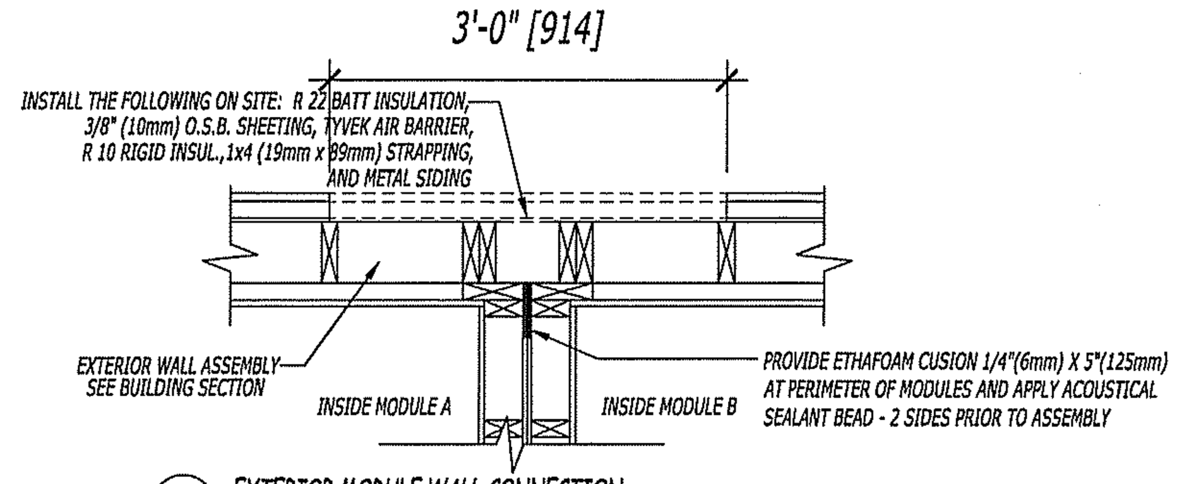
DATE
MARCH 16 2011

PROJECT NO.
11-032

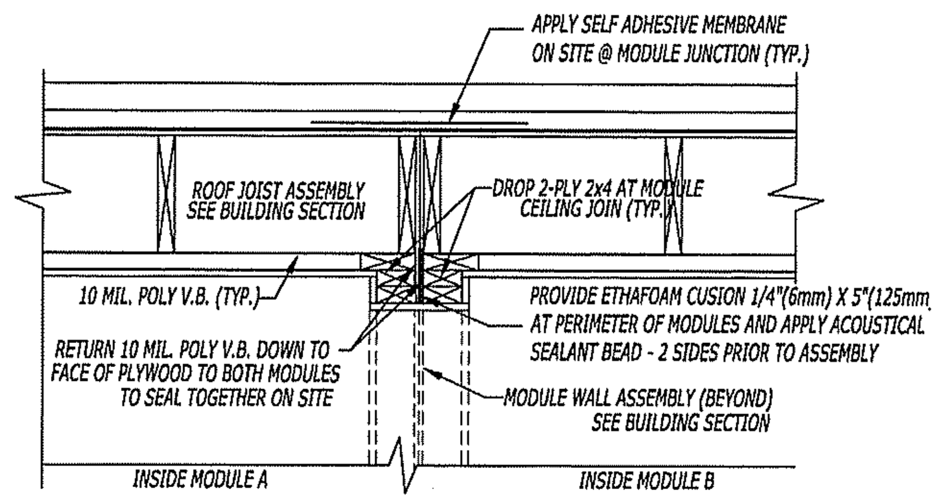
DRAWING NO.
A-202

REV.
-

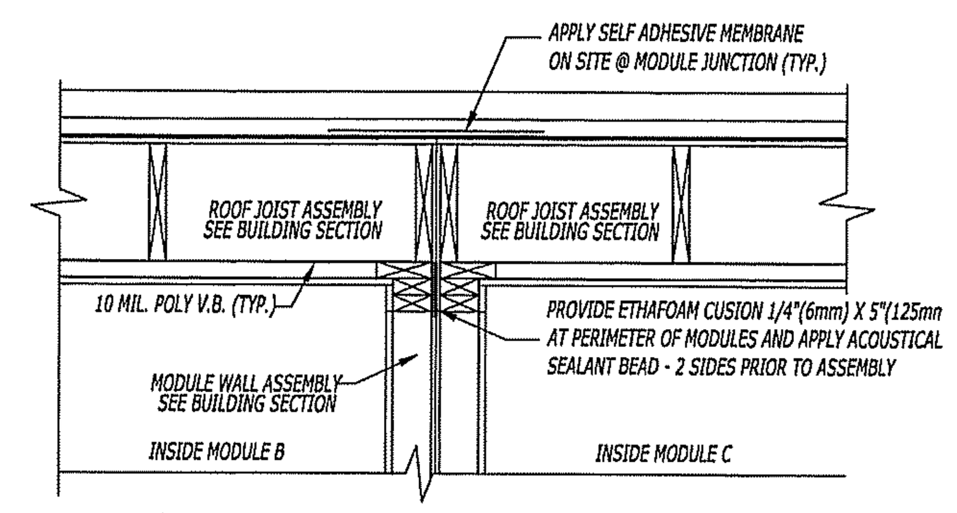
11-032 RCMP HOUSING RESOLUTE BAY, NUNAVUT



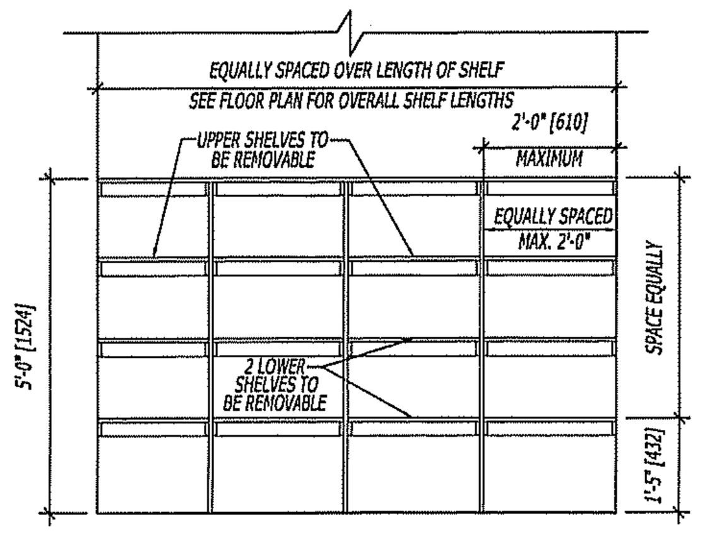
01 / A-101 EXTERIOR MODULE WALL CONNECTION
SCALE: 1"=1'-0"



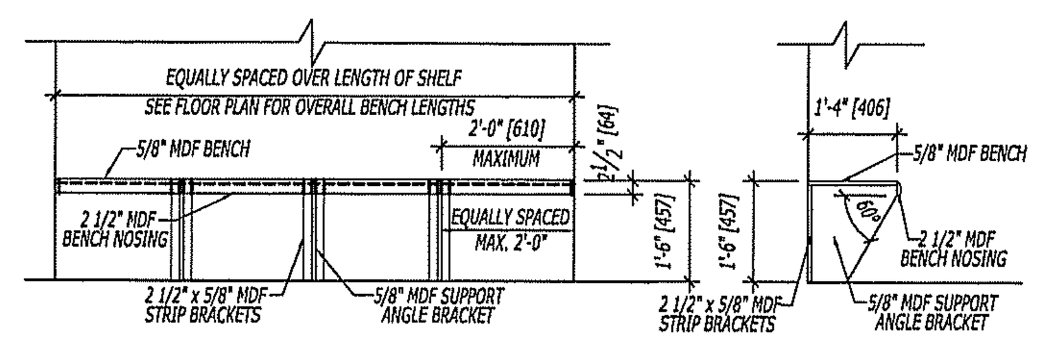
02 / A-101 INTERIOR OPEN MODULE JOIN CONNECTION
SCALE: 1"=1'-0"



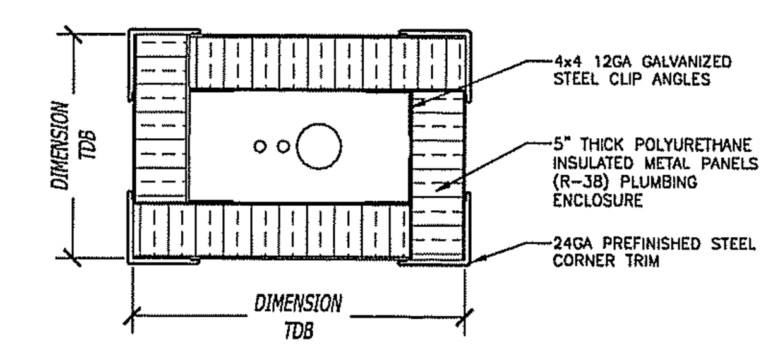
03 / A-101 INTERIOR CLOSED MODULE JOIN CONNECTION
SCALE: 1"=1'-0"



04 / A-101 STANDARD STORAGE SHELF DETAIL
SCALE: 1/2"=1'-0"



05 / A-101 STANDARD BENCH DETAIL
SCALE: 1/2"=1'-0"



06 / A202 INSULATED PLUMBING STACK
SCALE: 1"=1'-0"

RCMP HOUSING

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REVISIONS

No.	Date	Description	By
-	2011-05-24	ISSUED FOR PERMIT	AR
-	2011-04-14	ISSUED FOR COORDINATION	AR

DISTRIBUTION

GENERAL NOTE

THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING DIMENSIONS, MEASUREMENTS, LEVELS, DETAILS, SPECIFICATIONS, AND SITE CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION AND PRECISE FITTING OF ALL ELEMENTS. ALL ERRORS, OMISSIONS, AND ANOMALIES MUST BE REPORTED TO THE ARCHITECT IMMEDIATELY.

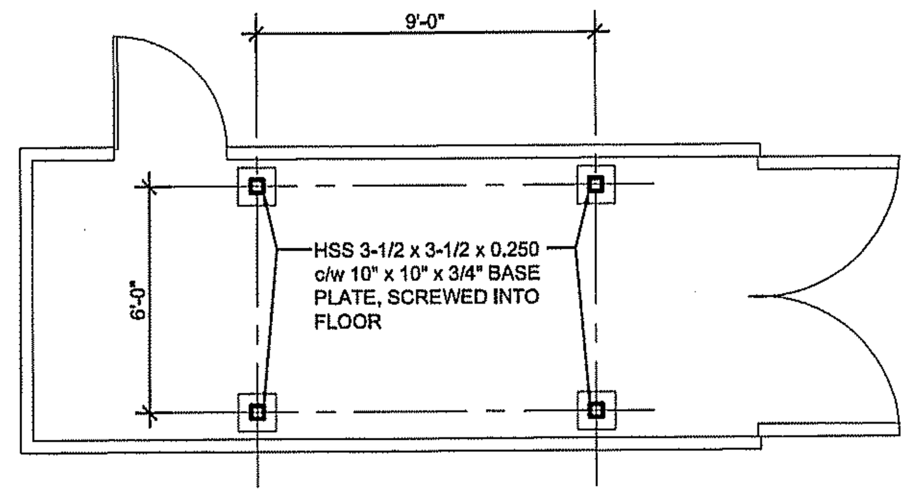
DRAWN BY: NR
VERIFIE BY: JM
APPROVED BY: SR

SEAL: Ordre des architectes du Québec — SHELDON M. REICH ARCHITECT

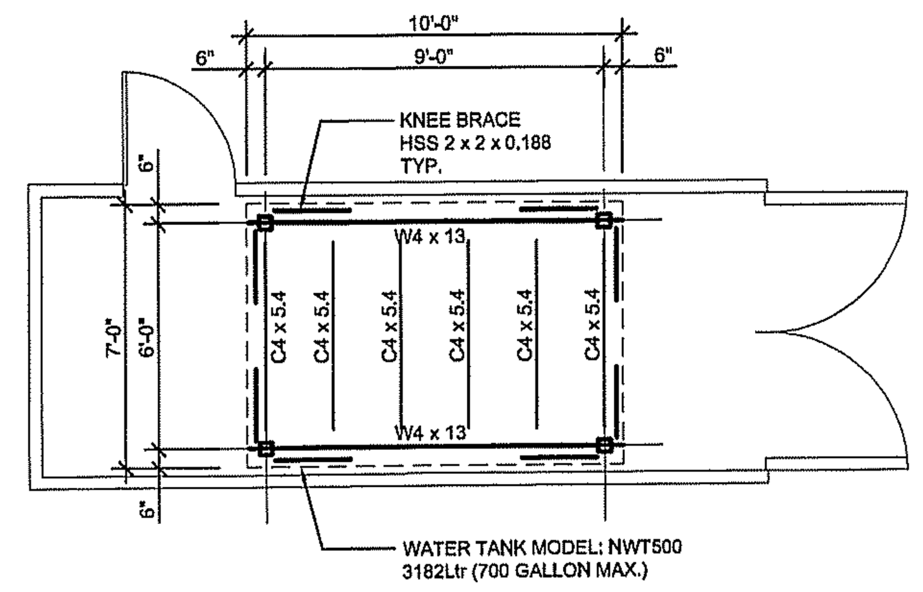
DRAWING TITLE: DETAILS

SCALE	DATE		
1/4" = 1'-0"	MARCH 16 2011		
PROJECT NO.	DRAWING NO.		REV.
11-032	A-501		-

11-032 RCMP HOUSING RESOLUTE BAY, NUNAVUT

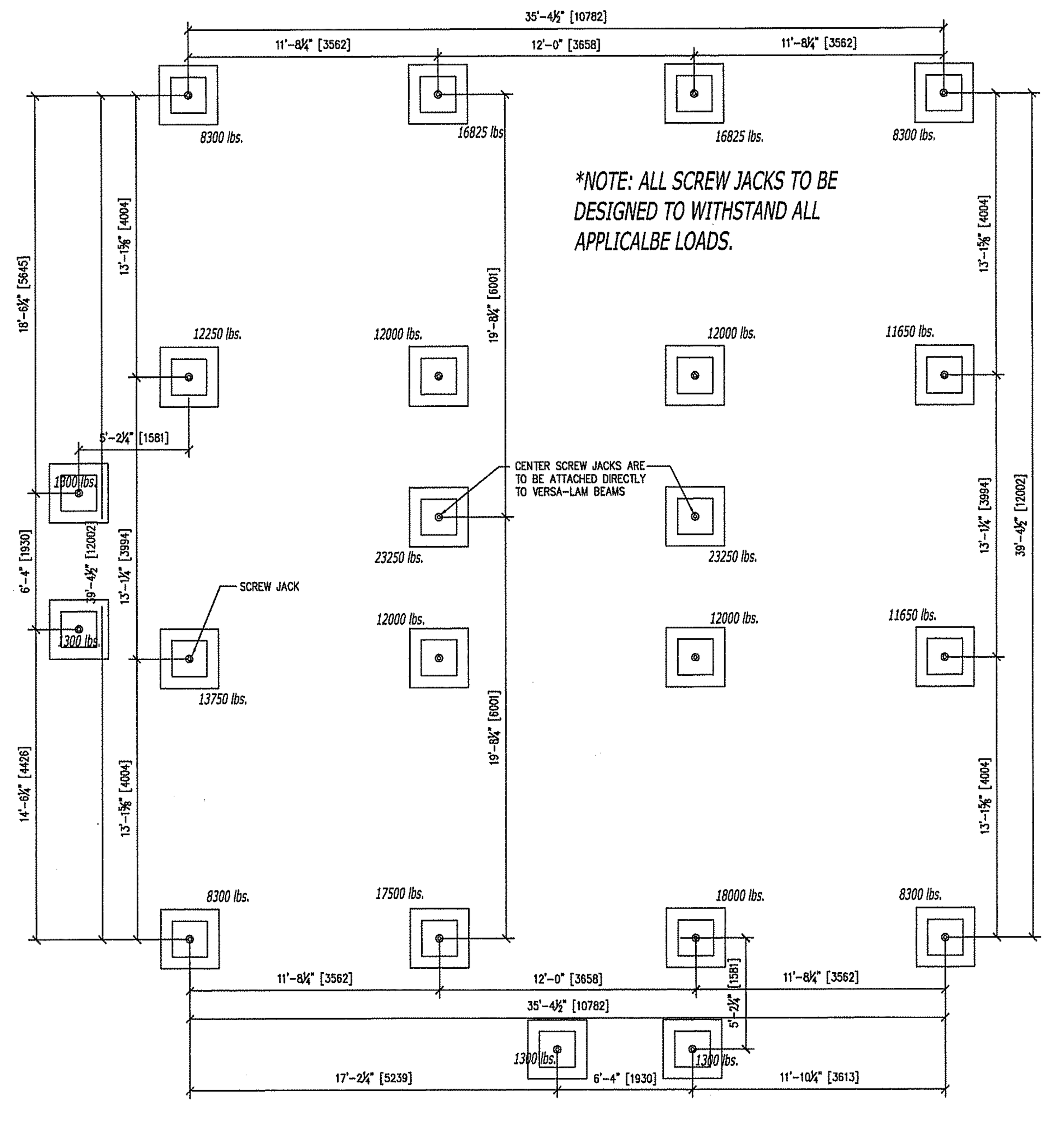


1 SEA CAN CONTAINER BASE PLAN
S100 1/4" = 1'-0"



2 SEA CAN CONTAINER PLATFORM PLAN
S100 1/4" = 1'-0"

1. PROVIDE FOR STEEL GRATING FLOWFORGE MODEL 19-4 WITH BEARING BAR SIZE 1" x 1/8" WITH END COVER PLATE ALL AROUND



3 SCREW JACK LAYOUT
S100 1/4" = 1'-0"

STRUCTURAL SPECIFICATIONS 45440

1. GENERAL NOTES

1.1 List of structural design documents: S100

1.2 These design documents were prepared by 'BCA Structural Consulting Services Inc.' for the use of their client only. The material in them reflects Les Conseillers BCA Consultants Inc.'s best judgment in light of the information available to it at the time of preparation.

1.3 Any use which a third party makes of these design documents, or any reliance on or decisions to be made based on it, are the responsibility of such parties. BCA Structural Consulting Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on these design documents.

1.4 For the purpose of these design documents, 'BCA Structural Consulting Services Inc.' is synonymous with 'the structural engineer', and the 'Client' refers to the party with whom BCA Structural Consulting Services Inc. has entered into a contract for the preparation of these design documents. 'Contractor' refers to the general contractor, project manager, or any similar person/firm undertaking construction and/or construction management of the subject project.

1.5 Inasmuch as design for remodeling and rehabilitation requires that certain assumptions be made regarding existing conditions, and because some of these assumptions cannot be verified without the expenditure of large sums of additional money or destroying otherwise adequate or serviceable portions of the building, the client agrees that, except where the engineer is held to be negligent, the owner will hold harmless and indemnify the structural engineer from and against any and all claims, damages, awards, and costs of defense arising out of the professional services provided under this Agreement.

1.6 These design documents represent the finished structure, and except where specifically shown, do not indicate the method or means of construction. The contractors shall supervise and direct all the work and shall be solely responsible for all construction means, methods, procedures and sequence.

1.7 All workmanship, materials, connections, etc. shall conform to the most recent applicable norms, bylaws and codes, for all given trades, including the National Building Code, 2005 + all amendments to date & all applicable standards of the Canadian Standards Association (CSA).

1.8 These design documents are to be used only in conjunction with Architectural, Mechanical & Electrical drawings and specifications. Do not scale drawings. Use only those marked "ISSUED FOR CONSTRUCTION".

1.9 Contractors must verify all dimensions and conditions on the job site and compare these dimensions and conditions with those on plans before proceeding with any work. Notify Engineer of any errors or discrepancies immediately.

1.10 The contractor shall review these design documents and report any conflicts or omissions to the engineer immediately. Ordering of material or construction of any portion of the structure that is in conflict, prior to resolution of that conflict shall be at the full risk of the contractor.

1.11 Temporary supports, which will be required during construction, such as formwork, bracing, shoring, etc. are not shown on these drawings and are the responsibility of the contractor. The contractor is responsible to ensure that all safe construction procedures are followed.

1.14 Anticipated maximum deflection of structural members is span/360. Design of all walls, ceilings, window frames, etc. not shown on structural drawings is the responsibility of others and shall accommodate these deflections.

1.15 No loads shall be hung or attached to the steel structure unless shown on structural drawings. Do not exceed design live loads during construction.

1.16 No opening shall be made in any beams, columns, or other structural members unless shown on structural drawings or approved by Engineer in writing.

1.17 Substitute materials, members, etc. may only be used with Engineer's prior written permission.

1.18 These design documents are copyright of BCA Structural Consulting Services Inc. and shall not be used for any other projects, in whole or in part, without the engineer's written consent.

2. CONCRETE

2.1 All concrete materials, procedures, tolerances & workmanship shall conform with the latest issues of CSA CAN3-A23.1 & A23.2, with special attention to cold weather concreting procedures, if applicable. Contractor shall retain a copy of these standards on site.

2.2 Grout. All grout shall be non-shrink type with a minimum 28 days strength of 35.0 MPa (5000 PSI). Use 1" grout under all steel column base plates.

3 STRUCTURAL STEEL

3.1 Structural steel shall be CSA G40.21-50W, HSS sections, shall be CSA G40.21-50W (class C) unless otherwise noted.

3.2 All construction, erection, tolerances, etc. shall conform to CSA CAN3 S16.1 latest edition.

3.3 All bolts shall be ASTM A325. All welding shall conform to CSA standards W47, W55.2, W55.3 & W59.1.

3.4 The structural steel fabricator shall design and be responsible for all structural steel connections. He shall retain a registered engineer for this purpose.

3.5 These design documents are not intended to be used as fabrication or erection drawings and, if so used, the fabricator/supplier assumes all responsibility for the correctness of the drawings.

3.6 Submit one sepia copy of erection drawings, indicating all connections, sealed by the connection designer, to Structural Engineer for review before fabrication.

3.7 All steel members shall be new (not previously used) and shall be one continuous piece (unspliced) from connection to connection.

3.8 The structural steel erector is responsible for all temporary bracing of the building. Temporary bracing shall be left in place until other permanent means are provided to brace the structure.

3.9 It is the general contractor's responsibility to retain an independent testing company to perform the following random surveys:

3.9.1 Torquing of bolts
3.9.2 Quality of welds
3.9.3 Grade of steel
3.9.4 Plumbness of columns
3.9.5 Touchup of steel deck and all structural steel. Written reports shall be issued to the structural engineer.

3.10 Paint all steel with 1 shop coat CANADIAN INSTITUTE OF STEEL CONSTRUCTION (CISC) - CPMA 1-73A . Surface preparation to be: STEEL STRUCTURES PAINTING COUNCIL (SSPC) SP-2. Color to be gray. Touch-up on site, after erection.

4 DEMOLITION SPECIFICATIONS

4.1 Shoring and scaffolding required during construction are not indicated on these drawings, and are the responsibility of the Contractor. The Contractor shall engage an engineer to produce the shoring and scaffolding plans.

4.2 All work shall conform to the requirements of the National Building Code, 2005 + all amendments to date & all applicable standards of the Canadian Standards Association (CSA), paying special attention to the CSA standard S350-M1980 'Code for the Safety in Demolition of Structures'.

4.3 The Contractor shall evaluate the site for existing conditions. This drawing is for general reference only. All conditions and dimensions shall be verified on site. Notify Structural Engineer for all discrepancies.

4.4 Based on examination of the site, the demolition contractor shall determine the method and sequence of demolition. The demolition plan shall be submitted to the Structural Engineer for verification before commencing demolition. No wall, etc. shall be left unsupported in an unstable condition.

4.5 The demolition sequence and schedule must conform to the requirements of the owner. Shoring and scaffolding installations shall conform to the owner's schedule.

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REVISIONS

No.	Date	Description	By
-	2011-05-27	ISSUED FOR PERMIT	JFG

DISTRIBUTION

GENERAL NOTE

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DRAWN BY: JF Girard

SEAL: INGENIEUR - ENGINEER, ROGER BARTOSH

VERIFIED BY

APPROVED BY: R. Bartosh

DRAWING TITLE: SEA CAN PLATFORM AND SCREW JACK LAYOUT

SCALE: AS SHOWN

DATE: MAY 2011

PROJECT NO.: 45440

DRAWING NO.: S100

REV.

RCMP HOUSING

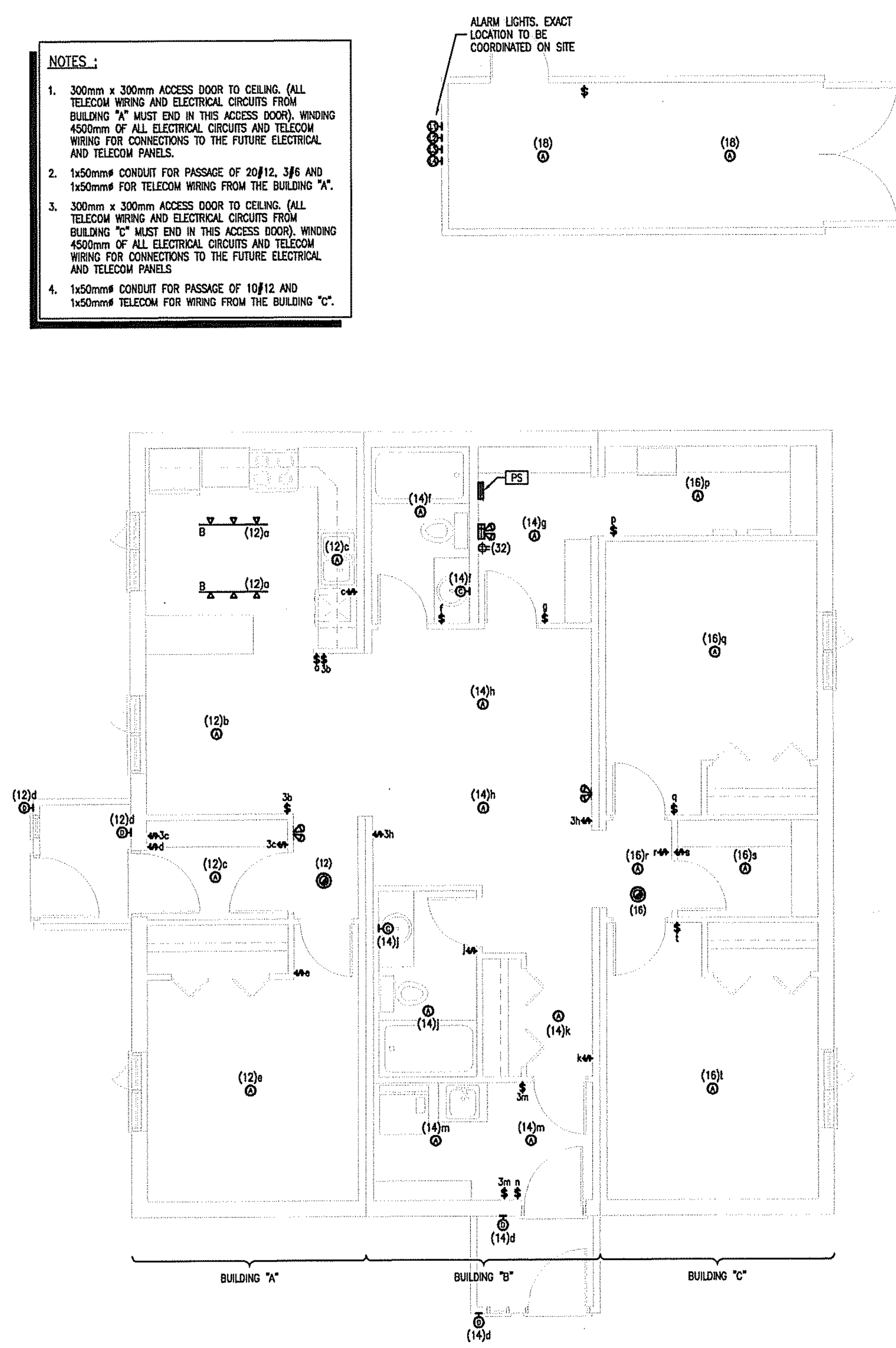
Resolute, Nunavut
Canada

STENDEL + REICH
architectes

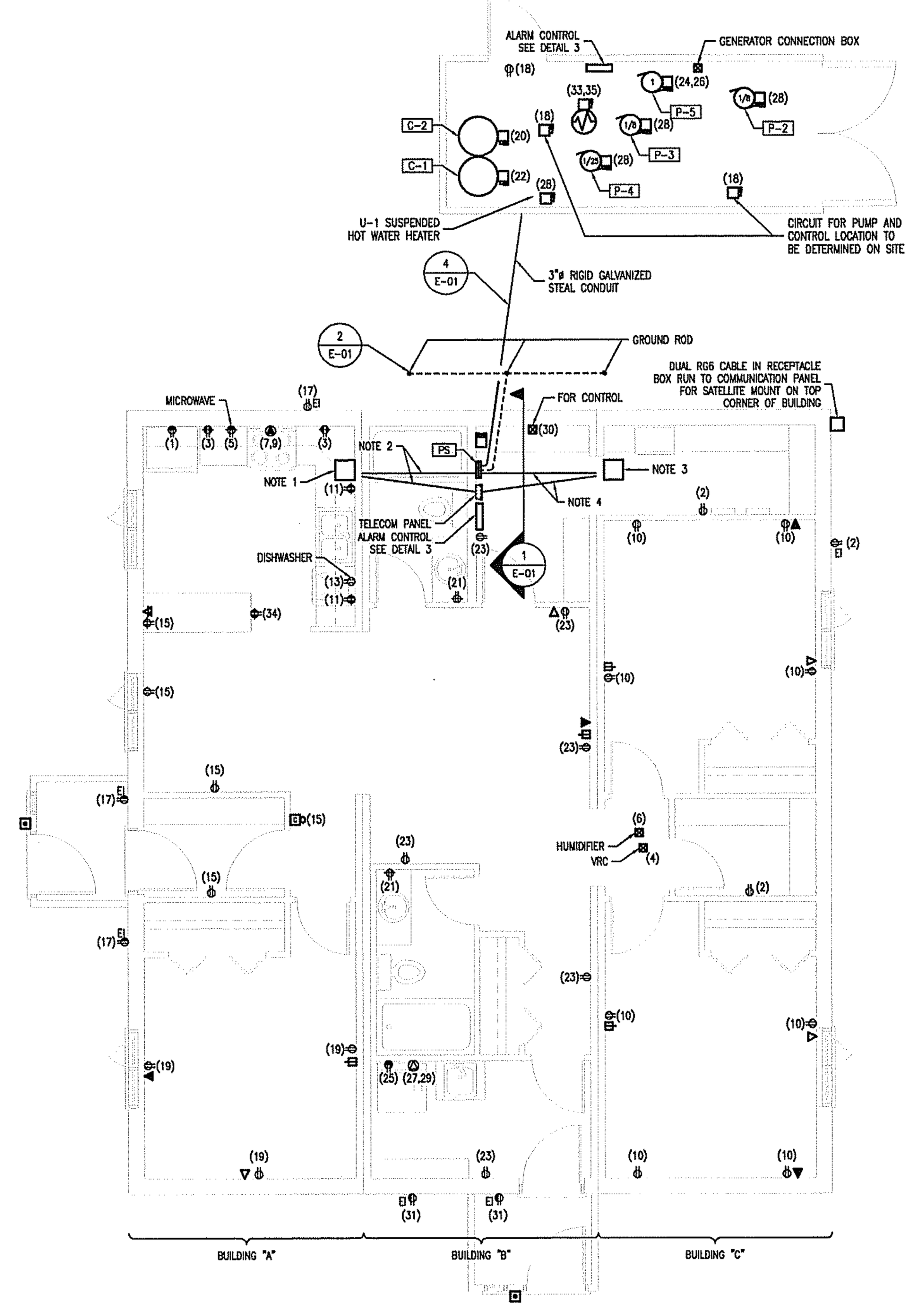
PERMIT TO PRACTICE
LES CONSULTANTS LBCD INC.
Signature
Date
PERMIT NUMBER: P 763
NT/NU Association of Professional Engineers and Geoscientists

NOTES :

1. 300mm x 300mm ACCESS DOOR TO CEILING. (ALL TELECOM WIRING AND ELECTRICAL CIRCUITS FROM BUILDING "A" MUST END IN THIS ACCESS DOOR). WINDING 4500mm OF ALL ELECTRICAL CIRCUITS AND TELECOM WIRING FOR CONNECTIONS TO THE FUTURE ELECTRICAL AND TELECOM PANELS.
2. 1x50mmø CONDUIT FOR PASSAGE OF 20#12, 3#6 AND 1x50mmø FOR TELECOM WIRING FROM THE BUILDING "A".
3. 300mm x 300mm ACCESS DOOR TO CEILING. (ALL TELECOM WIRING AND ELECTRICAL CIRCUITS FROM BUILDING "C" MUST END IN THIS ACCESS DOOR). WINDING 4500mm OF ALL ELECTRICAL CIRCUITS AND TELECOM WIRING FOR CONNECTIONS TO THE FUTURE ELECTRICAL AND TELECOM PANELS
4. 1x50mmø CONDUIT FOR PASSAGE OF 10#12 AND 1x50mmø TELECOM FOR WIRING FROM THE BUILDING "C".



LIGHTING
SCALE: 1:50



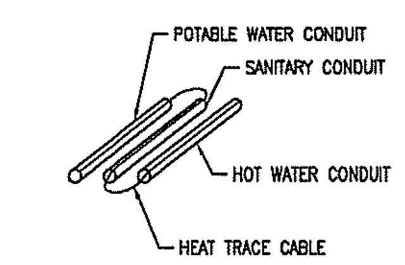
SERVICES
SCALE: 1:50

LOAD CALCULATION (AS PER CSA C22.10-10)	
SECTION 8-200 1)	
i) 1st 90m2:	5 000W
ii) 2nd 90m2:	1 000w
iii) -----	
iv) OVEN	6 000W
v) HEATER	24 000W
vi) DRYER: 6 000W @ 25%	1 500W
PUMPS: 4 000W @ 25%	1 000W
TOTAL:	38 500W
AMPERAGE:	
38 500W / 240V	160,41A
RECOMMANDATION	
MAIN ELECTRICAL ENTRY: 200A @ 240V	

GENERAL NOTE:

REFER TO SECTION 13 34 34 AND 01 11 00 FOR THE SPECIFICATIONS.

HEAT TRACE CABLE AS PER URECON # C10-240-COJ. PROVIDE A THERMOSTAT (IN THE MECHANICAL ROOM) AS PER URECON # UTC-2030-05. IN THE HOUSE, PROVIDE A CONNECTION KIT AS PER URECON # A1333-COJ. IN THE MECHANICAL ROOM, PROVIDE AND INSTALL TWO SENSOR AS PER URECON # URTD-06-G AND URTD-06-R. CONNECT THE CONNECTION KIT TO A 15A-240V CIRCUIT.



4 / E-01 HEAT TRACE CABLE DETAIL
SCALE: NONE

LIGHTING FIXTURE LIST

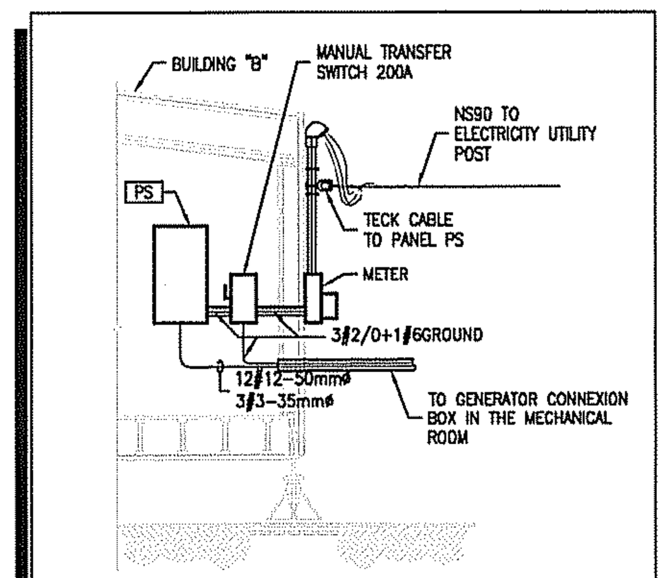
TYPE	MANUFACTURER	# CATALOG	VOLT	LAMP	MOUNTING	REMARKS
A			120	FLUO COMPACT	RECESSED	
B			120	FLUO COMPACT	RAIL	
C			120	FLUO COMPACT	WALL	
D			120	HPS	WALL	

NOTES :

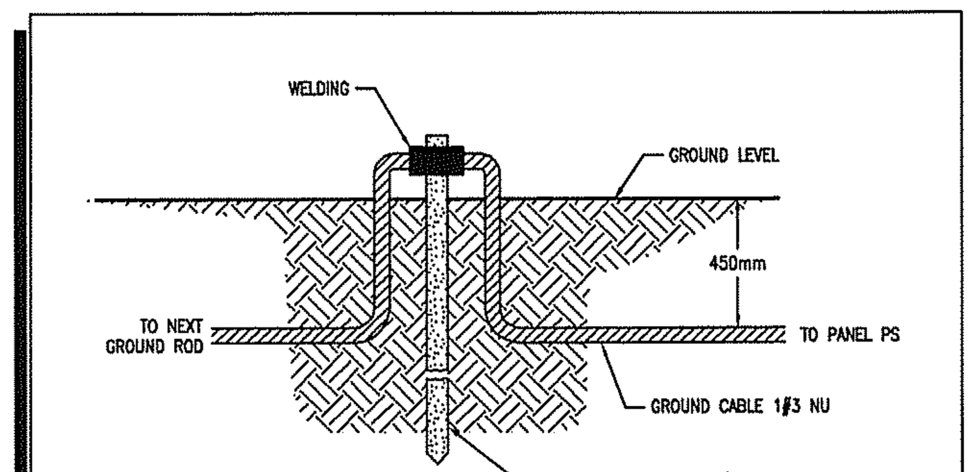
PANEL "PS" — 120 / 240 V; 1 Ø - 3 WIRES; MAIN BREAKER : 200A; BUS BAR - 200A

	REMARKS	SERVICES (W)	HEATING (W)	LIGHTING (W)	BREAKER	CIRCUIT	CIRCUIT	BREAKER	LIGHTING (W)	HEATING (W)	SERVICES (W)	REMARKS	
	REFRIGERATOR (A)	700			15	1	2	15			200	SERVICES OUTLETS(C)	
*	COUNTER OUTLETS (A)	1500			20	3	4	15			500	VRC (C)	
	MICROWAVE (A)	1200			15	5	6	15			100	HUMIDIFER	
	OVEN (A)	6000			50	7	8	15			300	HOT WATER HEATER	
						9	10	15			800	ROOM OUTLETS (C)	**
*	COUNTER OUTLETS (A)	1500			20	11	12	15	800			LIGHTING (A)	
	DISHWASHER (A)	700			15	13	14	15	800			LIGHTING (B)	
	SERVICES OUTLETS (A)	400			15	15	16	15	350			LIGHTING (C)	
	OUTDOOR OUTLETS (A)	500			15	17	18	15	200		200	SERVICES/LIGHT/CONTROL	
**	ROOM OUTLETS (A)	300			15	19	20	15			265	C-1 WATER HEATER	
*	WASHROOM OUTLETS (B)	300			15	21	22	15			265	C-2 BOILER	
	SERVICES OUTLETS (B)	500			15	23	24	15			1920	P-5	
	WASHING MACHINE (B)	1000			15	25	26						
	DRYER (B)	6000			30	27	28	15			1000	HOT WATER HEATER/PUMPS	
						29	30	15			500	CONTROL PANELS (B)	
	OUTDOOR OUTLETS (B)	500			15	31	32	15			150	EMERGENCY	
	ELECTRIC HEATER	24000			125	33	34	20			500	KITCHEN ISLAND	*
						35	36						
						37	38						
						39	40	15				TVSS	
						41	42						
	TOTAL :	47300.000000	##	##					1750.000000	##	6700.000000	: TOTAL	
	TOTAL LOAD BY TYPE (W) :	SERVICES	54000.000000					TOTAL LOAD (W) :			55750.000000		
		HEATING	##										
		LIGHTING	1750.000000										

* GROUND FAULT INDICATOR BREAKER
** ARC FLASH BREAKER



1 / E-01 AERIAL CONNECTION DETAIL
SCALE: NONE



2 / E-01 GROUND ROD DETAIL (TYPICAL FOR ALL GROUND ROD)
SCALE: NONE

LEGEND

○	RECESSED OR SURFACE MOUNTED LIGHTING FIXTURE
⊢○	WALL MOUNTED LIGHTING FIXTURE
▽ ▽ ▽	"TRACK LIGHT" TYPE LIGHTING FIXTURE
[G]	DIMMER FOR INCANDESCENT LIGHTING @ 600W
$	SINGLE POLE LIGHT SWITCH 15A, 120V
$3	THREE-WAY LIGHT SWITCH 15A, 120V
	DUPLEX RECEPTACLE 15A, 120V
	DUPLEX RECEPTACLE 15/20A, 120V, WITH GROUND FAULT "GFI"
	DUPLEX RECEPTACLE 15A, 120V, WITH GROUND FAULT "GFI"
	DUPLEX RECEPTACLE 15/20A, 120V
	DUPLEX RECEPTACLE 15A, 120V, ON DEDICATED CIRCUIT
	DUPLEX RECEPTACLE SPECIAL, VOLTAGE AND AMPERAGE INDICATED TO THE PLAN
	DUPLEX RECEPTACLE, INSTALLATION HEIGHT INDICATED ON PLAN (APPLICABLE FOR EACH TYPE OF RECEPTACLE)
	SINGLE RECEPTACLE 30A, 120/250V, FOR STOVE
	SINGLE RECEPTACLE 50A, 120/250V, FOR DRIER
▼	TELEPHONE OUTLET
▽	DATA OUTLET
	COMBINED TELEPHONE AND DATA OUTLET
	COMBINED TELEPHONE AND DATA OUTLET, INSTALLATION HEIGHT INDICATED ON PLAN
	SORTIE POUR CABLODISTRIBUTION
	DISTRIBUTION HOUSING TEL / DATA / TV
(T)	THERMOSTAT (SUPPLIED AND INSTALLED BY OTHERS, CONNECTED BY ELECTRICAL CONTRACTOR)
	SERVICE PANEL 120/240, 1ø - 3W
(1/3)	SINGLE PHASE MOTOR (CAPACITY AS INDICATED ON PLANS)
	TWO CONDUCTEURS #12AWG (COPPER)
	HOT WATER TANK
⊠	WALL OR CEILING MOUNTED JUNCTION BOX
	SAFETY SWITCH
	TRANSFER SWITCH
	ENTRANCE DOOR BELL
[C]	ENTRANCE DOOR CHIME
	AUTONOMOUS SMOKE WARNING @ 120V
EI	WEATHER PROOF

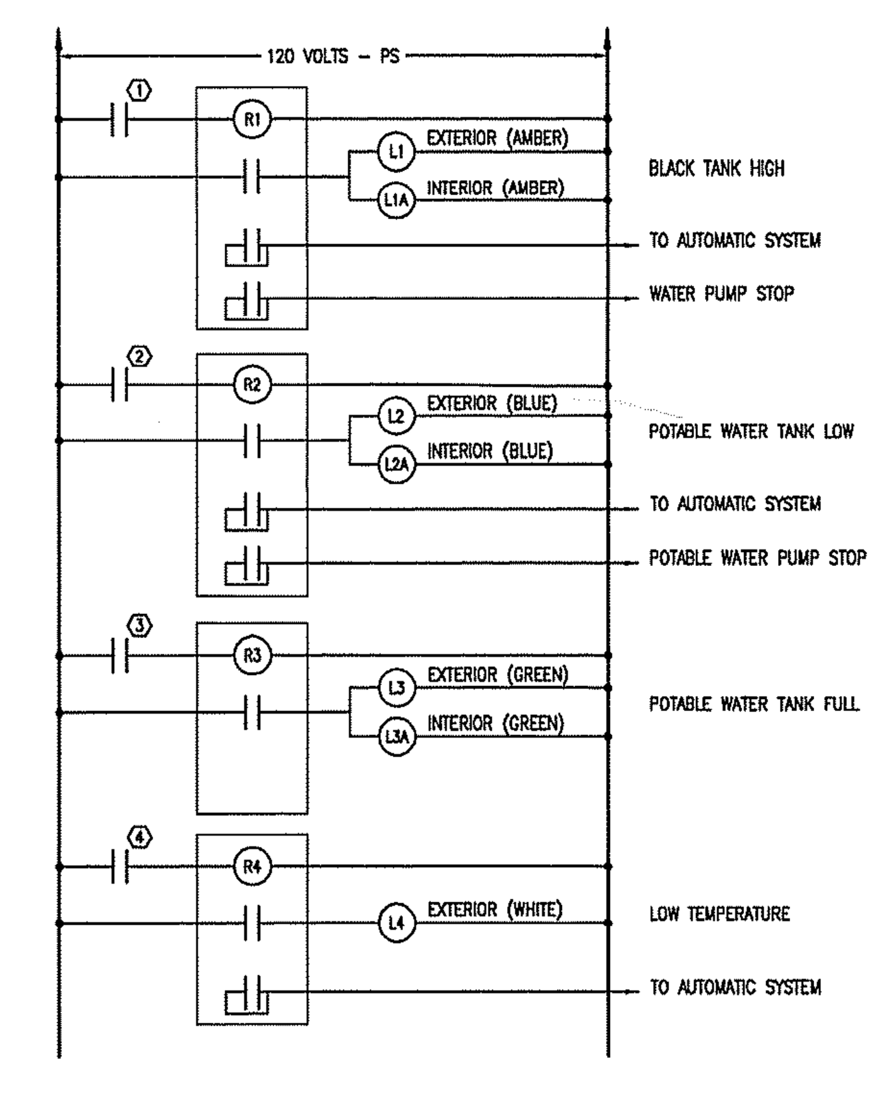
INSIDE, THE INDICATOR LAMPS L1A, L2A, L3A, ARE AS EDWARDS SERIES 9505-1014 c/w COLOR FILTERS AS INDICATED AND WITH 120V À 24V.C.A TRANSFO. #592 20VA (1 TRANSFO. PER LAMP). ALL TRANFO. MUST BE INSTALLED ABOVE THE CONCERNED PANEL. IN THE MECHANICAL ROOM THE INDICATOR LAMPS L1, L2, L3, L4 ARE AS EDWARDS SÉRIE 50SI, 120V AT CONTINUOUS LIGHTING.

L1 No 50SIR-N5(AMBER)
L2 No 50SIB-N5(BLUE)
L3 No 50SIC-N5(GREEN)
L4 No 50SIG-N5(WHITE)

1. HIGH LEVEL CONTACT IN BLACK TANK
2. LOW LEVEL CONTACT IN POTABLE WATER TANK
3. HIGH LEVEL CONTACT IN POTABLE WATER TANK
4. LOW TEMPERATURE CONTACT IN MECHANICAL ROOM

PROVIDE ALL CONTACTS AND RELAYS TO ACTIVATE ALL INDICATORS LAMPS TO LINK WITH THE AUTOMATIC SYSTEM

NOTE: THE TWO CONNECTIONS BOXES MUST BE COMPLETED WITH ALL RLAYS (2NC AND 2NO) AND CONNECTORS. THE CONTRACTOR MUST PROVIDE SHOP DRAWINGS AND CONNECTIONS SKETCHES FOR VERIFICATION AND TO BE ADDED IN THE MAINTENANCE MANUAL.



3 / E-01 LEVEL CONTROL MECHANICAL CONNECTION DIAGRAM
SCALE: NONE

Client

Structure

Electrical/Mechanical
LES CONSULTANTS LBCD
Montréal

REVISIONS

No.	Date	Description	By
05	2011-06-17	ISSUED FOR CSA APPROBATION	
04	2011-06-08	ISSUED FOR CSA APPROBATION	
03	2011-06-02	ISSUED FOR REVISION #1	
02	2011-05-24	ISSUED FOR PERMIT	
01	2011-04-27	ISSUED FOR CONSTRUCTION REVISED	
00	2011-03-25	ISSUED FOR CONSTRUCTION	

DISTRIBUTION

GENERAL NOTE

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DRAWN BY: J.-F. PROULX
VERIFIED BY: M-A MERCIER
APPROVED BY: M. GRAVEL
SEAL: REGISTERED PROFESSIONAL ENGINEER — M. GRAVEL — LICENSEE — NT/NU

DRAWING TITLE

ELECTRICITY
LIGHTING AND SERVICES
AND SPECIFICATIONS

SCALE	DATE	
1:50	2011-03-11	
PROJECT NO.	DRAWING NO.	REV.
SRAS-053	E-01	02

MECHANICAL LEGEND

GENERAL

- DUCT AND PIPING FOR DEMOLITION
- NEW DUCT AND PIPING
- EXISTING DUCT AND PIPING
- EXISTING CONTROL WIRING
- NEW CONTROL WIRING

EE	EXISTING EQUIPMENT TO REMOVE
EC	EXITING EQUIPMENT TO REMAIN
ER	EXISTING EQUIPMENT TO RELOCATE
R	EXISTING EQUIPMENT RELOCATE
N	NEW EQUIPMENT
E.B.	DOWN
E.H.	UP
T.A.	ACCES TRAP
P.A.	ACCES DOOR
©	TO CAP
®	CONNECTION POINT TO EXISTING

PLUMBING

- ABOVE GROUND DRAINAGE PIPING
- BELOW GROUND DRAINAGE PIPING
- VENT PIPING
- DOMESTIC COLD WATER
- DOMESTIC HOT WATER
- RECIRCULATED DOMESTIC HOT WATER
- GAZ — GAS PIPING
- C — WATER HEATER
- RN — CLEAN OUT
- DOWNWARD PIPING
- UPWARD PIPING
- UPWARD PIPING
- COLD WATER TAP
- HOT WATER TAP
- BALL VALVE
- ISOLATION VALVE
- SOLENOID VAVLE
- SOLENOID VAVLE
- FREEZE PROOF EXTERIOR WATER CONNECTION
- CHECK VALVE
- STRAINER
- DEEP P TRAP
- DUCT CAP

VENTILATION

- NEW ROUND VENTILATION CONDUIT
- FLEXIBLE DUCT
- MISCELLANEOUS EQUIPMENT
- SUPPLY GRILL
- RETURN GRILL
- MANUAL BALANCING DAMPER
- Ⓣ NEW THERMOSTAT
- Ⓢ NEW PROBE
- EXT. FIRE EXTENGUISHER, CLASS "ABC", SIZE 2.3 Kg

GENERAL NOTES

1. PLANS & SPECIFICATIONS :
THE PLANS AND SPECIFICATIONS ARE INTENDED TO INCLUDE ALL WORK AND MATERIAL REQUIRED FOR THE ENTIRE COMPLETION OF THE WORK AS OUTLINED IN THE SECTION ENTITLED SCOPE OF WORK WITH THE SYSTEMS LEFT READY FOR CONTINUOUS AND EFFICIENT OPERATION. ANY MATERIAL, WORK OR DETAILS MENTIONED IN THE SPECIFICATION AND OMITTED FROM THE PLANS, OR INDICATED ON THE PLANS BUT OMITTED FROM THE SPECIFICATION, OR OMITTED FROM BOTH DOCUMENTS BUT OBVIOUSLY UNDERSTOOD, SHALL BE DONE AND FURNISHED AS PART OF HIS CONTRACT WITHOUT EXTRA CHARGE. ALL MECHANICAL & ELECTRICAL PLANS FORM A COMPLETE SET THAT CANNOT BE SEPARATED.
FOR COMPLEMENTARY INFORMATION, REFER TO SEPARATE SPECIFICATIONS INCLUDED WHIT DRAWINGS (PROJECT R.044530.001)

2. PERMIT, CERTIFICATES, FEES :
THE CONTRACTOR SHALL, IN THE PERFOMANCE OF THE CONTRACT, GIVE ALL NECESSARY NOTICES, OBTAIN ALL NECESSARY PERMITS AND PAY ALL FEES. THE CONTRACTOR SHALL FURNISH TO THE ENGINEER AND TO THE OWNER ALL THE NECESSARY CERTIFICATES AS EVIDENCE THAT THE WORK IS CARRIED OUT IN COMFORMITY TO ALL APPLICABLE MUNICIPAL, PROVINCIAL AND FEDERAL LAWS, REGULATIONS AND ORDINANCES.

3. TAXES :
THE CONTRACTOR SHALL INCLUDE TAXES IN HIS TENDER AND PAY ALL APPLICABLE FEDERAL, PROVENCIAL AND LOCAL TAXES.

4. MATERIAL & EQUIPMENT :
ALL MATERIALS AND APPARATUS REQUIRED FOR THE WORK, EXCEPT AS SPECIFICALLY INDICATED OTHERWISE, SHALL BE NEW, OF FIRST-CLASS QUALITY, AND SHALL BE FURNISHED, DELIVERED, ERECTED, CONNECTED AND FINISHED IN EVERY DETAIL, AND SHALL BE SO SELECTED AND ARRANGED AS TO FIT PROPERLY INTO THE BUILDING SPACES. WHERE NO SPECIFIC AND OR QUALITY MATERIAL IS GIVEN, A FIRST-CLASS STANDARD ARTICLE AS APPROVED BY THE ENGINEER SHALL BE FURNISHED. SECOND HANDS, REJECTS OR DAMAGED EQUIPMENT OR MATERIAL WILL NOT BE ACCEPTED.

5. SCHEDULE :
THE CONTRACTOR MUST FOLLOW A CONSTRUCTION SCHEDULE, WHICH SHALL FORM PART OF THE CONTRACT DOCUMENTS, AS ESTABLISHED PRIOR TO THE START OF CONSTRUCTION BY THE GENERAL CONTRACTOR, ENGINEER, ARCHITECT OR OWNER. IF HE FALLS BEHIND, HE MUST ARRANGE FOR OVERTIME WORK AT NO EXTRA COST TO HIS CONTRACT AND SHALL BE LIABLE FOR ALL DAMAGES CAUSED BY THIS DELAY.

6. INSTALLATION OF EQUIPMENT :
THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER AND/OR ARCHITECT FOR DECISION ANY CONTROVERSIAL POINT BEFORE PROCEEDING WITH THE WORK. IF IN THE OPINION OF THE CONTRACTOR ANY CHANGES COULD BE MADE FOR THE BETTER COMPLETION OF THE WORK, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING FOR SUCH SUGGESTED CHANGES AND FOR HIS APPROVAL BEFORE CONTINUING WITH THE WORK.

7. SLEEVES & OPENINGS :
OPENING IN WALL & FLOOR SLABS WILL BE REQUIRED FOR PIPING AND SHALL BE DONE WITH A ROTARY DRILL ONLY. ALL DUCTWORK AND OPENINGS FOR DUCTWORK SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. GET APPROVAL FROM OWNER/ENGINEER FOR LOCATION OF NEW HOLES TO DRILL.

8. SEALING OF OPENINGS :
THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR SEALING ALL DUCT OPENING THROUGH FLOORS AND WALLS WITH AN APPROVED FIRE RESISTANT SEALANT TO MAINTAIN THE FIRE RESISTANCE RATING OF WALLS, CEILINGS AND FLOORS.

9. EQUIPMENT BASES, HANGERS & SUPPORTS :
WHERE REQUIRED ON DRAWINGS, CONCRETE BASES, LEVELLING PADS AND PRIMARY STEEL STRUCTURAL SUPPORTS REQUIRED FOR MECHANICAL EQUIPMENT SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR. THIS CONTRACTOR SHALL FURNISH AND SET ALL ANCHORS, BOLTS, ETC., INTO THE BASES AND FOUNDATIONS OF THE WORK. ALL SUPPORT SHALL BE PRIME COATED AND PAINTED WITH TWO COATS OF HEAVY DUTY, OIL-BASE LIGHT GREY PAINT.

10. SWITCH INTERRUPTER & STARTERS :
THESE ARE SUPPLIED BY THE VENTILATION CONTRACTOR. THESE ARE MOUNTED AND WIRED BY THE ELECTRICAL CONTRACTOR.

11. ACCESS TO EQUIPMENT :
ANY EQUIPMENT WHICH MAY REQUIRE SERVICE, MAINTENANCE OR ADJUSTMENT SHALL BE INSTALLED IN SUCH A MANNER AS TO PROVIDE EASY ACCESS TO THE EQUIPMENT.

12. MOVING OF EQUIPMENT :
THE CONTRACTOR SHALL VERIFY THAT THE EQUIPMENT TO BE INSTALLED CAN BE TRANSPORTED THROUGHOUT THE BUILDING SO IT CAN BE BROUGHT TO THE SPECIFIED LOCATION.

13. PROTECTION OF EQUIPMENT :
THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE PROTECTION AGAINST THE WEATHER, DIRT AND OTHER DAMAGE FOR ALL THE EQUIPMENT ON THE SITE FROM THE TIME IT IS RECEIVED UNTIL FINAL ACCEPTANCE OF THE WORK.

14. CLEANING UP :
THE CONTRACTOR SHALL KEEP THE PREMISES CLEAN AND IN GOOD ORDER AT ALL TIMES.

15. SHOP DRAWINGS :
WITHIN TWO WEEKS OF AWARDING OF THE CONTRACT, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER, FOR HIS REVIEW, ONE DIGITAL COPIES OF SHOP DRAWINGS OF ALL LAYOUTS, EQUIPMENT, WIRING DIAGRAMS AND CONTROL DIAGRAMS. THE ENGINEER'S REVIEW OF THESE DRAWINGS IS GENERAL AND SHOULD NOT BE CONSIDERED AN OFFICIAL APPROVAL. THEREFORE, THIS DOES NOT RELIEVE THE CONTRACTOR OF THE POSSIBILITY OF ERROR. IN PARTICULAR THE FOLLOWING DOCUMENTS ARE REQUIRED:
A) CVCA FABRICATION DRAWINGS (SCALE 1:50);
B) MECHANICAL AND ELECTRICAL EQUIPMENT DRAWINGS;
C) AUTOMATIC CONTROLS DRAWINGS;

17. AS BUILD DRAWINGS :
THE CONTRACTOR SHALL KEEP AN EXTRA SET OF PLANS AND SPECIFICATIONS ON WHICH HE WILL RECORD DAILY ALL CHANGES AND DEVIATIONS FROM PIPING AND DUCT AS SHOWN ON DRAWING. UPON COMPLETION OF THE JOB, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING TWO CLEAN SETS OF PRINTS OF THE MECHANICAL DRAWINGS ON WHICH ALL AS BUILT DEVIATIONS AND CHANGES SHALL BE NEATLY RECORDED AND SUBMITTED FOR THE OWNER'S AND ENGINEER'S RECORDS.

18. OPERATING & MAINTENANCE MANUALS :
PRIOR TO ISSUING FINAL ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL SUPPLY TWO COPIES OF OPERATING AND MAINTENANCE MANUALS TO THE ENGINEER. THESE MANUALS SHALL CONSIST OF A THREE RING HARD COVER LOOSE-LEAF BINDER AND IT SHALL CONTAIN A COPY OF EACH APPROVED SHOP DRAWING, GUARANTEES OF ALL EQUIPMENT AND OPERATION INSTRUCTIONS FOR EACH PIECE OF EQUIPMENT. A SUPPLIERS LIST SHALL BE INSERTED AS FRONT PAGE.

19. CO-OPERATION WITH OTHER SUBCONTRACTORS :
THE CONTRACTOR SHALL CONFER WITH OTHER SUBCONTRACTORS WHOSE WORK MAY AFFECT THE WORK OF THE CONTRACTOR SO THAT ALL WORK MUST PROCEED EXPEDITIOUSLY AND WITHOUT INTERFERENCES SO THAT CONFLICTS ARE AVOIDED PRIOR TO THE BEGINNING OF THE INSTALLATIONS. THE INSTALLATION OF ANY PIECE OF EQUIPMENT, DUCTWORK, PIPES, ETC., SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR PRIOR TO THE BEGINNING OF THE WORK.

20. FINAL APPROVAL & GUARANTEE :
FINAL APPROVAL OF THE INSTALLATION SHALL BE GIVEN BY THE ENGINEER, ON BEHALF OF THE OWNER, AFTER IT HAS BEEN CHECKED AND FOUND IN COMPLETE ACCORDANCE WITH THE PLANS AND SPECIFICATIONS AND AFTER ALL DEFICIENCIES HAVE BEEN CORRECTED. THE CONTRACTOR SHALL SUBMIT WRITTEN GUARANTEES ON ALL LABOR AND MATERIALS AGAINST ALL DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF AT LEAST ONE YEAR, INCLUDING ONE COMPLETE HEATING AND COLD SEASON, FROM THE DATE OF FINAL APPROVAL, AND SHALL MAKE GOOD ALL DEFECTS DEVELOPPED DURING SUCH TIME TO THE SATISFACTION OF THE ENGINEER WITHOUT EXPENSE TO THE OWNER.

SECTION 15A - PLUMBING

SECTION 15A – PLUMBING

THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO HIS SUBMITTAL TO VERIFY THE EXISTING LOCAL CONDITIONS AND EXAMINE THE MECHANICAL AND ELECTRICAL DRAWINGS ALONG WITH THE EQUIPMENT OR ANY OTHER RELEVANT PLANS.

PLANS AND SPECIFICATIONS HAVE BEEN PREPARED WITH THE GREATEST POSSIBLE ACCURACY. HOWEVER, THE CONTRACTOR IS RESPONSIBLE TO LOCATE, MEASURE AND, IF NEEDED, ALL MODIFICATIONS TO THE DUCTWORK AND TO THE EXACT LOCATION OF THE EQUIPMENT TO SATISFY THE NORMAL JOBSITE CONDITION.

THE WORK TO BE DONE INCLUDES PROVIDING OF THE MATERIAL, DELIVERY, INSTALLATION, TESTING AND SETUP OF ALL THINGS TO PROVIDE AND INSTALL COMPLETLY AND THOUROUGHLY ALL FUNCTIONNING SYSTEMS AS DESCRIBED IN THE SCOPE OF WORK AND IN THE PLAN DRAWINGS.

15A.1 – PLUMBING SCOPE OF WORK:

1. DISMANTLING:
   - N/A
2. NEW WORK:
SUPPLY AND INSTALL THE FOLLOWING SYSTEMS:
   - WATER SUPPLY SYSTEM;
   - SANITARY SYSTEM;
   - HYDRONIC HEATING SYSTEM;

15A.2 – PLUMBING SPECIFIC REQUIREMENTS:

1. CODE AND REGULATIONS:
THE PLUMBING WORK SHALL BE DONE CONFORMLY TO PROVINCIAL AND LOCAL PLUMBING LAWS. INSTALATION OF THE PLUMBING PIPING NETWORK SHALL CONFORM TO THE NORM ANSI B31.1-1983. THE CONTRACTOR SHALL DO ALL THE NECESSARY TESTING AND PAY FOR ALL OF THE REQUIRED PERMITS.
2. TESTINGS:
2.1 TEST ALL THE DOMESTIC HOT AND COLD WATER PIPING TO AT LEAST TWICE THE SERVICE MAXIMUM PRESSURE. HOWEVER, TESTING MUST NOT BE BELOW 690 KPA (100 PSI). THE TESTING PRESSURE SHALL BE MAINTAINED FOR AT LEAST FOUR (4) HOURS WITHOUT ANY DROP IN PRESSURE
2.2 ALL DRAIN PIPING SHALL BE FILLED WITH WATER AND BE ISOLATED FROM THE NETWORK AND EQUIPMENT. THE WATER LEVEL SHALL REMAIN THE SAME FOR AT LEAST (15) MINUTES IN CASE OF A LEAK, REPAIR THE FAULTY JOINT AND RETEST.
2.3 TEST ALL GLYCOL HEATING AND CHILLED WATER PIPES AT PRESSURE EQUAL TO ONE AND HALF TIMES THE SYSTEM OPERATION PRESSURE FOR FOUR (4) HOURS.
3. DOMESTIC COLD AND HOT WATER PIPING:
3.1 ABOVE GROUND 12 TO 50MM (1/2 TO 2") – PROVIDE FREEZE-DAMAGE RESISTANT, NON METALIC WATER SUPPLY LINE . THE FITTING MUST BE SUPPLIED BY THE TUBING MANUFACTURER. TYPE: CROSS-LINKED POLYETHYLENE. APROVED AQUAPEX, UPONOR BRAND.
4. DRAIN AND VENT PIPING:
4.1 DRAIN – ABS MATERIAL, CSA B1800-02 APPROVE
4.2 VENT – ABS MATERIAL, CSA B1800-021 APPROVE
5. HANGER AND SUPPORTS:
PROVIDE AND INSTALL ALL THE HANGERS FOR THE PIPING AS PER CODE.
6. VALVE MAINTENANCE:
FOR EACH PLUMBING FIXTURE, INSTALL VALVE INSULATION IN POLISHED BRASS ON THE HOT AND COLD WATER PIPING.
7. INSULATION:
THE DOMESTIC COLD AND HOT WATER SHALL BE INSULATED WITH A 25MM (1") THICK FIBER GLASS INSULATION COVERED BY A VAPOR BARRIER FOR COLD WATER. ALL THE JOINTS SHALL BE WATER PROOF. THE VENTS FIRST 3M (10') FEET SHALL BE INSULATED WITH A 25MM (1") THICK FIBER GLASS INSULATION COVERED BY A VAPOR BARRIER. ALL THE JOINTS SHALL BE WATER PROOF. ALL THE GLYCOL HEATING AND CHILLED WATER PIPES SHALL BE INSULATED WITH FIBER GLASS INSULATION AND COVERED BY CANEVAS TO THE FOLLOWING THICKNESSES:
   - 25MM (1") THICK FOR THE PIPES 50MM (2") AND LESS;
   - 38MM (1 1/2") THICK FOR THE PIPES OF 64 TO 200MM (2 1/2" TO 8");

   ALL JOINTS SHALL BE WATER PROOF.

15A.3 – PLUMBING EQUIPMENT LIST:

TANK-1 SEPTIC TANK
- COMPANY: ACE ROTO MOLD
- MODEL: AST-1000-1
- PROVIDED WITH 75MM THICK POLYURETHANE INSULATION COMPLETE WITH A PROTECTIVE JACKET AND HIGH LEVEL ALARM FLOAT IN TANK (FLYGT, ENM-10).

TANK-2 WATER TANK
- COMPANY: ACE ROTO MOLD
- MODEL: AST-0850-1W
- PROVIDED WITH HIGH AND LOW LEVEL ALARM FLOAT IN TANK (FLYGT, ENM-10).

TANK-3 FUEL OIL TANK
- COMPANY: VITOSET
- MODEL: DWT 1500

C-1 WATER HEATER
- COMPANY: GIANT
- MODEL: OG50
- PROVIDED WITH RIELLO BURNERS, 0.65GPH
- SPECIFICATION: 120V, 60HZ, 2.2 AMPS

C-2 BOILER
- COMPANY: WEIL-MCLAIN
- MODEL: WGO-2
- PROVIDED WITH RIELLO BURNERS, 0.65GPH
- SPECIFICATION: 25KW (86MBH) @ 86%, 120V, 60HZ, 2.2 AMPS
- NOTE: USE WHIT PROPYLENE GLYCOL @ 48% TO OBTAIN PROTECTION TO MINUS 30°C.

C-3 ELECT. BACKUP BOILER
- COMPANY: HYDRA
- MODEL: 24
- SPECIFICATION: 24KW, 240V
- OPERATION TEMPERATURE: 49°C (120°F)

U-1 HOT SUSPENDED WATER HEATER
- COMPANY: REZNOR
- MODEL: WWS-18/24
- SPECIFICATION: 7KW (24MBH), 135L/S (270PCM), 120V, 60HZ, 0.6AMPS

P-1 HOT WATER DELIVERY SYSTEM
- COMPANY: WIRSBO D'MAND
- MODEL: 200
- SPECIFICATION: 120V, 60HZ, 1.92AMPS, 1/8HP, 860KPA (125PSI) MAX@ 60°c.

P-2 CIRCULATION PUMP
NOTE: SUPPLY WITH C-2 UNIT

P-3 CIRCULATION PUMP
- COMPANY: WILO
- MODEL: TOP S 1.25-15
- SPECIFICATION: 120V, 60HZ, 1.4AMPS, 1/8HP

P-4 CIRCULATION PUMP
- COMPANY: GRUNDFOS
- MODEL: UPS 15-58FC/FRC
- SPECIFICATION: 120V, 60HZ, 0.75AMPS AT SPEED 3, 1/25HP,

P-5 WATER DELIVERY SYSTEM
- COMPANY: GRUNDFOS
- MODEL: GRN 1-10 A-P-C-E-HQQE
- SPECIFICATION: 240V, 60HZ, 3.4AMPS, 1HP, 0.45 L/S (6GPM)

SECTION 15A - PLUMBING - CONT'D

MV-1 MIXING VALVE
- COMPANY: WIRSBO
- MODEL: A5400102
- OPERATION TEMPERATURE: 87°F (30°C)

V-1 BALANCE VALVE
- COMPANY: WIRSBO
- MODEL: A5400102

RP-1 WELL TANK
- COMPANY: AMTROL
- MODEL: WELLXTROL WX-101
- SPECIFICATION: 9L (2GAL), 262KPA (38PSI) PRE-CHARGE

RP-2 WELL TANK
- COMPANY: AMTROL
- MODEL: WELLXTROL WX-202XL
- SPECIFICATION: 118L (26GAL), 262KPA (38PSI) PRE-CHARGE

HEATING

1. UNDERFLOOR TUBING :
1.1. THE HYDRINIC UNDERFLOOR HEATING PIPING SHALL BE OF NIMINAL INSIDE DIA, TER AS INDICATED, CROSS LINKED POLYETHYLENE TUBING MEETING ASTM STANDARD F876 AND CSA B37.1. TUBING SHALL BE RATED FOR 82C AT 689 KPa AND SHALL HAVE INTERNAL OXYGEN DIFFUSION BARRIERTO REDUCE POTENTIAL CORROSION TO NO GREATER THAN 0.4 g/m3/DAY AT 4.4C ALL TUBING SHALL BE CSA APPROVED.
1.2. ALL PIPING IN THE FLOOR SHALL BE LOCATED A MINIMUM OF 150mm FROM ANY WALL. PIPING SERVING INDIVIDUAL ROOMS UN THOUGH DOOR OPENING ONLY.
1.3. MANIFOLDS SHALL BE CAST BRONZE CONSTRUCTION AND SHALL HAVE INTEGRAL CIRCUIT BALANCING VALVES AND INDIVUAL CIRCUIT MOTORIZED CONTROL VALVES. SUPPLY AND RETURN MANIFOLDS SHALL BE ALBE TO VENT AIR FROM THESYSTEM. MANIFOLDS SHALL BE PROVIDED WITH SUPPORT BRACKETS AND TUBE BEND SUPPORTS. MANIFOLDS SHALL BE ISOLATED FROM SUPPLY AND RETURN PIPING WITH VALVES THAT ARE SUITABLE FOR ISOLATION AND BALANCING. PROVIDE MINIMUM 600mmX600mm ACCESS PANEL AT EACH RECESSED MANIFOLD LOCATION WITH RATING TO MATCH WALL ASSEMBLY.
1.4. TUBE FITTINGS SHALL BE MANUFACTURED OF DEZINCIFATION RESISTANT BRASS. THESE FITTINGS MUST BE SUPPLIED BY THE TUBING MANUFACTURER. THE TUBE FITTING CONSISTS OF AN INSERT, A SERRATED COMPRESSION RING AND A NUT. ALL FITTINGS SHALL BE CSA APPROCED.
2. HEATING :
2.1. DESIGN PIPING DISTRIBUTION TO AVOID PENETRATION OF BUILDING AIR/VAPOUR BARRIER. APROUVED HEPEX, UPONOR BRAND
2.2. ZONE ROOMS FOR INDIVIDUAL HEAT CONTROL AND SIDE LENGTH OF LOOP PIPING AS PER MANUFACTURERS RECOMMENDATIONS.
2.3. BALANCE SYSTEM TO PROVIDE PROPER FLOW RATES THROUGH ALL AREAS. PROVIDE BALANCING VALVES AT ALL LOOP CONNECTIONS.
3. HEATING
THE HYDRONIC SYSTEM SHALL BE SIZED TO PROVIDE THERMAL COMFORT RATES TO MEET ASHREA STANDARDS.
4. DESIGN AND SIZE THE SYSTEM TO HANDLE THERMAL LOADS TO MAINTAIN AN AVERAGE INTERIOR BUILDING TEMPERATURE OF AT LEAST 22°C, AT AN OUTSIDE TEMPERATURE OF -50°C.

SECTION 15B - VENTILATION

THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO HIS SUBMITTAL TO VERIFY THE EXISTING LOCAL CONDITIONS AND HAVE A LOOK AT THE MECHANICAL AND ELECTRICAL DRAWINGS ALONG WITH THE EQUIPMENT OR ANY OTHER RELEVANT PLANS.

THE PLANS AND SPECIFICATIONS ARE PREPARED AS EXACT AS POSSIBLE. HOWEVER, THE CONTRACTOR IS RESPONSIBLE FOR ANY LOCATION, MEASUREMENTS AND, IF NEEDED, ALL MODIFICATIONS TO THE DUCTWORK AND THE EXACT LOCATION OF THE EQUIPMENT TO SATISFY THE NORMAL JOBSITE CONDITION.

THE VENTILATION CONTRACT SHALL INCLUDE ALL MATERIALS LABOUR, DELIVERY, MOVING, INSTALLATION, CONNECTION, START-UP AND LEAVE IN FIRST CLASS OPERATING CONDITIONS OF ALL VENTILATION SYSTEMS SHOWN ON DRAWINGS AND/OR SPECIFIED IN THE PRESENT SPECIFICATIONS.

15B.1 – VENTILATION SCOPE OF WORK

1. NEW WORK
   - SUPPLY, INSTALL AND CONNECT NEW VCR AND HUMIDIFIER;
   - SUPPLY AND INSTALL ALL THE DUCTWORK, HANGERS AND SUPPORTS;
   - SUPPLY AND INSTALL ALL THE ACCESSORIES AND WORK NECESSARY FOR THE PROPER OPERATION OF ALL EQUIPMENT.

15B.2 – VENTILATION SPECIFIC REQUIREMENTS

.1 CODE AND RULINGS:
VENTILATION WORK SHALL BE DONE ACCORDING TO THE RECOMMENDATIONS OF SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE", LATEST REVISION.

.2 DUCTWORK:
ALL DUCTWORK SHALL BE MADE OF GALVANIZED STEEL ASTM A525M-80 AxD WITH A ZINC CONFORM TO G90 AND AS PER ASHRAE. PROVIDE BALANCING REGISTERS AS PER PLANS AND/OR AS REQUIRED. FOR PROPER SETUP, THE DUCT DIMENSIONS SHOWN ON PLANS ARE INSIDE DIMENSIONS. WHEN ACOUSTIC INSULATION IS ADDED, THE DUCT DIMENSIONS SHALL INCREASE ACCORDINGLY.

.3 ACCESS DOORS:
ACCESS DOORS PERMITTING ACCESS TO REGISTERS, COILS AND OTHER EQUIPMENT SHALL BE INSTALLED FOR SERVICE AND INSPECTION. THE ACCESS DOORS, SHALL BE SCREWED PANEL OF 350 X 350mm MINIMUM UNLESS THERWISE NOTED ON DRAWING, AND SHALL BE EQUIPPED WITH TWO (2) FRAME LOCKS.

.4 ACCESSORIES:
FLEXIBLE CONNECTIONS: PROVIDED AT VENTILATION UNIT, CONNECTIONS MADE OF FIBER GLASS COATED NEOPRENE. DEFLECTORS: ALL THE SQUARE DUCT ELBOWS AT 90 DEGREES SHALL BE EQUIPPED WITH DOUBLE THICKNESS DEFLECTORS. ALL THE BLADES OF THE DEFLECTORS SHALL BE SOLIDLY FIXED TO ELIMINATE VIBRATIONS.

.5 SUPPORTS AND HANGERS:
SUPPORT EACH SECTION OF DUCT ACCORDING TO THE STANDARDS OF SMACNA.

.6 THERMAL INSULATION:
NEW VENTILATION DUCTING SHALL BE INSULATED WITH A 50mm THICK FIBER GLASS INSULATION COVERED BY A VAPOUR BARRIER. ALL JOINTS SHALL BE WATER PROOF.

.7 BALANCING:
THE CONTRACTOR SHALL VERIFY AND NOTE THE RESULTING AIR FLOW AND THE STATIC PRESSURE AS PER PLAN FOR FRESH, COMBUSTION/COOLING (TOTAL NEW AIR) AND EXHAUST AIR.

15B.3 – VENTILATION EQUIPMENT LIST:

- UNITÉ VRC-1
- FABRICANT : TEMPEFF
- MODEL : RGSP 300
- 45 L/S

- UNITÉ HUM-1
- FABRICANT : HONEYWELL
- MODEL : HE300A1005
- C/W H8908 HUMIDISTAT

PERMIT TO PRACTICE
LES CONSULTANTS LBCD INC.
Signature
Date
PERMIT NUMBER: P 763
NT/NU Association of Professional Engineers and Geoscientists

RCMP HOUSING

Resolute, Nunavut
Canada

STENDEL + REICH
architectes

Client

Structure

Electrical/Mechanical

LES CONSULTANTS LBCD
Membre de Trow Global
Montréal

REVISIONS

No.	Date	Description	By
05	2011-06-17	ISSUED FOR CSA APPROBATION	
04	2011-06-08	ISSUED FOR CSA APPROBATION	
03	2011-06-02	ISSUED FOR REVISION #1	
02	2011-05-24	ISSUED FOR PERMIT	
01	2011-04-27	ISSUED FOR CONSTRUCTION REVISED	
00	2011-03-25	ISSUED FOR CONSTRUCTION	

DISTRIBUTION

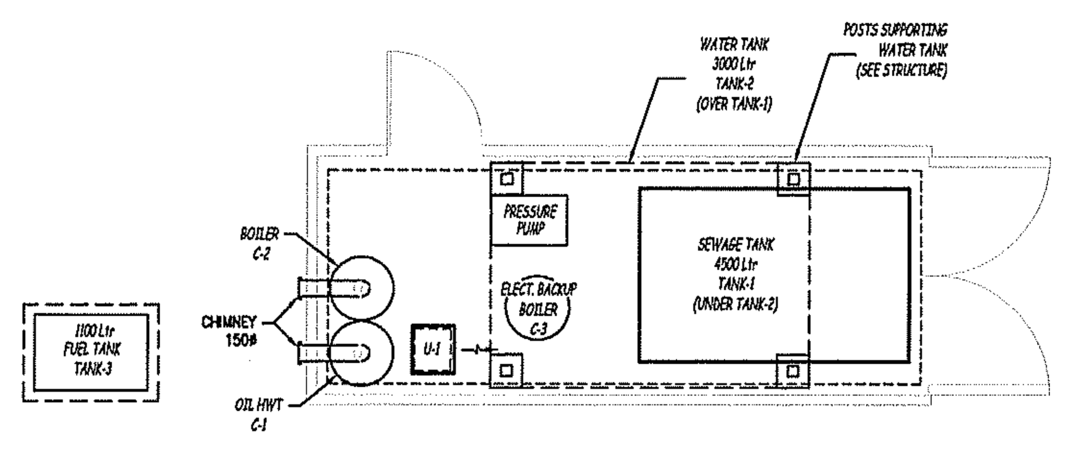
GENERAL NOTE

THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING DIMENSIONS, MEASUREMENTS, LEVELS, DETAILS, SPECIFICATIONS, AND SITE CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION AND PRECISE FITTING OF ALL ELEMENTS. ALL ERRORS, OMISSIONS, AND ANOMALIES MUST BE REPORTED TO THE ARCHITECT IMMEDIATELY.

DRAWN BY: V. PINEAULT
VERIFIED BY: J-P. DIONNE
APPROVED BY: B. OHANIAN
SEAL

DRAWING TITLE: SPECIFICATION & LEGEND

SCALE	DATE	
-	2011-03-11	
PROJECT NO.	**DRAWING NO.**	**REV.**
SRAS-053	M-01	04



CONTAINER - LAYOUT OF EQUIPMENT
SCALE : 1:50

TOTAL CHARGE

IDENT.	QUANT.	CHARGE
KITCHEN SINK	2	2
SINK	2	1
BATH	2	2
W-C	2	3
WASHING MACHINE	1	3
DISHWASHER	1	-
S-TOTAL		17.5
3" @ 1/50 = TOTAL		27

WATER POTABLE SUPPLY

IDENT.	Ø COND.	CHARGE COLD WATER	CHARGE HOT WATER
KITCHEN SINK	½"Ø	2	2
SINK	⅜"Ø	1	1
BATH	½"Ø	2	2
W-C	⅜"Ø	3	-
WASHING MACHINE	½"Ø	3	3
DISHWASHER	½"Ø	-	3
S-TOTAL		11	11
TOTAL		22	

SANITARY DRAINAGE AND VENTILATION

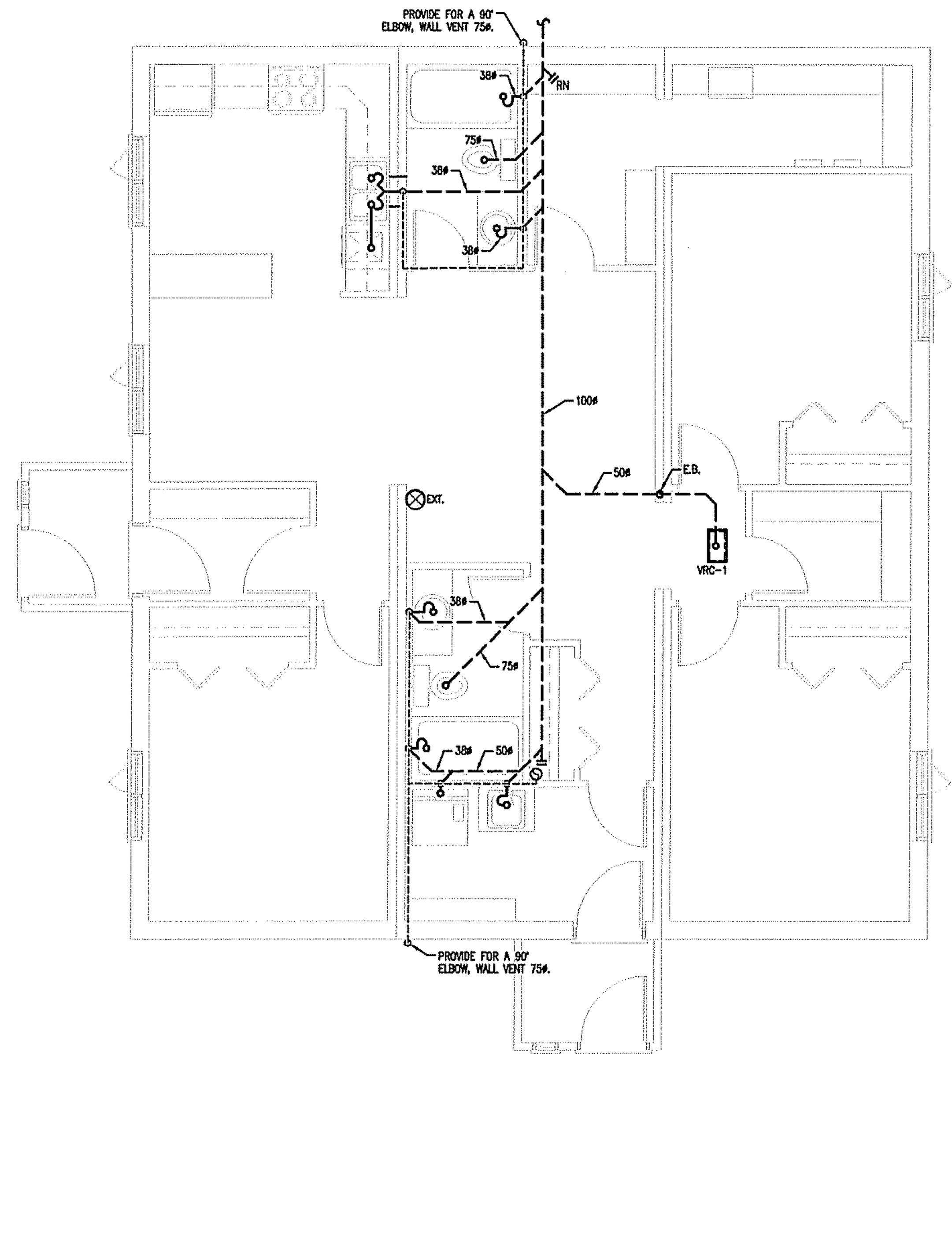
IDENT.	Ø COND.	HYDROLIC CHARGE	Ø COND. VENTILATION	
KITCHEN SINK	1½"Ø	1½"Ø	1¼"Ø	2
SINK	1¼"Ø	1¼"Ø	1¼"Ø	2
BATH	1½"Ø	1½"Ø	1¼"Ø	2
W-C	3"Ø	4	-	-
WASHING MACHINE	1½"Ø	1½"Ø	1¼"Ø	2
DISHWASHER	1½"Ø	1½"Ø	1¼"Ø	2

PERMIT TO PRACTICE
LES CONSULTANTS LBCD INC.
Signature
Date
PERMIT NUMBER: P 763
NT/NU Association of Professional Engineers and Geoscientists

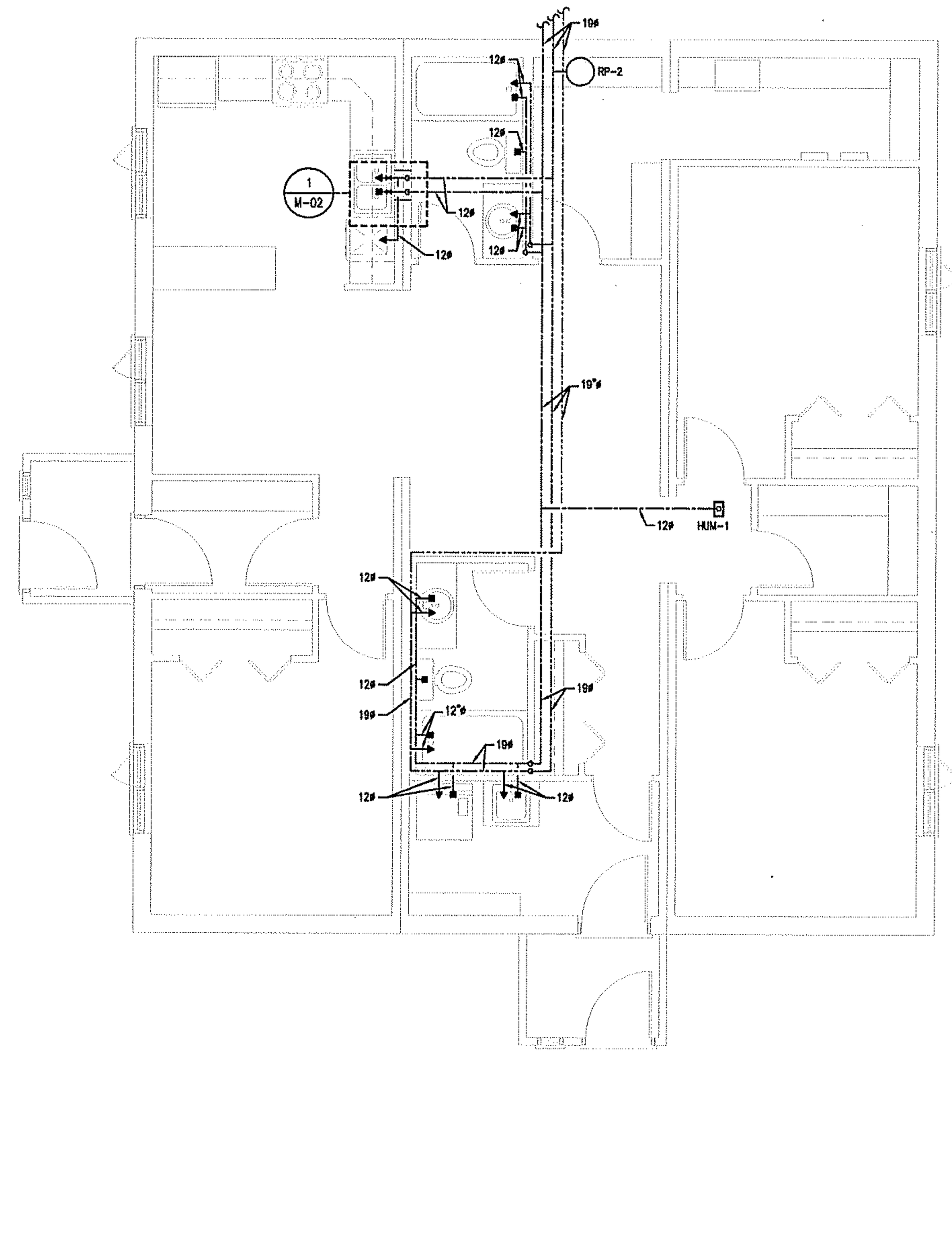
RCMP HOUSING

Resolute, Nunavut
Canada

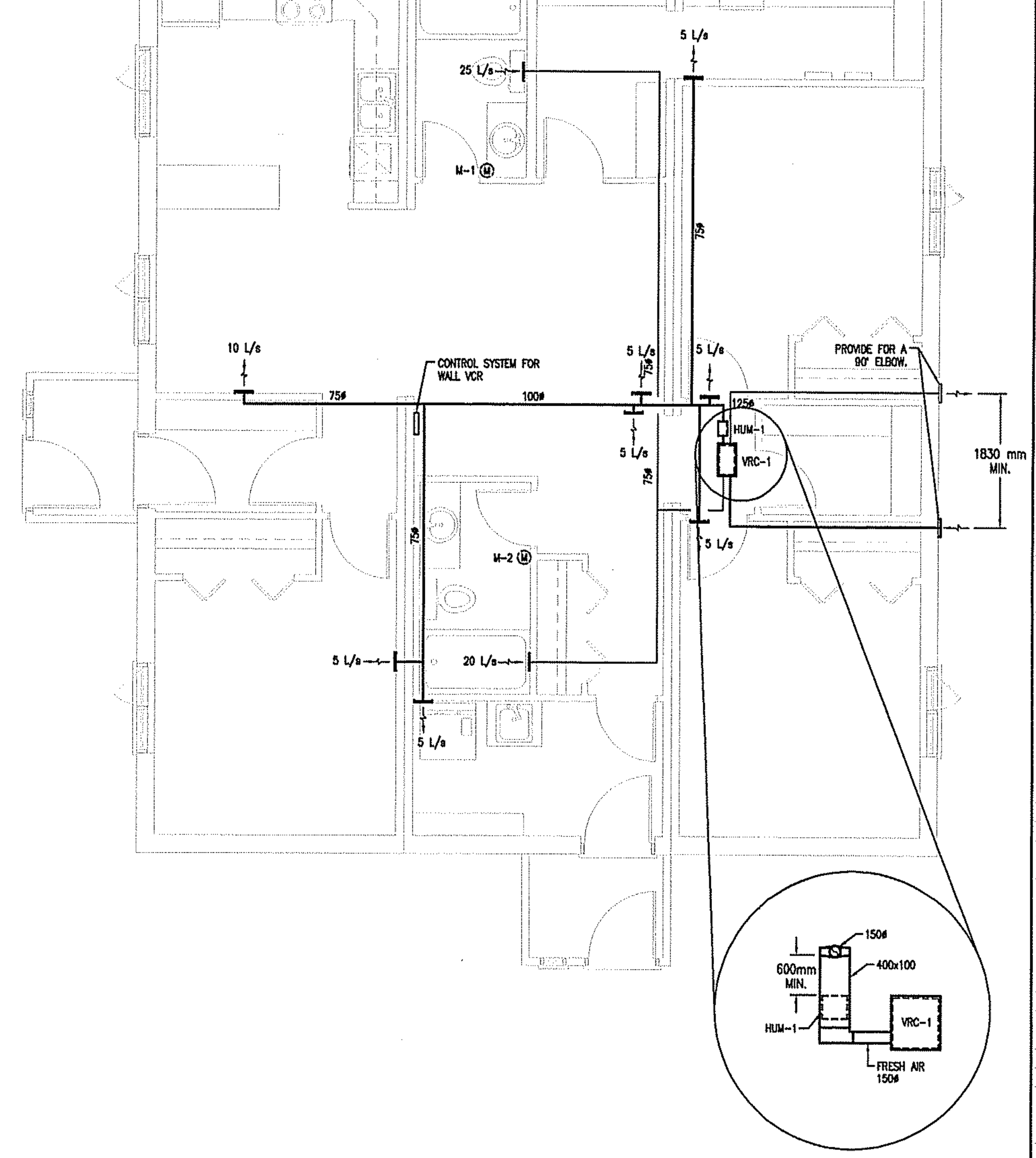
STENDEL + REICH
architectes



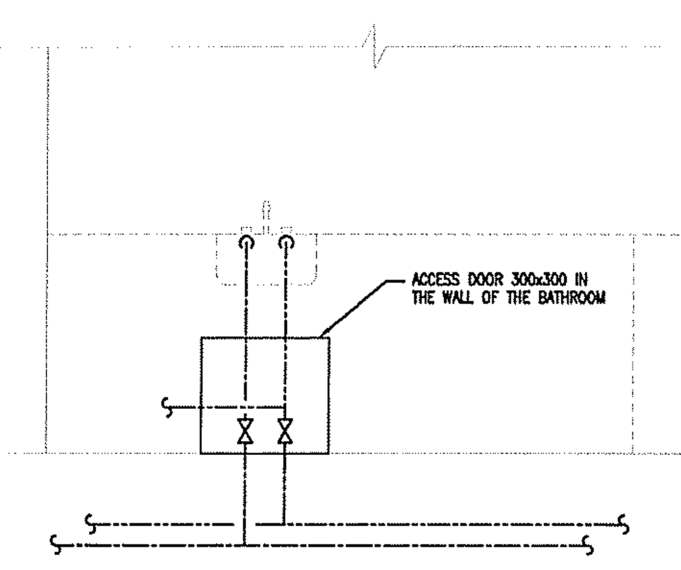
PLUMBING - DRAINAGE
SCALE : 1:50



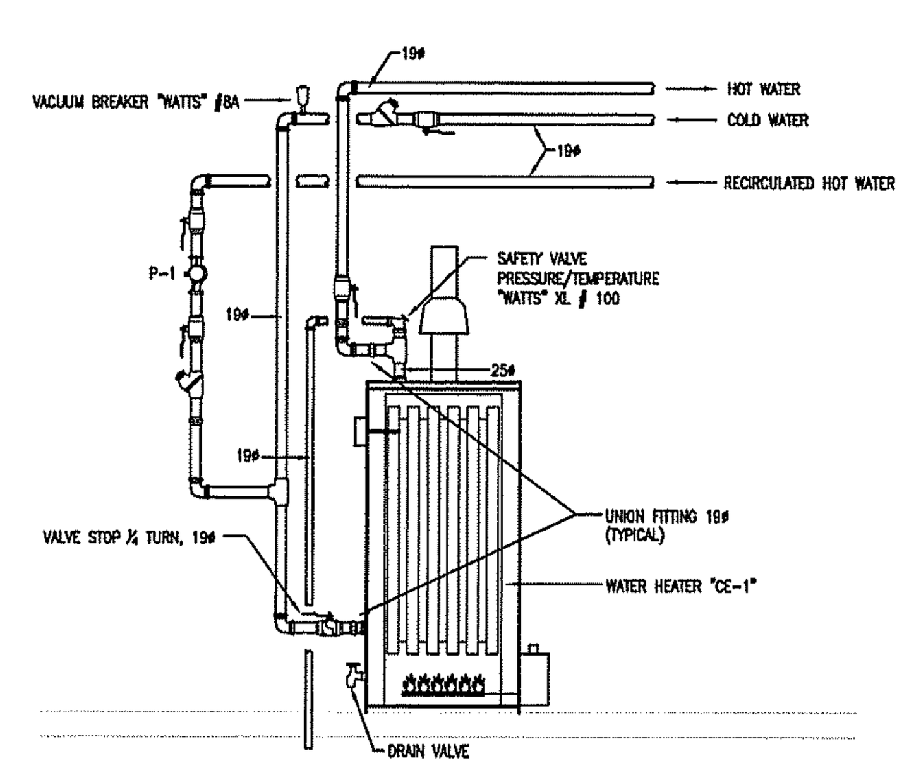
PLUMBING - DOMESTIC WATER
SCALE : 1:50



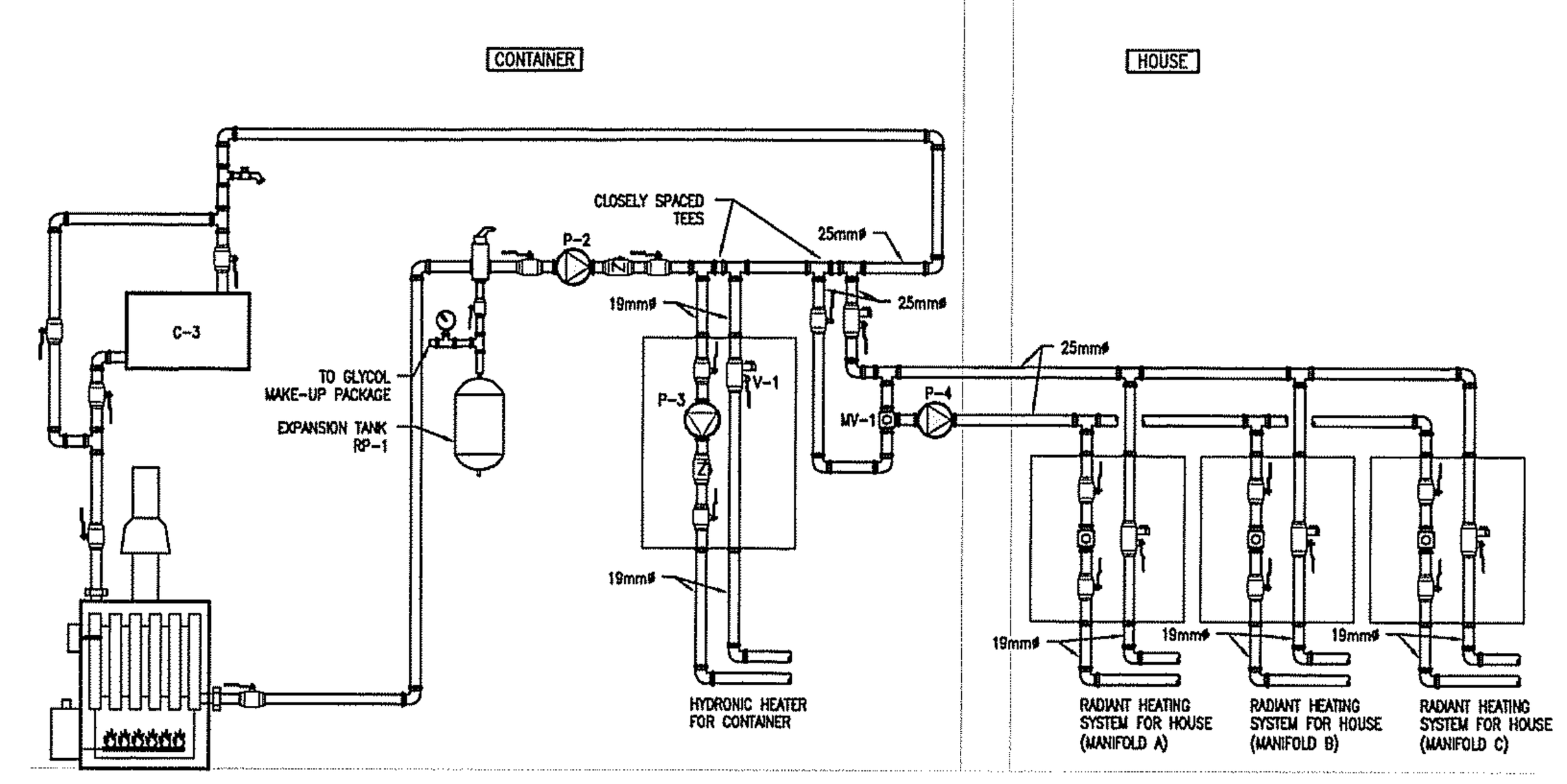
VENTILATION
SCALE : 1:50



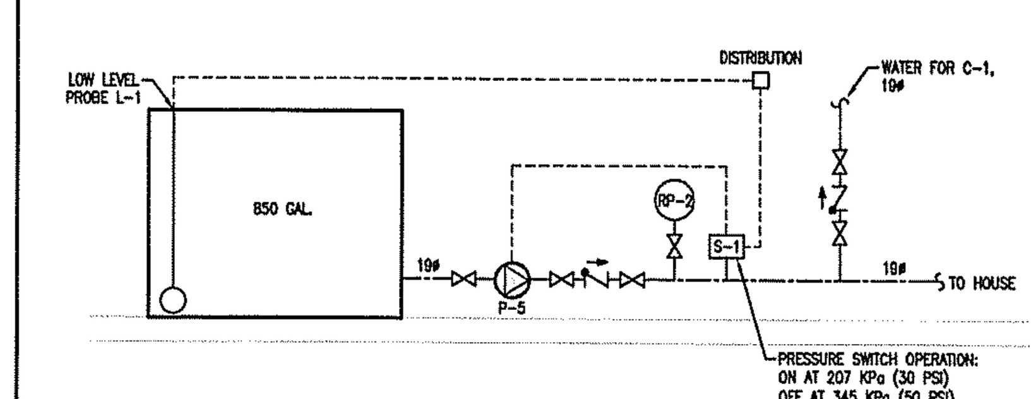
1 DETAIL
M-02 NO SCALE



2 DETAIL - INSTALL WATER HEATER
M-02 NO SCALE



3 DETAIL - HEATING DISTRIBUTION
M-02 NO SCALE



4 DETAIL - WATER DISTRIBUTION
M-02 NO SCALE

Client

Structure

Electrical/Mechanical

LES CONSULTANTS LBCD
Membre de Trow Global
Montréal

REVISIONS

No.	Date	Description	By
05	2011-06-17	ISSUED FOR CSA APPROBATION	
04	2011-06-08	ISSUED FOR CSA APPROBATION	
03	2011-06-02	ISSUED FOR REVISION #1	
02	2011-05-24	ISSUED FOR PERMIT	
01	2011-04-27	ISSUED FOR CONSTRUCTION REVISED	
00	2011-03-25	ISSUED FOR CONSTRUCTION	

DISTRIBUTION

GENERAL NOTE

THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING DIMENSIONS, MEASUREMENTS, LEVELS, DETAILS, SPECIFICATIONS, AND SITE CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION AND PRECISE FITTING OF ALL ELEMENTS. ALL ERRORS, OMISSIONS, AND ANOMALIES MUST BE REPORTED TO THE ARCHITECT IMMEDIATELY.

DRAWN BY
V. PINEAULT

VERIFIED BY
J-P. DIONNE

APPROVED BY
B. OHANIAN

SEAL

DRAWING TITLE

PLUMBING & VENTILATION

SCALE
1:50

DATE
2011-03-11

PROJECT NO.
SRAS-053

DRAWING NO.
M-02

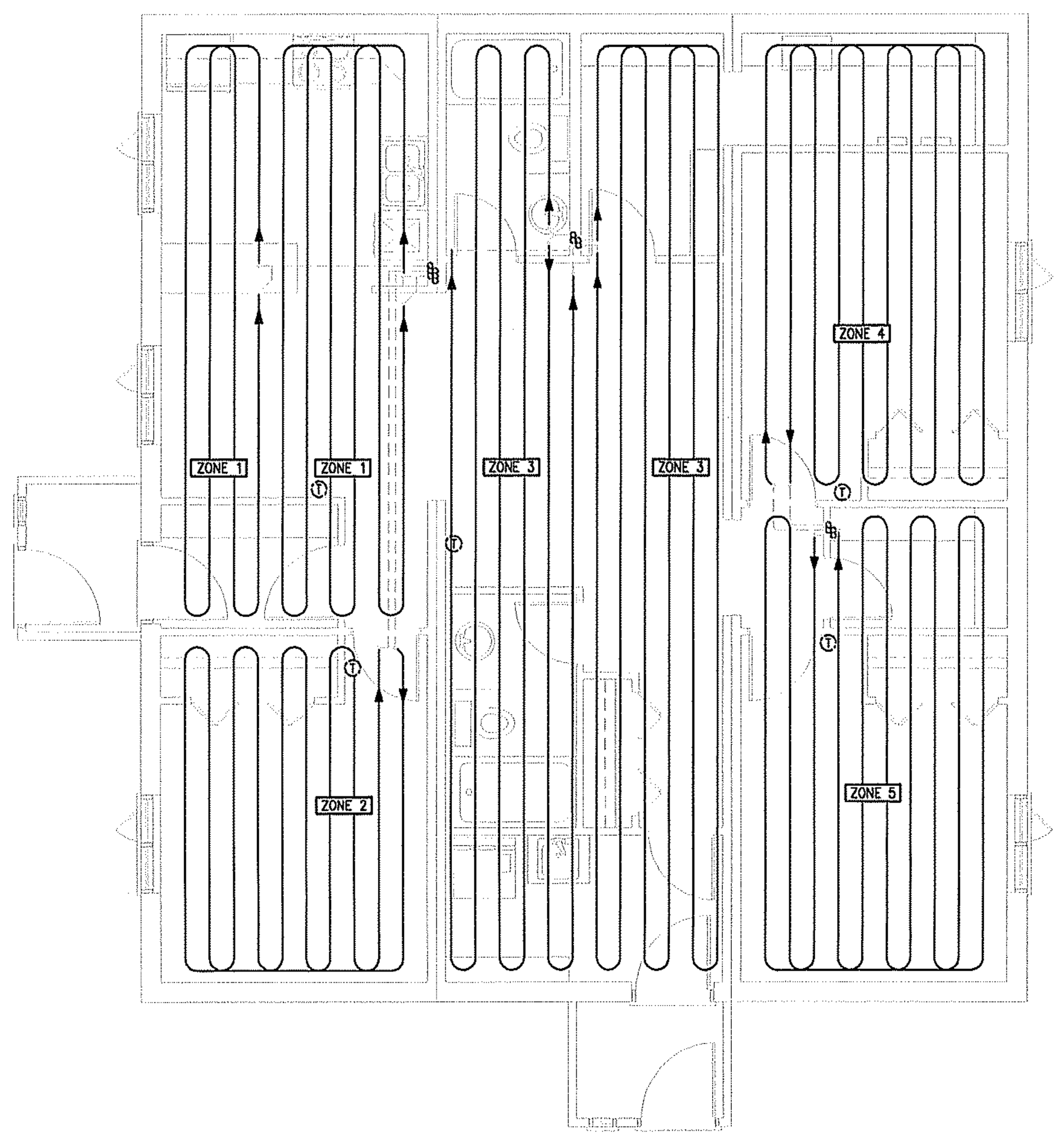
REV.
04

RCMP HOUSING

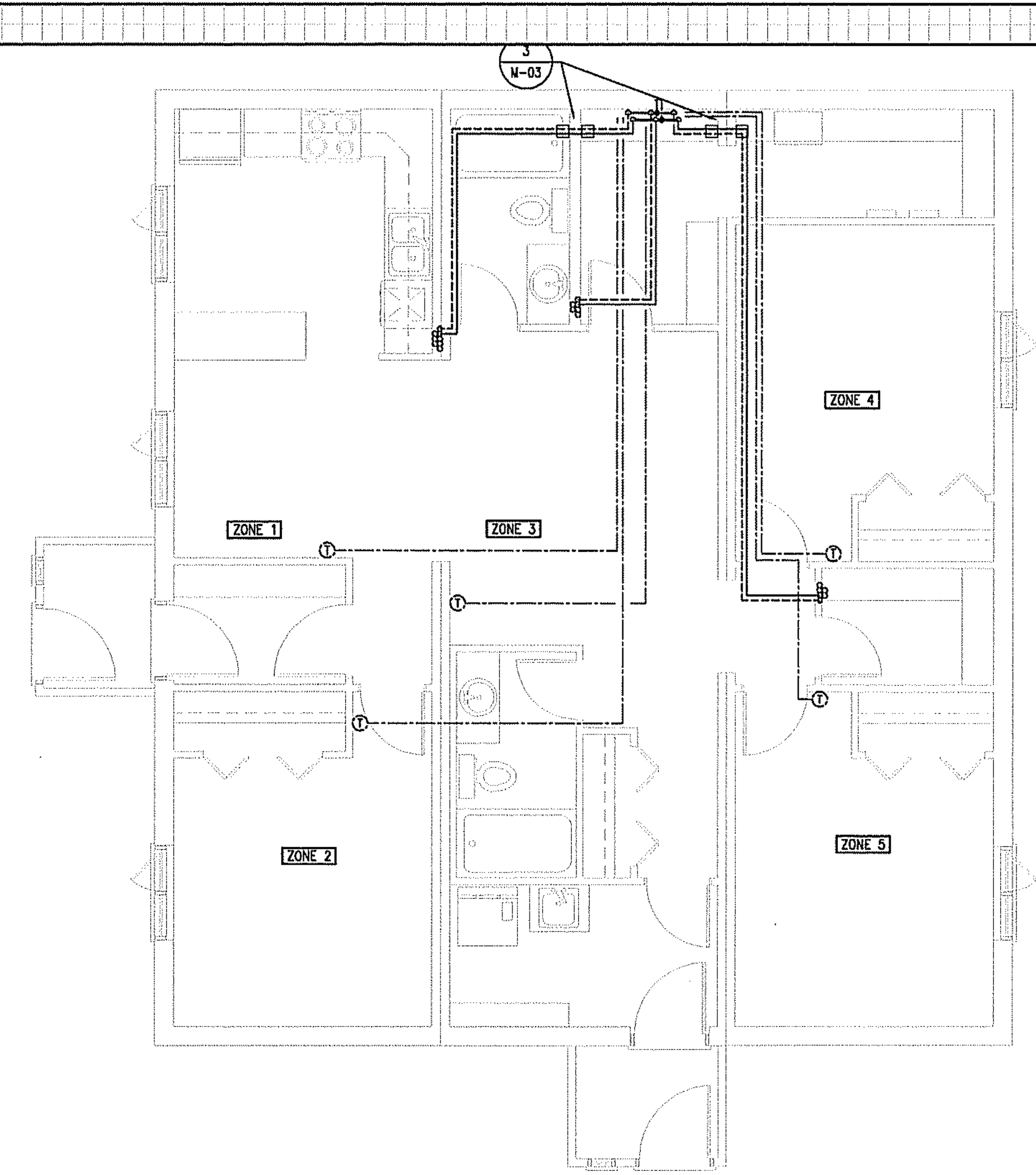
Resolute, Nunavut
Canada

STENDEL + REICH
architectes

PERMIT TO PRACTICE
LES CONSULTANTS LBCD INC.
Signature
Date
PERMIT NUMBER: P 763
NT/NU Association of Professional Engineers and Geoscientists



TUBING LAYOUT
SCALE : 1:50



MANIFOLD DISTRIBUTION
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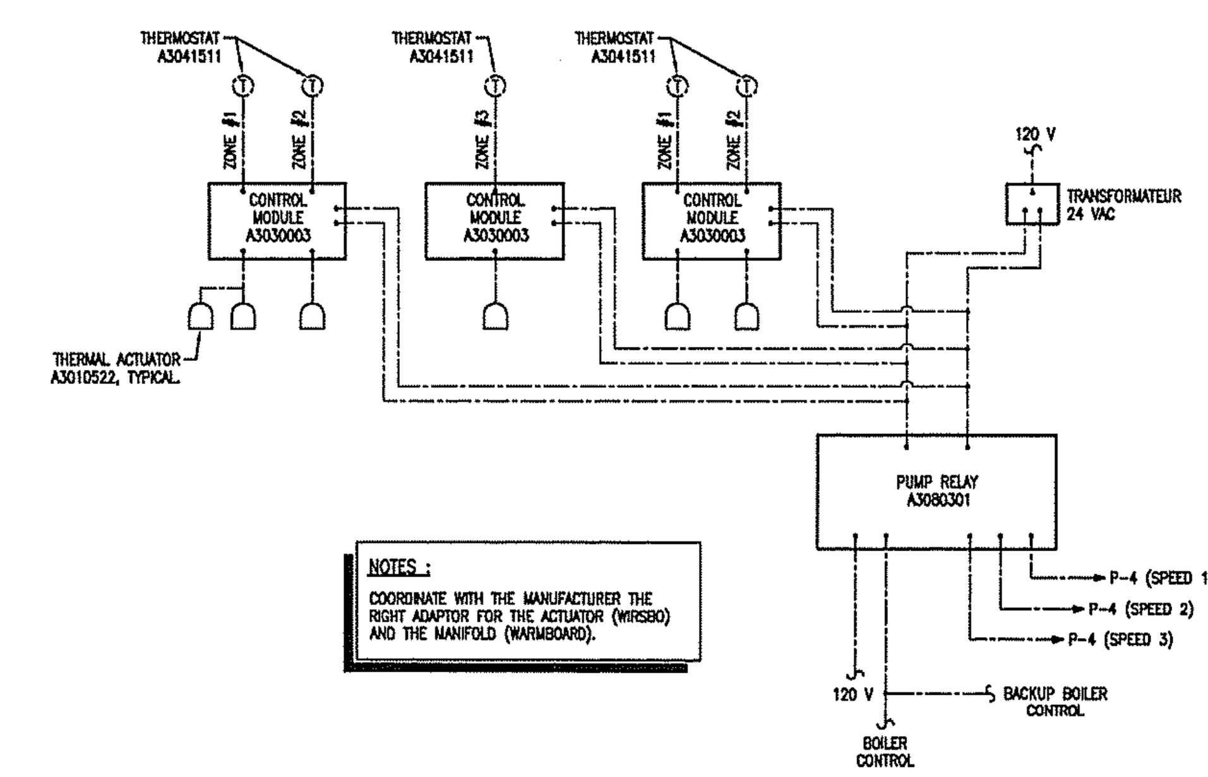
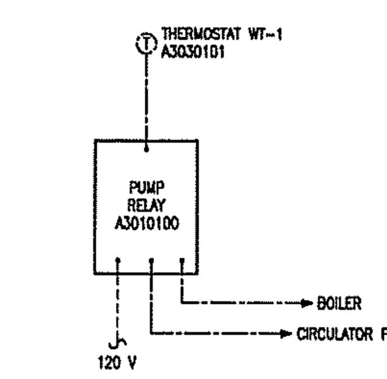
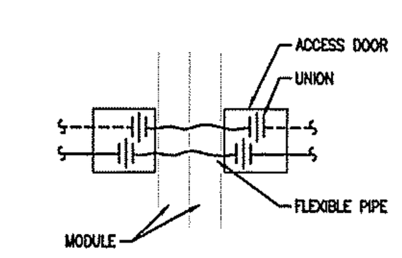


1 DETAIL – CONTROL SYSTEM FOR THE RADIANT FLOOR
M-03 NO SCALE



3 DETAIL – CONTROL SYSTEM FOR THE HYDRONIC HEATER
M-03 NO SCALE



2 DETAIL – CONNEXION BETWEEN MODULES, PIPE CHASE
M-03 NO SCALE

CALCULS DE CHARGE POUR LE PROJET SRAP-053

Module 1 - zone 1

	Aire total	R	R-si	T1	T2	q (W)
TOÎT	28,13	56	9,86	21	-50	202,58
MUR N	8,91	40	7,04	21	-50	89,79
MUR E	0,00	40	7,04	21	-50	0,00
MUR S	0,00	40	7,04	21	-50	0,00
MUR W	18,54	40	7,04	21	-50	186,96
2 x FENÊTRE	2,42	7	1,23	21	-50	139,42
1 x PORTE	2,14	10	1,76	21	-50	86,30
PLANCHER	28,13	50	8,80	21	-50	226,89
Infiltration bâtiment	88,27	n/a	n/a	21	-50	770,86
Échangeur	n/a	n/a	n/a	21	-50	69,86

facteur de sécurité: 10%

Module 1 - zone 2

	Aire total	R	R-si	T1	T2	q (W)
TOÎT	16,46	56	9,86	21	-50	118,54
MUR N	0,00	40	7,04	21	-50	0,00
MUR E	0,00	40	7,04	21	-50	0,00
MUR S	8,91	40	7,04	21	-50	89,83
MUR W	12,77	40	7,04	21	-50	128,79
1 x FENÊTRE	1,21	7	1,23	21	-50	69,71
PLANCHER	16,46	50	8,80	21	-50	132,76
Infiltration	55,81	n/a	n/a	21	-50	487,42
Échangeur	n/a	n/a	n/a	21	-50	34,93

facteur de sécurité: 10%

Module 2 - zone 3

	Aire total	R	R-si	T1	T2	q (W)
TOÎT	44,59	56	9,86	21	-50	321,11
MUR N	8,91	40	7,04	21	-50	89,83
MUR E	0,00	40	7,04	21	-50	0,00
MUR S	6,77	40	7,04	21	-50	68,26
1 x PORTE	2,14	10	1,76	21	-50	86,30
MUR W	0,00	40	7,04	21	-50	0,00
PLANCHER	44,59	50	8,80	21	-50	359,67
Infiltration	107,00	n/a	n/a	21	-50	934,46
Échangeur	n/a	n/a	n/a	21	-50	104,80

facteur de sécurité: 10%

Module 3 - zone 4

	Aire total	R	R-si	T1	T2	q (W)
TOÎT	22,30	56	9,86	21	-50	160,57
MUR N	8,91	40	7,04	21	-50	89,83
MUR E	17,33	40	7,04	21	-50	174,74
1 x FENÊTRE	1,21	7	1,23	21	-50	69,71
MUR S	0,00	40	7,04	21	-50	0,00
MUR W	0,00	40	7,04	21	-50	0,00
PLANCHER	22,30	50	8,80	21	-50	179,84
Infiltration	72,05	n/a	n/a	21	-50	629,17
Échangeur	n/a	n/a	n/a	21	-50	69,86

facteur de sécurité: 10%

Module 3 - zone 5

	Aire total	R	R-si	T1	T2	q (W)
TOÎT	22,30	56	9,86	21	-50	160,57
MUR N	0,00	40	7,04	21	-50	0,00
MUR E	17,33	40	7,04	21	-50	174,76
1 x FENÊTRE	1,21	7	1,23	21	-50	69,71
MUR S	8,91	40	7,04	21	-50	89,83
MUR W	0,00	40	7,04	21	-50	0,00
PLANCHER	22,30	50	8,80	21	-50	179,84
Infiltration	72,05	n/a	n/a	21	-50	629,19
Échangeur	n/a	n/a	n/a	21	-50	34,93

facteur de sécurité: 10%

Total +10% 6482,67

LOOP SCHEDULE - MODULE A

ZONE	MANIFOLD	LOOP	LENGHT	W/M²	L/S	GPM	HEAD (METER OF WATER) 80°F
ZONE 1	1	1	180'	77.06	0.059	0.935	* 2.8
ZONE 1	1	2	250'	77.06	0.082	1.299	* 6.3
ZONE 2	1	3	190'	85.61	0.073	1.157	* 4.2
TOTAL			430'-0"		0.214	3.391	

NOTE:
* CALCULATIONS ARE BASED ON A TEMPERATURE OF 80'F, BUT THE OPERATING TEMPERATURE WILL BE 87'F MAX.

LOOP SCHEDULE - MODULE B

ZONE	MANIFOLD	LOOP	LENGHT	W/M²	L/S	GPM	HEAD (METER OF WATER) 80°F
ZONE 3	2	1	230'	62.35	0.066	1.046	* 4.3
ZONE 3	2	2	245'	62.35	0.070	1.109	* 4.6
TOTAL			475'-0"		0.136	2.155	

NOTE:
* CALCULATIONS ARE BASED ON A TEMPERATURE OF 80'F, BUT THE OPERATING TEMPERATURE WILL BE 87'F MAX.

LOOP SCHEDULE - MODULE C

ZONE	MANIFOLD	LOOP	LENGHT	W/M²	L/S	GPM	HEAD (METER OF WATER) 80°F
ZONE 4	3	1	215'	83.01	0.079	1.252	* 5.4
ZONE 5	3	2	210'	81.10	0.075	1.188	* 4.6
TOTAL			425'-0"		0.154	2.440	

NOTE:
* CALCULATIONS ARE BASED ON A TEMPERATURE OF 80'F, BUT THE OPERATING TEMPERATURE WILL BE 87'F MAX.

Calculs de débit pour le système radiant:

		Effective Floor area (pi2)	Btu/h	(Btu/h)/pi2	gpm/pi-l (12"O.C.)	Tubing (Pi-l)	Flow (gpm)	Flow (l/s)	Pressur loss per foot 40% glycol/water solution for 1/2"PEX @ 80 degre F	Head (feet of water)	Head (Meter of water)
Module 1	zone 1 - loop1	260	6368	24,49	0,0052	180	0,9	0,059	0,052	9,3	2,8
	zone 1 - loop2					250	1,3	0,082	0,083	20,7	6,3
	zone 2 - loop1	142	3864	27,21	0,0061	190	1,2	0,073	0,072	13,6	4,2
Module 2	zone 3- loop 1	353	6996	19,82	0,0046	230	1,05	0,066	0,061	14,1	4,3
	zone 3- loop 2					245	1,11	0,070	0,061	15,0	4,6
Module 3	zone 4 - loop 1	169	4459	26,39	0,0059	215	1,26	0,079	0,083	17,8	5,4
	zone 5 - loop 1	173	4459	25,78	0,0056	210	1,18	0,075	0,072	15,1	4,6

Client

Structure

Electrical/Mechanical

LES CONSULTANTS LBCD
Membre de Trow Global
Montréal

REVISIONS

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DRAWN BY
V. PINEAULT

VERIFIED BY
J-P. DIONNE

APPROVED BY
B. OHANIAN

SEAL

DRAWING TITLE

TUBE LAYOUT

SCALE 1:50 | DATE 2011-03-11

PROJECT NO. SRAS-053 | DRAWING NO. M-03 | REV. 04

PHOTOS
Residences V397 (Red) and V399 (Blue)

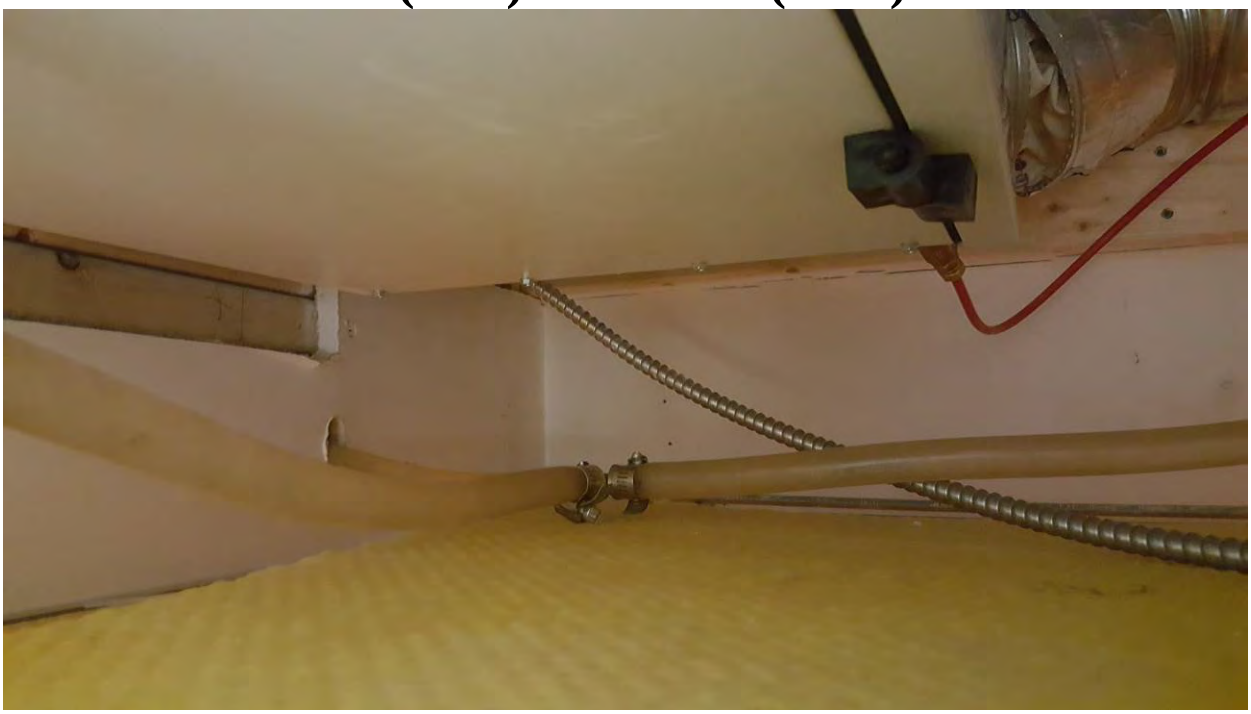

Photo 1- HRV and Humidifier Drain Lines

Photo 2 HRV ducts to be insulated

Photo 3 Existing Humidifier

Photo 4 Water Damage at Ceiling

Photo 5 Damaged Window

Photo 6 Damaged Window

Photo 7 Existing Exhaust and Supply Outlets

Photo 8 Exterior Window Elevation

Photo 9 Front Elevation

Photo 10 Side Elevation

Photo 11 Front Elevation

Photo 12 Rear Elevation

Oil Tank Replacement Project Photos

Photo 13 - Existing Oil Tank

Photo 14 – Typical Interior Piping

Photo 15 - Interior Piping

Photo 16 - Interior Piping

Photo 17 - Interior Piping

Photo 18 - Exterior Fuel Tank

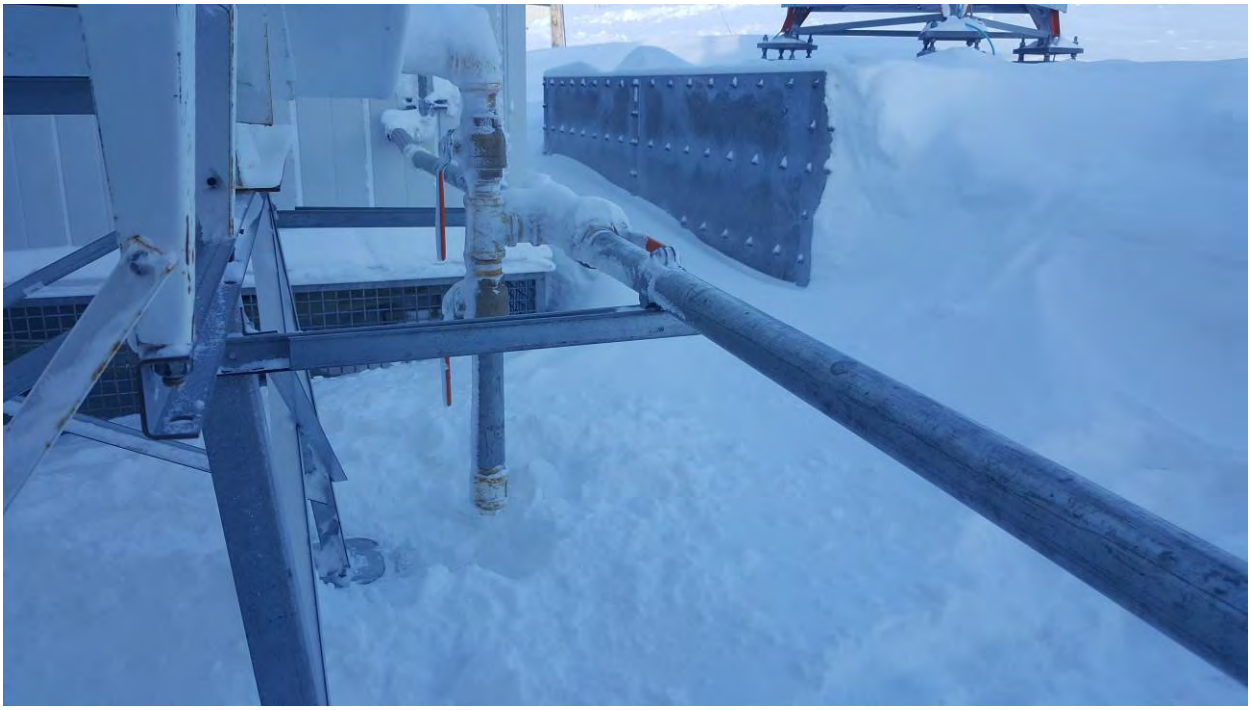

Photo 19 Facility Building Piping

Photo 20 Facility Building Piping

Photo 21 Facility Building Piping

Facility Building Exterior

Photo 22 Damage to Facility Building

Photo 23 - Damage To Garage

Photo 24 Damage to Garage

Photo 25 - Goose Neck to be Re-Painted