



# Public Works and Government Services Canada

Requisition No. EZ899-181525

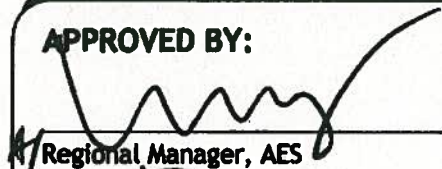
MERX I.D. No. \_\_\_\_\_

### SPECIFICATIONS

For **Port Hardy Airport Sand Shed  
Metal Shed Cladding Replacement  
R.077018.001**

Issued for Bid - September 08, 2017

### APPROVED BY:

  
\_\_\_\_\_  
Regional Manager, AES

Sept 28, 2017  
Date

  
\_\_\_\_\_  
Construction Safety Coordinator

2017-09-26  
Date

### TENDER:

  
\_\_\_\_\_  
Project Manager

2017  
Date





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PART 1 - GENERAL

The drawings listed below will be included in the General Contractor/ Owner agreement and will become part of the contract.

Drawing No.	Drawing Title	Date
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End of Section

PART 1 - GENERAL

1.1 CODES

- .1 Perform work to CURRENT Codes, Construction Standards and Bylaws, including Amendments up to the TENDER closing date.
- .2 National Building Code of Canada 2015.

1.2 DESCRIPTION OF WORK

- .1 Work to be performed under this Contract includes, but is not limited to, the following items covered further in the Contract documents.
  - .1 Removal of existing cladding system and replacement with new metal cladding and exterior insulation assembly.
  - .2 Provision of reinforced concrete curbing at the base of wall.
  - .3 Provision of reinforced concrete pads and steps.
  - .4 Modifications and additions to the existing perimeter drainage system.
  - .5 Provision of two new man doors and associated framing requirements.
  - .6 Provision of two new overhead doors and associated framing requirements.
  - .7 Repair all areas damaged by the construction activity.
- .2 "Green Requirements:
  - .1 Use only environmentally responsible green materials/products with no VOC emissions or minimum VOC emissions of indoor off-gassing contaminants for improved indoor air quality - subject of Departmental Representative's approval of submitted MSDS Product Data.
  - .2 Use materials/products containing highest percentage of recycled and recovered materials practicable - consistent with maintaining cost effective satisfactory levels of competition.

- .3 Adhere to waste reduction requirement for reuse or recycling of waste materials, thus diverting materials from landfill.

### 1.3 CONTRACT DOCUMENTS

- .1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.
- .2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.

### 1.4 DIVISION OF SPECIFICATIONS

- .1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.
- .2 A division may consist of the work of more than 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.
- .3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

### 1.5 TIME OF COMPLETION

- .1 Complete the project ready for use within sixteen (16) weeks after Contract Award.

### 1.6 HOURS OF WORK

- .1 Restrictive as follows:
  - .1 Notify the Department Representative of all after hours work, including weekends and holidays. Work shall not proceed without prior written approval from the Department Representative.

### 1.7 WORK SCHEDULE

- .1 Carry on work as follows:
  - .1 Within 10 working days after Contract award, provide a bar chart schedule showing anticipated progress stages and final completion of the work within the time period required by the Contract documents. Indicate the following:

- .1 Submission of shop drawings, product data, MSDS sheets and samples.
- .2 Commencement and completion of work of each section of the specifications or trade.
- .3 Final completion date within the time period required by the Contract documents.

- .2 Do not change approved Schedule - without notifying the Department Representative and obtaining approval from the Department Representative.
- .3 Interim reviews of work progress based on work schedule will be conducted as decided by the Department Representative and schedule updated by Contractor in conjunction with and to approval of the Department Representative.

#### 1.8 COST BREAKDOWN

- .1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Department Representative and aggregating Contract price.

#### 1.9 CODES, BYLAWS, Standards

- .1 Perform work in accordance with the National Building Code of Canada (NBC) 2010, and other indicated Codes, Construction Standards and/or any other Code or Bylaw of local application.
- .2 Comply with applicable local bylaws, rules and regulations enforced at the location concerned.
- .3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.
- .4 In any case of conflict or discrepancy, the most stringent requirements shall apply.

#### 1.10 DOCUMENTS REQUIRED

- .1 Maintain 1 copy each of the following at the job site:
  - .1 Contract drawings.
  - .2 Contract specifications.
  - .3 Addenda to Contract documents.



- .4 Copy of approved work schedule.
- .5 Reviewed/approved shop drawings.
- .6 Change orders.
- .7 Other modifications to Contract.
- .8 Field test reports.
- .9 Reviewed/approved samples.
- .10 Manufacturers' installation and application instructions.
- .11 One set of record drawings and specifications for "as-built" purposes.
- .12 Building Safety Plan.

1.11 REGULATORY  
REQUIREMENTS

- .1 Obtain and pay for - Building Permit, Certificates, Licenses and other permit required by regulatory municipal, provincial or federal authorities to complete the work.
- .2 Provide inspection authorities with plans and information required for issue of acceptance certificates.
- .3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

1.12 CONTRACTOR'S  
USE OF SITE

- .1 Use of site:
  - .1 Exclusive and complete for execution of work.
  - .2 Assume responsibility for assigned premises for performance of this work.
  - .3 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Department Representative.
- .2 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.

- .3 Do not unreasonably encumber site with material or equipment.
- .4 Contractor to provide 1.8m high security fencing to PWGSC standards around area of work as directed.

### 1.13 EXAMINATION

- .1 Examine site and be familiar and conversant with existing conditions likely to affect work.
- .2 Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.

### 1.14 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by the authorities having jurisdiction.

### 1.5 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space, and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform the Department Representative of impending installation and obtain the Department Representative's approval for actual locations.
- .4 Submit field drawings or shop drawings to indicate the relative position of various services and equipment when required by the Department Representative.

### 1.16 CUTTING AND PATCHING

- .1 Cut existing surfaces as required to accommodate new work.
- .2 Remove items so shown or specified.
- .3 Do not cut, bore, or sleeve load-bearing members.
- .4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

- .5 Fit work airtight to pipes, sleeves ducts and conduits.
- .6 Conceal pipes, ducts and wiring in raised floors, wall and ceiling construction of finished areas except where indicated otherwise.
- .7 Patch and make good surfaces cut, damaged or disturbed, to Department Representative's approval. Match existing material, colour, finish and texture.
- .8 Install firestops and smoke seals in accordance with ULC-S115, around pipe, ductwork, cables and other objects penetrating fire separations to provide fire resistance not less than the fire resistance of surrounding floor, ceiling and wall assembly.
- .9 Making good is defined as matching construction and finishing materials and the adjacent surfaces such that there is no visible difference between existing and new surfaces when viewed from 1.5 metres in ambient light, and includes painting the whole surface to the next change in plane.

#### 1.17 SETTING OUT OF WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work.

#### 1.18 ACCEPTANCE OF SUBSTRATES

- .1 Each trade shall examine surfaces prepared by others and job conditions which may affect his work, and shall report defects to the Department Representative. Commencement of work shall imply acceptance of prepared work or substrate surfaces.

#### 1.19 QUALITY OF WORK

- .1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.
- .2 The workmanship, erection methods and procedures to meet minimum standards set out in the current edition of the National Building Code of Canada.

- .3 In cases of dispute, decisions as to standard or quality of work rest solely with the Department Representative, whose decision is final.

#### 1.20 WORKS COORDINATION

- .1 Coordinate work of subtrades
  - .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
  - .2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.
    - .1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.
    - .2 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.
      - .1 Pay particular close attention to overhead work above ceilings and within or near to building structural elements.
      - .2 Identify on coordination drawings, building elements, service lines, rough-in points and indicate location services entrance to site.
    - .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
    - .4 Publish minutes of each meeting.
    - .5 Plan and coordinate work in such a way to minimize quantity of service line offsets.
    - .6 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
  - .3 Submit shop drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.
  - .4 Work coordination:

- .1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.
- .2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed work.
- .3 Ensure disputes between subcontractors are resolved.
- .5 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.

#### 1.21 APPROVAL OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- .1 In accordance with Section 01 33 00, submit the requested shop drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.
- .2 **Allow sufficient time for the following:**
  - .1 Review of product data.
  - .2 Approval of shop drawings.
  - .3 Review of re-submission.

#### 1.22 RELICS AND ANTIQUITIES

- .1 Relics and antiquities and items of historical or scientific interest shall remain property of the Owner. Protect such articles and request directives from the Department Representative.
- .2 Give immediate notice to the Department Representative's if evidence of archeological finds are encountered during excavation/construction, and await written instructions before proceeding with work in this area.

#### 1.23 SECURITY CLEARANCES

- .1 Personnel employed on this project will be subject to security check. Obtain requisite

clearances, as instructed, for each individual required to enter the premises.

- .2 Personnel will be checked at start of work shift and provided with pass which must be worn at all times.
- .3 Contractor shall be fully responsible for securing the premises and its contents throughout the construction period.
- .4 The Department Representative to provide (1) one commissionaire to be present during all times phases of the project.

#### 1.24 PROJECT MEETINGS

- .1 The Department Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

#### 1.25 TESTING AND INSPECTION

- .1 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the following:
  - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
  - .2 Inspection and testing performed exclusively for Contractor's convenience.
  - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems:
    - .1 Mill tests and certificates of compliance.
    - .2 Tests specified to be carried out by Contractor under the Departmental Representative's supervision.
- .2 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Department Representative may require to verify acceptability of correct work.

- .3 Contractor shall furnish labour and facilities to:
  - .1 Notify Department Representative in advance of planned testing.
- .4 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .5 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Department Representative.
- .6 The Department Representative may require, and pay for, additional inspection and testing services not included in Paragraph 27.1.

#### 1.26 AS-BUILT DOCUMENTS

- .1 The Consultant will provide 2 sets of drawings, 2 sets of specifications, and 2 copies of the drawings for "as-built" purposes.
- .2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.

#### 1.27 CLEANING

- .1 Daily conduct cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.
- .2 **Ensure cleanup of the work areas each day after completion of work.**
- .3 Clean interior building areas when ready to receive finish painting and continue cleaning on an as-needed basis until building is sufficiently completed or ready for occupancy.
- .4 In preparation for interim and final reviews:
  - .1 Examine all sight-exposed interior and exterior surfaced and concealed spaces.
  - .2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces, including glass and other polished surfaces.

- .5 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.

1.28 DUST CONTROL

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

1.29 ENVIRONMENTAL PROTECTION

- .1 Prevent extraneous materials from contaminating air beyond construction area, by providing temporary enclosures during work.
- .2 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.
- .3 Ensure proper disposal procedures in accordance with all applicable territorial regulations.

1.30 ADDITIONAL DRAWINGS

- .1 The Consultant may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.

1.31 BUILDING SMOKING ENVIRONMENT

- .1 Smoking within the building is not permitted.

1.32 SYSTEM OF MEASUREMENT

- .1 The metric system of measurement (SI) will be employed on this Contract.

1.33 FAMILIARIZATION WITH SITE

- .1 Before submitting tender, visit site - as indicated in tender documents and become familiar with all **conditions likely to affect the cost of the work.**

1.34 SUBMISSION OF TENDER

- .1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract documents and inspected the



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General Instructions

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site, and is fully conversant with all conditions.

END OF SECTION

PART 1 - GENERAL

1.1 RESTRICTED OR  
SECURE AREA

- .1 Any area on airport property to which access is restricted by sign and/or monitored is a secure or restricted area.
- .2 In general, access to the airside of the Airport is restricted to the access points indicated on the drawings or as subsequently approved by the Airport Manager. All personnel and vehicles entering or leaving the construction site must follow prescribed access routes and be under escort or surveillance.
- .3 Security measures shall be taken at the Contractor's expense to meet the Airport's security requirements.
- .4 The RCMP may, for security reasons, remove all of the Contractor's workforce from the Airport at any time. No assessment for temporary "Stop Work" periods will be payable by Transport Canada.

1.2 CONTRACTOR'S  
RESPONSIBILITY

- .1 General Contractor and subcontractor shall be responsible for construction, personnel and vehicles employed on project and requiring access to restricted areas.
- .2 All Contract personnel and equipment must remain within designated work areas at all times.
- .3 Contractors shall be responsible for the security of their own equipment and materials.

1.3 PASSES AND KEYS

- .1 Passes are mandatory on airside and other restricted areas for all personnel engaged in work and are subject to AIRPORT RESTRICTED AREA ACCESS CLEARANCE.
- .2 Passes for personnel requiring access to restricted area will be made available on application to the Airport Manager.
- .3 The Department Representative will provide one commissionaire (approved by Airport Manager) to have permanent passes and be present during all times phases of the project.

- .4 Permanent passholders - Commissionaires shall provide ESCORT and SURVEILLANCE to temporary passholders.
- .5 Temporary passes will be issued at beginning and returned at end of each working day. Their safekeeping will be responsibility of Contractor.
- .6 On completion of project, passes will be returned to Airport Manager. A charge of \$500.00 will be issued for each pass not returned.

#### 1.4 RESPONSIBLE PERSONNEL

- .1 Provide the Department Representative and the Airport Manager with a list of responsible personnel and phone numbers, and those of subcontractors, who may be contacted after working hours in case of emergency.

#### 1.5 DELIVERIES

- .1 Escort vehicle and trained escort personnel must be provided by Contractor.

#### 1.6 EXISTING SECURITY BARRIERS

- .1 Security barriers, such as doors, fences, gates, locks, or door hardware, which are required to be removed, must be replaced, if practicable, at the end of each work day. If it is necessary to remove barriers for an extended period, enclose unprotected areas with temporary hoarding. Where the possibility exists that the restricted area may be left unprotected at the end of the work day, inform Airport Manager immediately.
- .2 Failure to restore such security barriers when required will result in their restoration by other forces and the cost of such restoration being recovered from the Contractor.

#### 1.7 DAILY SECURITY

- .1 Ensure that access to the restricted area is secured at the end of each work day.
- .2 When work is to be done within the restricted area after scheduled working hours, notify the Airport Manager of area and times.
- .3 The Contractor shall follow the Airport Manager's instructions to maintain airport security during all phases of construction. Any work required to

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restore airport security will be carried out at  
the Contractor's expense.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

- .1 This Section specifies general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and other requested submittals to Consultant for review. Additional specific requirements for submissions are specified in individual technical sections.
- .2 Present shop drawings, product data and samples in SI Metric units.
- .3 Where items or information is not produced in SI Metric units, converted values are acceptable.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submissions.
- .5 Notify Consultant in writing at time of submission, identifying deviations from requirements of Contract documents and stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Consultant's review of submission unless Consultant gives written acceptance of specific deviations.
- .7 Make any changes in submissions which the Department Representative or Consultant may require consistent with Contract documents and resubmit as directed.
- .8 Notify Consultant in writing, when resubmitting, of any revisions other than those requested by Consultant.
- .9 **Do not proceed with work until relevant submissions are reviewed and approved by the Department Representative.**

1.2 SUBMISSION  
REQUIREMENTS

- .1 Coordinate each submission with the requirements of the work and the Contract documents. Individual submissions will not be reviewed until all related information is available.
- .2 Allow (5) five days for Consultant's review of each submission, unless noted otherwise.

- .3 Accompany submissions with transmittal letter, in duplicate, 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.
- .4 Submissions shall 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.

.6      After Consultant's review, distribute copies.

### 1.3 SHOP DRAWINGS

.1      Shop drawings: original drawings or modified standard drawings provided by Contractor to illustrate details of portion of work which are specific to project requirements.

.2      Maximum sheet size: 850 x 1050 mm.

.3      Submit 6 prints of shop drawings for each requirement requested in the specification sections and/or as requested by the Consultant.

.4      Cross-reference shop drawing information to applicable portions of the Contract documents.

### 1.4 SHOP DRAWINGS REVIEW

.1      Review of shop drawings by the Department Representative is for the sole purpose of ascertaining conformance with the general concept.

.2      This review shall not mean that the Department Representative approve the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same.

.3      This review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and Contract documents.

.4      Without restricting the generality of the foregoing, the Contractor is responsible for:

.1      Dimensions to be confirmed and correlated at the job site.

.2      Information that pertains solely to fabrication processes or to techniques of construction and installation.

.3      Coordination of the work of all sub-trades.

### 1.5 PRODUCT DATA

.1      Product data: manufacturers' catalogue sheets, MSDS sheets, brochures, literature, performance charts and diagrams, used to illustrate standard

manufactured products or any other specified information.

- .2 Delete information not applicable to project.
- .3 Supplement standard information to provide details applicable to project.
- .4 Cross-reference product data information to applicable portions of Contract documents.
- .5 Submit 6 copies of product data.

#### 1.6 SAMPLES

- .1 Samples: examples of materials, equipment, quality, finishes and workmanship.
- .2 Where colour, pattern or texture is a criterion, submit a full range of samples.
- .3 **Reviewed and accepted samples will become the standard of workmanship and material against which installed work will be verified.**

#### 1.7 PROGRESS SCHEDULE

- .1 Submit work schedule and cost breakdown as required in Section 01 11 55.

END OF SECTION



PSPC Update on Asbestos Use

Effective April 1, 2016, all Public Works and Government Services Canada (PWGSC) contracts for new construction and major rehabilitation will prohibit the use of asbestos-containing materials. Further information can be found at <http://www.tpsgc-pspc.gc.ca/comm/vedette-features/2016-04-19-00-eng.html>

PART 1 - GENERAL

1.1 REFERENCES

- .1 Government of Canada.
  - .1 Canada Labour Code - Part II
  - .2 Canada Occupational Health and Safety Regulations.
- .2 National Building Code of Canada (NBC):
  - .1 Part 8, Safety Measures at Construction and Demolition Sites.
- .3 The Canadian Electric Code (as amended)
- .4 Canadian Standards Association (CSA) as amended:
  - .1 CSA Z797-2009 Code of Practice for Access Scaffold
  - .2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes
  - .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
  - .4 CSA Z1006-10 Management of Work in Confined Spaces.
  - .5 CSA Z462- Workplace Electrical Safety Standard
- .5 National Fire Code of Canada 2010 (as amended)
  - .1 Part 5 - Hazardous Processes and Operations and Division B as applicable and required.
- .6 American National Standards Institute (ANSI):
  - .1 ANSI A10.3, Operations - Safety Requirements for Powder-Actuated Fastening Systems.
- .7 Province of British Columbia:

- .1 Workers Compensation Act Part 3-Occupational Health and Safety.
- .2 Occupational Health and Safety Regulations.
- .8 Any Hazardous Materials Assessment Reports must be listed in this section.

#### 1.2 RELATED SECTIONS

- .1 Refer to the following current NMS sections as required:
  - .1 General Requirements: Section 01 10 01

#### 1.3 WORKERS' COMPENSATION BOARD COVERAGE

- .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

#### 1.4 COMPLIANCE WITH REGULATIONS

- .1 PSPC may terminate the Contract without liability to PSPC where the Contractor, in the opinion of PSPC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
- .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

#### 1.5 SUBMITTALS

- .1 Submit to the Consultant submittals listed for review in accordance with Section(s) 06 10 00, 01 78 39, and 01 78 36.
- .2 Work effected by submittal shall not proceed until review is complete.
- .3 Submit the following:
  - .1 Site Specific Health and Safety Plan.

- .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .3 Copies of incident and accident reports.
- .4 Complete set of current Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
- .5 Emergency Procedures.
- .4 The Department Representative will review the Contractor's Site Specific Health and Safety Plan and emergency procedures, and provide comments to the Contractor within five days after receipt of the plan. Revise the plan as appropriate and resubmit to the Department Representative for review.
- .5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to the department representative.
- .6 Submission of the Site Specific Health and Safety Plan, and any revised version, to the Department Representative is for information and reference purposes only. It shall not:
  - .1 Be construed to imply approval by the Department Representative.
  - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
  - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

## 1.6 RESPONSIBILITY

- .1 Assume responsibility as the Prime Contractor for work under this contract.
- .2 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.

- .3 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.

#### 1.7 HEALTH AND SAFETY COORDINATOR

- .1 The Health and Safety Coordinator:
  - .1 Be responsible for completing all health and safety training and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
  - .2 Be responsible for implementing, revising, daily enforcing, and monitoring the Site Specific Health and Safety Plan.
  - .3 Be on site during execution of work.

#### 1.8 GENERAL CONDITIONS

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
  - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
  - .2 Secure site at night time specialty permits as deemed necessary to protect site against entry.

#### 1.9 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
  - .1 Multi-employer work site,
  - .2 Federal employees and general public,
  - .3 Vehicular, Aircraft, and pedestrian traffic, and

- .4 Refer to Hazardous Materials Assessment, North West Environmental Dated November 23, 2015

1.10 UTILITY CLEARANCES

- .1 The Contractor is solely responsible for all utility detection and clearances prior to starting the work.
- .2 The Contractor will not rely solely upon the Reference Drawings or other information provided for utility locations.

1.11 REGULATORY REQUIREMENTS

- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.
- .2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

1.12 WORK PERMITS

- .1 Obtain specialty permits related to project before start of work.

1.13 FILING OF NOTICE

- .1 The General Contractor is to complete and submit a Notice of Project as required by Provincial authorities.
- .2 Provide copies of all notices to the Department Representative.

1.14 HEALTH AND SAFETY PLAN

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
- .1 Primary requirements:
- .1 Contractor's safety policy.

- .2 Identification of applicable compliance obligations.
  - .3 Definition of responsibilities for project safety/organization chart for project.
  - .4 General safety rules for project.
  - .5 Job-specific safe work procedures.
  - .6 Inspection policy and procedures.
  - .7 Incident reporting and investigation policy and procedures.
  - .8 Occupational Health and Safety Committee/Representative procedures.
  - .9 Occupational Health and Safety meetings.
  - .10 Occupational Health and Safety communications and record keeping procedures.
- .3 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
  - .4 List hazardous materials to be brought on site as required by work.
  - .5 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
  - .6 Identify personal protective equipment (PPE) to be used by workers.
  - .7 Identify personnel and alternates responsible for site safety and health.
  - .8 Identify personnel training requirements and training plan, including site orientation for new workers.
  - .9 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

- .10 Revise and update Health and Safety Plan as required, and re-submit to the Department Representative.
- .11 Department representative's review: the review of Site Specific Health and Safety Plan by the Department Representative shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

### 1.15 EMERGENCY PROCEDURES

- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
  - .1 Designated personnel from own company.
  - .2 Regulatory agencies applicable to work and as per legislated regulations.
  - .3 Local emergency resources.
  - .4 Departmental Representative.
- .2 Include the following provisions in the emergency procedures:
  - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
  - .2 Evacuate all workers safely.
  - .3 Check and confirm the safe evacuation of all workers.
  - .4 Notify the fire department or other emergency responders.
  - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
  - .6 Notify the Department Representative.
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
  - .1 Work at high angles.

- .2 Work in confined spaces or where there is a risk of entrapment.
- .3 Work with hazardous substances.
- .4 Underground work.
- .5 Work on, over, under and adjacent to water.
- .6 Workplaces where there are persons who require physical assistance to be moved.
- .4 Design and mark emergency exit routes to provide quick and unimpeded exit.

#### 1.16 HAZARDOUS PRODUCTS

- .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 the Department Representative and in accordance with the Canada Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
  - .1 Advise the Department Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 33 00.
  - .2 In conjunction with the department representative, schedule to carry out work during "off hours" when tenants have left the building.
  - .3 Provide adequate means of ventilation in accordance with Section 01 51 00.
  - .4 The contractor shall ensure that the product is applied as per manufacturers recommendations.
  - .5 The contractor shall ensure that only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

#### 1.17 ASBESTOS HAZARD

- .1 Carry out any activities involving asbestos in accordance with applicable Provincial / Federal Regulations.



- .2 Removal and handling of asbestos will be in accordance with applicable Provincial / Federal Regulations.

#### 1.18 PCB REMOVALS

- .1 Mercury-containing fluorescent tubes and ballasts which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.
- .2 Remove, handle, transport and dispose of in accordance with Provincial / Federal Regulations.

#### 1.19 REMOVAL OF LEAD-CONTAINING PAINTS

- .1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.
- .2 Carry out demolition and/or remediation activities involving lead-containing paints in accordance with applicable Provincial Regulations.
- .3 Dry Scraping/Sanding of any materials containing lead is strictly prohibited.
- .4 The use of Methylene Chloride based paint removal products is strictly prohibited.

#### 1.20 ELECTRICAL SAFETY REQUIREMENTS

- .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.
  - .1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with the Department Representative.
  - .2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

#### 1.21 ELECTRICAL LOCKOUT

- .1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

- .2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Department Representative.
- .3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by the Department Representative or by any authorized safety representative.

#### 1.22 OVERLOADING

- .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

#### 1.23 FALSEWORK

- .1 Design and construct falsework in accordance with CSA S269.1-1975 (R2003).

#### 1.24 Scaffolding

- .1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 and B.C. Occupational Health and Safety Regulations.

#### 1.25 CONFINED SPACES

- .1 Carry out work in confined spaces in compliance with Provincial Regulations and CSA Z1006 Standard

#### 1.26 POWDER-ACTUATED DEVICES

- .1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Department Representative.

#### 1.27 FIRE SAFETY AND HOT WORK

- .1 Obtain the Department Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

1.28 FIRE SAFETY  
REQUIREMENTS

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
- .3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the Department Representative is required prior to any gas or diesel tank being brought onto the work site.
- .4 Refer to Paragraph 1. References .5 (Section 01 35 33) Fire Safety Requirements.

1.29 FIRE PROTECTION  
AND ALARM SYSTEM

- .1 Fire protection and alarm systems shall not be:
  - .1 Obstructed.
  - .2 Shut off.
  - .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.
- .3 Be responsible/liable for costs incurred from the fire department, the Department Representative and the tenants, resulting from false alarms.

1.30 UNFORESEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Department Representative verbally and in writing.

1.31 POSTED DOCUMENTS

- .1 Post legible versions of the following documents on site:
  - .1 Site Specific Health and Safety Plan.
  - .2 Sequence of work.

- .3 Emergency procedures.
- .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
- .5 Notice of Project.
- .6 Floor plans or site plans.
- .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
- .8 Workplace Hazardous Materials Information System (WHMIS) documents.
- .9 Material Safety Data Sheets (MSDS).
- .10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Department Representatives.

### 1.32 MEETINGS

- .1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Department Representative.

### 1.33 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by the Department Representative.
- .2 Provide the Department Representative with written report of action taken to correct non-compliance with health and safety issues identified.

- .3 The Department Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

END OF SECTION

PART 1 - GENERAL

1.1 STORAGE FACILITIES

- .1 Storage space will be limited to the area of construction.

1.2 POWER

- .1 Electrical power and lighting at existing building may be used for construction purposes at no extra cost, provided that warranties are not affected thereby and electrical components used for temporary power are replaced when damaged. Do not use emergency power or UPS panels for this purpose.

1.3 WATER SUPPLY

- .1 Water supply is available at existing building and may be used for construction purposes at no cost.

1.4 SANITARY FACILITIES

- .1 Existing designated washroom facilities may be used on approval of the Department Representative. Clean and stock washroom daily and before final completion.

1.5 HEATING AND VENTILATION

- .1 Do not begin work until arrangements have been made with the Department Representative for protection of on-floor heating, ventilating and air conditioning.
  - .1 If there is any dirt in the heating and ventilation system, it will be the Contractor's responsibility to return it to its original state in accordance with the the Department Representative's specifications.
- .2 Prevent dust and odour migration to other occupied areas.
  - .1 Do not activate HVAC system to occupied floors. Purge air from construction floors only when directed by the Department Representative, where dust and fumes will be generated.
  - .2 Change filters in existing HVAC system frequently.

1.6 SCAFFOLDING

- .1 Construct and maintain scaffolding in rigid, secure and safe manner.
- .2 Erect scaffolding independent of walls. Remove promptly when no longer required.

1.7 REMOVAL OF TEMPORARY FACILITIES

- .1 Remove temporary facilities from site when directed by the Department Representative.

1.8 SIGNS AND NOTICES

- .1 Signs and notices for safety and instruction shall be in both official languages or graphic symbols conforming to CAN/CSA-Z321.
- .2 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or when directed by the Department Representative.

END OF SECTION

PART 1 - GENERAL

1.1 PRODUCTS/MATERIAL  
AND EQUIPMENT

- .1 Use NEW products/material and equipment unless otherwise specified. The term "products" is referred to throughout the specifications.
- .2 Use products of 1 manufacturer for material and equipment of the same type or classification unless otherwise specified.
- .3 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .4 Notify the Consultant in writing of any conflict between these specifications and manufacturer's instructions. The Consultant will designate which document is to be followed.
- .5 Provide metal fastenings and accessories in the same texture, colour and finish as base metal in which they occur.
  - .1 Prevent electrolytic action between dissimilar metals.
  - .2 Use non-corrosive fasteners, anchors and spacers for securing exterior work.
- .6 Fastenings which cause spalling or cracking are not acceptable.
- .7 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .8 Use heavy hexagon heads, semi-finished unless otherwise specified.
- .9 Bolts may not project more than 1 diameter beyond nuts.
- .10 Types of washers as follows:
  - .1 Plain type washers: use on equipment and sheet metal.
  - .2 Soft gasket lock type washers: use where vibrations occur.
  - .3 Resilient washers: use with stainless steel.



- .11 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
- .12 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.
- .13 Store products in accordance with suppliers' instructions.
- .14 Touch up damaged factory finished surfaces to Department Representative's satisfaction:
  - .1 Use primer or enamel to match original.
  - .2 Do not paint over nameplates.

## 1.2 QUALITY OF PRODUCTS

- .1 Products, materials and equipment (referred to as products) incorporated into work shall be new, not damaged or defective, and of the best quality (compatible with the specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of the products provided.
- .2 Defective products will be rejected regardless of previous reviews.
  - .1 Review does not relieve responsibility, but is precaution against oversight or error.
  - .2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Retain purchase orders, invoices and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Department Representative.
- .4 Should any dispute arise as to quality or fitness of products, the decision rests strictly with the Department Representative based upon the requirements of the Contract Documents.
- .5 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout the 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 OF PRODUCTS

- .1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items.
- .2 If delays in supply of products are foreseeable, notify Department Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.
- .3 In event of failure to notify Department Representative at the start of work and should it subsequently appear that the work may be delayed for such reason, the Department Representative reserves the right to substitute more readily available products of similar character, at no increase in either the Contract price or the Contract time.

### 1.4 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in the specifications, install or erect products in accordance with the manufacturer's instructions.
  - .1 Do not rely on labels or enclosures provided with products.
  - .2 Obtain written instructions directly from the manufacturer.
- .2 Notify the Consultant in writing of conflicts between the specifications and the manufacturer's instructions.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Consultant to require removal and re-installation at no increase in either the Contract price or the Contract time.

### 1.5 CONTRACTOR'S OPTIONS FOR SELECTION OF PRODUCTS FOR TENDERING

- .1 Products are specified by **"Prescriptive" specifications:** select any product meeting or exceeding specifications.

- .2 Products specified under **"Acceptable Products"** (used for complex Mechanical or Electrical Systems): select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.
- .3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.
- .4 Products specified to meet particular design requirements or to match existing materials: use only material specified Approved Product. Alternative products may be considered provided full technical data is received in writing by Consultant in accordance with "Special Instructions to Tenderers".
- .5 When products are specified by a referenced standard or by Performance specifications, upon request of Consultant obtain from manufacturer and independent laboratory report showing that the product meets or exceeds the specified requirements.

1.6 SUBSTITUTION AFTER  
CONTRACT AWARD

- .1 No substitutions are permitted without prior written approval of the Consultant.
- .2 **Proposals for substitution may only be submitted after Contract award.** Such request must include statements of respective costs of items originally specified and the proposed substitution.
- .3 Proposals will be considered by the Consultant if:
  - .1 products selected by tenderer from those specified are not available;
  - .2 delivery date of products selected from those specified would unduly delay completion of Contract, or
  - .3 alternative product to that specified, which is brought to the attention of considered by Consultant as equivalent to the product specified, and will result in a credit to the Contract amount.
- .4 **Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects**

other work on the project. Pay for design or drawing changes required as result of substitution.

- .5 Amounts of all credits arising from approval of the substitutions will be determined by the Consultant, and the Contract price will be reduced accordingly.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Refer to every technical section for waste management and disposal.

1.2 DEFINITIONS

- .1 Waste Audit (WA): relates to projected waste generation. Involves controlled separation of waste.
- .2 Waste Reduction Workplan (WRW): a written report which addresses opportunities for reduction, re-use or recycling of materials.
- .3 Materials Source Separation Program (MSSP): consists of a series of ongoing activities to separate re-usable and recyclable waste material into material categories from other types of waste at point of generation.

1.3 MATERIALS SOURCE SEPARATION

- .1 Before project start-up, prepare Materials Source Separation Program. Provide separate containers for re-usable and/or recyclable materials of the following:
  - .1 Gypsum board.
  - .2 Metals.
  - .3 Wood.
  - .4 Plastics
  - .5 Other materials as indicated in technical sections.
- .2 Implement Materials Source Separation Program for waste generated on project in compliance with approved methods and as approved by the Department Representative .
- .3 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .4 Locate separated materials in areas which minimize material damage.



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PART 1 - GENERAL

1.1 SUBMISSION

- .1 Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- .2 Revise content of documents as required before final submittal.
- .3 Phasing of submission:
  - .1 Two (2) weeks before substantial performance of the work for Phase 1 construction, submit to the Consultant 4 final copies of operation and maintenance manuals.
- .4 Ensure spare parts, maintenance materials and special tools provided are new, neither damaged nor defective, and of same quality and manufacture as products provided in work.
- .5 If requested, furnish evidence as to type, source and quality of products provided.
- .6 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

1.2 FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 "D" ring, loose leaf 219x279 mm with spine and face pockets.
- .3 Cover: identify each binder with typed or printed title "Project Record Documents"; list title of project and identify subject matter of contents.
- .4 Arrange content by systems under section numbers and sequence of Table of Contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.3 CONTENTS,  
EACH VOLUME

- .1 Table of contents - provide the following:
  - .1 Title of project.  
Date of submission.
  - .2 Names, 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, 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 clearly identify 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.

1.4 AS-BUILT DOCUMENTS

- .1 **Contract drawings** and shop drawings: legibly mark each item to record actual construction, including:
  - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .2 Field changes of dimension and detail.
  - .3 Changes made by change orders.
  - .4 Details not on original Contract drawings.
  - .5 References to related shop drawings and modifications.
- .2 **Contract Specifications:** legibly mark each item to record actual "Workmanship of Construction", including:
  - .1 Manufacturer, trade name, and catalogue number of each "Product/Material" actually installed, particularly optional items and substitute items.
  - .2 Changes made by addenda and change orders.



- .3 As-built information:
  - .1 Record changes in red ink.
  - .2 Mark on 1 set of drawings, specifications and shop drawings at completion of project and, before final inspection, neatly transfer notations to second set.
  - .3 Provide 1 set of CDs in AutoCAD dwg. file format with all as-built information on the CDs.
  - .4 Submit all sets for the Departmental Representative.

1.5 EQUIPMENT AND SYSTEMS

- .1 Operating procedures - include the following:
  - .1 Start-up, break-in, and routine normal operating instructions and sequences.
  - .2 Regulation, control, stopping, shutdown, and emergency instructions.
  - .3 Summer, winter, and any special operating instructions.
- .2 Maintenance requirements - list routine procedures:
  - .1 \_\_\_\_\_
  - .2 \_\_\_\_\_
  - .3 \_\_\_\_\_
  - .4 \_\_\_\_\_
- .3 Provide servicing and lubrication schedule, and list of lubricants required.
- .4 Include manufacturer's printed operation and maintenance instructions.
- .5 Include sequence of operation by controls manufacturer.
- .6 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .7 Provide installed control diagrams by controls manufacturer.

- .8 Provide Contractor's coordination drawings with installed colour coded piping diagrams.
- .9 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .10 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .11 Additional requirements: as specified in individual specification Sections.

#### 1.6 MANUFACTURER'S DOCUMENTATION REPORTS

- .1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and system, instruct the Department Representative's indicated facility's personnel, and provide detailed written report that demonstration and instructions have been completed.
- .2 The Department Representative will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

#### 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 on-site location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to the Consultant. Include approved listings in maintenance manual.
- .5 Obtain receipt for delivered products and submit to the Consultant.

#### 1.8 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 on-site location as directed; place and store.

- .4 Receive and catalogue all items. Submit inventory listing to the Consultant. Include approved listings in maintenance manual.
- .5 Obtain receipt for delivered products and submit to the Consultant.

#### 1.9 SPECIAL TOOLS

- .1 Provide special tools in quantities specified in individual specification Sections.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue all items:
  - .1 Submit inventory listing to the Departmental Representative.
  - .2 Include approved listings in maintenance manual.

#### 1.10 WARRANTIES, BONDS, TEST REPORTS, INSPECTION REPORTS

- .1 Separate each Document 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, Bonds, Test Results, Inspection Reports executed in duplicate by subcontractors, suppliers, manufacturers, and inspection agencies within 10 days after completion of the applicable item of work.
- .4 Except for items put into use with the Department Representative's approval, leave date of beginning of time of warranty until the date of substantial performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

1.11 COMPLETION

- .1 Submit a written certificate that the following have been performed:
  - .1 Work has been completed and inspected for compliance with the 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 the Boiler Inspection Branch, Fire Commissioner of Canada, and utility companies have been submitted.
  - .5 Operation of systems has been demonstrated to the personnel indicated by the Department Representative.
  - .6 Work is complete and ready for final review.

END OF SECTION

PART 1 - GENERAL

1.2 WARRANTY/GUARANTY PERIOD

- .1 All of the Work of the Contract: Three (3) year guaranty, secured by Performance Bond for the first 2 years as noted above, commencing on the date of substantial performance.
- .2 Any required maintenance or repair of any of the work is to be performed by the contractor for the duration of the Warranty Period, at no extra cost.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 REMEDIAL WORK UNDER GUARANTY/WARRANTY

- .1 The Department Representative shall provide written notice to the Contractor, within thirty (30) days of the discovery of any defect in the system under normal usage. The Contractor shall immediately take necessary steps to protect the area against further damage and shall take corrective action to make good any damage incurred. The Contractor shall schedule all repair work with the Department Representative and shall make every attempt to make good the defects within 3 weeks of notification.
- .2 Remedy is to include, at no cost to the Department Representative, labor, materials, equipment, services required to make good defective areas of the Work, and to make good damages incurred in obtaining access to defective areas. The Contractor will reimburse the Department Representative for any resulting investigation costs to define the extent of defective areas and to retest to confirm acceptability of repairs.
- .3 Warranty periods for areas requiring repair are to be extended by the amount of time between notification that the remedial work is necessary and the completion of the remedial work, thereafter the warranty/guaranty period will re-commence upon completion of the remedial work.

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Public Works

Warranties

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Sand Shed Metal Cladding Replacement

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.4 Warranties are not to be deemed to restrict any liability of the Contractor arising out of any applicable law.

END OF SECTION

PART 1 - GENERAL

1.1 RECORD DRAWINGS

- .1 Consultant will provide Contractor two sets of white prints for record drawing purposes.
- .2 The Contractor shall maintain project record drawings and record accurately deviations from Contract documents.
- .3 Record changes in red and mark on one set of prints.
- .4 At completion of contract and prior to final inspection, neatly transfer "as-built" records to second set of white prints using a fine red marker. Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand, but shall be neat and accurate. Add at each drawing title block note: "AS-BUILT RECORD". Circle on List of Drawings each title and number of drawings marked with "as-built" records.
- .5 Submit both sets of "as-built drawings" record drawings to Consultant on completion of contract and before the final payment.
- .6 Record following information:
  - .1 Field changes of dimension and detail.
  - .2 Changes made by Change Order and/or Field Order.
  - .3 Deviation from electrical and mechanical installation shown on drawings.
  - .4 Other significant deviations that are concealed in construction and cannot be identified by visual inspection.
  - .5 Type and location of structural repairs, delaminations, etc.
  - .6 Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
- .7 Make project record drawing available at all times for reference purposes and for inspection by the Consultant. Provide reproducible prints to

Consultant at regular intervals but not less than once each month.

- .8 If project is completed without significant deviations from contract drawings, declare this in writing and submit to Consultant in lieu of project record documents.

1.2 OPERATION AND  
MAINTENANCE MANUALS

- .1 Submit three (3) copies of Manufacturers printed operation and maintenance manuals for requirements requested within those specification Sections.
- .2 Provide original Manufacturers parts list, illustrations, assembly drawings and diagrams required for maintenance as requested within the related specification sections.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

END OF SECTION



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PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Includes general requirements for commissioning facilities and facility systems.

1.2 DEFINITIONS

- .1 Acronyms:
  - .1 AFD - Alternate Forms of Delivery, service provider.
  - .2 BMM - Building Management Manual.
  - .3 Cx - Commissioning
  - .4 EMCS - Energy Monitoring and Control Systems.
  - .5 O&M - Operation and Maintenance.
  - .6 PI - Product Information.
  - .7 PV - Performance Verification.
  - .8 TAB - Testing, Adjusting and Balancing.
- .2 Cx - a required program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved.

1.3 QUALITY ASSURANCE

- .1 Testing organization: current member in good standing of AABC certified to perform specified services.
- .2 Comply with applicable procedures and standards of the certification sponsoring association.
- .3 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.

1.4 REFERENCES

- .1 Associated Air Balance Council (AABC): National Standards for Field Measurement and Instrumentation, Total Systems Balance, Air Distribution-Hydronics Systems.

1.5 SUBMITTALS

- .1 Prior to start of Work, submit name of organization proposed to perform services. Designate who has managerial responsibilities for coordination of entire testing, adjusting and balancing.
- .2 Submit documentation to confirm organization compliance with quality assurance provision.
- .3 Submit 3 preliminary specimen copies of each of report forms proposed for use.
- .4 Ten (10) days prior to Substantial Performance, submit 3 copies of final reports on applicable forms.
- .5 Submit reports of testing, adjusting and balancing postponed due to seasonal, climatic, occupancy, or other reasons beyond Contractor's control, promptly after execution of those services.

1.6 PROCEDURES - GENERAL

- .1 Comply with procedural standards of certifying association under whose standard services will be performed.
- .2 Notify Consultant 3 days prior to beginning of operations.
- .3 Accurately record data for each step.
- .4 Report to the Consultant any deficiencies or defects noted during performance of services.

1.7 CONTRACTOR'S RESPONSIBILITIES

- .1 Prepare each system for testing and balancing.
- .2 Cooperate with testing organization and provide access to equipment and systems.
- .3 Provide personnel and operate systems at designated times, and under conditions required for proper testing, adjusting, and balancing.
- .4 Notify testing organization 7 days prior to time project will be ready for testing, adjusting, and balancing.

1.8 PREPARATION

- .1 Provide instruments required for testing, adjusting, and balancing operations.

- .2 Make instruments available to the Owner to facilitate spot checks during testing.
- .3 Retain possession of instruments and remove at completion of services.
- .4 Verify systems installation is complete and in continuous operation.
- .5 Verify lighting is turned on when lighting is included in cooling load.
- .6 Verify equipment such as computers, laboratory and electronic equipment are in full operation.

#### 1.9 FINAL REPORTS

- .1 Organization having managerial responsibility shall make reports.
- .2 Ensure each form bears signature of recorder, and that of supervisor of reporting organization.
- .3 Identify each instrument used, and latest date of calibration of each.

#### 1.10 COMPLETION OF COMMISSIONING

- .1 Upon completion of Cx leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.
- .3 Cx deliverables have been submitted and accepted by the Owner.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE AND STANDARDS

- .1 CAN/CSA 0141, Softwood Lumber.
- .2 CAN/CSA 0325.0 (R1998), Construction Sheathing.
- .3 CSA B111, Wire Nails, Spikes and Staples.
- .4 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber, Latest Edition.

1.2 DELIVERY, STORAGE AND HANDLING

- .1 Protect materials from moisture upon delivery; store all materials in a dry environment.
- .2 Store materials on raised supports. Cover materials with waterproof covering. Provide adequate air circulation and ventilation. Do not cover materials having a moisture content of over 15%.

PART 2 - PRODUCTS

2.1 LUMBER MATERIALS

- .1 Lumber: Except as otherwise specified, lumber shall be softwood, S-P-F, S4S, kiln-dried, moisture content 15% or less, not finger jointed, and in accordance with the following standards:
  - .1 CAN/CSA 0141.
  - .2 Graded and stamped in accordance with the National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber and by an agency certified by Canadian Lumber Standards Accreditation Board.

2.2 PANEL MATERIALS

- .1 Douglas Fir Plywood: to CSA with applicable grade stamp.
  - .1 Wall Sheathing: untreated, 12.5mm thick, standard construction.

2.3 FASTENERS

- .1 Nail, Spikes and Staples: to CSA B111.

PART 3 - EXECUTION

3.1 ERECTION OF FRAMING MEMBERS

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

- .2 Construct continuous members from pieces of longest practicable length.
- .3 Install spanning members with "crown-edge" up.
- .4 Install blocking to facilitate installation of finishing materials, fixtures, specialty items and trim.
- .5 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .6 Countersink bolts where necessary to provide clearance for other work.
- .7 Install foam sill gaskets between wood and concrete.

3.2 WOOD FURRING AND  
BLOCKING

- .1 Provide wood furring and blocking as required.

3.3 NAILING STRIPS,  
GROUNDS AND ROUGH  
BUCKS

- .1 Install rough bucks, nailer and linings to rough openings as required to provide backing for frames and other work.
- .2 Erect all wood framing members level and plumb. Construct to framing member's full height without splices.

3.4 WALL SHEATHING

- .1 Install wall sheathing in accordance with building code requirements except as follows:
  - .1 Install wall sheathing with panel end-joints located on solid bearing, staggered at least 800 mm.
  - .2 Fasten roof and wall sheathing panels spaced 150 mm O.C. along edges and 300 mm O.C. along intermediate supports. Do not use staples.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION  
INCLUDES

- .1 Exterior board insulation installed behind wall cladding.
- .2 Insulated concrete board at base of wall.

1.2 REFERENCE  
STANDARDS

- .1 All Reference Standards are latest editions, unless noted otherwise.
- .2 ASTM C165 - 07(2012), Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
- .3 ASTM C209 - 15, Standard Test Methods for Cellulosic Fiber Insulating Board.
- .4 ASTM C356 - 10, Standard Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat.
- .5 ASTM C612 - 14, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- .6 ASTM C518 - 10, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- .7 ASTM C1104 / C1104M - 13a, Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
- .8 ASTM C1338 - 14, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
- .9 ASTM E96 / E96M - 15, Standard Test Methods for Water Vapor Transmission of Materials.
- .10 ASTM C423, Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- .11 ASTM E90, Method for Laboratory Measurement of Airborne-Sound Transmission Loss in Building Partitions.
- .12 ASTM E336, Measurement for Airborne Sound Insulation in Buildings.

- .13 ASTM E413, Classification for Rating Sound Insulation.
- .14 CSA-A101, Thermal Insulation, Mineral Fibre, for Buildings.
- .15 CSA B111, Wire Nails, Spikes and Staples.
- .16 CAN/ULC-S101, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .17 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .18 CAN4-S114, Standard Method of Test for Determination of Non-Combustibility of Building Materials.

### 1.3 SUBMITTALS

- .1 Product Data:
  - .1 Provide manufacturer's technical data for insulation.
  - .2 Include product characteristics and performance criteria: RSI, fire performance characteristics, moisture vapour permeance, water absorption ratings, compressive strengths, sound transmission ratings.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Store products in dry location.
- .2 Protect products from damage during handling, installation and at point of installation.

### 1.5 AMBIENT CONDITIONS

- .1 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

## PART 2 - PRODUCTS

### 2.1 MINERAL FIBRE BOARD INSULATION

- .1 Board insulation for continuous insulation systems:  
To ASTM C612, Type IVB.
  - .1 Fire performance:

- .1 Non-combustibility: To CAN/ULC S114.
- .2 Surface Burning Characteristics: To CAN/ULC S102.
  - .1 Flame spread: 0.
  - .2 Smoke developed: 0.
- .2 Thermal resistance: RSI value/25.4 mm at 24 ° C: 0.70 m2K/W to ASTM C518.
- .3 Moisture resistance:
  - .1 Moisture sorption: 0.28 % maximum to ASTM C1104/C1104M.
  - .2 Water vapour transmission: 2160 ng/Pa·s·m2 to ASTM E96, Desiccant Method.
  - .3 Water absorption: 1.2 % to ASTM C209.
- .4 Dimensional stability: 0.38 % maximum linear shrinkage at 650 °C to ASTM C356.
- .5 Density: 176 kg/m3 to ASTM C612.
- .6 Compressive strength: To ASTM C165.
  - .1 58 kPa at 10 %.
  - .2 90 kPa at 25 %.
- .7 Recycled content: 40 % minimum.
- .8 Fungi resistance: To ASTM C1338.

2.2 CONCRETE FACED  
BOARD INSULATION

- .1 Board insulation for continuous insulation systems: To ASTM C612, Type IV.
  - .1 Thermal resistance: RSI value/25.4 mm at 24 ° C: 0.88 m2K/W to ASTM C518.
  - .2 Moisture resistance:
    - .1 Water vapour transmission: 60 ng/Pa·s·m2 to ASTM E96, Desiccant Method.
    - .2 Water absorption: 0.7% to ASTM D2842.
  - .3 Foam Compressive strength: 241kPa To ASTM D1621.



- .4 Mortar Compressive strength: 32MPa To CSA A23.2-09.

### 2.3 ACCESSORIES

- .1 Insulation Fasteners: Designed to anchor insulation by frictional resistance within structurally adequate substrates. Use one of the following types:
  - .1 Impale type (self-adhered): galvanized steel, spindle and self-locking retaining washer on flat metal base, self-adhering, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
  - .2 Performance requirements for installed insulation fasteners:
    - .1 Pullout Resistance: minimum 200 N, perpendicular to applicable substrates and within temperature range of -30°C to +40°C.
    - .2 Corrosion Resistance: carbon steel components shall show not more than 15% of the surface rusted, and coatings shall not blister, peel or crack, when tested to Corrosion Test Procedure of Factory Mutual Research Approval Standard, Class I Roof Covers (4470).
- .2 Insulation Adhesive: as recommended by the insulation manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Verify that building substrate surfaces, adjacent materials and installation conditions are ready to accept the work of this section. Ensure insulation materials and surfaces are dry.
- .2 Verify that substrate is flat, sound, clean, and free of irregularities.

### 3.2 INSTALLATION

- .1 Install materials in accordance with manufacturer's recommendations.
- .2 Install insulation after building substrate materials are dry.

- .3 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .4 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .5 Use boards of largest possible dimensions to reduce number of joints. Boards with rough edges are unacceptable.
- .6 Insert fasteners into and compress against surrounding substrates.
- .7 Where impale type insulation fasteners are used to adhere to air/vapour barrier membrane, place a 100mm x 100mm minimum air/vapour barrier membrane patch centered on each pin after fastener is installed.
- .8 Ensure that the integrity of the air/vapour barrier system is maintained. Take extreme care that the systems are sealed where elements penetrate them, and that they extend across and are sealed at junctions between other parts of the barrier system.

### 3.3 PROTECTION

- .1 Do not permit work to be damaged. Protect from harmful weather exposures and physical abuse.
- .2 Provide temporary coverings or enclosures when insulation will be subject to damage and cannot be protected by permanent construction immediately after installation.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Air, vapour and moisture (AVM) barrier membrane in exterior wall construction.

1.2 REFERENCE STANDARDS

- .1 ASTM D1970/D1970 - 15a, Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .2 ASTM E96/E96M - 15, Standard Test Methods for Water Vapor Transmission of Materials.
- .3 ASTM D412 - 06a(2013), Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .4 ASTM D882-12, Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
- .5 ASTM D412 - 06a(2013), Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .6 ASTM E154 / E154M - 08a(2013)e1, Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.3 SUBMITTALS

- .1 Submit product data prior to commencing application of materials.
- .2 Product Data: Provide data on material characteristics, performance criteria, and limitations.

1.4 MOCK-UP

- .1 Provide mock-up of AVM barrier materials.
- .2 Allow for review of mock-up by the Consultant before proceeding with AVM barrier work.

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- .3 Mock-up may remain as part of the Work.

1.5 ENVIRONMENTAL AND  
PROJECT REQUIREMENTS

- .1 Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation. Check surfaces and areas specified and shown to receive membrane.

1.6 DELIVERY, STORAGE  
AND HANDLING

- .1 Deliver and store all materials in their original packaging in undamaged condition, sealed with labels intact, having manufacturer's name, brand, weight, CSA and other references to accepted standards clearly shown.
- .2 Protect materials from damage, weather and store in a dry place.
- .3 Handle materials and equipment in strict accordance with the manufacturer's recommendations. Damaged or deteriorated materials shall be removed from premises.

PART 2 - PRODUCTS

2.1 MODIFIED  
BITUMINOUS SHEET  
AIR/VAPOUR/MOISTURE  
BARRIER (SELF-ADHERED)

- .1 Shall be self-adhering composite SBS rubberized asphalt based membrane self-adhering sheet membrane with a cross-laminated polyethylene film, providing a continuous air, vapour and moisture seal and having the following physical properties:
- .1 Thickness: 1.5 mm min.,
- .2 Flexibility: Pass @ -40 degrees C to ASTM D1970,
- .3 Vapour permeance: 2.8 ng/Pa.s.m<sup>2</sup> ( 0.05 perms) to ASTM E96,
- .4 Tensile strength (membrane): 2.24 MPa to ASTM D412,
- .5 Tensile strength (film): 34.5 MPa to ASTM D882,
- .6 Elongation: 300% to ASTM D412,
- .7 Puncture resistance: 222 N min. to ASTM E154.

2.2 ACCESSORIES

- .1 Associated Materials: Primers, mastics, sealants, liquid membrane, control joint materials, etc. required for complete AVM barrier membrane system installation shall be in accordance with membrane manufacturer's requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the Work of this section.
- .2 Report any unsatisfactory conditions and/or surfaces to the Consultant in writing. Starting work shall imply acceptance of surfaces and conditions.

3.2 PREPARATION

- .1 Preparation of all surfaces to receive AVM barrier membrane, including substrate, joints, cracks, coves, etc. shall be carried out in accordance with the manufacturer's directions.
- .2 Ensure that all substrate surfaces are smooth, dry and firm. Remove any frost, ice, loose particles, ridges, laitance, cracks, grease, asphalt, oil and other foreign matter which could prevent adhesion of the membrane to the substrate.
- .3 Ensure that concrete surfaces are free from surface pitting and honeycombing. Remove fins, rough projections and other irregularities which could puncture membrane. Fill voids, surface pitting and honeycombing. Repair pour joints and provide a surface satisfactory for application of membrane. Concrete must be sufficiently cured prior to membrane application.

3.3 PRIMING

- .1 Clean and prime substrate surfaces to receive sheet membrane in accordance with manufacturer's instructions.
- .2 All surfaces to receive self-adhering membrane shall be primed at the rate recommended by the manufacturer. Primer shall be uniformly applied.
- .3 Open time of 30 minutes minimum shall be allowed before installation of self-adhering membrane. Primed surfaces not covered by membrane during the same working day must be re-primed.

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3.4 MEMBRANE  
APPLICATION

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- .1 Application of membrane, including temperature limitations, curing requirement and all other application procedures shall be carried out in accordance with the membrane manufacturer's written directions.
- .2 Coordinate proper construction of interface junctions to maintain continuity of the AVM barrier. The AVM barrier must be installed to create a continuous seal at construction elements such as foundations, roofs and walls, and at junctures of different materials or construction types.
- .3 Cut and seal AVM barrier membrane around protrusions to form tight AVM seal.
- .4 Apply troweled bead of mastic to all terminations at end of each day's work, and at any penetration through the membrane. Where fasteners penetrate the membrane, back caulk the threads with mastic prior to installation.
- .5 Inspect membrane thoroughly before being covered and make any corrections immediately. Misaligned or inadequately capped seams, punctures, or other damage shall be repaired by patching and sealing with membrane manufacturer's directions.
- .6 At all detail areas, take extra care to ensure continuity of the AVM barrier.
- .7 Apply membrane in a "shingle" fashion.
- .8 Reinforce all corners with second ply of membrane.
- .9 All membrane patches shall extend a minimum 150mm (6") in all directions from the limit of the deficiency repair location or penetration. Seal all around patches with tooled mastic.
- .10 Seal all side laps and all top laps with mastic.
- .11 Fill all joints or gaps wider than 6mm with galvanized steel sheet, wood or other suitable backing and apply 300mm strip of membrane over joints prior to application of the field membrane.

3.5 PROTECTION AND  
CLEANING

- .1 Repair, remove and clean all smears on exposed finished surfaces or surfaces to be subsequently finished. Clean off immediately as directed by and to the satisfaction of the Consultant.
- .2 Protect all adjacent surfaces from damage due to AVM barrier membrane operations.
- .3 As work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from this work.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Furnish all materials, labour, equipment and services, necessary for the supply and installation of fibre reinforced cementitious trim.

1.2 REFERENCE STANDARDS

- .1 All Reference Standards are latest editions, unless noted otherwise.
- .2 Do work in accordance with applicable standards of the Association of Wall and Ceiling Contractors (AWCC) of BC unless stated otherwise.
- .3 ASTM C1186, Standard Specification for Flat Non-Asbestos Fibre-Cement Sheets.

1.3 SUBMITTALS

- .1 Product Data: Submit duplicate copies of specifications, installation data, and other pertinent manufacturer's literature.
- .2 Samples: Submit duplicate 150mm x 150mm samples of trim materials, of texture, colour and profile specified.

1.4 MOCK-UP

- .1 Assemble a full-size mock-up of the trim on the project site for review by the Consultant.
- .2 Allow for review of mock-up by the Consultant before proceeding with the work.
- .3 Mock-up may be part of finished work.

PART 2 - PRODUCTS

2.1 TRIM BOARDS

- .1 Non-asbestos fibre-cement board, to ASTM C1186, Grade II, Type A.
- .2 Colour: As selected by Department Representative from manufacturer's standard colour palette.
- .3 Profile: Smooth, width to suit.



## 2.2 ACCESSORIES

- .1 Fasteners: to CSA B111. Purpose made stainless steel or hot-dipped galvanized nails. Nail head diameter of not less than 4.8mm and shank thickness of not less than 2.0mm, with sufficient length to penetrate 19mm into substrate.
- .2 Sealants: to CAN/CGSB 19.17 sealant as per Section 07 92 00 - Building Enclosure Sealants.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- .1 Prior to start of erection, examine existing work and report to Consultant any unsatisfactory conditions.
- .2 Examine and obtain all necessary measurements of previously executed work which may affect the work to this Division.
- .3 Report any discovered discrepancies to the Consultant so that instructions may be given for the necessary remedial work.

### 3.2 TRIM INSTALLATION

- .1 Install trim in strict accordance with the manufacturer's written instructions.
- .2 Provide a sub-fascia as required by the manufacturer.
- .3 Fasten through trim and sub-fascia into structural substrate.
- .4 Place fasteners no closer than 19mm ( $\frac{3}{4}$ " ) and no further than 50mm (2" ) from side edge of trim board and no closer than 25mm (1" ) from end. Fasten maximum 400mm (16" ) on center and in accordance with reviewed shop drawings.
- .5 Maintain clearance between trim and adjacent finishes.
- .6 Install single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten trim board to trim board.

- .7      Join trim boards with weather/bevel cuts.
- .8      Allow 3mm (1/8") gap between trim and cladding. Seal gap with caulking.

3.3 TOUCH-UP AND  
CLEANING

- .1      The Contractor shall remove grime and dirt from the cladding. Patch all hammer dents, holes or chipped edges and touch up paint as specified by the manufacturer.
- .2      At completion of the work, remove any excess materials, debris and equipment pertaining to the work, from the site.
- .3      Cracked trim is to be removed and replaced.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Furnish all labour, materials, equipment and services necessary for the design, supply, fabrication and erection of the complete preformed metal siding wall system.
- .2 The work of this section shall include, but shall not be limited to the design, fabrication, supply and erection of the following:
  - .1 Metal siding wall system, fascia panels.
  - .2 All necessary connection hardware and supporting members for attachment of the metal siding to the exterior backup walls, including brackets, clips, channels.
  - .3 All metal siding panel caps, interfacing with sloped metal roofing, closure strips and trim required in connection with the above installations.
- .3 All cutting and flashing required for metal panel penetrations as indicated on the drawings.

1.2 REFERENCES

- .1 All Reference Standards are latest editions, unless noted otherwise.
- .2 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- .3 American Society for Testing and Materials International, (ASTM):
  - .1 ASTM A 653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM D 523-14, Test Method for Specular Gloss.
- .4 The current edition of the National Building Code of Canada
- .5 CAN/CSA-S136 for the Design of Cold Formed Steel Structural Members.

- .6 CSSBI B16-14, Prefinished Sheet Steel for Building Construction.
- .7 CSSBI 20M-08, Sheet Steel Cladding for Architectural and Industrial Applications.
- .8 Architectural Sheet Metal Manual, SMACNA
- .9 ANSI B18.6.4, Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws, Inch Series
- .10 CSA B111, Wire Nails, Spikes and Staples.

1.4 DESIGN  
RESPONSIBILITY

- .1 The design, fabrication and erection of the metal siding shall be the complete responsibility of the Contractor.
- .2 Design requirements include but are not necessarily limited to the design and sizing of all metal siding, connection hardware including, all anchors, fasteners, clips and girts as required for the proper anchorage of the siding to the building structure, whether indicated on the drawings or not. Connection hardware shall be of material and design that is compatible with the metal siding system.
- .3 The metal siding details shown are included for the purpose of indicating the profiles, dimensions and material thickness are minimums, necessary to achieve the design intent.
- .4 The Consultant's review of any and all items designated in this specification will be done with the understanding and assurance that the Contractor is fully responsible for the performance of all work covered in this section.

1.5 DESIGN AND  
PERFORMANCE  
REQUIREMENTS

- .1 The following criteria shall be used in design of the preformed metal siding system:
  - .1 Siding, connection and attachment hardware, suspension systems and fasteners shall be designed to accommodate expansion and contraction.
  - .2 Connection and attachment hardware shall not cause staining to siding or to other adjoining materials.

- .3 Labels and trademarks, including applied labels, shall not be visible on the finished work.
  - .4 There shall be no oil canning, warping or buckling of siding faces, including when panels are under full design loads.
  - .5 Siding system shall provide and/or make allowances for free and noiseless vertical and horizontal thermal movement, due to the contraction and expansion of any or all component parts of the cladding system. Buckling, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to the thermal movement of any or all component parts will not be accepted.
  - .6 The deflection of the components of the siding system shall be limited as required to prevent any adverse effects on the watertight integrity of the system assembly or on any related component.
  - .7 All materials, recommendations and details describing the proposed use, design and application procedures for all anchorage shall be documented and fully described in the shop drawings.
  - .2 Reference to products does not relieve the manufacturer of responsibility to comply fully with all specified criteria.
  - .3 Cladding is to be designed in accordance with the requirements of the current edition of the National Building Code of Canada, Part 4: "Structural Design".
  - .4 For the purpose of the cladding design in subsection 4.1.7.1 "Specified Windloads", a value of 4.8 kPa is to be used for the product of  $q \times C_e$  in the expressions provided for calculating the specified external pressure or suction in part or all of the building. In these expressions the importance category to be used for determining the windload on the cladding is "Normal".
- 1.6 SUBMITTALS
- .1 Shop Drawings
    - .1 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and

closure pieces, metal furring channels and girts, and related work.

- .2 Ensure each shop drawing submitted has been stamped by a licensed professional engineer registered in British Columbia.

.2 Samples

- .1 Submit samples of wall system specified before proceeding with the work, showing proposed method of shaping, forming, jointing and fastening.
- .2 Submit minimum 50 mm x 100 mm sample of siding material, of colour and profile specified.
- .3 Submit samples if approval of substitutions is requested.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

- .1 Submit manufacturer's printed product literature, specifications and datasheet.

1.8 QUALITY ASSURANCE

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Materials shall not be exposed to wetting or damage and shall be stored neatly, properly stacked.
- .2 Assembled units and/or their component parts shall be transported, handled and stored in a manner to preclude damage of any nature.
- .3 Remove all units or components that are stained, watermarked, cracked, bent, chipped, scratched or otherwise unsuitable for installation and replace with new.

- .4 Protect finish and edges in accordance with metal siding manufacturer's directions.
- .5 Store material in accordance with metal siding manufacturer's directions.

#### 1.10 MOCK-UP

- .1 Assemble a full-size mock-up of preformed metal siding system on the project site for review by the Consultant. Exact area for assembly will be determined by the Consultant. Mock-up shall include all components of the system, including typical joints and connection hardware, and typical tie-ins to adjoining systems, all finished as specified.
- .2 Locate where directed by the Consultant.
- .3 Allow for review of mock-up by the Consultant.
- .4 Mock-up may remain as part of the Work

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- .1 Sheet steel panel with structural quality, grade 230 steel to ASTM A 653, with G90 galvanized zinc coating.
  - .1 Factory precoated. Apply paint system coating to reverse side of coil stock.
  - .2 Coating Performance Level: equivalent to "VicWest 10,000 (PVDF) coating, not less than 25 micrometres +/- 5 micrometres (1.0 mils +/- 0.2 mils.
  - .3 Colour: "Slate Blue"
- .2 Screws: stainless steel, head colour same as exterior sheet, hexhead stainless steel/neoprene washer self-tapping screw fastener.
- .3 Sealants: as recommended by the panel manufacture
- .4 Touch-up paint: as recommended by panel manufacturer.
- .5 Isolation coating: epoxy resin solution.

#### 2.2 COMPONENTS

- .1 Exterior corners: of same profile, material and finish as adjacent cladding material, factory built and brake formed to required angle, concealed corner

brace, pop rivet connections with painted head to match cladding.

- .2 Exposed joint (perpendicular to profile): ends of cladding sheet shop cut clean and square, backed with tight fitting filler lapping back of joint, exposed components colour matched to cladding.
- .3 Accessories: cap flashings, drip flashings, internal corner flashings, copings and closures for head, jamb, sill and corners, of same material, thickness and finish as exterior cladding, brake formed to shape. Closure flashings factory precut fitting to folded down position between the corrugations of the flutes.
- .4 Metal cladding fasteners to be minimum 14 Gauge stainless steel with integral washer and self-tapping points that protrude 25 mm past the face of the supporting member.

### PART 3 - EXECUTION

#### 3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

#### 3.2 PREPARATION

- .1 Protect metal surfaces in contact with concrete and other cementitious surfaces with isolation coating.

#### 3.3 INSTALLATION (FIELD ASSEMBLED)

- .1 Install semi-rigid stone wool insulation as specified in Section 07 21 13 Board Insulation.
- .2 Provide notched and formed top closures, sealed to arrest direct weather penetration at vertical profiles for exterior cladding. Ensure continuity of "pressure equalization" of rain screen principle.
- .3 Provide alignment bars, brackets, clips, inserts, shims as required to securely and permanently fasten wall system to building structure.
  - .1 Provide sheet steel wall panel and all accessories in longest practicable length to minimize field lapping.



- .2 Attach components in manner not restricting thermal movement.
- .3 Install sheet metal wall panels using fasteners spaced according to reviewed shop drawings.
- .4 Endlaps shall be located over supports. Minimum endlaps shall be 300 mm.
- .5 Sidelaps shall be sealed with continuous lengths of taped caulking, and shall be connected at intervals not exceeding 200 mm
- .6 Flash wall penetrations with material matching the metal siding, and make watertight and airtight.
- .7 Form seams in direction of water-flow and make watertight.
- .8 Install notched and formed closures. Seal against weather penetration from wind-driven rain.
- .9 When cutting or drilling prefinished material, care shall be exercised to ensure that cuttings do not remain to rust on exposed prefinished surfaces. Where practicable, cutting and drilling shall be conducted so that cuttings do not strike or accumulate on exposed surfaces. Brush up cutting with a finish in matching colours using touch up paint recommended by the manufacturer.
- .10 Finished surfaces shall be free from buckling, warp, wave, dents, oil canning, cutting deformities, or other defects.

### 3.5 CONTROL/EXPANSION JOINTS

- .1 Construct control joints so stresses on the cladding materials and on the sealants are within manufacturers' recommended limits.
- .2 Use cover sheets, of brake formed profile, of same material and finish as adjacent material.
- .3 Use mechanical fasteners to secure sheet materials.

### 3.6 CONSTRUCTION

- .1 Site Tolerances:
  - .1 Maintain following installation tolerances:

- .1 Maximum variation from plane or location shown on approved shop drawings: 10 mm/m of length and up to 20 mm/60 m maximum.
- .2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 2 mm.

### 3.7 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Wash down exposed interior and exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths. Wipe interior surfaces clean as part of final clean-up.
- .3 Remove excess sealant with recommended solvent.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .1 All Reference Standards are latest editions, unless noted otherwise.
- .2 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
- .3 CSA B111, Wire Nails, Spikes and Staples.
- .4 Architectural Sheet metal Manual, Sheet metal and Air Conditioning Contractors National Association, Inc (SMACNA).

1.2 SUBMITTALS

- .1 Samples:
  - .1 Submit samples of each type of material and colour to be used.
- .2 Product Data: Provide manufacturer's technical data for material to be used.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Materials shall not be exposed to wetting or damage and shall be stored neatly, properly stacked.
- .2 Assembled units and/or their component parts shall be transported, handled and stored in a manner to preclude damage of any nature. Stack preformed material in manner to prevent twisting, bending and rubbing.
- .3 Remove all units or components that are stained, watermarked, cracked, bent, chipped, scratched or otherwise unsuitable for installation and replace with new.
- .4 Protect finish and edges in accordance with manufacturer's directions.
- .5 Store material in accordance with manufacturer's directions.
- .6 Prevent contact of dissimilar metals during storage and protect from acids, flux, and other corrosive materials and elements.

1.4 MOCK-UP

- .1 Assemble a mock-up of each condition on the project site for review by the Consultant. Mock-up shall include all components of the system, including typical joints and connection hardware, and typical tie-ins to adjoining systems, all finished as specified.
- .2 Modify the mock-ups at no additional cost to the contract as may be required to meet design and performance requirements.
- .3 Mock-up may be part of finished work.
- .4 Allow 24 hours for review of mock-ups by Consultant before proceeding with work.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- .1 **Carbon Steel:**
  - .1 G90 galvanized steel sheet to ASTM A653/A653M, commercial quality with Z275 designation zinc coating. Thickness of sheet metal to be 0.6070mm unless otherwise noted.
  - .2 **Finish:**
    - .1 Factory precoated. Apply paint system coating to reverse side of coil stock.
    - .2 Coating Performance Level: equivalent to "VicWest 10,000 (PVDF) coating, not less than 25 micrometres +/- 5 micrometres (1.0 mils +/- 0.2 mils.
    - .3 **Colour:** The Department Representative will select up to 2 colours from the manufacturer's core colour range.

2.2 ACCESSORIES

- .1 **Plastic Cement:** cutback asphalt type, to CAN/CGSB 37.5.
- .2 **Underlay for Metal Flashing:** refer to Section 07 27 13 - Modified Bituminous Sheet Air-Vapour Barrier.
- .3 **Cleats and Starter Strips:** of same material, and temper as sheet metal, minimum 50 mm wide x thickness same as sheet metal being secured.

- .4 Fasteners: of same material as sheet metal, corrosion resistant, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing and trim application.
- .5 Washers: of same material as sheet metal, 1.0 mm thick with rubber packings.
- .6 Touch-Up Paint: as recommended by the prefinished material manufacturer.

### 2.3 FABRICATION - GENERAL

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable SMACNA details and specifications.
- .2 Form lengths to maximum 2400mm using 1 piece for each flashing section. Make allowance for expansion at joints.
- .3 Use flat-lock folded seams for all joints and splices of thru-cavity flashings. Contractor may use S-lock joints if all surfaces of flashing are sloped greater than 3:1.
- .4 Use standing seams for all joints and splices for cap flashings.
- .5 Hem exposed edges on underside 12 mm; mitre and seal corners with sealant.
- .6 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .7 Ends of thru-cavity flashing to have 1/2" folded upturn, creating an end dam. Cutting and caulking of upturns will not be accepted.
- .8 Metal flashing shall be formed on a bending brake with shaping trimmed. Hand seaming shall be done on a bench, as far as practicable, with proper sheet metal working tools. Angles of bends and folds for interlocking metal shall be made with full regard to expansion and contraction to avoid buckling and damage to metal.

### 2.4 METAL FLASHINGS

- .1 Form flashings to profiles indicated and as required to complement and finish the wall systems.

2.5 EAVES TROUGHS AND  
RAIN WATER LEADERS

- .1 Form eaves troughs and rain water leaders from 0.7595mm thick sheet steel.
- .2 Provide goosenecks, outlets, strainer baskets and necessary fastenings.
- .3 Splash pads to be precast concrete.

PART 3 - EXECUTION

3.1 EXAMINATIONS OF  
SURFACES

- .1 Examine surfaces to receive flashings. Notify the Consultant of surfaces which are considered unacceptable to receive the work of this Section.

3.2 PROTECTION OF  
EXISTING WORK

- .1 Protect the work of other Sections from damage by the work of this Section.
- .2 Place protection to the requirements and satisfaction of this Section before performing the work of other Sections.

3.3 INSTALLATION -  
GENERAL

- .1 Install sheet metal working accordance with applicable SMACNA specifications.
- .2 Use concealed fastenings throughout, except where approved by the Consultant prior to start of the work.
- .3 Provide underlay under sheet metal; secure in place and lap joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flashing joints using standing seams forming tight fit over hook strips.
- .5 Use flat-lock joints for all metal flashing except roof (S-pocket and standing seams are acceptable). Lock end joints and caulk with sealant.

3.4 COUNTER FLASHINGS

- .1 Install metal counter flashings as soon as possible after membrane flashings are in place and reviewed by the Consultant.

- .2 Where detailed turn top edge of flashing into walls, secure with lead wedge or friction fit pins into reglet and caulk at joint to wall.
- .3 Secure sections in S-pocket joints and allow sufficient tolerance for expansion and contraction between each piece.
- .4 Secure metal counter flashing a minimum of 300mm above roof membrane. Use fasteners of sufficient length to penetrate at least 25mm into substrate.

### 3.5 EAVES TROUGHS AND DOWNPIPES

- .1 Install eaves troughs in maximum 15m lengths, and secure to building at 300 mm o.c.. Slope eaves troughs to downpipes. Provide one downspout per 15m (50 ft.) eaves trough length. Solder and seal joints watertight.
- .2 Install downpipes and provide goosenecks back to wall. Secure downpipes to wall with straps at 1800 mm o.c.; minimum 4 straps per downpipe. Seal all nail penetrations at straps.
- .3 Connect downpipes to drainage system and seal joint with plastic cement. Access and extend existing drainage system as required.

### 3.6 TOUGH-UP AND CLEAN-UP

- .1 The Contractor shall remove grime and dirt from flashing materials by dry wiping as the material is erected.
- .2 Remove all excess solder and sealants with recommended solvent.
- .3 Wipe off all hand prints, smudges, and other superficial stains.
- .4 Remove and replace all dented and damaged materials.
- .5 At completion of the work, remove any excess materials, debris and equipment pertaining to the work, from the site.

END OF SECTION





- .4 ASTM A568 - General Requirements for Steel, Sheet, Carbon, and High Strength, Low-Alloy, Hot-Rolled and Cold-Rolled.
- .5 Canadian Steel Door and Frame Manufacturers Association (CSDFMA).
- .6 CAN/CGSB 82.5, Insulated Steel Doors.
- .7 CAN/CSA-G40.21, Structural Quality steel.
- .8 CAN/CGSB-51.20, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .9 NFPA No.80 - Fire Doors and Windows

### 1.3 DESIGN AND PERFORMANCE REQUIREMENTS

- .1 Provide a system that will fulfill the requirements of the specifications and drawings including items which may not be shown or specified but are required for performance of the system.
- .2 Materials, fabrications, attachments, accessories, assembly and performance, other than thermal performance, shall meet or exceed applicable requirements as specified herein.
- .3 Labels and trademarks, including applied labels, shall not be visible on the finished work, except identification of safety glass as required by code.
- .4 The system shall be fabricated and installed square, level and plumb as follows:
  - .1 Plumb to within 3 mm of vertical over the height of each unit.
  - .2 Within 3.0 mm of level relative to a datum established for frames at the same floor.
  - .3 Within 1.5 mm of level relative to an adjacent frame.
  - .4 Each frame shall be within 3.0 mm of square when measured across the diagonals.
  - .5 Clearances required for installation should be considered and indicated on the shop drawings.

- .5 Weather Tightness
  - .1 Air Infiltration - Air infiltration around edges of door panels shall not exceed  $11.6 \times 10 \text{ m}^3/\text{s}$  for each metre of crack length when tested in accordance with ASTM E283, at a static air pressure of 75Pa.
  - .2 Water Resistance - No water shall pass the interior face of the door unit when tested in accordance with ASTM E331, The air pressure differential shall be 300 Pa and the test duration shall be 5 minutes.
- .6 Durability
  - .1 The doors, frames and integral seals shall be designed to have an expected service life of 10 years. All seals, gaskets, corrosion protection, coatings and attachments are expected to be serviceable at the end of this service period.

#### 1.4 SUBMITTALS

- .1 Submittals to be made in accordance with Section 01 33 00 - Submittals.
- .2 Product Data: Submit catalogue details for each type of door and framing system illustrating profiles, dimensions and methods of assembly, installation procedures, recommendations and data that products have been tested and comply with performance requirements.
- .3 Samples: If requested, make the following samples available for Department Representative/Consultant review at least one week prior to shop drawing preparation:
  - .1 One (1) door and frame.
- .4 Installation Manual: The manufacturer shall provide a copy of the installation manual for the system. An additional copy of this manual shall be kept on site for the use of the Contractor and personnel reviewing the installation work.
- .5 Maintenance Data: Provide in accordance with Section 01 78 23 - Maintenance and Renewal Manual, the following data for incorporation into specified maintenance manual:



- .2 All pre-delivery and in situ testing, except for re-testing, shall be paid for directly by the Department Representative.
- .3 All coordination with the Testing Agency shall be the responsibility of the Contractor. Contractor to ensure adequate notice is provided to all parties prior to scheduling testing.
- .4 Testing Agency will distribute written results of all tests within three days of completing testing.

### 1.7 QUALITY ASSURANCE

- .1 Conform to requirements of Canadian Steel Door and Frame Manufacturers Association standard.
- .2 Sealed insulation unit manufacturer to be a member in good standing of IGMA.
- .3 Manufacturer, fabricator and installation contractor to be a member in good standing of GCABC and have a minimum of 5 years uninterrupted experience in successfully carrying out projects of similar size and shall employ suitable qualified tradespersons with at least five (5) consecutive years experience in this type of work. Contractor to document past experience on request.
- .4 Contractor to ensure all safety hardware and operable hardware is functioning upon temporary and final installation.
- .5 Fire rated frame construction to conform to CAN4 S105-M.
- .6 Installed frame and door assembly to conform to NFPA No.80 for fire rated class to match existing.

### 1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials so as to avoid damage, following the recommendations contained in AAMA publication CW-10, "Care and Handling of Architectural Aluminum from Shop to Site".
- .2 All delivered products shall be stored on site in a safe and secure location that is inaccessible to residents or general public.



and deficiencies in materials and workmanship, and continue to perform satisfactorily for a period of five years from certified date of Substantial Performance of the Work.

- .1 Satisfactory performance means compliance with the performance criteria and the testing and construction standards of this specification, and with the reviewed shop drawings. This includes the performance of finishes, hardware, glass and glazing materials, structural attachment, air, vapour and water seals, sealants and flashings.
- .2 Correct all deficiencies that appear during the warranty period, including removal and replacement of failed sealed insulating units, at no cost to the Department Representative.
- .2 Obtain, on behalf of the Department Representative, copies of standard product warranties in excess of one year, from the respective manufacturers.
- .3 All on site modifications to window assemblies are to be in accordance and shall have written approval from the Manufacturer and shall not compromise specified Warranties.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Sheet Steel: 24 gauge galvanized steel, cold rolled galvanized steel conforming to ASTM A 525M. Paint film thickness is in addition to the preceding minimum total thickness value.
- .2 Core: Expanded polystyrene to CAN/CGSB-51.20, density 16 to 32 kg/m.
- .3 Fasteners: As specified by door manufacturer.
- .4 Primer: baked-on enamel coating, to CAN/CGSB-1.132M (for galvanized material).
- .5 Finish: Baked enamel. Refer to Section 09 91 13 - Exterior Painting and Finishing. The Department Representative will select up to two (2) colours from the manufacturer's core colour range.

- .6 Exterior Frames: Steel frames, 1.2 mm thick material, appropriate to grade and model of door.
- .7 Weatherstripping shall be of a material that is resistant to deterioration by weathering and aging and shall be compatible with associated materials. Open cell plastic foam shall not be used. Surface-applied, glued-on weatherstripping is not acceptable. Flexible vinyl weatherstripping shall conform to CGSB 41-GP-20M. Weatherstripping shall be mechanically secured in position and shall be replaceable without the aid of tools specially designed for this purpose.
- .8 Thresholds: extruded aluminum.
- .9 **Provide full height astragals at the jamb to protect against forced entry.**

## 2.2 DOOR Type

- .1 Swing Type: 1 panel steel doors; shall be installed at locations indicated. Include all frames and hardware.

## 2.3 HARDWARE

- .1 Exposed Hardware Components: metal, in finish to match existing. Door and frames shall be fully prepared for locks and strikes in conformance with ANSI A 115.
- .2 Hardware exposed to exterior environment with sash in closed and open positions shall be corrosion-resistant.
- .3 Hardware shall be screw attached. Supply two minimum 63mm number 10 screws for each hinge and strike plate to be used at the time of installation.
- .4 **Key to Department Representative's requirements.**
- .5 Hardware Reinforcement: NAAMM CHM-1-74.

## 2.4 FABRICATION AND MANUFACTURE

- .1 Workmanship: All work shall be performed by skilled workmen, especially trained and experienced in the applicable trades employed and in full conformity with applicable provisions of the listed references and standards and/or as specified herein. Work shall be carefully fabricated and assembled with proper and approved provisions for thermal expansion

and contraction, fabrication and installation tolerances and adjoining building component tolerances and design criteria. All forming, welding and cutting operations shall be done prior to finishing.

All work shall be true to detail with sharp, clean profiles, straight and free from defects, dents, marks, indentations, waves or flaws of any nature impairing strength or appearance; fitted with proper joints and intersections and with specified finishes. All members shall be extruded unless otherwise indicated on the drawings and shall be securely engaged into adjacent components. Extrusions shall be toleranced to eliminate any edge projection or misalignment at joints.

Expansion joints within framing shall be so designed and constructed to provide noiseless and free movement, and be and remain, permanently watertight.

No field forming, cutting and/or alteration of framing members will be allowed. All framing members will be shop fabricated and finished. No unfinished surfaces will be permitted on exposed surfaces.

- .2 Protection of Metals: Provide suitable protecting against galvanic action wherever dissimilar metals are in contact, as applicable.
- .3 Joints in Metal Work: All exposed work shall be carefully matched to produce continuity of line, design and finish. Joints in exposed work, unless otherwise required, shall be accurately fitted, rigidly secured with contact tolerance less than 1mm and sealed watertight. Where two or more sections of metal are used in building up members, the surface in contact shall be brought to a smooth, true and even surface and secured together so that the joints shall be absolutely tight without the use of any pointing materials.
- .4 Shop Assembly: wherever practicable, all fitting and assembly of the work shall be done in the shop. Work that cannot be permanently shop assembled shall be temporarily assembled in the shop and marked before disassembly and shipping.
- .5 Fasteners: All fasteners, connectors, anchors including washers and accessory items shall be scheduled and designated by the door manufacturer.





required in connection with door system required to make the work watertight, whether or not such flashings are indicated on the drawings or details.

- .3 Flashings and closures shall be formed to suit the various conditions as detailed and as required.
- .4 Metal shall be supplied as long as practicable in order to provide the minimum number of joints.

### 3.5 GASKETS

- .1 Install all gaskets, tapes, weatherstripping and sealants as required to provide watertight, weathertight and airtight joints.
- .2 Joints and spaces to be sealed shall be thoroughly cleaned of foreign matter and be thoroughly dry before applying gaskets or sealants.

### 3.6 PROTECTION MARKINGS

- .1 Material for protection markings on glass such as adhesives for manufacturer's labels shall be either neutral or slightly acidic. In no case shall such materials be alkaline. Any staining of glass or other surfaces by such alkaline materials will be cause for rejection.

### 3.7 ADJUST AND CLEAN

- .1 The work must be adequately protected daily against any such detrimental soiling in coordination with the General Contractor
- .2 Upon completion of the work of this section, remove protective coverings and paper labels from exposed surfaces and clean surfaces of all dust, smears, marks and discoloration. Cleaning shall be in accordance with applicable provisions of listed standards and the requirements of the manufacturer.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Aluminum overhead sectional door.
- .2 Glazing into aluminum sections
- .3 Operating hardware and tracks.
- .4 Manual door operator.

1.2 REFERENCES

- .1 ANSI/DASMA 102 - 2011 - Specifications for Sectional Doors.
- .2 ASTM B117-11 Standard Practice for Operating Salt Spray (Fog) Apparatus.
- .3 ASTM D523-14 - Standard Test Method for Specular Gloss.
- .4 ASTM D714-02(2009) Standard Test Method for Evaluating Degree of Blistering of Paints.
- .5 ASTM D1308-02(2013) Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
- .6 ASTM D3363-05(2011) 2 Standard Test Method for Film Hardness by Pencil Test.
- .7 ASTM D7091 - 13 - Standard Practice for Non-destructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals.
- .8 ASTM E84-14 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

- .1 **Reference Attachment, "ALUMINUM GLAZED SECTIONAL DOORS".**

1.4 SUBMITTALS FOR REVIEW

- .1 Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations and installation details.
- .2 Product Data: Provide manufacturers technical information including component construction, anchorage method, hardware, and operation layout.

- .3 Installation Data: Manufacturer's special installation requirements, special procedures and perimeter conditions requiring special attention. Operation and Maintenance Data: Provide data for operating and maintenance activities including lubrication frequency.
- .4 Warranty Documentation: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

### 1.5 QUALITY ASSURANCE

- .1 Provide all Products and components specified in this section from one manufacturer.
- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 10 years' experience.
- .3 Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience and approved by the manufacturer.

### 1.6 DELIVERY, STORAGE AND HANDLING

- .1 Door sections shall be carried and handled in the upright position, on edge. Carrying flat may result in damage.
- .2 Store in manufacture's unopened packaging until time of installation. Protect from moisture.
- .3 Store in dry, weather tight location.

### 1.7 WARRANTY

- .1 Warranty: Manufacturer's 10 year warranty against materials and workmanship of door sections.
  - .1 Include coverage of polycarbonate, including discolouration, loss of light transmission, and loss of strength due to weathering.

## PART 2 - PRODUCTS

**Reference Attachment, "ALUMINUM GLAZED SECTIONAL DOORS".**

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Verify that wall openings are ready to receive work and opening dimensions and tolerances are within required limits.

3.2 INSTALLATION

- .1 Install door unit assembly to manufacturer written instructions.
- .2 Anchor assembly to wall construction and building framing without distortion or point loading.
- .3 Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- .4 Fit and align door assembly including hardware.
- .5 Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components. Final connection of electrical service to be performed by qualified personnel.
- .6 Coordinate installation of sealants and backing materials at frame perimeter.
- .7 Install closures.

3.3 ERECTION TOLERANCES

- .1 Maximum Variation from Plumb: 1.5 mm.
- .2 Maximum Variation from Level: 1.5 mm.
- .3 Longitudinal or Diagonal Warp: Plus or minus 3 mm, over 3 m straight edge.
- .4 Maintain dimensional tolerances and alignment with adjacent work.

3.4 AJUSTING

- .1 Adjust door assembly to smooth operation and in full contact with weather stripping.

3.6 PROTECTION OF FINISHED WORK

- .1 Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Provide material labour and equipment necessary to install soffits as specified.

1.2 REFERENCE STANDARDS  
(Most recent version  
unless noted otherwise)

- .1 ASTM B 209, Aluminum and Aluminum Alloy Sheet and Plate.
- .2 CSA B111, Wire Nails, Spikes and Staples.
- .3 CAN/CGSB-93.2, Prefinished Aluminum Siding, Soffits and Fascia, for Residential Use.
- .4 CGSB 93.4 - M92 Galvanized Steel and Aluminum-Zinc Alloy Coated Steel Siding, Soffits, and Fascia, Prefinished, Residential.
- .5 CGSB 93.5, Installation of Metal Residential Siding, Soffits and Fascia.

1.3 SUBMITTALS

- .1 Samples:
  - .1 Submit standard colour charts and samples of standard vent pattern.
  - .2 Submit samples if approval of substitutions is requested.
- .2 Maintenance Data:
  - .1 Provide one (1) carton (12 to 18 pieces minimum) of material for maintenance purposes.

1.4 DELIVERY, STORAGE  
AND HANDLING

- .1 Materials shall not be exposed to wetting or damage and shall be stored neatly, properly stacked.
- .2 Assembled units and/or their component parts shall be transported, handled and stored in a manner to preclude damage of any nature.

- .3 Remove all units or components that are stained, watermarked, cracked, bent, chipped, scratched or otherwise unsuitable for installation and replace with new.
- .4 Protect finish and edges in accordance with manufacturer's directions.
- .5 Store material in accordance with manufacturer's directions.

## PART 2 - PRODUCTS

### 2.1 VENTED SOFFIT PANEL

- .1 Aluminum Soffit: To CAN/CGSB-93.2, Type B, Class 1.
  - .1 Colour: White
  - .2 Profile: flat sheet 'v' crimped for stiffness, vented 0.1 m<sup>2</sup> of opening for every 30 m<sup>2</sup> of building area.
  - .3 Pattern: plain surface.

### 2.2 ACCESSORIES

- .1 Soffit J-trim, painted both sides.
- .2 Accessories to be of same manufacture as soffit panel and to be utilized in accordance with manufacturer's requirements.
- .3 Fasteners: Screws to ANSI B18.6.4. Purpose made stainless steel screws with neoprene washers.
- .4 Sealants: as per Section 07 92 00 - Building Enclosure Sealants.

## PART 3 - EXECUTION

### 3.1 WORKMANSHIP

- .1 Use skilled workers experienced in panel installation.
- .2 Cut and fit items to adjacent material for tight tailored custom installations.

### 3.2 INSTALLATION

- .1 Install items level, plumb and straight with ribs parallel, in accordance with details.

- .2 Install panels without waves, warps, buckles, or distortions, and allow for thermal movement considerations.
- .3 J-trim to be installed around all edges.

3.3 TOUCH-UP AND  
CLEANING

- .1 The Contractor shall remove undue grim and dirt from the cladding by dry wiping the panels as the material is erected.
- .2 Leave soffit system in clean and neat condition.
- .3 At completion of the work, remove any excess materials, debris and equipment pertaining to the work, from the site.

END OF SECTION



PART 1 - GENERAL

1.1 WORK INCLUDED

- .1 Provide required drain piping to connect all new gutter downspouts to the existing drainage system.

1.2 STANDARDS

- .1 BC Building Code (BCBC)
- .2 ASTM D1784-11, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

1.3 PERFORMANCE REQUIREMENTS

- .1 The piping supplied and installed under this Contract shall:
  - .1 Be fully operational and not unduly sustain damage or undue deterioration under normal use.
  - .2 Not hinder the flow of water.
  - .3 Not leak and remain securely fastened.

PART 2 - PRODUCTS

2.1 PIPE

- .1 Perimeter drain pipes installed below finished grade to be 100 mm (4") i.d. Schedule 40 PVC to ASTM D1784, Type I, Grade I.

PART 3 - EXECUTION

3.1 PIPE RUN INSTALLATION

- .1 Install piping and associated connections in accordance with BC Building and Plumbing code requirements.
- .2 Connect to existing catch basin. All drainage pipes to have a minimum slope to drain of 2%.

3.2 CLEANING OF DRAINAGE SYSTEM

- .1 Contractor to power flush (high pressure jetting, or approved equivalent) all drainage systems within the Work areas to ensure all new and existing drains, drain lines and related piping are totally cleaned, operational and free running.
- .2 Test system to ensure unobstructed operation.

END OF SECTION

## APPENDIX

Attachment A:

Aluminum Glazed Sectional Doors for Information

**For Reference Only**

## **PART 1 - GENERAL**

### **1.1 RELATED WORK**

- .1 Metal Fabrications: Section 05 50 00
- .2 Joint Sealants: Section 07 92 00
- .3 Electrical: Division 26.

### **1.2 REFERENCES**

- .1 ANSI/DASMA 102 - 2011 – Specifications for Sectional Doors.
- .2 ASTM E84-14 - Standard Test Method for Surface Burning Characteristics of Building Materials.

### **1.3 SYSTEM DESCRIPTION**

- .1 Panels: Aluminum frame panels with full-width clear polycarbonate glazing.
- .2 Lift Type: Vertical lift and High lift operating style with track and hardware.
- .3 Operation: manual chain hoist with motor interlock.
- .4 Loads: Design and size components to withstand dead and live loads caused by pressure and suction of wind acting normal to plane of wall as measured in accordance with ANSI/DASMA 102.

### **1.4 SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, installation details.
- .3 Product Data: Provide component construction, anchorage method, hardware.
- .4 Samples: Submit aluminum and polycarbonate glazing panel samples, illustrating colour and finish.

### **1.5 CLOSEOUT SUBMITTALS**

- .1 Section 01 78 00: Closeout Submittals.
- .2 Operation and Maintenance Data:
  - .1 Include electrical control adjustments.
  - .2 Include data for motor, shaft and gearing, lubrication frequency, spare part sources.
- .3 Warranty Documentation: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

### **1.6 QUALITY ASSURANCE**

- .1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.
- .2 Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience and approved by the manufacturer.

### **1.7 REGULATORY REQUIREMENTS**

- .1 Conform to applicable code for motor and motor control requirements.
- .2 Products Requiring Electrical Connection: Listed and classified by testing firm acceptable to the Departmental Representative CSA and ULC as suitable for the purpose specified.

**For Reference Only**

## 1.8 DELIVERY, STORAGE AND HANDLING

- .1 Door sections should be carried and handled in the upright position, on edge. Carrying flat may result in damage.
- .2 Store in manufacture's unopened packaging until time of installation. Protect from moisture.

## 1.9 WARRANTY

- .1 Warranty: Manufacturer's ten (10) year warranty against materials and workmanship of door sections.
  - .1 Include coverage of polycarbonate to manufacturers tolerances, including discolouration, loss of light transmission, and loss of strength due to weathering.
- .2 Provide ten (10) year manufacturer warranty for electric operating equipment.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Aluminum: Extruded, 6063-T5, 2 mm thick, 4 mm thick at hinge fastening locations.
- .2 Glazing: Continuous full width Polycarbonate, Triple-wall construction, 16 mm, clear.
- .3 Glazing gasket: Glazing wedge, compression fit rubber glazing wedge.
- .4 Aluminum Finish: Clear Anodized.
- .5 Weatherstripping:
  - .1 Glazing: Thermoplastic vulcanizate, polyolefin based, recyclable. Santoprene 201-64.
  - .2 Between sections: Bulb weatherstripping, factory installed.

### 2.2 PANEL CONSTRUCTION

- .1 Stiles and rails: Extruded aluminum frame stiles and rails, minimum 2 mm thick, and 4 mm thick at hardware fastening locations.
  - .1 Provide integral aluminum truss wall concealed within rail extrusion, from exterior to interior at the centre, on both interior and exterior frames. Truss wall to run whole width of door panel.
- .2 Panels:
  - .1 Glazing Panels: Polycarbonate, one-piece continuous triple-wall glazing, full width of panel, with extruded aluminum frame. Seal exterior glazing joints with gasket; do not use silicone.
  - .2 Colours: clear ~~and silver/grey~~
- .3 Door Nominal Thickness: 45 mm thick.

### 2.3 HARDWARE COMPONENTS

- .1 Track: Rolled galvanized steel, 2.0 mm (12 gauge) thick; 75 mm wide, continuous one piece per side; galvanized steel mounting brackets 1.6 mm (14 gauge) thick.
- .2 Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel ; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.
- .3 Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables. Manual operation with maximum exertion of 110 N, force.
- .4 Operator: manual chain hoist with motor interlock.
- .5 Sill Weatherstripping: Fit to bottom of door panel, full length contact.
- .6 Jamb Weatherstripping: Place full height of jamb, in moderate contact with door panels.
- .7 Head Weatherstripping: One piece full length, fixed to top section.
- .8 Panel Joint Weatherstripping: One piece full length, bulb weather stripping.

**For Reference Only**

## 2.4 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- .1 Electrical Characteristics:
  - .1 1HP-575V-3 Phase continuous duty motor.
  - .2 60Hz high starting torque, continuous-duty.
- .2 Motor: NEMA MG1, Type 1 enclosure.
- .3 Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
- .4 Disconnect Switch: Factory mount disconnect switch in control panel
- .5 Electric Operator:
  - .1 Side mounted on cross head shaft, adjustable safety friction clutch.
  - .2 Brake system actuated by independent voltage solenoid controlled by motor starter; enclosed gear driven limit switch; enclosed magnetic cross line reversing starter; mounting brackets and hardware.
- .6 Control Station:
  - .1 Standard three (3) button (open-close-stop) continuous pressure type, control for each electric operator; 24 volt circuit, surface mounted .
- .7 Wireless bottom 'FeatherEdge' safety reversing edge system
- .8 Dual photocell reversing safety eyes

## 2.5 FINISHES

- .1 Door Panels:
  - .1 Clear anodized.
  - .2 Track: Uncoated.
  - .3 Hardware: Uncoated.

## **PART 3 - EXECUTION**

### 3.1 EXAMINATION

- .1 Section 01 71 00 - Examination and Preparation: Verify existing conditions before starting work.
- .2 Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- .3 Verify that electric power is available and of the correct characteristics.

### 3.2 PREPARATION

- .1 Prepare opening to permit correct installation of door unit to perimeter air and vapour barrier seal.

### 3.3 INSTALLATION

- .1 Install door unit assembly to manufacturer written instructions.
- .2 Anchor assembly to wall construction and building framing without distortion or stress.
- .3 Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- .4 Fit and align door assembly including hardware.
- .5 Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components. Final connection of electrical service to be performed by qualified personnel.
- .6 Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 92 00.

### 3.4 ERECTION TOLERANCES

- .1 Maximum Variation from Plumb: 1.5 mm.

**For Reference Only**

- .2 Maximum Variation from Level: 1.5 mm.
- .3 Longitudinal or Diagonal Warp: Plus or minus 3 mm, from 3 m straight edge.
- .4 Maintain dimensional tolerances and alignment with adjacent work.

**3.5 ADJUSTING**

- .1 Ensure the operation and adjustments to door assembly for specified operation.
- .2 Adjust door assembly to smooth operation and in full contact with weatherstripping.

**3.6 CLEANING**

- .1 Section 01 74 00: Cleaning installed work.
- .2 Clean frames, doors, glass.
- .3 Remove temporary labels and visible markings.

**3.7 PROTECTION OF FINISHED WORK**

- .1 Do not permit construction traffic through overhead door openings after adjustment and cleaning.

**3.8 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.

**END OF SECTION 08 36 13**

Northwest Environmental Hazardous Material Report

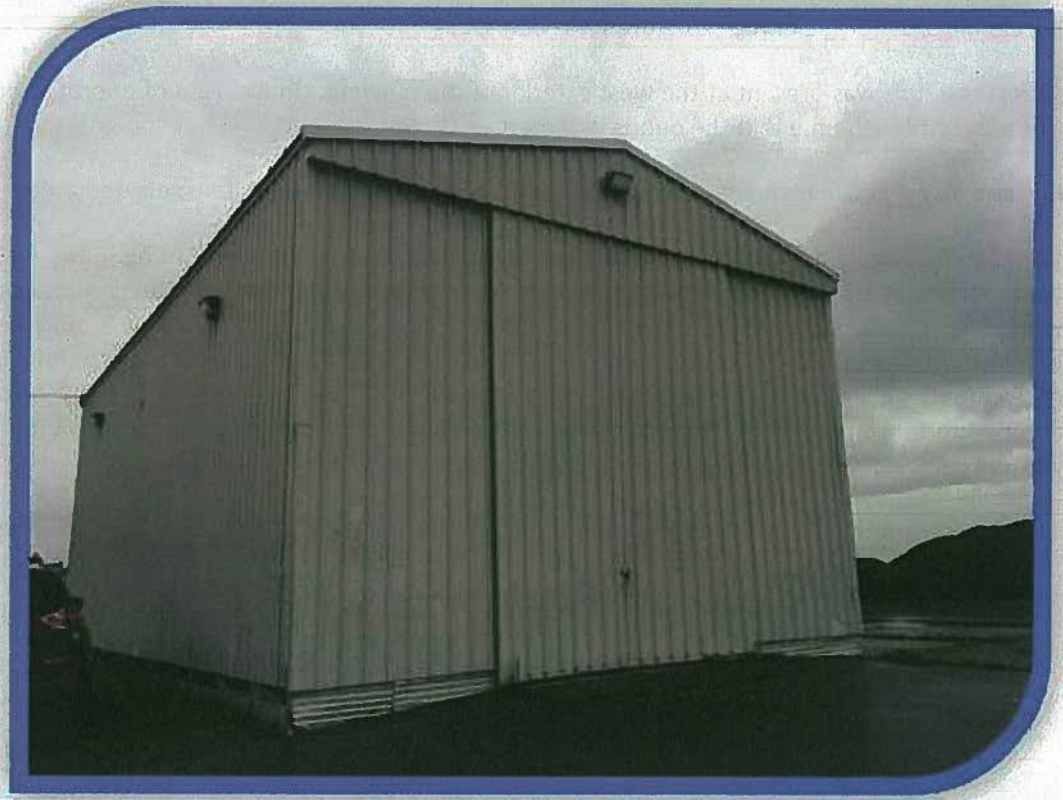
Attachment B:

Northwest Environmental Hazardous Material Report



Prepared for:  
Read Jones Christoffersen  
Suite 301-155 Skinner Street, Nanaimo, BC

# Hazardous Materials Assessment 3675 Byng Road, Port Hardy BC Port Hardy Airport-Sand Shed



Prepared by:



**North West  
Environmental Group Ltd.**

210-2950 Douglas Street  
Victoria, British Columbia V8T 4N4

Project No. 27384 HMA V0.A  
Date issued: November 23, 2015

## EXECUTIVE SUMMARY

North West Environmental Group Ltd. (NWest) conducted a project-specific hazardous materials assessment of the Port Hardy Airport Sand Shed located at 3675 Byng Road in Port Hardy BC in accordance with the WorkSafeBC regulatory requirements outlined in the BC Occupational Health and Safety Regulation Section 20.112 – Hazardous Materials. The assessment was conducted by Marianne Farrell on November 18, 2015. Building fabric components suspected of containing hazardous materials were identified, logged and, where necessary, sampled and analyzed to confirm the presence or absence of hazardous materials.

The building is a wood framed structure clad in sheet metal on a concrete foundation that was built circa 1940. It was reported to NWest at the time of the survey that the roof of the structure was replaced in May of 2015 and that the exterior had also been recently painted. The building was not insulated with exception of the northwest storage room which was insulated with fiber glass insulation.

The client defined the assessment area as the exterior cladding and the northwest storage room. Accessible areas of the entire structure were accessed.

Asbestos debris was present at the west exterior of the building. Limit access of unprotected workers to this area until such time that the debris is abated.

Invasive investigative techniques were used to assess concealed materials in selected areas

WorkSafeBC Regulation 20.112 requires that all hazardous materials found to be in the way of planned work, including asbestos, be identified prior to the commencement of construction and/or renovation work. These hazardous materials must be either safely contained or removed by a qualified contractor employing WorkSafeBC approved procedures. If materials that are suspected of containing hazardous components such as lead or asbestos, are encountered during deconstruction that differ from, or are in addition to those reported in the bulk sample collection report, then work must stop until the material content can be determined.

The purpose of this hazard assessment was to identify the locations of asbestos and other hazardous materials prior to planned renovation/demolition work. This report includes a list of building materials that are confirmed or suspected of containing hazardous materials.

The following table summarizes the observations and results of the assessment.

**Table 0-1: Hazmat Assessment Observations and Results\***

Hazardous Material	Type and Location	Recommendation
PCBs	<ul style="list-style-type: none"><li>Fluorescent Light Ballasts observed</li></ul>	See Section 4
Asbestos* (confirmed)	<ul style="list-style-type: none"><li>Black Mastic Debris – West Exterior ↳ Chrysotile 8%</li></ul>	See Section 4
Asbestos (may contain)	<ul style="list-style-type: none"><li>Materials commonly found to contain asbestos were observed (not sampled) or are suspected to be present including: Electrical cables, buried asbestos cement</li></ul>	See Section 4

Hazardous Material	Type and Location	Recommendation
	pipes, bell and spigot piping gaskets and incandescent light fixtures (heat shields).	
Mercury	<ul style="list-style-type: none"> <li>Fluorescent Light Tubes observed</li> </ul>	See Section 4
Ozone Depleting Substances	<ul style="list-style-type: none"> <li>ODS not observed</li> </ul>	No action necessary
Radioactive Materials	<ul style="list-style-type: none"> <li>Smoke Detectors not observed</li> </ul>	No action necessary
Above Ground Storage Tanks (AST)	<ul style="list-style-type: none"> <li>AST not observed</li> </ul>	No action necessary
Lead	<ul style="list-style-type: none"> <li>Elemental lead assumed to be present in seals on bell and spigot piping joints seals, solder on wiring, electrical equipment, roof exhaust venting and flashing, and copper pipe joints.</li> </ul>	See Section 4
Hantavirus – Rodent Droppings	<ul style="list-style-type: none"> <li>Evidence of rodent presence observed</li> </ul>	See Section 4
Silica	<ul style="list-style-type: none"> <li>Silica may be present in concrete, cement, mortar, and any other cementitious building materials.</li> </ul>	See Section 4
Mould	<ul style="list-style-type: none"> <li>Mould was not observed</li> </ul>	No action necessary
Flammables/Explosive Materials	<ul style="list-style-type: none"> <li>Gasoline cans, paint, paint thinners, compressed gases etc. were observed</li> </ul>	See Section 4

Where hazardous materials were found they can be presumed to be found in similar materials throughout the building.

**\*Warning:** in the event any additional suspect hazardous materials are encountered during renovation or demolition activities, work on those materials must STOP immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material. If any material suspected of containing asbestos or another hazardous material is disturbed during the work, all work shall STOP until the area is contained, the hazard evaluated by a qualified professional and the hazardous materials, if indeed present, is safely managed by a qualified contractor.

#### Limitations

Following conditions/materials were not included in this assessment:

- Radon testing is not included in the scope of this project.
- Underground systems and personal contents were not assessed for hazardous materials.
- A Stage I Environmental Site Assessment is beyond the scope of this project.
- Personal and/or occupant contents were not assessed.
- Based on the age of the building, all coatings are assumed to contain lead; until test results prove otherwise
- Leachate analysis was not conducted of lead-containing paint.

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## 1 INTRODUCTION

North West Environmental Group Ltd. (NWest) conducted a project-specific hazardous materials assessment of the Port Hardy Airport Sand Shed located at 3675 Byng Road in Port Hardy BC in accordance with WorkSafeBC regulatory requirements outlined in the BC Occupational Health and Safety Regulation Section 20.112 – Hazardous Materials. The assessment was conducted by Marianne Farrell on November 10, 2015. This is a project-specific assessment intended to identify building materials and equipment containing hazardous materials that may be impacted by the renovation or demolition work planned for the building. The scope of the assessment was limited to areas impacted by proposed work identified to NWest by the client.

WorkSafeBC Regulations require that all hazardous materials including asbestos be removed prior to demolition or protected from damage prior to the commencement of construction and/or demolition/renovation work. Removal or disturbance of hazardous materials must be undertaken by a qualified contractor employing WorkSafeBC approved procedures. If materials are encountered during deconstruction that differ from, or are in addition to those described in this report, then work must stop until the material content can be determined and appropriate precautionary measures employed to protect workers and others at or near the worksite.

## 2 SITE CONDITION AND SCOPE OF WORK

Age of Construction	1940's
Number of Storeys	1
Foundation	Concrete
Structural Frame	Wood Post Frame
Exterior Finishes	Metal Cladding
Insulation	Mineral fibre (Fibreglass-type) in northwest room
Structural Floor	Wood deck Mezzanine
Roofing	Metal Cladding reportedly installed in 2015
Interior Finishes	None in the main area of the building Plywood panelling in northwest room.
Heating and Ventilation	None
Electrical and Lighting	Wired outlets
Fire Protection	None

The area assessed included the accessible areas of the entire structure.

### 2.1 Limitations

As per WorkSafeBC requirements all accessible areas of this building in the assessment area were visually assessed for the presence of asbestos-containing materials, mould, lead, radioactive sources, ozone depleting substances, mercury, flammables and explosives, PCBs and above-ground fuel storage tanks.

Invasive investigative techniques were used to assess concealed materials in select areas.

Following conditions/materials were not included in this assessment:

- Radon testing is not included in the scope of this project.
- Underground systems and personal contents were not assessed for hazardous materials.

- A Stage I Environmental Site Assessment is beyond the scope of this project.
- Based on the age of the building, all coatings are assumed to contain lead; until further testing proves otherwise
- Leachate analysis was not conducted of lead-containing paint.

Hazardous materials may be present at the subject site that were not visible, accessible or available for inspection during the assessment and are therefore not described in this report.

### 3 FINDINGS

Refer to Section 4.0 for handling and disposal recommendations relating to the findings in this report. Photographs of representative materials are located in Appendix A. Copies of the analytical laboratory reports are provided in Appendix B. Drawings outlining sample locations are included Appendix C, and regulatory criteria for hazardous materials handling and disposal are found in Appendix 5.

#### 3.1 Polychlorinated Biphenyls (PCB)

Fluorescent light fixtures were observed in the building during the assessment. Based on the age of construction, PCB-containing light ballasts are likely to be present.

#### 3.2 Asbestos

##### 3.2.1 Bulk Samples

All accessible areas of the building that could be disturbed by planned work were inspected for building materials suspected of containing asbestos. Bulk samples of building materials were collected in accordance with WorkSafeBC requirements and analyzed to determine the type and approximate content of asbestos.

The following table summarizes the analytical results of samples collected during this assessment which were found to be asbestos-containing. All visually similar materials throughout the building must be considered to be asbestos containing.

See Appendix B for a complete list of materials analyzed for asbestos content. See Appendix C for a site plan showing sample locations.

Table 3-1: Asbestos Containing Materials

Sample Numbers	Location	Materials	Percentage and Type of Asbestos	Estimated Quantities
27384-4	West Exterior on the Ground	Mastic Debris	8% Chrysotile	Unknown

*\*Estimated Quantity is an estimate of observable asbestos-containing materials. Concealed or otherwise inaccessible materials may not have been included in this estimate.*

*Note 1: In the event that suspected hazardous materials are encountered during demolition activities, work on those materials must STOP immediately and the materials must remain undisturbed until testing determines their status. In the event that the materials have been damaged or otherwise impacted, all work shall STOP until appropriate controls can be put in place to protect workers and the public.*

### 3.3 Mercury

Mercury-containing fluorescent light tubes and/or compact fluorescent light (CFL) bulbs were observed within the building.

### 3.4 Ozone-depleting Substances (CFCs/ODS)

Equipment that may use chlorofluorocarbons (CFCs) or ozone-depleting substances (ODS) was not observed in the building.

### 3.5 Radioactive Materials

Smoke detectors containing sealed 241Americium sources were not observed in the building.

Radon was not tested for as it was beyond the scope of this project.

### 3.6 Aboveground Storage Tanks

No aboveground tanks were observed near the area of the site where the planned work will be undertaken.

### 3.7 Lead

#### 3.7.1 Lead Paint

None of the paint samples collected were found to be lead based.

The following table summarizes the lead content found in paint chips sampled during the assessment.

Table 3-2: Lead Containing Coatings

Sample #	Location	Lead Concentration % by Weight	Lead Concentration mg/kg
<b>Surface Coating Materials Regulation Threshold</b>		<b>0.009</b>	<b>90</b>
27384-13	Exterior Grey	<0.0057	<57
27384-14	Interior Beige	<0.0077	<77
27384-14	West Exterior Paint Debris Grey	<0.0055	<55

#### 3.7.2 Elemental Lead

Sources of elemental lead may be present in the way of planned work in the form of:

- Exhaust vents and flashing on roof
- Caulk in bell and spigot cast iron pipes
- Electrical solder
- Copper pipe solder

Lead within the copper water pipes/fittings was not tested for lead content however lead content in solder, especially from buildings of this vintage, is known to reach levels up to 98% lead.



### 3.8 Hantavirus – Rodent Droppings

Visual evidence of rodent presence was observed in the building.

### 3.9 Silica

All concrete, cement, mortar, drywall, plaster, ceramic tiles, stucco and any other cementitious building materials are suspected of containing silica in crystalline and non-crystalline forms.

### 3.10 Mould

Mould was not observed in the building.

### 3.11 FLAMMABLES AND EXPLOSIVES

Flammables and explosives were noted in the building and include:

- Paints and associated products
- Gasoline cans

Personal items were not assessed.

## 4 RECOMMENDATIONS

Based on the findings, the recommendations are:

1. **Asbestos** containing mastic debris is present on the ground on the west exterior of the building. Limit access of unprotected workers to this area until the debris is abated.
2. Provide copies of this report to site personnel, including contractors. A copy of the assessment must be immediately available at the site whenever workers are present. Site personnel need to have read and understood the content of this report prior to commencement of any work which may disturb building materials and contents.
3. The contractor shall have an exposure control plan in place for each hazardous substance identified in this report as being in way of the planned work.
4. Work must STOP if previously unidentified suspected hazardous materials are encountered during renovations and/or demolition activities. These suspect materials must be left undisturbed until testing determines their status. Work must also STOP in the event that these suspect materials have been damaged or otherwise impacted. Contact NWest for further direction.
5. **Polychlorinated biphenyls:** Equipment suspected of containing polychlorinated biphenyls such as fluorescent light fixtures was observed. Prior to disposal the ballast for each unit must be checked to determine if it contains PCB. Ballasts containing PCB must be removed, sorted and transported to a licensed facility.
6. **Asbestos:** Asbestos containing black mastic debris was present on the ground next to the structure on the west side of the building. This material was not observed on the building and may be debris left over from an early renovation. If during renovations black mastic is observed anywhere in the building it should be treated as asbestos containing until further testing proves otherwise.

7. **Asbestos:** All asbestos containing materials with the potential to be impacted by the work must be removed or protected from damage prior to the commencement of construction and/or demolition work. This work, called asbestos abatement, must be undertaken by trained personnel following procedures acceptable to WorkSafeBC which comply with the BC Occupational Health and Safety Regulation and conform to the WorkSafeBC document, "Safe Practices for Handling Asbestos".
8. **Mercury** containing fluorescent light tubes and CFL light bulbs were observed. Care should be taken to avoid releasing mercury vapour by breaking these items.
9. **Elemental Lead** is assumed to be present in materials as outlined in the Findings section above. Lead products and metals coated with lead paint can be recycled as metal construction waste. Workers should exercise caution if heat is to be used to melt any lead found as means of facilitating its extraction. Molten lead can produce significant quantities of inhalable lead fume which can pose a severe health hazard. As per WorkSafeBC regulation 12.115 - "coating on metal which could emit harmful contaminants (such as lead, chromium, organic materials, or toxic combustion products) must be removed from the base metal, whenever practicable, before welding or cutting begins."
10. **Hantavirus:** Visual evidence of rodent presence was observed. The contractor must comply with Section 6 of the BC Occupational Health and Safety Regulations – Biohazards, which involves development of an Exposure Control Plan (ECP) to mitigate or eliminate worker exposure and contraction of Hantavirus. The ECP should include worker instruction on the hazards of Hantavirus and how to eliminate or reduce risk of exposure, including the types of respirators and protective clothing to be worn. Ensure any rodent droppings or nests encountered are cleaned up and in full compliance with WorkSafeBC regulations.
11. **Silica (crystalline):** Safe Work Procedures including the use of adequate personal protective equipment (PPE) must be in place prior to commencing the work. Workers must use caution to avoid creating airborne silica dust while working on, otherwise disturbing or removing concrete, drywall, plaster, ceramic tile, stucco or any other cementitious material. Use wetting techniques and/or HEPA equipped extraction systems attached to drills and other power equipment where
12. **See Appendix D – Regulatory Criteria** for further information regarding the safe handling or management practices for hazardous materials, including flammable and explosive materials.

## 5 CLOSURE

This assessment and assessment report has been prepared exclusively for the client. It is a statement of the presence of the listed hazardous materials as outlined in the report and as observed on the date of this assessment. The conclusions and recommendations contained in this assessment report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with accepted hygiene assessment standards and practices applicable to these locations and are subject to the following inherent limitations:

- The data and findings presented in this report are valid as of the date of the investigation. The passage of time, hidden or inaccessible conditions, manifestation of latent conditions or occurrence of future events may warrant further exploration at the properties, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.
- The data reported and the findings, observations and conclusions expressed in this report are limited by the Scope of Work. The Scope of Work was defined by the request of the client, the time and budgetary constraints imposed by the client, and availability of access to the properties.

Because of the limitations stated above, the findings, observations and conclusions expressed by NWest in this report are not, and should not be, considered an opinion concerning compliance of any past or present owner or operator of the site with any federal, provincial or local laws or regulations.

No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, and conclusions, which are based solely upon site conditions in existence at the time of this assessment.

This report may not be used, relied upon, copied, published, or quoted by any party without the written consent of NWest. Other parties reading this report must independently verify the completeness and accuracy of this report and its contents.

This report is not intended for use as a scope of work for removal or as a specification section for inclusion in Tender Documents. Any unauthorized use of this report in that fashion is at the sole discretion and liability of the Owner.

**North West Environmental Group Ltd.**

Report reviewed by:



Kathy Muirhead, B.Sc. EP (OHS)  
Senior Project Manager  
Qualified person as per OHS Reg 6.1

Report prepared by:



Marianne Farrell, B.Sc.  
Occupational Hygiene Technologist

**Appendix A. PHOTO PLATES**

The following photo plates provide a general documentation of the building materials that were sampled and analyzed during the assessment. It is meant to summarize the results of analysis and observations and is not intended to include all hazardous materials, or their locations, observed during the assessment.



Sample: 27384-1, 27384-2, 27384-3  
Location: West Exterior of the building  
Description: Clear Caulking on Electrical  
Hazardous Material: None Detected







Sample: 27384-4  
Location: West Exterior of the Building  
Description: Mastic Debris  
Hazardous Material: Chrysotile 8%



Sample: 27384-5  
Location: West Exterior of the Building  
Description: Mastic Debris  
Hazardous Material: Chrysotile 8%



Sample: 27384-6  
Location: West Exterior of the Building  
Description: Mastic Debris  
Hazardous Material: Chrysotile 8%

	
<p>Sample: 27384-7 Location: West Exterior of the Building Description: Textured Paint Debris Hazardous Material: No Asbestos Detected</p>	<p>Sample: 27384-8 Location: North Exterior of the Building Description: Textured Paint Hazardous Material: No Asbestos Detected</p>
	
<p>Sample: 27384-9 Location: West Exterior of the Building Description: Textured Paint Hazardous Material: No Asbestos Detected</p>	<p>Sample: 27384-10, 27384-11, 27384-12 Location: Interior East Wall Description: White Mastic Hazardous Material: None Detected</p>

**Appendix B. SAMPLE ANALYSIS REPORT**





Unit 210 - 2950 Douglas Street  
 Victoria, B.C. V8T 4N4  
 Tel: 250-384-9695  
 Fax: 250-384-9865  
 e-mail: northwest@nwest.bc.ca

**Bulk Sample Report**

**Asbestos Analysis of Bulk Materials using Polarized Light Microscopy**

**Client:** Read Jones Christoffersen - Nanaimo  
**Contractor:** Read Jones Christoffersen - Nanaimo  
**Project:** pre-reno HMA Port Hardy Airport Sand Shed  
**Date:** November 18, 2015  
**Client Job or PO#:**  
**Project number:** 27384

Sample No	Location	Date Analysed	Analyst	Description	Phase	%	Asbestos	%	Other Materials	%
27384-1	Exterior West wall	Nov-17-2015	SC	Caulking - Clear	Caulking	100	None Detected	0	Non-Fibrous	100
27384-2	Ext West Wall	Nov-17-2015	SC	Caulking - Clear	Caulking	100	None Detected	0	Non-Fibrous	100
27384-3	Ext West Wall	Nov-17-2015	SC	Caulking - Clear Caulking	Caulking	100	None Detected	0	Non-Fibrous	100
27384-4	Ext on West side of building	Nov-17-2015	SC	Mastic - Debris	Mastic Debris	100	Chrysotile	8	Non-Fibrous (82%) Fibrous (Other) (10%)	92
27384-7	West Side on Ground	Nov-17-2015	SC	Texture Coat - Text Paint	Non Fibrous	100	None Detected	0	Non-Fibrous	100
27384-8	South Side of Building	Nov-17-2015	SC	Texture Coat - Texture Paint	Non-Fibrous	100	None Detected	0	Non-Fibrous	100
27384-9	East Side of Building	Nov-17-2015	SC	Texture Coat - Textured Paint	Non-Fibrous	100	None Detected	0	Non-Fibrous	100
27384-10	Int East Wall	Nov-17-2015	SC	Mastic - White	Mastic	100	None Detected	0	Non-Fibrous (80%) Cellulose (20%)	100
27384-11	Int West Wall	Nov-17-2015	SC	Mastic - White	Mastic	100	None Detected	0	Non-Fibrous (80%) Cellulose (20%)	100
27384-12	Int West Wall	Nov-17-2015	SC	Mastic - White Mastic	Mastic	100	None Detected	0	Non-Fibrous (80%) Cellulose (20%)	100



Note: Samples were analyzed by method: EPA/600/R-93/116" Bulk Asbestos Analysis by Polarized Light Microscopy". For heterogeneous materials the concentration may vary. No reproduction without permission.

## CERTIFICATE OF ANALYSIS

**Client:** North West Environmental Group Ltd.  
2950 Douglas Street; Unit 210  
Victoria BC V8T 4N4

**Report Date:** 11/20/2015  
**Report Number:** 379524  
**Project:** Pre-Reno HMA Port Hardy  
**Project No.:** 27384

### LEAD PAINT SAMPLE ANALYSIS SUMMARY

<u>Lab No.</u>	<u>Client No.</u>	<u>Location / Description</u>	<u>Concentration Lead By Weight (%)</u>
5795670	27384-13	Ext; Ext Grey Paint	<0.0057
5795671	27384-14	Int; Beige Paint	<0.0077 ***
5795672	27384-15	West Side On Ground; Paint Debris	<0.0055

**Accreditations:**

#### NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)

AIHA-LAP, LLC No. 100188

NYSDOH-ELAP No. 11021

**Analytical Methods:** ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"  
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

**Comments:** Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Appendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0044% by weight. RL= 0.010% by weight (based upon 100 mg sampled). \* Insufficient sample provided to perform QC reanalysis (<200 mg) \*\* Not enough sample provided to analyze (<50 mg) \*\*\* Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

**Date Received:** 11/20/2015  
**Date Analyzed:** 11/20/2015  
**Analyst:** C. Shaffer

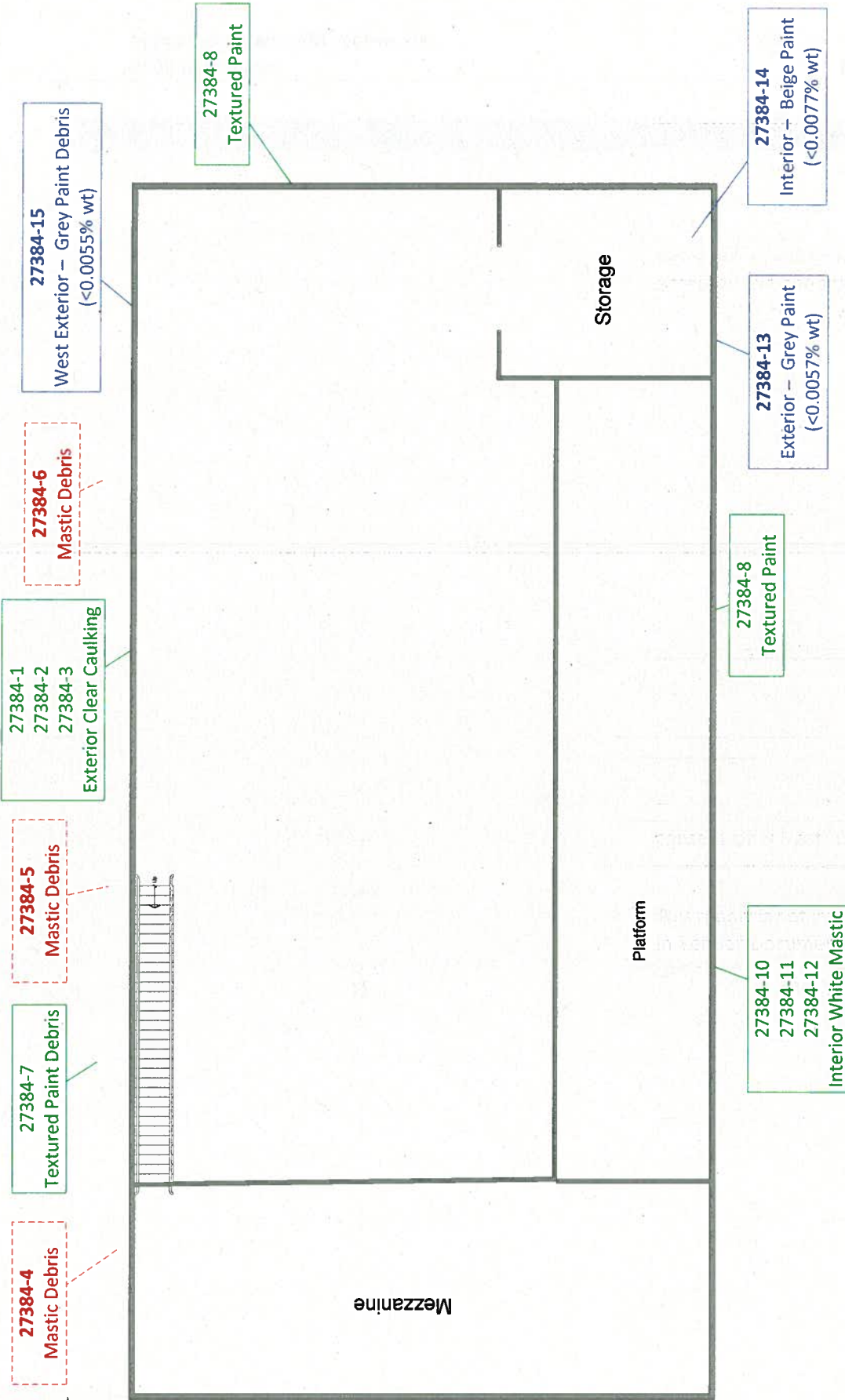
**Approved By:**



Frank E. Ehrenfeld, III  
Laboratory Director



**Appendix C. SAMPLE LOCATIONS**




Drawing Not to Scale

**Sample Result Key**

- 123 No Asbestos Detected
- 123 Lead Based Paint
- 123 Non-Lead Based Paint

**PROJECT NO.:** 26319  
**DATE:** 10/11/2015  
**SURVEYED BY:** MF  
**DRAWING NO.:** 001

**ADDRESS/LOCATION:**  
 3675 Byng Road Port Hardy BC  
 Airport Sand Shed  
**DRAWING TITLE:**  
 Sand Shed



**North West  
Environmental Group Ltd.**

# 1-1611 Bowen Road  
Nanaimo BC, V9G 5G6

## Appendix D. REGULATORY CRITERIA

As per WorkSafeBC requirements, the building was assessed for the presence of several different types of hazardous materials including:

- Polychlorinated biphenyls
- Asbestos
- Mercury
- Ozone Depleting Substances
- Radioactive Materials
- Above or Underground Storage Tanks
- Lead
- Hantavirus – rodent droppings
- Silica
- Mould

### Polychlorinated Biphenyls (PCB)

Polychlorinated biphenyls (PCB) are regulated under both federal (Canadian Environmental Protection Act; PCB Regulations SOR/2008-273) and the BC Ministry of Environment Hazardous Waste Regulation and must be treated as PCB waste and be stored and disposed of accordingly. Energized fluorescent light fixtures were not disassembled to examine ballasts during this assessment.

Each fluorescent light fixture removed during renovation or demolition should have the ballast checked to determine if it contains PCB. Ballasts containing PCB must be removed, sorted and transported to a licensed facility. Although rare, paints have been known to contain PCBs.

### Asbestos

Materials that contain at least 0.5% or more asbestos if tested in accordance with one of the following methods:

- (a)
  - (i) Asbestos, Chrysotile by XRD, Method 9000 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control;
  - (ii) Asbestos (bulk) by PLM, Method 9002 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control;
  - (iii) Test Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116, dated July 1993) published by the United States Environmental Protection Agency;
- (b) vermiculite insulation that would be determined to contain any asbestos if tested in accordance with the Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation (EPA/600/R-04/004, dated January 2004) published by the United States Environmental Protection Agency;

The asbestos-containing material can also be characterized as friable and non-friable. Friable asbestos "means any material which, when dry, can be easily crumbled or powdered by hand pressure, or a material that is crumbled or powdered" as defined under the BC Occupational Health and Safety Regulation. The condition of the asbestos and classifications would be used in assessing the level of action required with respect to re-use of the building.

Worker exposure to asbestos fibres is also regulated by the BC Occupational Health and Safety Regulation. The WorkSafeBC eight-hour time-weighted average (TWA) for asbestos fibres (all forms) is 0.1 fibre/cm<sup>3</sup>. Exposure to these substances must be kept as close to zero as is reasonably practicable.

Bulk samples are collected in accordance with NIOSH Analytical Method 9002 and the WorkSafeBC guideline document, Safe Work Practices for Handling Asbestos.

Asbestos is designated as an ALARA substance; worker exposure to this product must be kept "as low as reasonably achievable" (ALARA). Employers are required under Section 5.54 (Exposure control plan) of the Occupational Health and Safety Regulation (OHSR) to develop an exposure control plan (ECP) when workers are or may be exposed to airborne concentrations of this material in excess of 50% of the exposure limit.

## Mercury

Mercury is a hazardous substance, and any maintenance or abatement involving materials containing mercury or mercury compounds must be done in compliance with the BC Occupational Health and Safety Regulations (BCOHSR).

Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

As a hazardous substance, transportation and disposal of this substance must be done in compliance with the federal Transportation of Dangerous Goods (TDG) Regulations and the BC Hazardous Waste Regulation. Mercury is found in fluorescent light bulbs, thermostats, manometers, and equipment such as electrical switches.

Mercury is designated as an ALARA substance; worker exposure to this product must be kept "as low as reasonably achievable" (ALARA). Employers are required under Section 5.54 (Exposure control plan) of the Occupational Health and Safety Regulation (OHSR) to develop an exposure control plan (ECP) when workers are or may be exposed to airborne concentrations of this material in excess of 50% of the exposure limit.

## Ozone-depleting Substances (CFCs/ODS)

Chlorofluorocarbons (CFCs) are ozone-depleting substances (ODS) and a type of halocarbon. ODS are regulated by the Canadian *Environmental Protection Act* under the Ozone-Depleting Substances Regulations 1998 SOR/99-7 and the Federal Halocarbon Regulations (FHR) SOR/2003-289. Compounds that contain only chlorine, fluorine and carbon are called CFCs. These materials are used in refrigeration systems and in fire suppression systems. The other main refrigerants are hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and blends of fluorocarbons (designated by "R").

While the regulations allow the continued use of halocarbon refrigerants, they strictly prohibit any person from releasing into the environment any halocarbon.



In the case of demolition, these materials will require proper recovery and disposal. The BC Ozone-Depleting Substances Regulations would also apply to any CFC/ODS abatement procedures. These regulations require that all ODS must be collected, stored and recycled, or collected and disposed appropriately by a licensed professional.

A good source for determining if the compound is ozone depleting is found at the following link:  
<http://www.ec.gc.ca/Air/default.asp?lang=En&n=4CA440F8-1>

## Radioactive Materials

Many buildings contain smoke alarms which contain small sealed radioactive sources in the form of <sup>241</sup>Americium. The Canadian Nuclear Safety Commission (CNSC) and the Canadian *Nuclear Safety Act* regulate radioactive materials. These materials are sealed into a metal case within the smoke detector and must not be damaged or tampered with. Smoke detectors intended for disposal must be handled in accordance with CNSC regulations.

Ceramic tiles and some forms of granite sometimes contain radioactive materials. These materials should be checked prior to work being carried out on them to determine if radioactive materials are present.

Radon gas is a by-product of radioactive decay of certain naturally occurring radioactive materials. While Victoria has long been assumed to have low levels, a recent Health Canada nationwide study (March 2012) shows that in the Interior and east of the Coast Mountain Range, anywhere from 5 to 40 per cent of dwellings may have radon levels of more than 200 Bq/m<sup>3</sup>, depending on the community.

<http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/survey-sondage/index-eng.php#a1>

Radon levels vary widely not only from area to area, but even from house to house. A home is more likely to have high radon levels if:

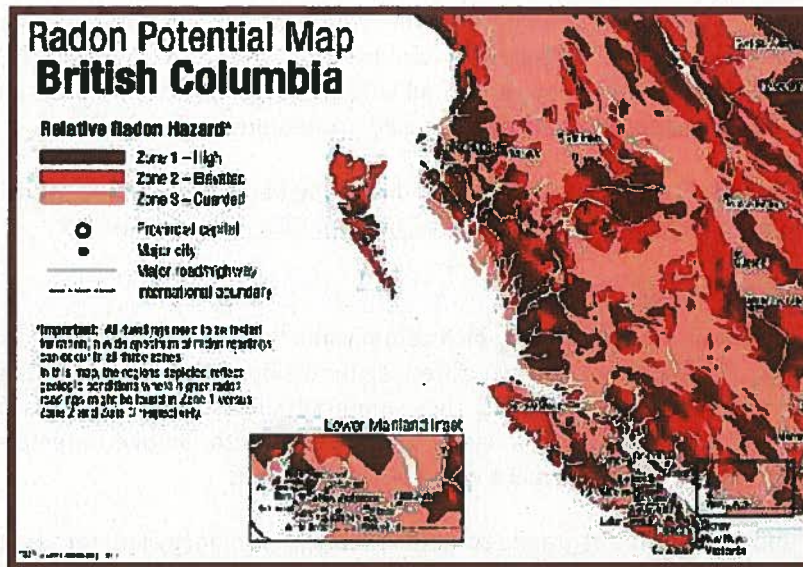
- It is built on dry porous soil.
- It has bare soil in the basement or crawlspace; or the building site was once a riverbed, a glacial outwash, or a slide area.
- There is high natural radioactivity in the area.

Newer dwellings that are tightly sealed tend to have higher radon levels. In homes with more than one floor, radon levels are often about twice as high in the basement as on the main floor.

The only way to establish the concentration of radon gas is to have it tested. The BC Centre for Disease Control (BCCDC) and Health Canada recommend that B.C. residents are encouraged to have their homes tested, especially those homes that are in the interior of the province.

New construction and renovations should meet requirements of the BC Building Code.

**Figure 5-1: Radon Concentrations and Terrestrial Background Radiation in British Columbia**



Radon Potential Map extract from Radon Corp (under copyright)

## Aboveground / Underground Storage Tanks

Storage tanks containing fuels have the ability to leak over time and can result in soil and groundwater contamination. These tanks must be observed and checked over time to ensure they do not leak. Evidence of leaks must be investigated and any potential contamination remediated. The Canadian Council of Ministers of the Environment (CCME) publishes a Code of Practice for the safe management of aboveground and underground storage tanks.

## Lead

Defined by the federal Ministry of Health, under the Hazardous Products Act, as a paint or other similar material that dries to a solid film that contains over 90 mg/kg (0.009%) dry weight of lead.

The Consumer Product Safety Act, Surface Coating Materials Regulation (SOR/2005-109) (SCMR) permits the advertising, sale and labeling of surface coatings (including paint) that meet the following criteria set out below. Quantities of lead and mercury are specifically limited. Other heavy metals are not addressed in this regulation.

Paints often contain heavy metals as pigments and/or preservatives. Under specific circumstances, persons may be exposed to these metals by ingestion, skin absorption and/or inhalation.

Most buildings built before 1950 have had lead-based paint applied to the interior or exterior surfaces, often up to 40% lead by weight. Paints made between 1950 and till present day usually contained smaller amounts of lead but can still pose risks to workers when disturbed.

There has been confusion in the past regarding the limits for lead and other heavy metals in paint and how that relates to worker safety and disposal. An explanation of the SCMR limits for paint and mercury are included in this report to help alleviate this confusion. Although a given paint sample may have concentrations of lead and mercury lower than the limits specified within the

SCMR, worker exposure may still occur if sufficient quantities of lead and/or mercury are inhaled, ingested or absorbed through the skin. The risk to workers posed by heavy metal containing coatings is proportional to the work undertaken. Heavy metal laden coatings that are not disturbed pose little risk to non-pre-school aged building occupants.

Other than during the application process, the primary mechanism of exposure for workers would be the inhalation of dusts through activities such as sanding, scraping, drilling, crushing, heating, burning or other processes likely to damage the coatings themselves. Paints containing heavy metals pose little risk to workers when in good condition and when undisturbed.

In 2005 the federal Surface Coating Materials Regulation was amended to reduce this threshold from 5,000 mg/kg to 600 mg/kg and then to 90 mg/kg in 2010. As paints under this concentration of lead are acceptable for use in residential settings today, such coatings do not pose a significant hazardous material issue unless rendered airborne within a worker's breathing zone by fine dust generating processes. Mercury is also limited to a level of 10 mg/kg. If a worker is, or may be, exposed to potentially harmful levels of lead, the employer must ensure that a risk assessment is conducted by a qualified person. Where a worker may be exposed to airborne lead concentrations in excess of 50% of the exposure limit of 0.05 mg/m<sup>3</sup> or where exposure through any route of entry could cause elevated blood levels, the employer must develop and implement an exposure control plan (ECP) which meets the requirements of section 5.54 of the BC Occupational Health and Safety Regulation. As an ALARA substance, worker exposure must be kept as low as reasonably achievable.

**Table 5-1: ACGIH / WorkSafeBC Exposure Limits**

Substance [CAS No.]	TWA
Lead - elemental and inorganic compounds, as Pb [7439-92-1]	0.05 mg/m <sup>3</sup>

Appropriate precautions for protecting workers from lead exposure should be implemented during any work involving lead or lead paint including the use of personal protective equipment, localized ventilation and/or dust suppression methods.

Toxicity Characteristic Leaching Procedure (TCLP) testing of positively identified lead paint applications is typically required to determine if the painted applications are classified as a hazardous waste as outlined in the Ministry of Environment's Hazardous Waste Regulation.

Note that lead residue on "cleaned" structural steel (from which lead-containing coatings have been removed) should not exceed 40 ug/sf prior to welding, cutting or burning.

**Table 5-2: Recommended lead clearance criteria for surfaces**

	Floor	Sill/ledge	Trough
Residences, schools, daycare centres, and other public buildings	0.43 mg/m <sup>2</sup> (40 µg/ft <sup>2</sup> )	2.7 mg/m <sup>2</sup> (250 µg/ft <sup>2</sup> )	4.3 mg/m <sup>2</sup> (400 µg/ft <sup>2</sup> )
Commercial buildings, including retail stores, offices (administrative), and laboratories (other than lead assay laboratories)	2.2 mg/m <sup>2</sup> (200 µg/ft <sup>2</sup> )	5.4 mg/m <sup>2</sup> (500 µg/ft <sup>2</sup> )	8.6 mg/m <sup>2</sup> (800 µg/ft <sup>2</sup> )

Reference: WorkSafeBC, Lead-Containing Paints and Coatings – Preventing Exposure in the Construction Industry, 2011

### **Hantavirus – Rodent Droppings**

The Hantavirus is a virus associated with Hantavirus Pulmonary Syndrome, a disease caught through contact with the urine or droppings, or by being bitten or scratched by infected rodents. The disease starts off like a cold or flu (fever, sore muscles, headaches, nausea, vomiting), but progresses to pneumonia-like conditions within a few days. The change in intensity of the symptoms is very rapid and can result in fluid build-up in the lungs and respiratory failure.

Possible exposure to Hantavirus is regulated under the BC Occupational Health and Safety Regulation. Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

### **Silica**

Silica is a hazardous substance and as such is regulated under the BC Occupational Health and Safety Regulation. Airborne exposure criteria, respirator requirements and mandatory worker testing requirements are also outlined under this regulation. As with all other designated substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

Crystalline silica dust can cause a disabling, sometimes fatal disease called silicosis. The fine particles are deposited in the lungs, causing thickening and scarring of the lung tissue. The scar tissue restricts the lungs' ability to extract oxygen from the air. This damage is permanent, but symptoms of the disease may not appear for many years.

Employers have a duty to protect their workers from silica dust exposure on construction projects. Studies show that when common construction work tasks involving the sanding, drilling, chipping, grinding, cutting, sawing, sweeping, and blasting of concrete and concrete products are conducted without using dust controls, workers are exposed to airborne silica concentrations at levels far above the occupational exposure limits.

Crystalline silica is an ALARA substance; worker exposure to this product must be kept "as low as reasonably achievable" (ALARA). Employers are required under Section 5.54 (Exposure control plan) of the Occupational Health and Safety Regulation (OHSR) to develop an exposure control plan (ECP) when workers are or may be exposed to airborne concentrations of these materials in excess of 50% of the exposure limit.





## Mould

Within the BC Occupational Health and Safety Regulations, there are no established permissible exposure levels for mould spores in air. This means that there are no published concentrations above which worker exposure is deemed to be hazardous and under which workers would not need respiratory protection. WorkSafeBC does, however, provide guidance on protocols for protecting workers from the hazards of airborne mould and bacteria within the section(s) of the Regulation guidelines addressing Indoor Air Quality.

Other guidelines for addressing mould in Canada include:

- The Canadian Construction Association document, "Mould Guidelines for the Canadian Construction Industry," CCA82-2004.
- The Institute of Inspection, Cleaning and Restoration and Certification (IICRC) standard S500 governing both water damage restoration and entitled: Standard for Professional Water Damage Restoration – S500. This document is approved by the American National Standards Institute (ANSI)
- Health Canada: Fungal contamination in public buildings: A guide to recognition and management, 1995
- Health Canada. Fungal Contamination in Public Buildings: Health Effects and Investigation Methods, 2004

These guidelines also state that any non-porous (metal, glass and hard plastics) and semi-porous (wood and concrete) materials that are structurally sound and visibly mouldy can be cleaned and re-used. However, porous materials such as ceiling tiles, wallpaper, insulation, drywall, and carpets with more than a small area of contamination, should be removed and discarded.

## Flammables and Explosives

WorkSafeBC regulates Flammable and Combustible Substances and Substances Under Pressure according to the BC Occupational Health and Safety Regulations: Part 5 Chemical Agents and Biological Agents. Sections 5.27 to 5.47 include criteria for condition, handling and storage of these materials. Please contact NWest for detailed information regarding specific substances.

## Appendix E. METHODOLOGY

As per WorkSafeBC requirements, the buildings/areas were assessed for the presence of several different types of hazardous materials. Sampling and analysis methodologies are detailed below.

If samples for hazardous contents are not indicated above, the Client may assume they were not collected and/or analyzed.

### Asbestos

The asbestos assessment methodology and sampling procedure are outlined in the following sections.

#### Assessment

This assessment was designed to determine the type and extent of asbestos containing material (ACM) presence within the subject site. The assessment is normally non-destructive, however, even with the most invasive assessment techniques the possibility remains for other concealed materials to be found during the demolition process.

Specific building material components were examined within the building and include, where applicable:

- Structural – all visible structural components including walls, roofs (invasive sampling may have been conducted) and supporting members,
- Mechanical systems – insulation, domestic hot and cold water, and caulks.
- Architectural systems including – texture coats, sheet flooring, vinyl floor tile, ceiling tile, wall board, drywall joint compound, sheet products.

Roofing core samples may have been collected with a roofing contractor on site to make good any damage made during sampling.

#### Bulk Sampling Procedures

Sampling procedures for various building materials vary somewhat depending on the exact conditions at each sample location. In all cases standardized protocols are used for collecting samples for asbestos analysis. All accessible suspect materials that were visually unique were sampled. Visually similar materials were only sampled once unless known to be heterogeneous such as drywall joint compound.

Where materials were observed that were suspected of containing asbestos, representative samples were collected. Where practicable, sample volumes were minimized to avoid unnecessary damage to building systems.

Sampled materials were cut down to the base substrate to ensure that a representative sample was collected. Samples were sent to an accredited laboratory and analysed following the EPA/600/R-93/116 method for analysis of asbestos in bulk materials by polarized light microscopy.

### Lead

#### Paint Bulk Sampling Procedures

Painted surfaces were scraped to the base substrate to ensure that all layers of paint were included. Paint samples were tested using one or more of the following methods:

1. EMSL (SW-846-7420) Lead in Paint Chips by Flame Atomic Absorption Spectrophotometer,
2. EMSL (SW-846-6010) Inductively Coupled Plasma-Atomic Emission Spectrometry, and/or
3. EMSL (SW-846-1311/7420) Toxicity Characteristic Leaching Procedure.

### Elemental Lead Assessment

The subject site was inspected for the presence of materials containing elemental lead. These materials were documented so that they can be removed prior to demolition activities. Samples were not collected.

### **Polychlorinated Biphenyls (PCB)**

#### PCB-Containing Electrical Equipment

The subject site was visually assessed for the presence of polychlorinated biphenyls (PCBs) in electrical equipment such as fluorescent light ballasts. An in-depth review of each ballast is to be reserved for the deconstruction. Dismantling of in-service electrical equipment to observe individual ballasts was not feasible due to risk of electric shock and damage to the operating fixtures.

#### PCB-Containing Materials

Paints were not tested for PCB-content as testing was beyond the scope of this assessment.

### **Ozone Depleting Substances (CFCs/ODS)**

The subject site was inspected for the presence of devices that are known or suspected of containing to contain Ozone Depleting Substances (ODS) or other halocarbons. Devices that contain ODS include refrigeration and air conditioning equipment. Devices suspected of containing these materials were documented so that the refrigerant gases may be removed prior to demolition or disposal of the equipment.

Labeling on the equipment will describe the type of refrigerant gases stored utilized within its compressor(s). In-use units were not opened to access labels.

### **Mercury-Containing Equipment**

The subject site was inspected for the presence of mercury containing equipment. Devices suspected of containing mercury were documented so they can be removed prior to demolition. These devices typically include fluorescent light tubes, high efficiency light bulbs, thermostats, and manometers.

### **Radioactive Materials**

Where observed, radioactive sources such as smoke detectors were noted by the NWest technicians. Testing for radioactive materials was outside the scope of this assessment.

### **Silica**

Testing for crystalline silica in dust was not completed/conducted as part of this assessment however it is known to be a component of concrete, plaster, ceramic tile and stucco.

Observations were made on site to determine the presence of potential silica-containing materials.

### **Mould**

Observations were made to identify the presence of mould and water damage within the subject site along with any obvious indoor air quality issues. Non-invasive or invasive investigation techniques were used, depending on the agreement with the Client.

### **Hantavirus – Evidence of Rodent Presence**

Visual inspections were conducted for evidence of rodent presence including, droppings, nests, damage, carcasses, traps and tracks.

### **Flammable and/or Explosive Materials**

Visual inspections were conducted for the presence of materials that may contain flammable and/or explosive contents. These typically include old drums, Jerry cans, cylinders with compressed contents and miscellaneous vessels. An assessment of the contents, if present, was beyond the scope of this project.

End of report.

