



Public Works and
Government Services Canada

Requisition Number: EZ899-181568/A

MERX I.D. Number: _____

SPECIFICATIONS for:

NRCAN – Header House Roof Replacement
506 West Burnside Road,
Victoria, BC, V8Z 4N9

Project Number: R.086545.001

APPROVED BY:

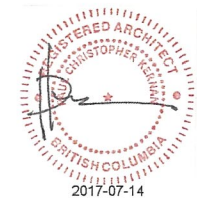
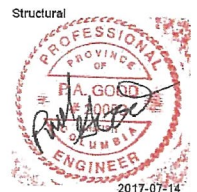
[Signature] 01/2017 Jun 19/2017
Regional Manager, AES Date

[Signature] 2017-07-18
Construction Safety Coordinator Date

TENDER:

[Signature] 2017-07-19
Project Manager Date

	Cover		1
Division 00 – Procurement and Contracting Requirements			
00 01 10	Table of Contents and List of Drawings		2
Division 01 – General Requirements			
01 11 55	General Instructions		12
01 31 19	Project Meetings		2
01 33 00	Submittal Procedures		9
01 35 33	Health & Safety Requirements		10
01 35 43	Environmental Procedures		4
01 41 00	Regulatory Requirements		1
01 45 00	Quality Control		3
01 51 00	Temporary Utilities		2
01 52 00	Construction Facilities		3
01 56 00	Temporary Barriers & Enclosures		2
01 61 00	Common Product Requirements		4
01 73 00	Execution		2
01 74 11	Cleaning		2
01 74 21	Construction, Demolition Waste Management & Disposal		2
01 77 00	Closeout Procedures		1
01 78 00	Closeout Submittals		4
Division 02 – Existing Conditions			
02 41 99	Demolition for Minor Works		2
02 81 01	Hazardous Materials Use & Abatement		7
Division 03 – Concrete			
03 30 53	Miscellaneous Cast-In-Place Concrete		7
Division 05 – Metals			
05 50 00	Metal Fabrications		4
Division 06 – Wood, Plastics and Composites			
06 05 73	Wood Treatment		3
06 10 00	Rough Carpentry		6
Division 07 – Thermal and Moisture Protection			
07 13 52	Conventional SBS Waterproofing		13
07 27 13	Modified Bituminous Sheet Air Barriers		4
07 62 00	Sheet Metal Flashing and Trim		5
07 72 00	Roof Accessories		4



Appendix 1

Stantec Consulting Ltd. – Project-Specific Hazardous Building Materials Assessment – Site Review Report – Header House Roof at Pacific Forestry Centre, Victoria British Columbia, Issued: July 13, 2017. 19

Appendix 2

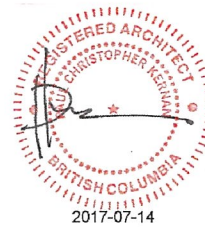
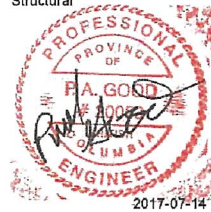
Public Works and Government Services Canada – Preconstruction Assessment Form (PAF)/Preliminary Hazard Assessment Form, Issued: June 15, 2017. 3

List of Drawings, Schedules and Details (Prepared by RDH Building Science Inc., Issued for Tender, July 14, 2017)

General Arrangement Drawings (24" x 36")

- BE0.0 Cover Sheet
- BE1.0 Site Plan
- BE1.1 Roof Plan & Assembly Schedule
- BE1.2 Photo References
- BE1.3 Details
- BE1.4 Details

Structural



1 GENERAL

1.1 WORK DESCRIBED BY CONTRACT DOCUMENTS

- .1 The work of the Contract comprises the replacement of the low-slope membrane roof assembly at the Header House building of the Pacific Forestry Centre complex located at 506 West Burnside Road, Victoria, BC.
- .2 Work to be performed under this Contract includes the following items covered further in the Contract documents:
 - .1 Temporary hoarding: Erect hoarding and weather protection as required, in order to facilitate continuous work during inclement weather.
 - .1 Tarping and/or shrink-wrap be fixed to the hoarding over each roof section and the hoarding anchorage is designed to resist all wind loads. Costs associated with shop drawings and engineering for any hoarding and weather protection are to be borne by the Contractor.
 - .2 Temporary facilities: Contractor is to provide site office, site storage of materials, temporary toilets. Contractor may locate temporary facilities in parking lot of the Header House site.
 - .3 Review of testing reports provided with the Contract documents. Contractor to refer to Hazardous Materials Report to determine the required level of hazardous materials abatement required and appropriate safe work procedures.
 - .4 Contractor is to make all submittals as described in the Contract Documents and ensure project schedules are submitted and accepted at project start-up.
 - .5 Clearly identify the value of the work of each work item as a percentage of the total project value and break each area into tasks, attaching the value of the work to each task as a percentage of total project value for the purpose of evaluating applications for payments and change orders. Submit these completed schedules prior to commencing with the work.
 - .6 Supply for distribution a minimum of every 2 weeks a written description of the project status and specific information about the work that will affect operations at the Pacific Forestry Centre.
 - .7 **Low-slope membrane roof assembly replacement:**
 - .1 Protect adjoining assemblies not included in the scope of work.
 - .2 Remove and dispose of existing metal cap flashings, low-slope roof membrane and accessories at the Header House.
 - .3 Reconstruct roof parapets to facilitate installation of a new thicker conventional SBS roof assembly. Framing work includes (but is not limited to) parapet pressure treated stud framing, parapet pressure treated sheathing, and

- pressure treated plywood coping to facilitate metal cap flashing sloping.
- .4 Remove existing roof drains at identified targeted locations, cap existing drain pipes as necessary. Includes associated sheathing installation prior to installation of SBS membrane for continuous membrane support. Refer to sheet BE1.1 – Roof Plan for locations.
 - .1 Remove and discard abandoned rainwater leaders following removal of identified roof drains. Locally repair brick masonry cladding at locations where rainwater leaders penetrate brick masonry cladding. Brick and mortar to match size, type and colour as adjacent wall area.
 - .5 Install new 12.5mm (1/2") plywood roof sheathing on top of the existing plywood roof sheathing.
 - .1 Prior to the installation of any roof membrane components, the new 12.5mm (1/2") plywood roof sheathing installed on top of the existing plywood is to be reviewed for approval by the Departmental Representative. New plywood roof sheathing is not to be concealed by roofing until the substrate is approved by the Departmental Representative. Any cost associated with demolition of new roof membrane components to expose the substrate for review by the Departmental Representative shall be borne by the Contractor.
 - .6 Prepare new plywood substrate in accordance with SBS waterproof membrane manufacturer recommendations and technical specifications.
 - .7 Install self-adhesive SBS base sheet vapour and air barrier ply. Extend a minimum of 38mm (1-1/2") above insulation height. Vapour and air barrier ply is intended to serve as temporary roof. All penetrations are to be sealed to a water tight status.
 - .8 Install tapered EPS insulation and continuous mineral fiber insulation into adhesive ribbons at 150mm (6") o/c. Ensure all board joints are staggered to eliminate thermal bridging.
 - .9 Install torch-applied SBS base ply.
 - .10 Install new roof drain assemblies, scupper drains, overflow scuppers and stripping plies. Prior to cap sheet installation all roof areas are to be covered with water in order to confirm positive slope to drain. Notify the Departmental Representative if significant ponding water exists after water testing.
 - .1 Install spray foam insulation air barrier tie-ins as indicated in construction details at penetrations and interface details.
 - .2 Allow for installation of new interior access panel and associated repairs of interior finishes at location of new roof drain.

- .3 Allow for repairs of interior finishes at existing exploratory ceiling openings.
- .11 Install SBS cap sheet and stripping plies.
- .12 Install prefinished metal skirt flashings and metal cap flashings at perimeter parapets.
- .13 Install sealant.
- .14 Install non-penetrating guardrail system and accessories at areas adjacent to rooftop mechanical equipment located within 1828mm (6') of the roof edge.
- .15 Install walk through type fixed access ladder complete with lockable climb guard at base of ladder, refer to BE1.1 – Roof Plan for location.

1.2 TIME OF COMPLETION

- .1 The work of this contract is to be completed within six (6) weeks of contract award.

1.3 WORK RESTRICTIONS

- .1 Access and Egress:
 - .1 Design, construction and maintain temporary "access to" and "egress" from work areas, including stairs or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.
- .2 Use of Site and Facilities:
 - .1 The Header House is an operational site within the Pacific Forestry Centre complex. All activities and security controls must remain operational at all times unless otherwise indicated. Coordinate with the Departmental Representative for all activities that impact on-going operations.
 - .2 Work is to be executed with least possible interference or disturbance to the normal use of the site. Make arrangements with Departmental Representative to facilitate work as stated.
 - .3 Where security is reduced by work, provide temporary means to maintain security as approved by Departmental Representative.
 - .4 Closures: protect work temporarily until permanent enclosures are completed.
 - .5 Work restrictions and security provisions will be enforced.
 - .6 Assume responsibility for assigned premises for laydown and storage areas as established at the project start-up meeting and for performance of this work.
- .3 Do not unreasonably encumber site with material or equipment.
- .4 Maintain temporary hoarding and weather protection throughout duration of work.
- .5 Maintain existing services and provide for personnel, visitor and vehicle access.

- .6 Where security is reduced by work, provide temporary means to maintain security. Review measures with Departmental Representative before proceeding.
- .7 Any works which impacts the operations on site must have one (1) week notice and must be approved by Departmental Representative. Five (5) visitor parking passes, valid for duration of work will be allocated to the Contractor for the visitor's parking lot. Additional parking will be permitted where directed by Departmental Representative. Do not occupy other parking areas without the approval of the Departmental Representative.
- .8 Hours of Work:
 - .1 Carry out work during "regular hours", 7:30am to 4:00pm PST, Monday to Friday. If work is required outside of regular work hours, a minimum of 24 hours notice is to be provided to the Departmental Representative.
 - .2 Delivery of materials is not permitted on Saturdays, Sundays and statutory holidays.
- .9 Special Requirements:
 - .1 All Contractors are required to sign in with the Pacific Forestry Centre upon arrival at the site and sign out when leaving the site.
 - .2 Delivery and removal of construction bins to occur during regular working hours.
 - .3 Security cameras to remain operational. Cameras requiring temporary relocation to be serviced as directed by Departmental Representative.
 - .4 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
 - .5 Keep within limits of work and avenues of ingress and egress. Respect properties adjacent to work site, providing continued access for public vehicular and pedestrian traffic.
 - .6 Noise generation: means and procedures of controlling and isolating other excessive or disturbing noise and vibration affecting occupied areas shall be the responsibility of the Contractor and approved by the Departmental Representative.
- .10 Building Smoking Environment:
 - .1 Comply with smoking restrictions. Smoking is not permitted on the site.

1.4 MINIMUM STANDARDS

- .1 Work to conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2010 (NBC) and applicable Provincial and Municipal codes. In the case of conflict or discrepancy, the most stringent requirement applies.
- .2 Work must be carried out in conformance to WorkSafe BC safety standards and requirements.
- .3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.

1.5 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. Drawings have been prepared in colour for clarity purposes and are intended to be printed in colour. Contractor is responsible for any misinterpretations caused as a result of printing in black and white.

1.6 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 one 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.

1.7 TAXES

- .1 Pay all taxes properly levied by law (including Federal, Provincial and Municipal).

1.8 REGULATORY
REQUIREMENTS

- .1 Building Permit is not required. Obtain and pay for - Certificates, Licenses and other permits 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.

1.9 PROJECT
MEETINGS

- .1 Within ten (10) days after award of Contract, the Contractor will schedule a project start-up meeting in accordance with 01 31 19 – Project Meetings.
 - .1 Contractor is to provide the agenda for the project start-up meeting. Refer to 01 31 19 – Project Meetings for start-up meeting agenda items.
 - .2 Subsequent meetings will be held in conformance with 01 31 19 – Project Meetings.

1.10 SECURITY

- .1 For Contractor access to building interior and for contractor access to exterior work after 16:30 hours, coordinate with and pay for the

services of a commissionaire from the BC Commissionaires from the time of beginning work on site until substantial completion of the work. The contractor shall provide the Departmental Representative with an estimate of the total cost for that requirement after contract award at which time the Departmental Representative will then contract directly with Commissionaires BC for that work and pay for those costs directly accordingly since they will not work directly for the contractor. Upon completion of the contract work, a change order credit will be issued for the full cost of the Commissionaires so the contractor shall allow for that cost in their contract pricing. Contractor can refer to the following web site as a reference: <http://www.commissionaires.bc.ca>

- .2 Provide required service for any security to contractor's forces for further works to be done between substantial and final completion.
- .3 Be accountable for tools/equipment at all times. Do not leave tools unattended and/or within reach of the travelling public.
- .4 Act professionally at all times. No foul language or rude behavior.
- .5 Do not interact with the public, unless authorized to do so where required.

1.11 NON SMOKING ENVIRONMENT

- .1 Smoking is not permitted on site.

1.12 WORK SCHEDULE

- .1 Provide detailed project schedule (Gantt Bar Chart) within 5 working days of Award of Contract date showing activity sequencing, interdependencies and duration estimates. Include listed activities as follows:
 - .1 Shop drawings.
 - .2 Samples.
 - .3 Approvals.
 - .4 Procurement.
 - .5 Construction.
 - .6 Installation.
 - .7 Site works.
 - .8 Testing.
 - .9 Acceptance.
- .2 Do not change approved schedule without notifying and receiving approval from Departmental Representative.
- .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.
- .4 Schedule Work in consultation with Departmental Representative to minimize impact on public use of facility during operating hours.

1.13 COST BREAKDOWN

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

1.14 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy of each document as follows:
 - .1 Contract Drawings.
 - .2 Contract Specifications.
 - .3 Addenda to Contract Documents.
 - .4 Copy of approved work schedule.
 - .5 Environmental Protection Plan.
 - .6 Reviewed and approved Shop Drawings.
 - .7 List of Outstanding Shop Drawings.
 - .8 Change Orders.
 - .9 Other Modifications to Contract.
 - .10 Field Test Reports.
 - .11 Reviewed and approved samples.
 - .12 Copy of Approved Work Schedule.
 - .13 Manufacturer's installation and application instructions.
 - .14 National Building Code, 2010.
 - .15 Health and Safety Plan and Other Safety Related Documents.
 - .16 Other documents as specified.

1.15 HEALTH, SAFETY AND HAZARDOUS MATERIALS

- .1 In accordance with Section 01 35 33 – Health & Safety Requirements, submit the required site specific Health and Safety documentation as indicated.
- .2 Perform duties in accordance with the British Columbia Occupational Health and Safety Regulation.
- .3 Submit copies of WCB Clearance Letter and WCB Contractor Rating. Submit copy of Final WCB Clearance Letter at completion of project.
- .4 Submit letter stating that Contractor assumes the role of Prime Contractor for the purposes of site safety responsibility and the Workers Compensation Act.
- .5 Submit copies of work site health and safety meeting minutes, inspection reports, reports or directions issued by Federal, Provincial or Municipal health and safety inspectors, incident and accident reports, and follow-up reports.
- .6 Work at site may involve contact with lead-containing paint. Take appropriate precautions.
- .7 Notify the Departmental Representative 48 hours for access to interior work and advise if work involves hazardous substances (Canada Labour Code, Part II, Section 10) or caulking.

- .8 Ensure fire code requirements are continued to be met during the course of construction. Ensure emergency exits from the building, exterior emergency egress paths, or access areas for emergency vehicles are not restricted.

1.16 EXAMINATION

- .1 Examine site and be familiar and conversant with existing conditions likely to affect work.
- .2 Provide photographs of surrounding objects and structures liable to be damaged or be the subject of subsequent claims (photographs not to include staff on duty).

1.17 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by the authorities having jurisdiction.
- .2 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .3 Provide for personnel and pedestrian traffic.
- .4 Contractor will be held responsible for damages to facility equipment as the result of service shut-downs.
- .5 Contractor will be held responsible for unscheduled-shut downs of building utilities and services.

1.18 LOCATION OF EQUIPMENT AND FIXTURES

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

1.19 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 particularly close attention to overhead work or near to building structural elements, including existing roof.
 - .2 Identify on coordination drawings, building elements and interface requirements.
- .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
- .4 Publish minutes of each meeting.
- .5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submit shop drawings and of rebuilt components only after coordination meeting for such items has taken place.
- .4 Work cooperation:
 - .1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of 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, 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.
- .6 Maintain efficient and continuous supervision. Full-time site superintendent required throughout project.

1.20 APPROVAL OF
SHOP DRAWINGS,
PRODUCT DATA
AND SAMPLES

- .1 In accordance with Section 01 33 00 - Submittal Procedures, 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.
 - .4 Ordering of approved material and/or products - refer to technical sections.

1.21 TESTING AND
INSPECTIONS

- .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative.
- .2 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.
 - .1 Mill tests and certificates of compliance.
 - .2 Tests specified to be carried out by Contractor under the Departmental Representative's supervision.
- .3 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 Departmental Representative may require to verify acceptability of corrected work.
- .4 Contractor shall furnish labour and facilities to:
 - .1 Notify Departmental Representative in advance of planned testing.
- .5 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .6 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.
- .7 The Departmental Representative may require, and pay for, additional inspection and testing services.
- .8 Provide Departmental Representative with 2 copies of testing laboratory reports as soon as they are available.

1.22 AS-BUILT DOCUMENTS

- .1 Make submissions of as-built Contract documents in accordance with Section 01 78 00 – Closeout Submittals,
- .2 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, for "as-built" purposes.
- .3 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.

1.23 CONTROL

- .1 Existing Structure:
 - .1 The Contractor and sub trade personnel shall pay utmost attention to the preservation of all existing items on this site at all times during remediation work. Prior to the commencement of this project, the Contractor shall submit to the Departmental Representative a list of all proposed protection measures for approval. This list must identify procedures for the protection of

adjacent building materials and elements to prevent accidental damage.

- .2 Provide temporary dust tight screens and/or partitions to localize dust generating activities, and for protection of workers, finished areas of work and public. Precautionary measure shall be taken for potential source of Lead and Arsenic dust within the complex.
- .3 Protect work area with scaffolding structure for work with weather-tight polyethylene film during construction.
- .4 Maintain and relocate protection until work is complete.

1.24 PUBLIC WAY CONSTRUCTION

- .1 Design, erect and maintain hoarding and covered pedestrian walkways to support all loads including windloads and provide protection, complete with signs and electrical lighting as required by authority having jurisdiction and Departmental Representative.

1.25 MAINTENANCE MATERIALS, SPECIAL TOOLS AND SPARE PARTS

- .1 Specific requirements for maintenance materials, tools and spare parts are specified in individual technical sections.

1.26 ADDITIONAL DRAWINGS

- .1 The Departmental Representative 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.
- .2 Upon request, Departmental Representative may furnish up to a maximum of 5 sets of Contract documents for use by the Contractor at no additional cost. Should more than 5 sets of documents be required the Departmental Representative will provide them at additional cost.

1.27 SYSTEM OF MEASUREMENT

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

1.28 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 site, and is fully conversant with all conditions.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

1 GENERAL

1.1 ADMINISTRATIVE

- .1 Contractor will arrange pre-construction project meeting.
- .2 Contractor to assume responsibility for setting meeting times and recording and distributing meeting minutes. Contractor to attend project meetings throughout the progress of the work and at the call of Departmental Representative.
- .3 Contractor to provide physical space and make arrangements for progress meetings.
- .4 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 START-UP MEETING

- .1 Contractor will:
 - .1 Within ten (10) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
 - .2 Departmental Representative, Contractor, major Subcontractors, field reviewers and supervisors will be in attendance.
 - .3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
 - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .2 Provide Agenda, to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 11 55 – General Instructions – Bar (Gantt) Chart.
 - .3 Schedule of submission of shop drawings and samples. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Delivery schedule of specified equipment.
 - .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .8 Record drawings in accordance with Section 01 78 00 - Closeout Submittals.
 - .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

- .10 Monthly progress claims, administrative procedures, photographs, hold backs.
- .11 Appointment of inspection firms.
- .12 Insurances, transcript of policies.

1.3 PROGRESS MEETING

- .1 Contractor will:
 - .1 During course of Work and up to project completion, schedule progress meetings every two weeks. Additional meetings will be scheduled to resolve extraordinary issues as required.
 - .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
 - .3 Notify parties minimum three (3) days prior to meetings.
 - .4 Contractor will record minutes of progress meetings and circulate to attending parties and affected parties not in attendance.
 - .5 Provide Agenda. Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Other business.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 APPROVALS

- .1 Approval of shop drawings: refer to Section 01 11 55 – General Instructions.

1.2 ADMINISTRATIVE

- .1 This Section specifies the general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and other requested submittals to Departmental Representative for review. Additional specific requirements for submissions are specified in individual technical sections.
- .2 Present shop drawings, product data, samples and mock-ups 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 Departmental Representative's review of submittals.
- .5 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review unless Departmental Representative gives written acceptance of specific deviations.
- .7 Make any changes in submissions which Departmental Representative may require consistent with Contract documents and resubmit as directed by Departmental Representative.
- .8 Notify Departmental Representative in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.
- .9 Do not proceed with work or order construction materials or products until relevant submissions are reviewed and approved by the Departmental Representative.
- .10 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .11 Verify field measurements and affected adjacent Work are coordinated.
- .12 Keep one reviewed copy of each submission on site.

1.3 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 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.
- .3 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. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
 - .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 characteristic.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Relationship to adjacent work.
- .4 After Departmental Representative's review, distribute copies. Keep one reviewed copy of each submission on site.

1.4 SHOP DRAWINGS

- .1 Shop drawings: original drawings or modified standard drawings, diagrams, illustrations, schedules, performance charts, brochures or other data provided by Contractor to illustrate details of portions of work which are specific to project requirements.
 - .1 Indicate materials, methods of construction and attachment or anchorage erection diagrams, connections, explanatory notes and other information necessary for completion of Work.

Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Provide cross references to drawings and specifications.

- .2 Submit electronic copies of all shop drawings to include:
 - .1 Date.
 - .2 Project Title and number.
 - .3 Name and address of Subcontractor, Supplier and Manufacturer.
 - .4 Fabrication.
 - .5 Key plan and layout, showing dimensions, including identified field dimensions and clearances.
 - .6 Setting or erection details.
 - .7 Relationship to adjacent work.
 - .8 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .9 Revised shop drawing submissions to be bubbled identifying revisions.
- .2 Cross-reference shop drawing information to applicable portions of the Contract documents.
- .3 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .4 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .5 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name, project number and address.
- .6 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.

- .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .7 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .8 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .9 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .10 Delete information not applicable to project.
- .11 Supplement standard information to provide details applicable to project.

1.5 SHOP DRAWING REVIEW

- .1 Review of shop drawings by the Departmental Representative is for the sole purpose of ascertaining conformance with the general concept.
- .2 Allow seven (7) business days for Departmental Representative's review of each submission.
- .3 This review shall not mean that the Departmental Representative approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same.
- .4 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.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with ordering materials or Work.
- .6 Make changes in shop drawings by Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested. All revisions to be clearly clouded.
- .7 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 and all sub-trades.

- .8 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, electronic copy will be returned and ordering, fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings with bubbled changes, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .9 Shop drawings to incorporate applicable key plan, plan, elevations and details for all work submitted. No materials to be ordered and no work to be fabricated shall be undertaken until shop drawings and other related submittals are reviewed.

1.6 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.
 - .1 Delete information not applicable to project.
 - .2 Submit electronic copies of documentation.
 - .3 Cross-reference product data information to applicable portions of Contract documents.
- .2 Supplement standard information to provide details applicable to project.

1.7 SAMPLES

- .1 Submit for review samples in duplicate as requested in individual technical specification Sections. Label samples with origin and intended use.
 - .1 Samples include: examples of materials, equipment, quality, finishes and workmanship.
 - .1 Provide minimum two samples of each material as indicated in technical sections.
 - .2 Where colour, pattern or texture is criterion, submit full range of samples.
 - .3 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.
 - .2 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
 - .3 Where colour, pattern or texture is criterion, submit full range of samples.
 - .4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to ordering materials or proceeding with Work.
 - .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

1.8 MOCK-UPS

- .1 Erect mock-ups where directed by Departmental Representative and in accordance with 01 11 55 – General Instructions. Upon acceptance by Departmental Representative, mock-up may remain.

1.9 PROGRESS SCHEDULE

- .1 Submit work schedule and cost breakdown in accordance with Section 01 11 55 – General Instructions.

1.10 INSPECTION REPORTS

- .1 Submit in electronic test results and inspection reports where indicated.

1.11 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution, monthly with progress statement and as directed by Departmental Representative.
- .2 Project identification: name and number of project, building name and elevation with date of exposure indicated.
- .3 Number of viewpoints: 4 locations.
 - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: as directed by Departmental Representative.
 - .1 Before concealment of Work and as directed by Departmental Representative.

1.12 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

1.13 CLOSEOUT SUBMITTALS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review manufacturer's warranty requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.

- .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
- .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.
- .2 Three (3) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, two (2) final hard copies and one electronic copy of operating and maintenance manuals. Substantial completion will not be considered until this submission is completed.
- .3 Ensure spare parts, maintenance materials and special tools are new, neither damaged nor defective, and of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.
- .5 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .6 Format:
 - .1 Organize data as instructional manual.
 - .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
 - .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
 - .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
 - .5 Arrange content by Section numbers and sequence of the Table of Contents according to the contract documents Table of Contents.
 - .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
 - .7 Text: manufacturer's printed data, or typewritten data.
 - .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages with drawing number and description visible.
- .7 Record Documents:
 - .1 Table of Contents (for each volume): provide the following:
 - .1 Title of project.
 - .2 Date of submission
 - .3 Names, addresses, telephone numbers and email addresses of Departmental Representative, Contractor and Sub-Contractors with name of responsible parties.
 - .4 Schedule of products and systems, indexed to content of volume.

- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
 - .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
 - .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
 - .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .8 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, reference to visible and accessible features of construction.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Change Orders and other modifications to Contract.
 - .5 Details not on original Contract drawings.
 - .6 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 as work progresses.
 - .2 Mark on 1 set of drawings, specifications and shop drawings at completion of project and, before final review, neatly transfer notations to second set.
 - .3 Provide 1 set of CDs in PDF file format with all as-built information included.
 - .4 Submit all sets to Departmental Representative.

1.14 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with colour and texture designations.
 - .1 Provide information for re-ordering products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

1.15 WARRANTIES

- .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 and inspection reports executed in by subcontractors, suppliers, manufacturers and inspection agencies within 10 days after completion of applicable item of work.
- .4 Except for items put into use with the Departmental Representative's permission 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 with Operating and Maintenance manual.
- .8 Conduct joint 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.

1.16 COMPLETION

- .1 Submit a written certificate that the following have been performed:
 - .1 Work has been completed and reviewed for compliance with the Contract documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Work is complete and ready for final review.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION



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 Canadian Standards Association (CSA) as amended:
 - .1 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
 - .2 CSA 350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
 - .3 CSA Z797-2009, Code of Practice for Access Scaffold.
- .4 Fire Protection Engineering Services, HRSDC:
 - .1 FCC No. 301, Standard for Construction Operations.
 - .2 FCC No. 302, Standard for Welding and Cutting.
- .5 American National Standards Institute (ANSI):
 - .1 ANSI/ASSE A10.3-2006, American National Standard – Construction and Demolition Operations – Safety Requirements for Powder-Actuated Fastening Systems.
- .6 Province of British Columbia:
 - .1 Worker's Compensation Act Part 3-Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation.

1.2 RELATED SECTIONS

- .1 01 11 55 – General Instructions
- .2 01 33 00 – Submittal Procedures
- .3 01 35 43 – Environmental Procedures
- .4 01 41 00 – Regulatory Requirements
- .5 01 51 00 – Temporary Utilities
- .6 01 56 00 – Temporary Barriers & Enclosures
- .7 02 41 99 – Demolition for Minor Works
- .8 02 81 01 – Hazardous Materials Use & Abatement

1.3 WORKERS COMPENSATION BOARD COVERAGE

- .1 Comply fully with Worker's Compensation Act, regulations and orders made pursuant thereto and any amendments up to completion of work.

- .2 Maintain Worker's Compensation Board coverage during the term of Contract, until and including date that Certificate of Final Completion is issued.

1.4 COMPLIANCE WITH REGULATIONS

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

1.5 SUBMITTALS

- .1 Submit to Departmental Representative submittals listed for review, in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Work effected by submittal will 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 Material Safety Data Sheets (MSDS) and all other documentation required by Workplace Hazardous Materials Information (WHIMIS) requirements.
 - .5 Emergency Procedures.
- .4 Departmental Representative will review Contractor's Site-Specific Health and Safety Plan and emergency procedures and provide comments to Contractor within 5 working days after receipt of plan. Revise plan as appropriate and re-submit to Departmental Representative.
- .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 Departmental Representative.
- .6 Submission of Health and Safety Plan and any revised version to Departmental Representative is for information and reference purposes only. It will not:
 - .1 Be constructed to imply approval by Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
 - .3 Relieve Contractor of his legal obligations for provision of health and safety on project.

1.6 RESPONSIBILITY

- .1 Assume responsibility as Prime Contractor for work under this Contract.
- .2 Be responsible for health and 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 statues, regulations and ordinances and with Site-Specific Health and Safety Plan.

1.7 HEALTH AND SAFETY CO- ORDINATOR

- .1 The Health and Safety Coordinator must:
 - .1 Be responsible for completing all health and safety training and ensuring that personnel that do not successfully complete required training are not permitted to enter site to perform work.
 - .2 Be responsible for implementing, daily enforcing and monitoring 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 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 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 as deemed necessary to protect site against entry.

1.9 PROJECT/SITE CONDITIONS

- .1 Refer to Appendix 2 for a Preconstruction Assessment Form (PAF). There may be a potential risk for:
 - .1 Slipping hazardous or unsound footing.
 - .2 Working at heights.
 - .3 Vehicular traffic.
 - .4 High noise levels.
 - .5 Construction equipment.
 - .6 Pedestrian traffic.
 - .7 Multi-employer work site.
 - .8 Federal employees and general public.
 - .9 Earthquake.
 - .10 Tsunami.
 - .11 Inclement weather.

- .12 Violence in the workplace.
- .13 Sharp or potentially infectious objects in wastes.

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 above authorities, the most stringent provision will apply. Should 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 Notice of Project as required by Provincial authorities.
- .2 Provide copies of all notices to Departmental Representative.

1.14 HEALTH AND
SAFETY PLAN

- .1 Conduct site-specific hazard assessment based on review of Contract documents, required work and project site. Identify 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 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.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.

- .2 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 work.
 - .3 List of hazardous materials to be brought on site as required by work.
 - .4 Indicate engineering and administrative control measures to be implemented at site for managing identified risks and hazards.
 - .5 Identify personal protective equipment (PPE) to be used by workers.
 - .6 Identify personnel and alternates responsible for site safety and health.
 - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in plan.
 - .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
 - .5 Departmental Representative's review: the review of Site Specific Health and Safety Plan by Public Services and Procurement Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in the 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 following provisions in emergency procedures:
 - .1 Notify workers and first-aid attendant, of nature and location of emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm safe evacuation of all workers.
 - .4 Notify fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond workplace.
 - .6 Notify Departmental 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 risk of entrapment.

- .3 Work with hazardous substances.
 - .4 Underground work.
 - .5 Work, on, over, 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 Sheet (MSDS) acceptable to Departmental Representative and in accordance with Canadian Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of product(s) intended for use. Submit applicable MSDS and WHMIS documents as per section 01 33 00 – Submittal Procedures.
 - .2 In conjunction with Departmental Representative, schedule to carry out work during “off hours” when tenants have left building.
 - .3 Provide adequate means of ventilation in accordance with Section 01 51 00 – Temporary Utilities.
 - .4 The Contactor 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 as indicated in Section 02 81 01.

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 / Territorial 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 Departmental 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 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 Departmental Representative.
- .3 Keep documents and lockout tags at site and list in log book for full duration of Contract. Upon request, make such data available for viewing by Departmental Representative or by an 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 and B.C. Occupational Health and Safety Regulations.

1.25 CONFINED SPACES

1.26 POWDER
ACTUATED
DEVICES

- .1 Carry out work in confined spaces in compliance with Provincial / Territorial regulations.

1.27 FIRE SAFETY AND
HOT WORK

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

1.28 FIRE SAFETY
REQUIREMENTS

- .1 Obtain Departmental Representative's authorization before 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 and roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

1.29 FIRE PROTECTION
AND ALARM
SYSTEMS

- .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 daily basis.
- .2 Handle, store, use and dispose of inflammable and combustible materials in accordance with National Fire Code of Canada.
- .3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the DR is required prior to any gas or diesel tank being brought onto the work site.

1.30 UNFORSEEN
HAZARDS

- .1 Where available, fire protection and alarm systems not to 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 fire department, building owner and tenants, resulting from false alarms.

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

1.31 POSTED
DOCUMENTS

- .1 Post legible versions of following documents on site:
 - .1 Site-Specific Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing project layout, location(s) of first-aid station, evacuation route and marshalling station, and emergency transportation provisions.
 - .5 Notice of Project.
 - .6 Floor plans or site plans.
 - .7 Notice as to where a copy of Worker's Compensation Act and Regulations are available on 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.
 - .1 Name of "qualified coordinator" responsible for coordination of health and safety activities in accordance with Section 118 of Worker's Compensation Act.
- .2 Post all Material Safety Data Sheets (MSDS) on site, in common area, visible to all workers and locations accessible to tenants when work of this Contract include construction activities adjacent to occupied areas.
- .3 Postings to be protected from weather and be visible from street or exterior of principal construction site shelter provided for workers and equipment or as approved by Departmental Representative.

1.32 MEETINGS

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

1.33 CORRECTION OF
NON COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
- .3 Departmental Representative issue "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. General Contractor will be responsible for costs arising from such "stop work order".

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 REFERENCES

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, Physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.
- .2 Reference Standards:
 - .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Convene start-up meeting prior to beginning work with contractor's representative and Departmental Representative to:
 - .1 Verify Environmental Protection Plan and conformance requirements to municipal, provincial and federal regulations.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing construction activities or delivery of materials to site, provide Environmental Protection Plan for review and approval by Departmental Representative.
- .3 Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

- .3 Names and qualifications of persons responsible for training site personnel.
- .4 Descriptions of environmental protection personnel training program.
- .5 Drawings showing locations of proposed temporary scaffolding over water crossings, material storage areas, structures, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .7 Pollution Control Plan:
 - .1 Including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .2 Identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .3 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .4 Air pollution control plan detailing provisions to assure that dust, paint overspray, debris, materials, and trash, are contained on project site.
 - .5 Name of individual who will be responsible for implementing and supervising the spill containment and cleanup.
 - .6 Training requirements for Contractor's personnel and methods of accomplishing the training.
- .8 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

1.4 FIRES

- .1 Fires and burning of rubbish on site not permitted.

1.5 DRAINAGE

- .1 Do not allow water containing suspended materials to into waterways, sewer or drainage systems.
- .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 POLLUTION CONTROL

- .1 Contractor and sub trade personnel must develop and maintain spill response and reporting procedures including containment methods.
- .2 In the event of a spill, Contractor shall immediately contain and assess the spill, provide appropriate notifications and take the necessary steps to prevent further discharge. Notifications shall include contacting the Provincial Emergency Program at 1-800-663-3456 and the Departmental Representative.
- .3 The Contractor must have spill containment kits ready for immediate deployment, containing sufficient quantities of absorbent materials on site in close proximity to work area including working machinery and equipment such as fuel portable generator, air compressors, hoist and tools.
- .4 The Contractor is to have personnel on site that are trained and ready to use spill containment kits. Ensure proper disposal procedures in accordance with all applicable provincial and municipal regulations. Fires and burning of rubbish on site is not permitted.
- .5 Contractor is responsible for immediate clean up of the spill and restoration of the area to the satisfaction of the Departmental Representative and other regulatory agencies, where involved.
- .6 Ensure all equipment used on site is clean and free from contaminants. Materials and equipment shall be regularly inspected, maintained, operated and stored in a manner that prevents deleterious substances (eg. Petroleum products, silt, etc.) from entering air.
- .7 Ensure proper procedures in accordance with all applicable provincial regulations.
- .8 Control emissions from equipment to local authorities' emission requirements.
- .9 Prevent extraneous materials from contaminating air beyond application area. Provide temporary enclosures.

1.7 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Do not take action until after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.8 ENVIRONMENTAL PROTECTION

- .1 Contractor is responsible for environmental protection during all construction activities at all locations work is performed.
- .2 Environmental degradation arising from construction activities shall be prevented, abated, controlled and minimized by complying with all applicable federal, provincial and local laws and regulations concerning environmental pollution control and abatement.
- .3 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers. Construction methods shall be employed to ensure no fuels, oils, wood preservatives or other contaminants enter the site. As general Mitigation Measures for this project, it must be enforced and closely supervised and monitored as follows:
 - .1 All contractors and work crews must be briefed upon the importance of adhering to prescribed best practices or mitigation measures. Project meeting prior to commencement of the work shall indicate the above requirements have been fully explained to the contractor and staff.
 - .2 A copy of the mitigation measures shall be posted in a conspicuous location on site or readily accessible for reference.
 - .3 Conduct work in a manner which clearly separates visitors from the active construction area on site to minimize potential accidents for public safety.
 - .4 Contractor and sub trade personnel must develop and maintain spill response and reporting procedures including containment methods. In the event of a spill, contact the Provincial Emergency Program at 1-800-663-3456.
 - .5 The Contractor is to have personnel on site that are trained and ready to use spill containment kits. Ensure proper disposal procedures in accordance with all applicable provincial and municipal regulations. Fires and burning of rubbish on site is not permitted.
 - .6 The Contractor must have all spill containment kits ready for immediate deployment, containing sufficient quantities of absorbent materials on site in close proximity to working machinery and equipment such as fuel portable generator, air compressors, hoist and tools.
 - .7 Ensure all equipment used on site is clean and free from contaminants.
- .4 Ensure proper disposal procedures in accordance with all applicable provincial regulations.
- .5 Do not bury rubbish or waste materials.
- .6 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC), 2010 including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Perform Work in accordance with WorkSafe BC current requirements and standards.
- .3 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

- .1 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative.

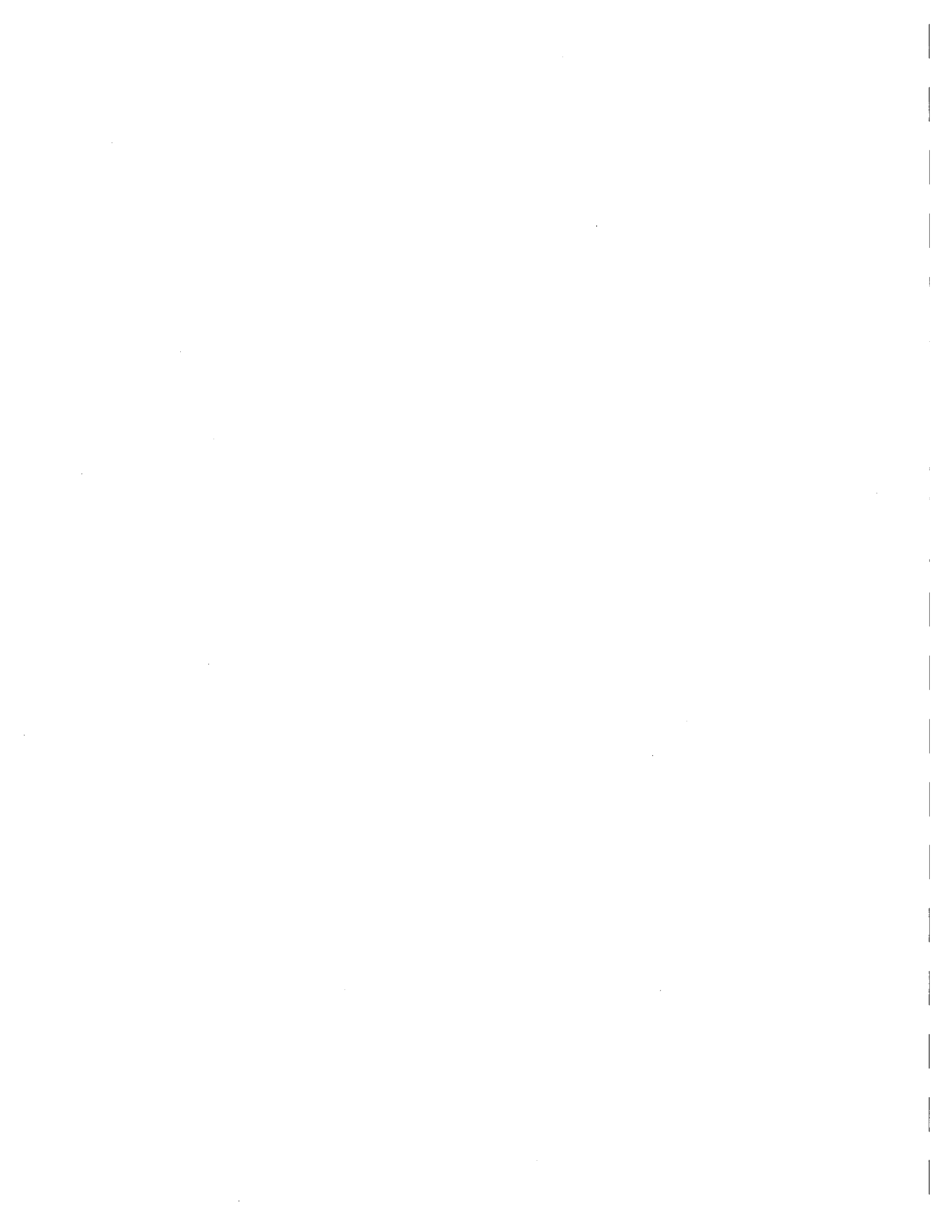
1.3 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION



1 GENERAL

1.1 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

1.3 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURES

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

- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.6 REPORTS

- .1 Submit two (2) copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.7 TESTS AND MIX DESIGNS

- .1 Furnish test results as requested.
- .2 Cost of tests beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.8 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in technical specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable and as approved by Departmental Representative.
- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Mock-ups, when approved may remain as part of Work.

1.9 MILL TESTS

- .1 Submit mill test certificates as required of specification Sections.

1.10 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.

1.11 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 Contractor. Commencement of work shall imply acceptance of prepared work or substrate surfaces.

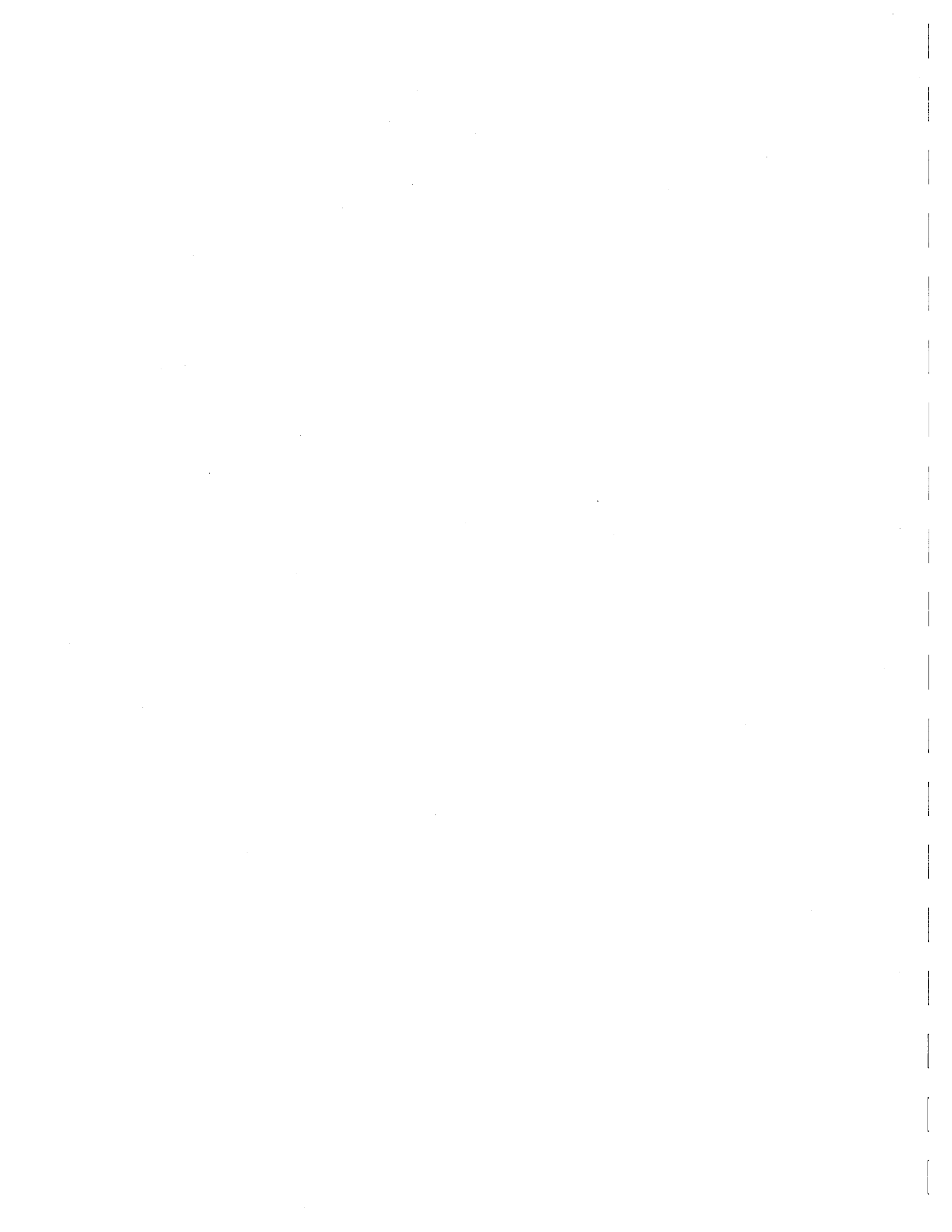
1.12 QUALITY OF WORK

- .1 Remedial Work:
 - .1 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of work.
 - .2 Perform remedial work required to repair or replace part or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Ensure that quality workmanship is performed through use of skilled and experienced tradesmen, under supervision of qualified journeyman.
- .3 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code Construction Standards.
- .4 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative whose decision is final.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION



1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA) as amended:
 - .1 CAN/CSA Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 ACCESS AND DELIVERY

- .1 Only designated entrance may be used for access to building. Confirm with Departmental Representative.
 - .1 Maintain for duration of Contract.
 - .2 Make good damage resulting from Contractor's use.
- .2 Use of facilities will be granted to the Contractor by reservation through the Departmental Representative.
 - .1 Limited parking is permitted as directed by Departmental Representative. Security has been instructed to have unauthorized vehicles towed at the Contractor's expense.

1.4 STORAGE FACILITIES

- .1 Storage space will be provided as directed by Departmental Representative.

1.5 WATER

- .1 Water supply is available at existing building and may be used for construction purposes at no cost.
 - .1 Hose bib locations for each building as directed by Departmental Representative.

1.6 POWER

- .1 Electrical power and lighting at existing buildings 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 Power located as directed by Departmental Representative.

1.7 HEATING AND VENTILATION

- .1 Do not begin work until arrangements have been made with the Departmental Representative for protection of heating, ventilating

and air-conditioning (temporary removal of existing exterior vents or louvres).

- .1 If there is any dirt or dust in the heating and ventilating system, it will be the Contractor's responsibility to return to its original state in accordance with the Departmental Representative's specifications.
- .2 Prevent dust and odour migration to occupied areas.
 - .1 Do not deactivate HVAC system.

1.8 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, fax, data hook up, lines and equipment necessary for own use and use of Departmental Representative.

1.9 SANITARY FACILITIES

- .1 Provide and pay for temporary sanitary facilities necessary for own use and use of Departmental Representative.

1.10 SCAFFOLDING

- .1 Construct and maintain scaffolding in rigid, secure and safe manner in accordance with WorkSafe BC requirements.
- .2 Scaffolding to be erected independent of walls where possible. Remove promptly when no longer required. Remove fastenings from structure, if used and patch, sand and paint to match.

1.11 REMOVAL OF TEMPORARY FACILITIES

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

1.12 SIGNS AND NOTICES

- .1 Signs and notices for safety and instruction are permitted and shall be in both official languages and 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 Departmental Representative.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Z271-10, Safety Code for Suspended Platforms.
 - .2 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Indicate use of supplemental or other staging area.
- .3 Provide construction facilities in order to execute work expeditiously.
- .4 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA- Z271.
- .2 Provide and maintain scaffolding, ladders, platforms and temporary stairs.

1.5 BARRIERS AND ENCLOSURES

- .1 In accordance with Section 01 56 00 – Temporary Barriers and Enclosures and WorkSafe BC requirements.

1.6 ELEVATORS

- .1 Existing elevators not to be used by construction personnel and transporting of materials.

1.7 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.8 CONSTRUCTION
PARKING

- .1 Limited parking will be permitted on site as directed by Departmental Representative. Provide for additional parking off site. Refer to 01 14 00 – Work Restrictions.
- .2 Provide and maintain adequate access to project site.

1.9 SECURITY

- .1 Provide and pay for responsible security personnel to guard contractor storage and laydown area after working hours and during holidays.

1.10 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.

1.11 EQUIPMENT, TOOL
AND MATERIALS
STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.12 SANITARY
FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.13 PROTECTION AND
MAINTENANCE OF
TRAFFIC

- .1 Refer to Section 01 14 00 – Work Restrictions.
- .2 Provide access as necessary to maintain traffic.
- .3 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .4 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .5 Protect travelling public from damage to person and property.

- .6 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .7 Verify adequacy of existing roads and allowable load limit on these roads. Contractor responsible for repair of damage to roads caused by construction operations.
- .8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .9 Dust control: adequate to ensure safe operation at all times.
- .10 Provide snow removal during period of Work when required.

1.14 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable, where directed by Departmental Representative.
- .4 Stack stored new or salvaged material not in construction facilities.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION



1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-O121-08(R2013), Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

- .1 Provide temporary barriers, enclosures and controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.3 HOARDING

- .1 Erect temporary building envelope enclosures to protect wall and roof assemblies from elements during Work.
- .2 Erect and maintain pedestrian walkways and exits including roof and side covers, complete with signs and electrical lighting as required by law.
- .3 Protect site from damage by equipment and construction procedures.

1.4 GUARD RAILS AND BARRICADES

- .1 Provide as required by governing authorities.

1.5 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished remediated wall and roof assemblies and other openings in exterior walls and roofs including window sashes, vents, louvres, and lighting.
- .2 Design enclosures to withstand wind pressure and snow loading.

1.6 DUST TIGHT SCREENS

- .1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

1.7 ACCESS TO SITE

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

1.8 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain barricades as required to perform Work and protect public.

1.9 FIRE ROUTES

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

1.10 PROTECTION FOR
OFF-SITE AND
PUBLIC PROPERTY

- .1 Protect surrounding property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.11 PROTECTION OF
BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment, including existing roof coverings during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule three (3) days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.12 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for reuse and recycling.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 REFERENCES

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 PRODUCTS, MATERIALS AND EQUIPMENT

- .1 Products, materials, equipment and articles incorporated in Work shall be NEW, not damaged or defective, and of best quality for purpose intended and compatible with the specifications. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Use products of one (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 Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.

1.3 AVAILABILITY

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

1.4 STORAGE,
HANDLING, AND
PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store sheet materials on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.5 TRANSPORTATION

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

1.6 MANUFACTURER'S
INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.8 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 REMEDIAL WORK

- .1 Refer to Section 01 73 00 – Execution.
- .2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.10 FASTENINGS

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 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 unless stainless steel or other material is specifically requested in technical specification sections.
 - .3 Use heavy hexagon heads, semi-finished unless otherwise specified.
 - .4 Bolts may not project more than 1 diameter beyond bolts.
- .3 Types of washers as follows:
 - .1 Soft neoprene washers: use for exposed fastening of exterior metal panels.
- .4 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
- .5 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.
- .6 Store products in accordance with suppliers' instructions.
- .7 Touch up damaged factory finished surfaces according to manufacturer's recommendations and to Departmental Representative's satisfaction.
 - .1 Use primer or enamel to match original.
 - .2 Do not paint over nameplates.
- .8 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .9 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .10 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.11 PROTECTION OF
EXISTING BUILDING
AND WORK IN
PROGRESS**

- .1 Protect existing building components and finishes (including glazing, roof finishes, ramps, guardrails, stairways and areas not included in scope of work) from damage. Repair damaged components and finishes according to Departmental Representative's specifications, to better condition.
- .2 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

**1.12 CONTRACTOR'S
OPTIONS FOR
SELECTION OF
PRODUCT FOR
TENDERING**

- .1 Products are specified by 'Prescriptive' specifications: select any product meeting or exceeding specifications.
- .2 Products specified under "Acceptable Products": 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 Acceptable Product. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with Section 01 11 55 – General Instructions.
- .5 When products are specified by a referenced standard or by or performance specifications, upon request of Departmental Representative obtain from manufacturer an independent laboratory report showing that the product meets or exceeds the specified requirements at no cost to Departmental Representative.
- .6 Provide cost saving breakout in bid form for alternate material or system if incorporated.
- .7 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative and the Contract price will be reduced accordingly.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Departmental Representative or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Departmental Representative or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.2 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work and review existing conditions with Departmental Representative.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work.

1.3 EXECUTION

- .1 Execute cutting, fitting, and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.

- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Restore work with new products in accordance with requirements of Contract Documents.
- .7 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

1.4 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for reuse and recycling.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 PROJECT CLEANLINESS

- .1 Progressive 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.
- .2 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by other Contractors.
- .3 Remove waste materials from site at daily regularly scheduled times or dispose of at municipal approved facilities. Do not burn waste materials on site.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Dispose of waste materials and debris off site.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not contaminate building systems.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Vacuum clean behind grilles, louvres and screens.
- .6 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

- .7 Broom clean and wash exterior walks, steps and surfaces; where used for project Work.
- .8 Remove dirt and other disfiguration from exterior surfaces of Work.
- .9 Clean equipment and fixtures to sanitary condition; clean glazing and frames where adjacent to work.

1.3 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for reuse and recycling.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work, conduct meeting with Departmental Representative to review and discuss PWGSC's Waste Management Plan and Goals.

1.2 DEFINITIONS

- .1 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .2 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .3 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .4 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

1.3 STORAGE, HANDLING, AND PROTECTION

- .1 Handle waste materials not re-used, salvaged or recycled in accordance with appropriate regulations and codes.
- .2 Materials in separated condition: collect, handle, store on site where directed and transport off-site to an approved and authorized recycling facility.
- .3 Materials must immediately be separated into required categories for re-use or recycling.
- .4 Unless specified otherwise, materials for removal become Contractor's property.
- .5 Separate non-salvageable materials for recycling where applicable recycling facility exists. Transport and deliver non-salvageable items to licensed recycling and disposal facilities.
- .6 Protect structural components not removed for demolition from movement or damage.

- .7 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .8 Separate and store materials produced during dismantling of structures in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.

1.4 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.
- .3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

1.5 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Maintain security measures as approved by Departmental Representative.

1.6 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

2 PRODUCTS (NOT USED)

3 EXECUTION

3.1 APPLICATION

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

1 GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative review.
 - .2 Departmental Representative's review:
 - .1 Departmental Representative and Contractor to review Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and reviewed for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Work: complete and ready for final review.
 - .4 Final Review:
 - .1 When completion tasks are done, request final review of Work by Departmental Representative.
 - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-review.

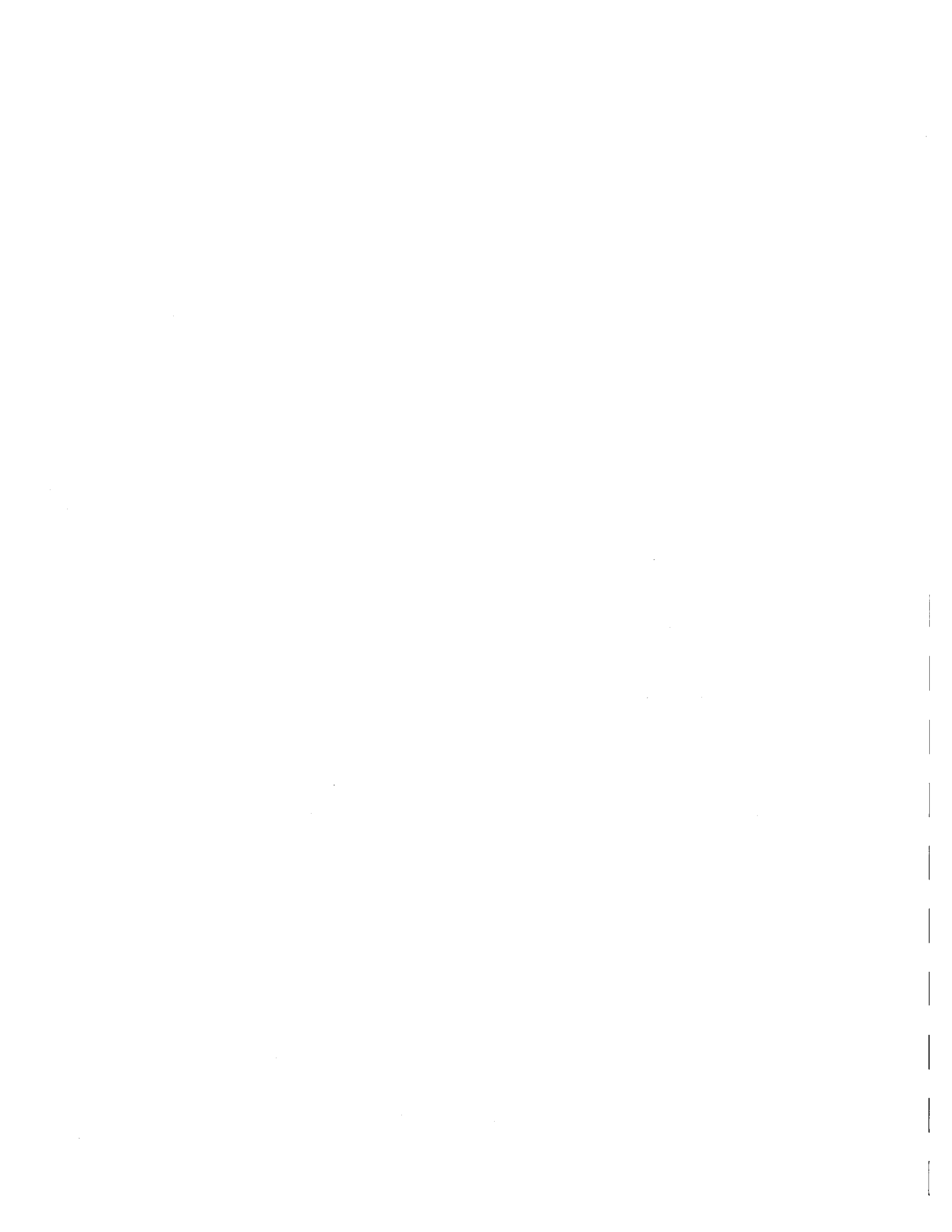
1.2 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
 - .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction, Demolition Waste Management and Disposal.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION



1 GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with contractor's representative and Departmental Representative to:
 - .1 Verify Project requirements.
 - .2 Review manufacturer's warranty requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Three (3) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, two (2) final hard copies and one electronic copy of operating and maintenance manuals. Substantial completion will not be considered until this submission is completed.
- .3 Ensure spare parts, maintenance materials and special tools are new, neither damaged nor defective, and of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.
- .5 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

1.3 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.

- .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by Section numbers and sequence of the Table of Contents according to the contract documents Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages with drawing number and description visible.
- .9 Provide 1:1 scaled CAD files in dwg format on CD.

1.4 CONTENTS- PROJECTS RECORD DOCUMENTS

- .1 Table of Contents (for each volume): provide the following:
 - .1 Title of project.
 - .2 Date of submission
 - .3 Names, addresses, telephone numbers and email addresses of Departmental Representative, Contractor and Sub-Contractors with name of responsible parties.
 - .4 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
 - .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
 - .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
 - .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.5 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, reference to visible and accessible features of construction.

- .2 Field changes of dimension and detail.
- .3 Changes made by change orders.
- .4 Change Orders and other modifications to Contract.
- .5 Details not on original Contract drawings.
- .6 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 as work progresses.
 - .2 Mark on 1 set of drawings, specifications and shop drawings at completion of project and, before final review, neatly transfer notations to second set.
 - .3 Provide 1 set of CDs in PDF file format with all as-built information included.
 - .4 Submit all sets to Departmental Representative.

1.6 EQUIPMENT AND SYSTEMS

- .1 Include manufacturer's printed operation and maintenance instructions.
- .2 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .3 Additional requirements: as specified in individual specification sections.

1.7 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with colour and texture designations.
 - .1 Provide information for re-ordering products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

1.8 WARRANTIES

- .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 and inspection reports executed in by subcontractors, suppliers, manufacturers and inspection agencies within 10 days after completion of applicable item of work.
- .4 Except for items put into use with the Departmental Representative's permission 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 with Operating and Maintenance manual.
- .8 Conduct joint 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.

1.9 COMPLETION

- .1 Submit a written certificate that the following have been performed:
 - .1 Work has been completed and reviewed for compliance with the Contract documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Work is complete and ready for final review.

2 PRODUCTS (NOT USED)

3 EXECUTION (NOT USED)

END OF SECTION

1 GENERAL

1.1 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 ACTION AND INFORMATION SUBMITTALS

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

1.3 SITE CONDITIONS

- .1 If material resembling spray or trowel-applied asbestos or other designated substance be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Proceed only after receipt of written instructions have been received from Departmental Representative.
- .2 Notify Departmental Representative before disrupting building access or services.

2 PRODUCTS (NOT USED)

3 EXECUTION

3.1 EXAMINATION

- .1 Inspect building with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities in operating condition.

3.2 PREPARATION

- .1 Protection of In-Place Conditions:
 - .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building and finishes to remain.
 - .2 Protect existing roofing.
 - .3 Keep noise, dust, and inconvenience to occupants to minimum.
 - .4 Protect building systems, services and equipment.
 - .5 Provide temporary dust screens, covers, railings, supports and other protection as required.

- .6 Do Work in accordance with Section 01 35 33 - Health and Safety Requirements.
- .2 Demolition/Removal:
 - .1 Remove items as indicated.
 - .2 Remove parts of existing buildings as indicated to permit remedial construction. Items for reinstallation to be stored in a dry, protected area as directed by Departmental Representative.

3.3 REINSTALLATION

- .1 Reinstall elements that have been removed for remediation work once remediated work has been completed and reviewed by Departmental Representative.
- .2 Install to original position and make good any damaged elements to satisfaction of Departmental Representative.
- .3 Upon completion of installation, notify Departmental Representative for review of completed work.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 35 33 – Health & Safety Requirements
- .3 Section 01 74 11 – Cleaning

1.2 REFERENCES

- .1 Project-Specific Hazardous Building Materials Assessment - Site Review Report - Header House Roof at Pacific Forestry Centre, Victoria British Columbia", prepared by Stantec Consulting Inc., dated July 13, 2017 (further referred to herein as the Assessment Report) - attached in Appendix 1 of the Project Specifications.
- .2 Definitions:
 - .1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
 - .2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
 - .3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.
 - .4 Hazardous Building Material: component of a building or structure that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when altered, disturbed or removed during maintenance, renovation or demolition.
- .3 Reference Standards:
 - .1 Canadian Environmental Protection Act, 1999 (CEPA 1999)
 - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
 - .2 Department of Justice Canada
 - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act) [1992], (c. 34).
 - .2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
 - .3 Canada Labour Code
 - .1 Part II - Occupational Health and Safety
 - .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .4 National Research Council Canada Institute for Research in Construction (NRC-IRC)
 - .1 National Fire Code of Canada (2010).

- .5 WorkSafe BC
 - .1 British Columbia's Occupational Health and Safety Regulation (BC Reg. 296/97, including amendments to date of work)
 - .2 "Safe Work Practices for Handling Asbestos" (2017)
 - .3 "Lead-Containing Paints and Coatings; Preventing Exposure in the Construction Industry" (2011)
 - .4 "Safe Work Practices for Handling Lead" (2017)
- .6 British Columbia Hazardous Waste Regulation (BC Reg. 63/88)
- .7 The Federal PCB Regulations (SOR/2008-273).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data for hazardous materials to be used by the Contractor to complete the Work:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets, and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS MSDS in accordance with Section 01 35 33 - Health & Safety Requirements to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.
 - .3 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle hazardous materials to be used by the Contractor to complete the Work in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver hazardous materials to be used by the Contractor to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .4 Storage and Handling Requirements:
 - .1 Co-ordinate storage of hazardous materials to be used by the Contractor to complete the Work with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.
 - .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

- .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
 - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
 - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
- .5 Transfer of flammable and combustible liquids is prohibited within buildings.
- .6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
- .7 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.
- .8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
- .9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
- .10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
 - .6 Store hazardous materials and wastes in secure storage area with controlled access.
 - .7 Maintain clear egress from storage area.
 - .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
 - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
 - .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
 - .11 When hazardous waste is generated on site:
 - .1 Co-ordinate transportation and disposal with Departmental Representative.
 - .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.

- .3 Use licensed carrier authorized by provincial authorities to accept subject material.
- .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.
- .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
- .6 Only trained personnel handle, offer for transport, or transport dangerous goods.
- .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
- .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.
- .12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .13 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

2 PRODUCTS

2.1 MATERIALS

- .1 Description:
 - .1 Bring on site only quantities hazardous material required to perform Work.
 - .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

3 EXECUTION

3.1 HAZARDOUS MATERIALS ABATEMENT

- .1 Scope of Abatement Activities:
 - .1 Abatement shall be conducted to handle, alter, remove and/or dispose of hazardous building materials as identified in the Assessment Report in accordance with applicable regulations, guidelines, standards and/or best practices for such work, where such identified hazardous building materials will be impacted (handled, altered, damaged, removed) by the Work.
 - .2 Contractor is responsible for reviewing plans, specifications and reports such that they understand the locations and amounts of

hazardous materials that will be impacted by the Work of this contract, and such that appropriate plans and budgets can be included in their overall bids.

- .3 The listing below is a summary of the identified hazardous building material categories and associated removal and disposal regulations, guidelines and/or standards.
 - .1 Asbestos-Containing Materials (ACMs)
 - .1 Refer to the Assessment Report for identities and locations of ACMs that may require disturbance during the Work.
 - .2 Actions that will disturb identified ACMs are to be conducted in accordance with the requirements of the 2017 WorkSafe BC publication "Safe Work Practices for Handling Asbestos", by appropriately trained personnel.
 - .3 Waste transportation to be conducted in accordance with BC Reg. 63/88 and the Federal Transportation of Dangerous Goods Regulation.
 - .4 Waste disposal to be conducted in accordance with BC Reg. 63/88.
 - .5 Notify Departmental Representative of suspected ACM discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from DCC Representative.
 - .2 Lead and Lead-Containing Paints (LCPs)
 - .1 Refer to the Assessment Report for identities and locations of lead-containing materials (including LCPs) that may require disturbance during the Work.
 - .2 Actions that will disturb lead-containing materials (including paints and materials coated with LCPs) are to be conducted in accordance with the requirements of the 2017 WorkSafe BC publication "Safe Work Practices for Handling Lead", keeping airborne exposure to lead dust to less than the 8-hour Occupational Exposure Limit (OEL) for lead of 0.05 milligram per cubic metre (mg/m³).
 - .3 Although LCPs and items coated with LCPs will be disturbed and/or removed for disposal during the Work, unless deemed necessary through risk assessment or cost analysis conducted by the Contractor, comprehensive removal of LCPs from items or surfaces is not expected to be required during the Work.
 - .1 Refer to the provisions of the 2017 WorkSafeBC document "Safe Work Practices for Handling Lead" for removal of LCPs from surfaces before any welding and torch-cutting, should the Contractor plan to use such methods to complete the Work.
 - .2 Contractor will be responsible for verification testing of surfaces where LCPs have been

removed. Confirmation of acceptable results is to be provided to the Departmental Representative for review before proceeding with any welding or torch-cutting on surfaces where LCPs were present.

- .4 Waste transportation to be conducted in accordance with BC Reg. 63/88 and the Federal Transportation of Dangerous Goods Regulation.
- .5 Waste disposal to be conducted in accordance with BC Reg. 63/88.
- .3 Polychlorinated Biphenyls (PCBs)
 - .1 Removal, alteration and/or disposal of PCB-containing equipment is not anticipated to be required during the Work.
- .4 Mould
 - .1 Removal, alteration and/or disposal of mould-impacted materials is not anticipated to be required during the Work.
- .5 Mercury
 - .1 Removal, alteration and/or disposal of mercury-containing equipment is not anticipated to be required during the Work.
- .6 Ozone-Depleting Substances (ODSs)
 - .1 Removal, alteration and/or disposal of refrigeration or air conditioning equipment with ODS refrigerants is not anticipated to be required during the Work.
- .7 Silica
 - .1 When silica-containing materials are to be disturbed and/or removed, ensure dust control measures are employed such that airborne silica dust concentrations do not exceed the exposure limit as stipulated by BC Reg. 296/97 (Cristobalite and Quartz - each 0.025 mg/m³). This would include, but not be limited to, the following:
 - .1 Providing workers with respiratory protection
 - .2 Wetting the surface of the materials, use of water or dust suppressing agents to prevent dust emissions
 - .3 Providing workers with facilities to properly wash prior to exiting the work area.

3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling.

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
- .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in timely fashion in accordance with applicable federal and provincial regulations.
- .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
- .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Hazardous waste burned for energy recovery.
 - .3 Lead-acid battery recycling.
 - .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION



1 GENERAL

1.1 DESCRIPTION OF WORK

- .1 Work in this Section includes but is not restricted to:
 - .1 New landings, and concrete accessories at new stairs.

1.2 REFERENCE STANDARDS

- .1 Concrete work shall conform to the requirements of the latest edition of the following standards unless otherwise required by this specification.
 - .1 BC Building Code
 - .2 ANSI/ACI 315, Details and Detailing of Concrete Reinforcement.
 - .3 ASTM A775/A775M, Specification for Epoxy-Coated Steel Reinforcing Bars.
 - .4 CAN/CSA-S269.3-M92, Concrete Formwork.
 - .5 CAN/CSA-A23.1/CAN/CSA-A23.2-09, Concrete Materials and Methods of Concrete Construction, Test Methods and Standard Practice for Concrete;
 - .6 CAN/CSA-A23.3-04, Design of Concrete Structures
 - .7 CAN/CSA-A3000-03 Cementitious Materials Compendium
 - .8 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

1.3 SCOPE OF WORK

- .1 Provide all labour, materials, services and equipment necessary and incidental for supply and installation of new concrete and reinforcing materials as specified herein and/or shown on the Drawings.

1.4 QUALITY CONTROL

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.

1.5 FIELD REVIEW

- .1 Provide adequate notice to the Departmental Representative to ensure the opportunity of reviewing all prepared areas prior to placement of new concrete.
- .2 Contractor to pay all costs incurred for uncovering and making good any work covered before required review is completed and approved by the Departmental Representative.
- .3 Payment for field review and specified testing to be by the Owner except for the following and as noted above:
 - .1 Testing required by laws, ordinances, rules, regulations or orders of the public authorities.

- .2 Field Review and testing performed exclusively for the Contractor's convenience.
- .3 Concrete cylinder compressive strength tests.
- .4 Where tests or review by the Departmental Representative reveals work not in accordance with Contract requirements, the Contractor shall pay costs for additional tests or field review that the Departmental Representative may require to verify acceptability of the corrected work.

2 PRODUCTS

2.1 CONCRETE MATERIALS - GENERAL

- .1 Formwork materials - use plywood and wood formwork materials to CSA-O121, CAN/CSA-O86.1 and CSA-O151.
- .2 Type 10 Portland cement in accordance with CAN/CSA-A5.
- .3 Supplementary Cementing materials in accordance with CAN/CSA-A3000-03.
- .4 Concrete Aggregates in accordance with CAN/CSA-A23.1 Clause 5.
- .5 Water to be potable in accordance with CAN/CSA-A23.1, Clause 4.
- .6 Air entraining admixtures in accordance with CAN3-A266.1.
- .7 Water reducing admixtures in accordance with CAN3-A266.2.
- .8 Superplasticizing admixtures in accordance with CAN3-A266.6.
- .9 Chlorides either as a raw material or as a constituent in admixtures shall not be used.
- .10 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.
- .11 Liquid membrane curing compounds shall not used. CAST-IN

2.2 CAST-IN PLACE CONCRETE

- .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1 to give following properties:
 - .1 Cement: Type 10 Portland cement.
 - .2 Minimum compressive strength at 28 days: 35 MPa.
 - .3 Class of exposure: C1.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 50 to 130 mm.
 - .6 Air content: 5 to 8%.
 - .7 Chemical admixtures: following admixtures in accordance with CAN3-A266.4, type, quantity, air entraining, super plasticizers.
 - .8 Maximum water to cement ratio: 0.4.

2.3 REINFORCING STEEL
AND ANCHORS

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada, unless indicated otherwise.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
- .5 Anchor bolts: 15mm (5/8") diameter by 200mm (8") long stainless steel bolts complete with nuts and washers, unless noted otherwise on drawings.

2.4 CONCRETE MIXING
EQUIPMENT

- .1 Pre-bagged concrete materials should be mixed in accordance with manufacturer's recommendations. Provide a drum mixer of adequate size for the amount of mixed material.

2.5 CONCRETE PLACING
AND FINISHING
EQUIPMENT

- .1 Concrete placing and finishing shall be in accordance with CAN/CSA-A23.1.

2.6 CONCRETE CURING
EQUIPMENT

- .1 Moist curing shall be in accordance with CAN/CSA-A23.1. Curing compounds shall not be used.
- .2 Only clean materials are to be used for curing.
- .3 Sufficient clean burlap and water sprinklers are to be provided to ensure that concrete can be moist cured as specified.

2.7 EQUIPMENT
APPROVAL AND
SUBSTITUTIONS

- .1 Departmental Representative may require the replacement of any unsatisfactory equipment during the work to ensure that the project specification is met.

3 EXECUTION

3.1 FIELD BENDING OF REINFORCEMENT

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars that develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.
- .2 When specified use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material as placed.
- .4 Ensure cover to reinforcement is maintained during concrete pour.
- .5 Protect epoxy coated portions of bars with covering during transportation and handling.

3.3 CONCRETE SLAB ON GRADE

- .1 Excavate existing soil and any other pre-existing finished surfaces as required down to undisturbed soil with minimum bearing capacity of 72kPa (1500psf). Confirm soil bearing adequacy with the Departmental Representative.
- .2 Proof roll exposed subgrade and locally remove all organic material and uncontrolled fill material.
- .3 Place minimum 150mm (6") of compacted well graded crushed gravel on prepared subgrade. Fill any voids with compacted gravel. Compact to 98% standard proctor in maximum 150mm (6") lifts.
- .4 Place concrete to extents and slopes as shown on the drawings. Minimum thickness unless noted otherwise is 100mm (4").
- .5 Concrete testing to be done unless Departmental Representative gives written approval otherwise. Air entrainment and slump testing to be done on each pour. Cast 3 test cylinders for 7-day and 28-day strength confirmation for each pour.
- .6 Reinforce as shown on the drawings. Use concrete bricks for rebar chairs. Minimum cover unless noted otherwise is 76mm (3") to soil, 50mm (2") to formed surfaces and 50mm (2") to concrete surface. Non-chaired reinforcement is not permitted and reinforcement must

- be chaired at spacing that is close enough to avoid permanent deflection of the reinforcement.
- .7 For slab on grade provide control joints at a maximum of 3650mm (12') o/c in both directions unless noted otherwise on the drawings. Unless noted otherwise, control joints are to be 3mm (1/8") wide by 1/4 of slab depth sawcut joints.
 - .8
 - .9 All free edges of concrete slabs, sidewalks and ramps are to have a rounded edge profiled with a 6mm (1/4") radius.
 - .10 Embedded steel components must be set in forms prior to concrete placement unless approval is obtained from the Departmental Representative.
 - .11 Finish exterior concrete with broom finish unless noted otherwise. Finish interior concrete with trowelled finished.
 - .12 As soon as the concrete surface has been finished and can bear weight without marking, carefully cover with burlap. Place burlap sections to overlap each other by 150mm (6") or more and to overlap concrete wall section by 300mm (1') or more at each side. Thoroughly wet the burlap with water before placing it on the concrete and keep saturated during curing period with a water spray sufficiently fine to avoid damaging the concrete surface. Cover burlap with polyethylene sheeting to maintain saturation of concrete during curing periods. Contractor shall ensure that the burlap is kept wet at all times during curing period. Curing to be in accordance with the manufacturer's recommendations and CSA A23.1. Wet cure for 7 days.

3.4 CONCRETE CURB PLACEMENT ON EXISTING CONCRETE SLAB

- .1 Locally excavate soil/overburden adjacent to new curb location back sufficiently to gain access to slab.
- .2 Remove loose and microfractured concrete, rust and contaminants from the area where new concrete will be bonded to existing concrete repair area by sandblasting or mechanical wire brush. Refer to article 3.2 Surface Preparation.
- .3 Unless specified otherwise place reinforcing steel as indicated on drawings and in accordance with CAN/CSA-A23.1. Unless specified otherwise drill and set 15M dowels into base concrete substrate at 450mm (18") on centres (maximum), with minimum 10mm (4") embedment. Provide minimum 2 dowels per curb. Set into slab with epoxy adhesive.
- .4 Install 15M horizontal reinforcing steel top bar with a minimum 50 mm cover, tied to the dowels. Prior to drilling conduct GPR survey to ensure dowels do not penetrate electrical conduits or other buried services. If the slab contains P/T cables then P/T cables prior to drilling.

- .5 Construct plywood forms to achieve the wall sizes indicated in the drawings. Minimum wall/curb thickness is 100mm (4") unless noted otherwise. Ensure forms can be completely filled with concrete by using chutes and other means of placement.
- .6 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .7 Ensure cover to reinforcement is maintained during concrete pour.
- .8 Erect forming to match original dimensions and as directed by the Departmental Representative.
- .9 Dampen substrate surface with clean water. Substrate to be saturated surface dry prior to application of concrete materials.
- .10 Apply bonding slurry to the repair surface in accordance with manufacturer's written specifications or CSA A23.1 Section 23.4.2.
- .11 Place and finish concrete in accordance with CSA-A23.1.
- .12 Allow concrete to cure to a minimum of 20MPa prior to stripping of forms.
- .13 Curing to be in accordance with CAN/CSA A23.1.
- .14 After stripping of forms grind any fins or protrusions within the repair area, and patch minor voiding.

3.5 ADDITION OF MIX WATER

- .1 Water to be used in accordance with manufacturer's written instructions.
- .2 Mix water addition shall conform strictly to CAN/CSA-A23.1.
- .3 No water shall be used to re-temper the concrete mix after the addition of superplasticizer.

3.6 DEFECTIVE CONCRETE AND PATCHING

- .1 Concrete repair surface to be free from open texturing, voids, and projections.
- .2 Repair of defective concrete work.
 - a) Repair defective areas while concrete is still plastic, otherwise wait until curing is completed. Use repair methods approved by Departmental Representative.
 - b) Grind off ridges and protrusions to match adjoining concrete as closely as possible.
- .3 Remove and replace defective concrete where directed. Removal and replacement procedures will be detailed by the Departmental Representative.

- .4 Repair of defective concrete work and/or removal and replacement of defective concrete prior to final acceptance of the work to be carried out at Contractor's expense.
- .5 Immediately after the removal of forms, all bolts, ties, nails or other metal not specifically required for construction purposes shall be removed or cut back to a depth of 25mm (1") from the surface of the concrete.

3.7 PROTECTION

- .1 All freshly placed and consolidated concrete shall be suitably protected during the curing period against damage from adverse weather conditions including freezing and hot weather. Protection of the concrete from adverse weather conditions is the sole responsibility of the Contractor and shall be conducted in strict accordance with CAN/CSA-A23.1.

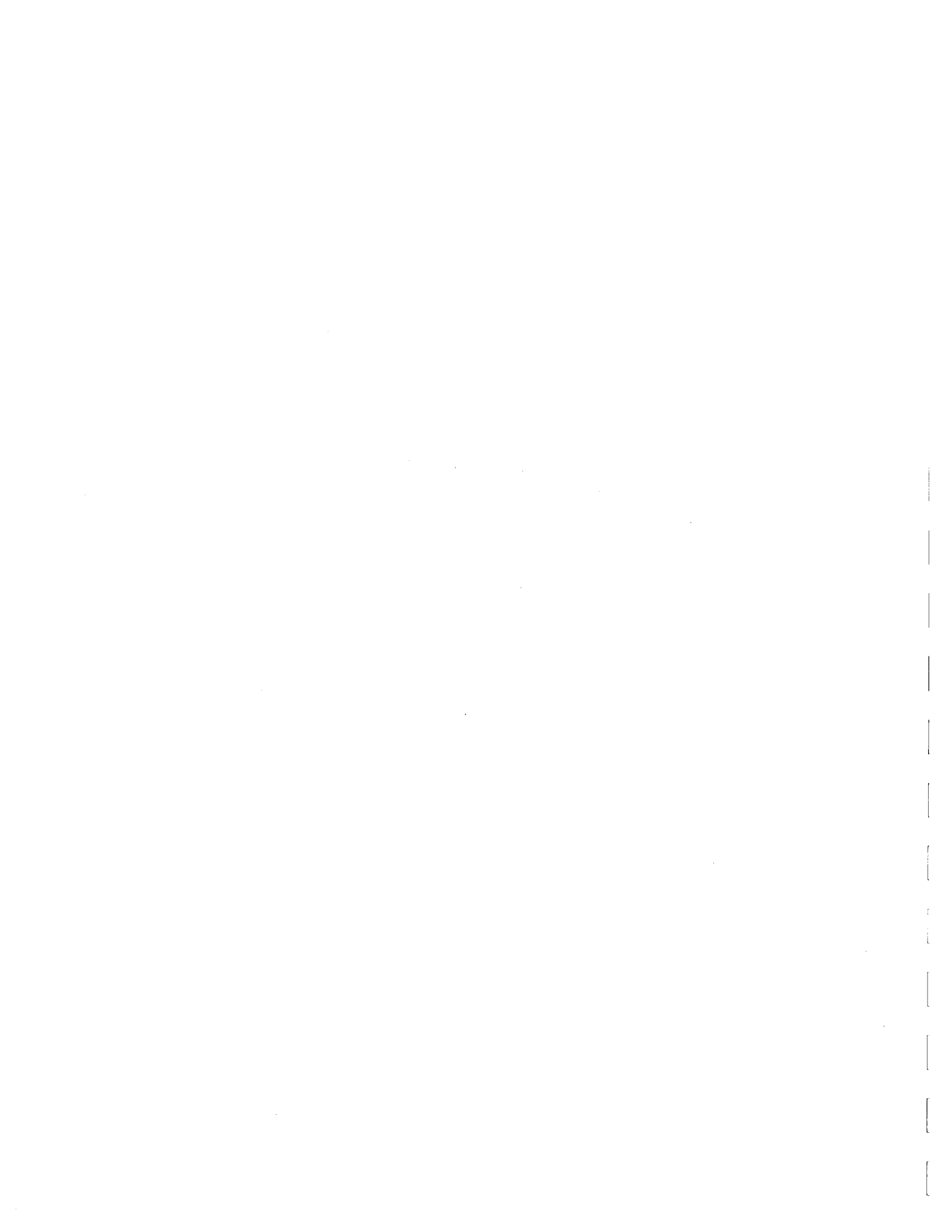
3.8 TOLERANCES

- .1 Tolerances shall conform to CAN/CSA-A23.1 or the requirements of these specifications, whichever are more rigorous.

3.9 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Departmental Representative in accordance with CAN/CSA-A23.1, if required.
- .2 Ship prepaid 3 test cylinders to Testing Laboratory for compressive strength testing. Take three cylinders from each batch or from first truck, if more than one load is placed in same day.
- .3 Contractor will pay for costs of compressive strength tests.
- .4 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete, which they represent.
- .5 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

END OF SECTION



1 GENERAL

1.1 REFERENCES

- .1 ASTM A53-[90b], Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A269-[92], Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A307-[92a], Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- .4 CAN/CGSB-1.40-[M89], Primer, Structural Steel, Oil Alkyd Type.
- .5 CAN/CGSB-1.108-[M89], Bituminous Solvent Type Paint.
- .6 CAN/CGSB-1.181-[92], Ready-Mixed, Organic Zinc-Rich Coating.
- .7 CAN/CSA-G40.21-[M92], Structural Quality Steels.
- .8 CAN/CSA-G164-[M92], Hot Dip Galvanizing of Irregularly Shaped Articles.
- .9 CAN/CSA-S16.1-[M89], Limit States Design of Steel Structures.
- .10 CSA W59-[1989], Welded Steel Construction (Metal Arc Welding).

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 11 55 – General Instructions and 01 33 00 - Submittal Procedures.
- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.3 PROTECTION

- .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
- .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

2 PRODUCTS

2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.21
 - .1 WF beams and HSS shapes: Grade 350W
 - .2 Channels, angles and plates: Grade 300W
- .2 Steel pipe: to ASTM A53
 - .1 Minimum yield strength is 241 MPa (36 ksi)

- .2 Standard weight unless noted otherwise.
- .3 Painting and surface preparation of steel sections and plates:
 - .1 For non-exposed conditions inside of heated walls provide single primer only.
 - .2 For steel in non-exposed conditions but subject to outside humidity levels provide a corrosion resistant primer only.
 - .3 For steel in exposed conditions provide hot dipped galvanized corrosion resistant coating.
- .4 Welding materials: to CSA W59.
- .5 Welding electrodes: to CSA W48 Series.
- .6 Bolts and anchor bolts: to ASTM A307.
- .7 Anchor bolts for exposed conditions to attach steel components to concrete.
 - .1 Provide stainless expansion anchor bolts conforming to AISI 304 or 316.
- .8 Grout for baseplates: non-shrink, non-metallic, flowable, 24h, MPa 15, pull-out strength 7.9 MPa.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .4 Bituminous paint: to CAN/CGSB-1.108.

2.4 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of bituminous paint:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.5 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7°C.
- .3 Clean surfaces to be field welded; do not paint.

2.6 PIPE RAILINGS

- .1 Steel:
 - .1 Pipe: 42.2mm outside diameter (OD), formed to shapes and sizes as indicated.
 - .2 Galvanize pipe railings after fabrication.

2.7 ACCESS LADDERS

- .1 Fixed Access Ladder: walk through type fixed access ladder with 1070mm minimum height handrails at top, complete with lockable climb guard at base of ladder. All-welded construction. Confirm sizes with fixed access ladder manufacturer prior to fabrication and the engineer engaged by the ladder manufacturer:
 - .1 Stringers: HSS 50mm (2") x 76mm (3") x 9mm (3/8")
 - .2 Ladder Rungs: 18" wide, 3/4" diameter, welded to stringers at 12" OC.
 - .3 Brackets: sizes and shapes as identified by ladder manufacturer, complete with fixing anchors.
 - .4 Non-Slip Safety Grating: 12-gauge safety grating with diamond pattern. 63mm (2-1/2") deep channel.
 - .5 Grab bars: 42.2mm outside diameter steel pipe.

3 EXECUTION

3.1 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.

- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

END OF SECTION

1 GENERAL

1.1 SUMMARY

- .1 Work includes labour, materials, equipment and services necessary for:
 - .1 Treatment of new lumber, plywood and cedar shingles.

1.2 REFERENCES

- .1 CAN/CSA 080 Series 080.1-08 – Specification of treated wood.
- .2 CAN/CSA 080 Series 080.2-08 – Processing and treatment
- .3 CAN/CSA 080 Series 080.3-08 – Preservative formulations
- .4 CAN/CSA 080 Series 080.4-08 – Hydrocarbon solvents
- .5 CAN/CSA 080 Series 080.5-08 – Additives
- .6 American Wood Preserver's Association Standards 1996.

1.3 QUALITY ASSURANCE

- .1 Inspection of products treated with preservative by vacuum-pressure impregnation will be carried out by an accredited inspection agency of the Canadian Wood Preservers Bureau (CWPB).
- .2 All treated lumber and plywood shall bear an identifying stamp in accordance with the CWPB requirements.

1.4 CERTIFICATES

- .1 For products treated with preservative by vacuum-pressure impregnation submit following information certified by authorized signing officer of treatment plant:
 - .1 Information listed in AWPA.M2 and revisions specified in CAN/CSA-O80 Series, Supplementary Requirement to AWPA Standard M2 applicable to specified treatment.
 - .2 Moisture content after drying following treatment with water-borne preservative.
 - .3 Acceptable types of paint, stain, and clear finishes that may be used over treated materials to be finished after treatment.

1.5 ENVIRONMENTAL AND SAFETY

- .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 acceptable to WCB. Ensure that building occupants, as well as adjacent materials including landscaping are thoroughly protected.

2 PRODUCTS

2.1 MATERIALS

- .1 In general all lumber is to be pressure treated.
- .2 All wood treatment to meet the requirements of CSA 080.1-08 for specific use and exposure. Where this specification is more strict than the CSA 080.1 standard then this specification will govern.
- .3 All lumber must be pressure treated after final cutting and fabrication whenever possible.
- .4 All wood products to be dried to below 19% moisture content after treatment by kiln drying. Wood products that require air drying instead of kiln dried are subject to the approval of the Departmental Representative. If treated wood becomes wet after treatment and kiln drying it will need to be air dried to below 19% moisture content before installation.
- .5 For the purpose of this specification, the use of borate treated wood products is limited to areas where the wood will not be subject to continual or direct water runoff as noted in the following sections.
- .6 Preservative treatment for new lumber is to be as follows:
 - .1 Framing inside of the moisture barrier and not subject to exterior humidity including stud walls, plates, headers, deck framing members (over living space): Borate (as B_2O_3) 2.8 kg/m^3 .
 - .2 Framing subject to direct moisture or used for rot repair of existing deteriorated framing (studs, plates, rafters, as directed by the Departmental Representative): ACQ-C or ACQ-D, 4.0 kg/m^3 .
- .7 Field treatment of treated lumber is to comply with CSA 080.3. Minimum of two coats.
- .8 Cedar roof shingles are to be CCA treated in accordance with CSA 080.1-97 – non-incised.
- .9 Preservative field treatment for ACQ or CCA treated lumber or plywood is to be with an organic solvent such as Copper Napthenate.
- .10 Preservative field treatment borate treated lumber is to be inorganic borate based insecticide / fungicide.
 - .1 Preservative field treatment to be dyed to allow easy identification of field treated wood areas. Dye additive to be:
 - .1 Sansin P-320
 - .2 Dye Tablets
 - .3 Food Colouring
 - .4 Approved alternative.
 - .2 Acceptable products:
 - .1 Boracol 20-2 BD Inorganic Boron Wood Preservative.
 - .2 Pre-Ser-Vor 25-3 Inorganice Boron Wood Preservative.
 - .3 Shellguard Insecticide and Fungicide Concentrate For Wood.

3 EXECUTION

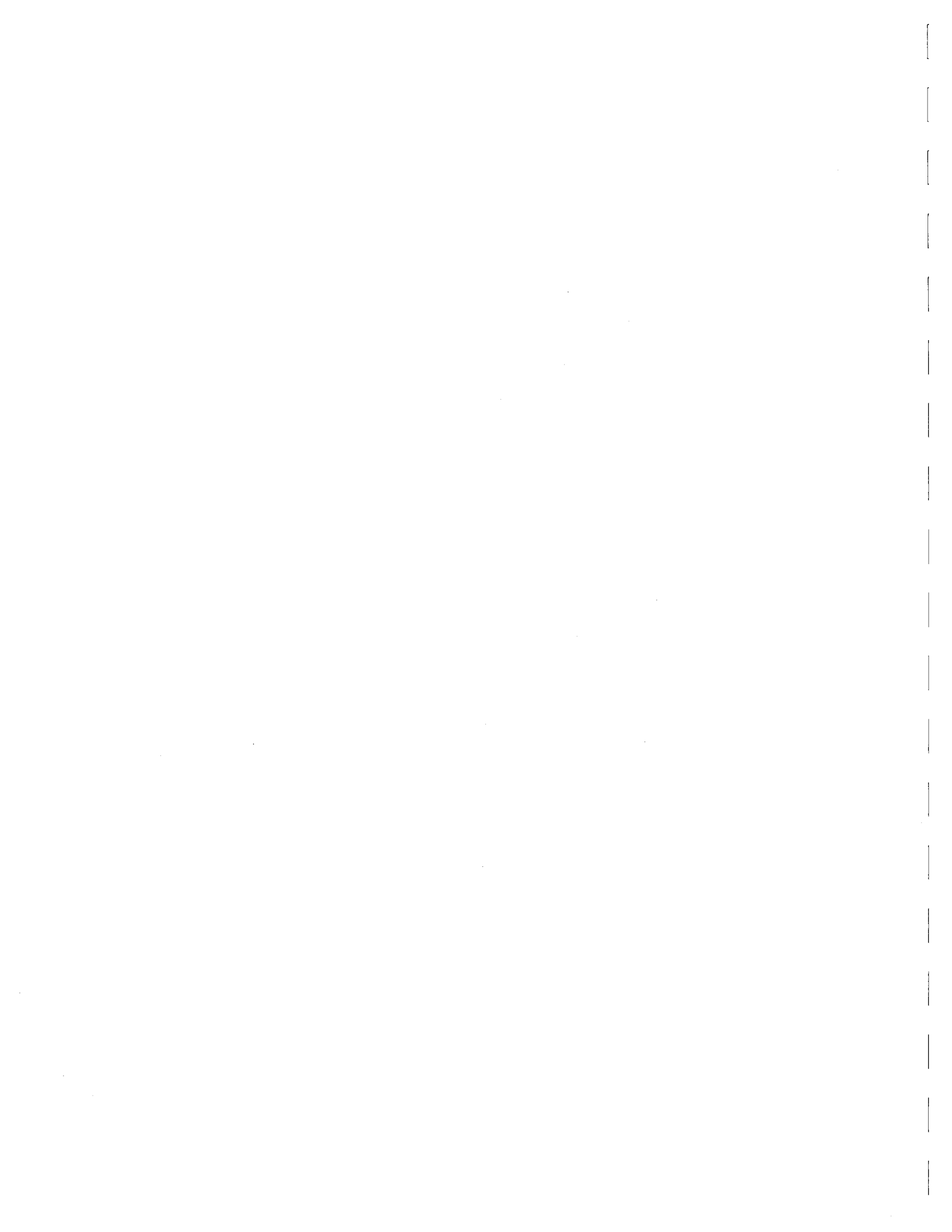
3.1 FACTORY APPLICATIONS OF PRESERVATIVES

- .1 All new lumber shall be factory treated to obtain an average net retention as specified.
- .2 Minimum depth of penetration in solid lumber is to meet CSA 080.1 Table 5 requirements but not less than 10mm for wood less than 115mm and not less than 13mm for wood greater than or equal to 115mm.
- .3 Retention values and depth of penetration is to be verified by assay method.
- .4 Following water-borne preservative treatment, dry all dimension lumber and plywood sheathing to maximum moisture content of 19%.

3.2 FIELD APPLICATION OF PRESERVATIVES

- .1 Field treat the following areas with the appropriate product:
 - .1 All cut ends of treated wood products.
 - .2 All bolt holes, chamfers, cuts, notches, etc to be thoroughly coated by submersing into preservative or other means acceptable to Departmental Representative if submersion is not practical.
 - .3 Existing dimension lumber and plywood that is not removed and replaced but exposed during the course of the retrofit may require treatment as directed by Departmental Representative. Existing treated lumber which is in good condition and not affected by mold will generally not require field treatment. Retained wood can be treated with either copper naphthenate or borate based preservative at the direction of the Departmental Representative. Retained wood that is field treated with copper naphthenate is to be dried prior to treatment. Retained wood that is field treated with borate based preservative can be damp prior to treatment. Before covering up retained wood it must be below 15% moisture content.
- .2 Field Application of wood preservatives to be applied by qualified personnel, in accordance with the manufacturers' instructions but not less than:
 - .1 Two coats applied by brush or roller. Underside of plywood decks can be done by spraying in two coats.
 - .2 Minimum 3 minute immersion of wood in preservative.

END OF SECTION



1 GENERAL

1.1 SUMMARY

- .1 Work included: Labour, materials, equipment and services necessary to provide rough carpentry for but not limited to roof overhangs, reframing, sheathing, parapet caps, and trims.

1.2 REFERENCES

- .1 BCBC – Part 9
- .2 CSA B111 Wire Nails, Spikes and Staples.
- .3 CAN/CSA-G164 Hot Dip Galvanizing of Irregularly Shaped Articles.
- .4 CAN/CSA 086.1 Engineering Design in Wood
- .5 CSA O121 Douglas Fir Plywood.
- .6 CAN/CSA-O141 Softwood Lumber.
- .7 CSA O151 Canadian Softwood Plywood.
- .8 CAN/CGSB-71.26 Adhesive for Field-Gluing Plywood to Lumber Framing and Metal Studs.
- .9 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.

1.3 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.

2 PRODUCTS

2.1 LUMBER MATERIAL

- .1 Unless otherwise specified, dimensions, thickness of materials must match existing or be in accordance with BCBC Part 9 Requirements as a minimum, whichever is more stringent.
- .2 All wood except cedar to be pressure treated in accordance with Specification 06 05 73 – Wood Treatment. See note on treatment of plywood sheathing in following section.
- .3 Framing lumber: to match existing size and grade, unless noted on the drawings or as directed by the Departmental Representative.
 - .1 Report any discrepancies in grading of existing lumber to Departmental Representative.

- .4 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .5 Furring, blocking, nailing strips, cants, curbs, fascia backing, and sleepers:
 - .1 Board sizes: No. 2 or better grade, Hem Fir.
 - .2 Dimension sizes: No. 2 or better grade, Hem Fir.

2.2 PANEL MATERIALS

- .1 Material requirements to meet BCBC Part 9 Requirements as a minimum unless specified otherwise.
- .2 Douglas fir plywood (DFP): to CSA O121, sheathing grade for walls, roofs and decks.
- .3 Canadian softwood plywood (CSP): to CSA O151, sheathing grade for walls, roofs and decks.
- .4 Typical edge requirement and minimum thicknesses of plywood are as follows unless noted otherwise in the drawings:
 - .1 Wall and parapet sheathing: 12.5 mm (1/2") thickness for stud spacing less than or equal to 610 mm (24") on centre unless noted otherwise. Square edges.
 - .2 Roof sheathing: 12.5 mm (1/2") with square edges can be used for rafter spacing up to 400 mm (16") and for rafter spacing of up to 610 mm (24") if the unsupported edges have H-clips or the sheathing has tongue and groove edges. Alternatively, square edge sheathing with 38x89 (2x4) blocking can be used in lieu of H-clips.
 - .3 Parapet cap liner flashing support: 15.5 mm (5/8") minimum.

2.3 ACCESSORIES

- .1 Corrosion resistant coatings on connectors and fasteners is as follows:
 - .1 For non-ACQ treated wood and in covered unheated areas not subject to direct moisture, all connectors to be a minimum of G185 hot dipped galvanizing and fasteners to be hot dipped galvanized. Screw fasteners are as noted below. Applies to balcony soffits, parapets, roof attics and unheated decks.
 - .2 For non-ACQ treated wood and in exposed conditions subject to direct moisture, all connectors to be a minimum of G185 hot dipped galvanizing and fasteners to be hot dipped galvanized. Screw fasteners are as noted below. Applies to exposed panels, fascia boards, cedar boards, deck boards.
 - .3 For ACQ treated wood in all locations all connectors and fasteners to be stainless steel unless noted otherwise. Do not combine stainless connectors with non-stainless fasteners.
- .2 Hot dipped galvanized fasteners to meet the following requirements:
 - .1 Hot dipped galvanizing to meet CAN/CSA-G164 and ASTM A653. Nails, spikes and lag screws when hot dipped galvanized are to meet ASTM A153 Class D at 1.0 oz of zinc

per sq ft of surface area of the fastener. Bolts, washers and nuts are to meet ASTM A153 Class D at 1.25 oz of zinc per sq ft of surface area of the fastener.

- .3 Corrosion protected screws:
 - .1 Corrosion resistant coatings for screws to meet the following requirement:
 - .1 For non-exposed conditions interior of the exterior sheathing plane and moisture barrier:
 - .1 Zinc plated with a yellow chromate conversion coating.
 - .2 Coating to meet 50 hours of salt spray test to ASTM B117.
 - .2 For exposed conditions and in covered unheated areas not subject to direct moisture exterior of the moisture barrier or subject to exterior humidity (not including ACQ wood applications)
 - .1 Zinc rich base coat with conversion coating and a baked on protective barrier coating.
 - .2 Coating to meet 500 hours of salt spray test to ASTM B117.
 - .3 For exposed conditions in exposed conditions subject to direct moisture (not including ACQ wood applications)
 - .1 Zinc rich base coat with conversion coating and a baked on protective barrier coating.
 - .2 Coating to meet 1000 hours of salt spray test to ASTM B117.
 - .4 Stainless steel screws:
 - .1 For exposed and unexposed conditions where screws are in contact with ACQ wood. Can also be used in fully exposed conditions subject to moisture such as deck boards.
 - .5 Stainless steel components to meet the following requirements.
 - .1 Nails and spikes (when stainless steel) are to be, 304 or 316 Series, purpose made for replacement of conventional nails.
 - .2 Stainless steel screws to be 304 or 316 Series.
 - .3 Stainless steel bolts to be 304 or 316 Series.
 - .4 Connectors (hangers, framing anchors) to be stainless steel Type 316L.
 - .6 Screws
 - .1 #8 minimum size wood screws with Robertson flat head.
 - .2 Fabricate to ANSI B18.6.4
 - .7 Nails, spikes and staples:
 - .1 Fabricate to CSA B111.
 - .2 Minimum nail length to be 64 mm (2.5"). Refer to the drawings for specific requirements.
 - .8 Bolts:
 - .1 Size to be 12.5 mm (1/2") minimum diameter unless indicated otherwise, complete with nuts and washers. Stainless steel, 304 or 316 series.

- .9 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws, explosive actuated fastening devices, recommended for purpose by manufacturer and as approved by the Departmental Representative.
- .10 Deck/balcony sheathing waterproof adhesive to CGSB 71-GP-26M, cartridge loaded.
- .11 Epoxy Anchors (Parapet wood framing connection to existing masonry structure, refer to sheet BE1.3, drawing D-1, D-2 and BE1.4, drawing D-11). Threaded rod and injectable adhesive are to be used for "epoxy anchor" type anchors.
 - .1 Threaded rod: Minimum tensile strength of 689 MPa (100 ksi) and minimum yield strength of 448 MPa (65 ksi). Anchor rods are to be embedded into adhesive mortar with plastic mesh screens if hollow masonry units are encountered.
 - .2 Adhesive: urethane methacrylate injectable adhesive of post-installed reinforcing steel, anchor rods and inserts into existing masonry and brick construction.
 - .3 Accessories as recommended by anchor manufacturer.
- .12 Expansion anchors (base of ladder connection to new concrete, refer to sheet BE1.4, drawing D-10).
 - .1 Expansion anchors: diameter as indicated in the drawings, type 316 stainless steel.
 - .2 Accessories as recommended by anchor manufacturer.

3 EXECUTION

3.1 GENERAL

- .1 Comply with requirements of BCBC Part 9 minimum, supplemented by the following paragraphs and contract drawings.
- .2 Protect new wood products, connectors and fasteners from weather and moisture.
- .3 All lumber must be below 19% moisture content at the time of installation.
- .4 Treated wood must be below 15% moisture content at the time of installation.
- .5 Lumber and plywood that is installed must be protected from moisture. Any lumber that becomes wet must be dried to the moisture contents noted above before covering up.

3.2 REPLACEMENT OF DAMAGED FRAMING

- .1 Where directed by the Departmental Representative, replace existing damaged lumber framing with new lumber to match size and grade of existing element, unless otherwise shown on the drawings or as directed by the Departmental Representative.

- .2 Replace entire length of damaged member. No splicing or scabbing to existing elements allowed without prior approval of Departmental Representative.
- .3 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .4 Countersink bolts where necessary to provide clearance for other work.
- .5 Provide temporary support and shoring in accordance with WCB for the structure while working on structural members. Notify Departmental Representative of any conditions, which appear to be unsafe.
- .6 Level and re-align building structure and framing to original grades, levels and elevations true, plumb and square as required to correct shifting due to deterioration of structural elements.

3.3 WALL AND PARAPET SHEATHING

- .1 Install new plywood sheathing over exterior stud walls and parapets. Thickness of new plywood to match existing unless noted otherwise.
- .2 Install plywood sheathing so that vertical joints are staggered.
- .3 Provide an edge gap of 2 mm (3/32") between sheets of plywood unless wood is exposed to moisture in which case increase edge gaps to 3 mm (1/8"). Maximum gap is 6 mm (1/4").
- .4 Fasten plywood sheathing to parapet at 150 mm (6") on centre along the perimeter of the sheet and at 300 mm (12") on centre along intermediate supports.

3.4 PLYWOOD ROOF SHEATHING

- .1 For roofs where partial sheathing replacement is required for decayed material:
 - .1 Reconstruct damaged framing areas including structural members to provide full support of the sheathing as instructed by the Departmental Representative. Match existing sheathing thickness unless noted otherwise. Slope new sheathing to match existing slopes. No sheathing replacement is to be done on the main roofs until the Departmental Representative has approved the repairs.
- .2 Install new sheathing with surface grain at right angles to existing roof joists.
- .3 Install new sheathing so that end joints parallel to joists are staggered with minimum off-set of 400 mm (16") from existing plywood joints.
- .4 Provide an edge gap of 3/32" (2 mm) between sheets of plywood unless wood is exposed to moisture in which case increase edge gaps to 1/8" (3 mm). For tongue and groove joints provide 1 mm (1/16") gap.

- .5 Nailing to existing joists: fasten with 76 mm (3") common nails at 150 mm (6") on centre at panel edges and at 300 mm (12") on centre at intermediate joists.
- .6 Nailing perpendicular to joists: #8 x 25 mm (1") long screws 150 mm (6") at unsupported panel edges and 76 mm (3") and 150 mm (6") at roof edge and other solid supports.

3.5 INSTALLATION OF STRAPPING, FURRING AND BLOCKING

- .1 Fasten strapping to sheathing and support framing (where possible) at 200mm (8") o.c. horizontally and vertically.
- .2 Soffit and overhang locations: Fasten strapping to sheathing and support framing (where possible) at 150 mm (6") o.c. at ends and corners, and 300 mm (12") o.c. along intermediate supports with a minimum #10 – 63 mm (2.5") screws.
- .3 Install furring and blocking as required to space-out and support wall and ceiling finishes, facings, fascia, soffit, and other work as required.
- .4 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .5 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .6 Install sleepers, wood cants, fascia backing, nailers, curbs and other wood supports as required.
- .7 Where rim joists are removed, install new rim joists to match. Ensure new rim joist is installed tight between top of wall plate the underside of floor sheathing.

END OF SECTION

1 GENERAL

1.1 SUMMARY

- .1 Work includes labour, materials, equipment and services necessary to provide low slope roof renewals for the building known as the Header House at the Pacific Forestry Centre complex.

1.2 REFERENCES

- .1 Applicable municipal by-law and building code.
- .2 CSA A123.3-M1979 Asphalt or Tar Saturated Roofing Felt.
- .3 CAN/CSA-A123.21-14 - Standard test method for the dynamic wind uplift resistance of membrane-roofing systems
- .4 CSA A123.4-M1979 Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.
- .5 CAN/CGSB-51.20-M87 Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .6 Canadian General Specification Board (CGSB) standards CGSB 37.56-M
- .7 Roofing Contractors' Association of B.C (RCABC), Roofing Practices Manual.
- .8 National Building Code of Canada 2015 (NBC)

1.3 QUALIFICATIONS

- .1 Roofing Contractor is required to submit evidence that the contractor has successfully completed similar work over a period of not less than 5 years.
- .2 The Contractor must be officially recognized as an authorized contractor by the roofing materials manufacturer and warranty provider.

1.4 LABORATORY TESTING

- .1 If required by Departmental Representative, manufacturers of Elastomeric Asphalt materials to provide, at no cost, the results of tests and chemical analysis on the Elastomeric Asphalt materials supplied.

1.5 JOB MOCK-UP

- .1 Fabricate, install and pay for mock-ups as required. Mock-ups will be used to confirm details as required by the Departmental

Representative. Mock-ups may remain as part of the finished product if found acceptable by the Departmental Representative.

- .2 A mock-up plan is required outlining a coordinated review of multiple mock-ups in order to reduce redundant site visits by the Departmental Representative.

1.6 QUALITY ASSURANCE

- .1 Installer Qualifications: Only competent, qualified tradesmen experienced with membranes shall execute the work of this section.
 - .1 A crew of qualified tradesmen is defined as follows:
 - .1 The foreman shall hold a three-year Apprenticeship Certificate; at least one other person shall hold a three year Apprenticeship Certificate; the balance of the crew should have completed some portion of the Apprenticeship program, but shall at least have submitted application for the certification as "Roofer". A Journeyman Certificate is acceptable in lieu of an Apprenticeship Certificate.
 - .2 Confirm that surfaces to which modified membrane is to be applied are in a condition suitable for this application. Notify the Departmental Representative in writing if substrate is unacceptable.
 - .3 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
 - .4 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.
 - .5 All work to be performed in conformance with PWGSC Technical Guidelines.

1.7 SUBMITTALS/SHOP DRAWINGS

- .1 Submit material bills of lading to the Departmental Representative, as requested.
- .2 Submit minimum 6" x 6" material samples and data sheets for all roof membrane products to the Departmental Representative.
- .3 Provide tapered insulation/cricket shop drawings, as required.

1.8 STORAGE AND HANDLING

- .1 Materials shall be stored on the site in a suitable location approved by Departmental Representative.
- .2 Provide and maintain dry, off-ground weatherproof storage.

- .3 Deliver and store all materials in their original packaging, bearing the Manufacturer's name, related standards and any other specifications or reference standards.
- .4 Protect and permanently store all materials in a dry, well ventilated and weatherproof location. Remove from this location only materials to be used the same day. Keep materials away from open flame or welding sparks. Prevent water-based materials from freezing.
- .5 Store adhesives and solvent based mastics at a minimum of 5° C
- .6 Store materials delivered in rolls carefully on end, with selvage edges up.
- .7 Avoid stockpiling materials on roof and decks, which could at certain places affect the loading of such roofs. If required, the contractor shall make good any deterioration or damage resulting from his work in progress.
- .8 Place plywood runways or similar over completed work and adjacent assemblies to enable movement of materials and other traffic in order to prevent membrane damage during the course of the work.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.
- .2 Before commencing work, Contractor to ensure that forecasted meteorological conditions shall permit work to be carried out without interruption during the course of the day.
- .3 Do not install materials when temperature remains below +5 C for torch application, or an equivalent temperature allowing for wind-chill factor.
- .4 Minimum temperature for solvent-based adhesive is -5 C.
- .5 Decks, insulation, or any part of the work will not be left unprotected at the end of each working day or during any interruption of work.
- .6 If water penetrates through the assembly due to inadequate protection, Contractor to cut and inspect damages, remove, replace and re-install all damaged materials (interior and exterior) at his own cost, to eliminate all traces of water in the assembly. No costs to be borne by Canada. Roofing must be watertight at end of each shift.

1.10 PROTECTION

- .1 Fire Extinguishers: maintain one cartridge operated type with shut-off nozzle, ULC labeled for A, B and C class protection. Size 2.25 kg on roof per torch applicator, within 10 m of torch applicator.
- .2 Maintain fire watch for a minimum of 2 hours after each day's roofing operations cease. At the end of the day use a heat detection gun to identify smoldering or concealed fire. The inspection must be

carried out by an employee of the roofing contractor familiar with this type of work.

- .3 Provide a written roof/deck fall protection plan in conformance with WorkSafe BC and OH&S Regulations. A copy of the fall protection plan must be available at the workplace before work with a risk of falling begins. The plan shall include but is not limited to the following:
 - .1 A roof/deck plan sketch indicating the fall hazards expected in each work area.
 - .2 The fall protection system or systems to be used in each area.
 - .3 The procedures to assemble, maintain, inspect, use and disassemble the fall protection system or systems.
 - .4 The procedures for rescue of a worker who has fallen and is suspended by a personal fall protection system or safety net, but is unable to effect self-rescue.
 - .5 Location of nearest medical facility, complete with shortest route directions.
- .4 Protect all adjacent surfaces from any damage that may result from the work of this section. If required, the contractor shall make good any deterioration or damage resulting from his work in progress.
- .5 Protect complete perimeter of the roof and any opening in the roof with guards or guardrails to prevent the possibility of accidents.
- .6 All damage to interior conduit or equipment caused by roofing work shall be repaired at no additional cost to Canada.

1.11 WARRANTIES

- .1 Provide standard RCABC RoofStar 10-Year Guarantee, copies of Inspection Reports, listing and literature of all products used, and Roof Maintenance Guide.
 - .1 Total RoofStar fees associated with RCABC RoofStar Guarantee are to be borne by the Contractor. RoofStar fees include, but are not limited to:
 - .1 RCABC Guarantee Fee
 - .2 Inspection Fees
 - .3 Inspection Travel Fees
 - .4 2/5/8 year Reinspection Fees
 - .2 The membrane manufacturer will issue a written warranty document (Platinum Privilege), valid for a 10-year period, with 5-year no cost option (material, labour and workmanship), stating that it will repair any leaks in the roofing membrane to restore the roofing system to a dry and watertight condition, to the extent that manufacturing or installation defects caused such water infiltration. The warranty must cover the total cost of repair(s) during the entire warranty period.
 - .3 Costs for all warranties to be included in the contract sum.
 - .4 Contractor to notify membrane manufacturer of roof renewal project within 1 week of project start date.
 - .5 All warranties to commence at Date of Substantial Performance.

1.12 COMPATIBILITY

- .1 Compatibility between components of the roofing system and adjacent assemblies is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.

1.13 MANUFACTURER'S REPRESENTATIVE

- .1 Manufacturer Requirements:
 - .1 The primary roof/deck waterproofing materials' manufacturer shall provide direct trained company personnel to attend necessary job meetings, perform base sheet and cap sheet inspections and conduct a final inspection upon successful completion of the project.
 - .2 Manufacturer's representative to provide a written copy of the report to the Departmental Representative after each visit to the site.
- .2 Contractor to permit and facilitate access to site and roof, at all times, by above mentioned manufacturer's representative.

2 PRODUCTS

2.1 2-PLY MODIFIED BITUMEN SYSTEMS

- .1 The following outline the various project roof systems
 - .1 Two-Ply SBS Modified Asphalt Membrane Conventional Roof System over wood substrate (**R-1**). Existing assembly to be removed.
 - .2 Vapour Barrier Base Ply (**R-1**): Roofing membrane composed of SBS modified bitumen and a polyester and glass mat composite reinforcement. Top and bottom surfaces: sanded surface/silicone release film (self-adhesive). The surface must be marked with three (3) chalk lines to ensure proper roll alignment:
 - .1 Minimum thickness 2.5mm.
 - .2 In conformance with CGSB 37.56-M (9th draft)
 - .3 In conformance with ASTM D6163
 - .3 Base Ply for Field Areas (**R-1**): Roofing membrane composed of homogeneous SBS modified bitumen with no oxidized asphalt content– reinforcement to be impregnated with SBS modified bitumen. The membrane must also meet the following criteria:
 - .1 Thickness (avg) 2.5 mm (ASTM D 5147)
 - .2 SBS content: 11-13%
 - .3 Maximum filler content in elastomeric blend: 35% by weight
 - .4 Low Temperature flexibility at -26C Pass (ASTM D 5147)
 - .5 Ultimate Elongation (avg) @ 23C: 50% (ASTM D 5147)
 - .6 Dimensional Stability (max) 0.1% (ASTM 5147)

- .7 Reinforcement: fiberglass scrim/fiberglass mat or other meeting the performance and dimensional stability criteria.
 - .8 Top and bottom surfaces: silica parting agent/polyolefin film
 - .9 Compound Stability (Min): 121C (ASTM 5147)
- .4 Stripping Ply for Field Areas (R-1): Roofing membrane composed of homogeneous SBS modified bitumen with no oxidized asphalt content– reinforcement to be impregnated with SBS modified bitumen. The membrane must also meet the following criteria:
- .1 Thickness (avg) 2.5 mm (ASTM D 5147)
 - .2 SBS content: 11-13%
 - .3 Maximum filler content in elastomeric blend: 35% by weight
 - .4 Low Temperature flexibility at -26C Pass (ASTM D 5147)
 - .5 Ultimate Elongation (avg) @ 23C: 50% (ASTM D 5147)
 - .6 Dimensional Stability (max) 0.1% (ASTM 5147)
 - .7 Reinforcement: fiberglass scrim/fiberglass mat or other meeting the performance and dimensional stability criteria.
 - .8 Top and bottom surfaces: silica parting agent/polyolefin burn-off film
 - .9 Compound Stability (Min): 121C (ASTM 5147)
- .5 Cap Sheet Ply and Cap Sheet Stripping Ply (R-1) Roofing membrane composed of homogeneous SBS modified bitumen with no oxidized asphalt content– reinforcement to be impregnated with SBS modified bitumen. The membrane must also meet the following criteria:
- .1 Thickness (avg): 4.1 mm (ASTM D 5147)
 - .2 Thickness at seldge (avg): 3.1 mm
 - .3 SBS content: 11-13%
 - .4 Maximum filler content in elastomeric blend: 35% by weight
 - .5 Low Temperature flexibility at -50C Pass (ASTM D 5147)
 - .6 Ultimate Elongation (avg) @ 23C: 90% (ASTM D 5147)
 - .7 Dimensional Stability (max) 0.5% (ASTM 5147)
 - .8 Reinforcement: fiberglass scrim/fiberglass mat or other meeting the performance and dimensional stability criteria.
 - .9 Top and bottom surfaces: No. 11 ceramic granules / polyolefin burn-off film
 - .10 Compound Stability (Min): 121C (ASTM 5147)
- .6 Waterproofing Accessories:
- .1 Primer: An asphalt solvent blend designed to prepare metal, concrete and masonry surfaces, to ASTM D41, as supplied by the manufacturer
 - .2 Primer: To be used for self-adhered membranes – a solvent based quick drying high-tack primer specifically designed for manufacturers membrane.
 - .3 Mastic: General purpose mastic composed of SBS modified bitumen, non-asbestos fibers, fillers and petroleum solvents:
 - .4 PMMA Flashing: as supplied by membrane manufacturer, compatible with membrane.

- .5 Pitch Pocket Filler: Polyurethane pitch pocket system made of pre-fabricated modules of various sizes, with interlocking compounds and solvent-free mastic, composed of two-component urethane and mono-component elastomeric sealant.

2.2 ACCESSORY MATERIALS

- .1 Roof Drains:
 - .1 Spun copper drain with cast aluminum grate and membrane clamping ring, c/w blue seal and clamping ring.
 - .2 New drain body pipe to sleeve into existing drain pipe whenever possible. Install blue seal where possible to prevent back flow leakage and dissimilar metal contact.
 - .3 All drains are to be set into a 24" x 24" minimum sump to ensure positive flow to drain assembly.
 - .4 All work to be in accordance to the British Columbia Plumbing Code.
- .2 Roof Drains < than 3" diameter: Hot welded copper type to suit. Provide multiple o-rings onto drain stem to prevent dissimilar metal contact and to reduce the potential for leakage resulting from backflow. Membrane termination to be sealed with PMMA membrane.
- .3 Scupper Drains:
 - .1 16oz. Copper, all seams in box scuppers to be hot welded (brazed) and capable of resisting 425 degrees C, c/w clamping ring.
 - .2 Install with minimum 2% slope c/w drip edge.
- .4 Overflow Scuppers:
 - .1 16oz. Copper, all seams in box scuppers to be hot welded (brazed) and capable of resisting 425 degrees C, c/w PMMA seal at leading edge.
 - .2 Install with minimum 2% slope c/w drip edge.
- .5 Asphaltic Overlay Board (adhered): Non-organic asphalt core sandwiched between two asphaltic saturated fibreglass liners (5mm, 3/16" thick). Adhere with polyurethane adhesive ribbons at 150mm (6") o/c.
- .6 EPS insulation (Type 2): Closed cell expanded polystyrene (EPS) to CAN/ULC-S710, Type 2, thermal resistance of RSI 0.70 per 25mm (R4.04 per inch). Insulation to be set into ribbons of adhesive evenly spaced at 150mm (6") o/c.
- .7 Tapered Insulation (sloped crickets): Closed cell expanded polystyrene (EPS) to CAN/ULC-S710, Type 2.
- .8 Insulation (Top layer): Mineral wool with top layer of bitumen to meet ASTM C518, R 3.5 per inch minimum. Provide 2" of insulation with bitumen top layer, set into two component polyurethane adhesive ribbons evenly spaced at 150mm (6"). Provide 25mm (1")

- at all drain sump locations with mineral cants and fireguard tape over joints to provide smooth transition.
- .9 Insulation Adhesive: Quick curing, two component bead applied polyurethane adhesive.
 - .10 Plumbing Vent Flashing (stack): spun aluminum vent stacks with vandal proof aluminum caps. Caps to be riveted to stack to prevent removal. Allow for stack extensions as required to facilitate insulation thickness.
 - .11 Roof Anchor Jack Flashing: Spun aluminum stack jack flashing with EPDM triple pressure grommet seal. Install heat-shrink gasket over grommet seal.
 - .12 Fireguard Tape: Inorganic glass mat reinforcing mat coated with SBS modified bitumen:
 - .1 Thickness: 1.5 mils
 - .2 Width: 150mm (6")
 - .13 Ceramic Granules: No #11 Ceramic granules matching the granule surfacing of the finish ply
 - .14 Sealant: For sealing SBS membrane leading edges. Single component, paintable, elastomeric tri-polymer sealant primarily designed to seal leading edges and small cracks SBS modified bitumen roof membranes,
 - .15 Filter Fabric: Industrial synthetic fabric consisting of high density polyethylene tapes coated on one side with low density polyethylene. Filter fabric to contain ultraviolet inhibitors and be suitable for outdoor applications
 - .16 Drain Mat: High strength drainage panel consisting of a high compressive strength polypropylene core (ASTM D 1621) with factory laminated geotextile. Flow rate minimum 5690 L/min/m² per ASTM D 4491)

3 EXECUTION

3.1 WORKMANSHIP

- .1 Install roof/deck waterproof membrane in accordance with applicable standard in R.C.A.B.C. Roofing Practices Manual, the membrane manufacturer's requirements, or this specification; whichever is more stringent.
- .2 Install primer for asphalt waterproof membrane in accordance with CGSB 37-GP-15M.
- .3 Install waterproofing elements on clean dry substrate in accordance with the manufacturer's written instructions. Where there is a discrepancy between the manufacturers' recommendations and the specifications, the more stringent will govern.
- .4 Waterproofing work shall be scheduled and performed in a sequence such that no component of the assembly is left unprotected when operations are interrupted.

3.2 PROTECTION

- .1 Cover walls and adjacent work where materials are hoisted or used.
- .2 Use warning signs and barriers. Maintain in good order until completion of work.
- .3 Clean off drips and smears of bituminous material immediately.
- .4 Ensure installed membrane is protected during the course of the work. Place plywood runways, or similar, over completed work as required to ensure the movement of materials and other traffic does not damage completed work.
- .5 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for work areas and materials out of storage. Maintain area in a watertight condition at all times.
- .6 Provide fireguard for all adjacent surfaces to protect from any damage that may result from the work of this section, as required. The contractor shall make good any damage resulting from the work at no cost to Canada.

3.3 EXISTING MEMBRANE REMOVALS

- .1 Fully remove existing roof membrane and assemblies as outlined in project documents.

3.4 EXAMINATION OF SUBSTRATE

- .1 Examine application substrate and immediately inform Departmental Representative in writing of any defects.
- .2 Contractor shall inspect and approve deck condition and water tightness of all drainage elements prior to commencement of work. Commencement of work implies contractor acceptance of the substrate surface condition.

3.5 2 PLY MODIFIED BITUMINOUS MEMBRANE

- .1 Details of waterproof membrane are for schematic purposes. Membrane systems to be installed in accordance with intent of details, along with manufacturer's recommendations and RCABC guidelines. The most stringent shall apply.
- .2 Use materials in accordance with manufacturer's recommendations.
- .3 Etch and prime all metal to receive direct membrane application.
- .4 Remove only as much of the existing roof/deck membrane as can be stripped in with base stripping ply in the same day. At the conclusion of each day's work provide water tight "night seals" that facilitate the continuation of the roof/deck membrane work the next day.

- .5 Installation of self-adhesive vapour barrier base sheet, (R1 roof area).
 - .1 Prime substrate.
 - .2 Unroll and position the roll on a surface already coated with primer.
 - .3 Peel off the corner of the silicone paper to allow membrane to adhere to the surface.
 - .4 Peel off silicone paper at 45° angle to avoid any wrinkles in the membrane. Maintain tension of the roll during silicone paper removal to avoid wrinkles.
 - .5 Roll all laps to ensure positive adhesion.
 - .6 Extend a minimum of 38mm (1 ½") above the finished height of all insulation.
 - .7 Strip in all wood support blocking to maintain vapour/air barrier continuity. Provide spray foam or sealant as required for air barrier continuity.
 - .8 Provide sheet metal membrane support at penetrations, as require, in order to maintain a continuous membrane installation (air barrier continuity). Membrane is to tie-into penetrations and be sealed with a silicone sealant ramp bead.
 - .9 Hot trowel and seal all stripping seams and transitions to ensure water and air tight installation.
- .6 Installation of Tapered Insulation (R1 roof area)
 - .1 Adhere all insulation into adhesive ribbons at 150mm (6") o/c.
 - .2 Ensure all board joints are staggered to minimize thermal bridging and are tight fitting. Board gaps are not acceptable and will need to be sliver filled with similar insulation or replaced.
- .7 Installation of Insulation (R1 roof area)
 - .1 Adhere all insulation into adhesive ribbons at 150mm (6") o/c.
 - .2 Adhere sloped EPS crickets per sloped insulation drawings.
 - .3 Adhere 50mm (2") mineral wool insulation over EPS, set in adhesive ribbons at 150mm (6") o/c. ensuring board joints are offset from underlying boards.
 - .4 Ensure all board joints are staggered (offset from underlying boards) to minimize thermal bridging and are tight fitting. Board gaps are not acceptable and will need to be sliver filled with similar insulation or replaced.
- .8 Installation of base sheet ply:
 - .1 Prime substrate. Provide fireguard protection, as required. Ensure primer is dry prior to application of base sheet.
 - .2 Starting at low point of roof, perpendicular to slope, unroll base sheet dry on deck, align, and reroll from both ends. Care must be taken to ensure good alignment of the first roll.
 - .3 Install the base sheet by heating the backside of the membrane roll so that there is a free flowing puddle of asphalt in front of the roll at all times. Ensure there is a minimum bleed out of 3mm (1/8") at all seams.
 - .4 Terminate base sheet tight to the bottom of vertical returns.

- .5 Application shall provide a smooth surface without air pockets, wrinkles, fishmouths or tears.
 - .6 Provide gussets over the base sheet at all inside and outside corners. Gusset size to be 100mm (4") wide x 150mm (6") long facilitating a 50mm (2") return on either side of the corner. Extend gusset 50mm (2") on to horizontal surface.
 - .7 Cut a dog ear angle at the end laps on overlapping selvage edges.
 - .8 Seal T-laps immediately following sheet application by applying pressure with a round nosed trowel.
 - .9 End laps to be staggered a minimum of 915mm (36").
 - .10 Application shall provide a smooth surface without air pockets, wrinkles, fishmouths or tears.
 - .11 After installation of the base sheet, check all lap seams on the base sheet.
- .9 Installation of base sheet stripping ply (flashing).
- .1 Upon the completion of the base ply field membrane, but before application of the second ply, provide membrane flashings at the intersection of the membrane and walls, curbs, and where a vertical member passes through the roof.
 - .2 Ensure that substrates are dry, smooth, even and adequately covered with overlay fireguard protection.
 - .3 At perimeters, install base sheet flashing ply up vertical surfaces a minimum of 200mm (8") and extend onto the horizontal surface of the roof/deck a minimum of 100mm (4").
 - .4 Install a 915mm (36") by 915mm (36") base sheet flashing ply at all vents, and other protrusions and penetrations as required.
 - .5 Base sheet stripping to be applied by torch. Warm SBS base sheet prior to application and thoroughly roll vertical applications and seams after application. Ensure laps are fully welded.
 - .6 Lap side joints 75mm (3"). Stagger laps joints a minimum of 300mm (12") from base sheet field laps.
 - .7 Exert pressure on the flashing sheet during application with a wet sponge, or similar, to ensure complete contact with the wall/roof surfaces to ensure no sags, blisters, fishmouths or wrinkles exist.
 - .8 Membrane manufacturer to review and approve base sheet and base sheet flashing ply installation prior to cap sheet installation.
 - .9 Install base sheet stripping at all drains, scuppers, vents, and other protrusions as required.
 - .10 Membrane manufacturer to review and approve, in writing, base sheet installation prior to cap sheet installation.
- .10 Installation of cap sheet ply:
- .1 Once the base sheet has been applied and does not show any defects, the cap sheet can then be laid.
 - .2 Cap sheet shall be unrolled starting from the low point on the roof. Cap sheet shall be rerolled from both ends prior to torching. Care must be taken to ensure alignment of the first roll.

- .3 Cap sheet shall be torch welded in accordance with the recommendations of the membrane manufacturer, to the base sheet membrane. During this application, both surfaces shall be simultaneously melted, forming an asphalt bead that shall be pushed out in front of the cap sheet.
 - .4 Care must be taken not to burn the membranes, and their respective reinforcements.
 - .5 Base and cap sheet seams shall be staggered a minimum of 300 mm (12").
 - .6 Cap sheet shall have side laps of 90mm (3-1/2") and end laps of 150mm (6"). Surface granules on end laps shall be embedded prior to installation of following sheet. Touch up seams with loose granules.
 - .7 End laps to be staggered a minimum of 915mm (36").
 - .8 Terminate field cap sheet edges at the base of the retained vertical membrane at the perimeter.
 - .9 Ensure the membranes are properly welded, without air pockets, wrinkles, fishmouths or tears.
 - .10 After installation of the cap sheet, check all lap seams on the cap sheet.
 - .11 During installation, ensure there is a minimum 2mm bleed out at all seams.
 - .12 Membrane manufacturer to review and approve, in writing, cap sheet installation.
- .11 Installation of cap sheet stripping ply (flashing):
- .1 Cap sheet stripping shall be laid in strips one meter wide. Side laps shall be 90mm (3-1/2"), and shall be staggered a minimum of 300mm (12") from cap sheet laps in order to avoid excessive thickness.
 - .2 Using a chalk line, lay-out a straight line on the cap sheet surface, parallel to deck edge, 150mm (6") inside roof from the base of the deck corner.
 - .3 Using a torch and round-nosed roofing trowel, embed the surface granules into the heated and soft bitumen, from the chalk line to edge of the cap sheet.
 - .4 Cap sheet stripping shall be torch welded directly on its base sheet proceeding from bottom to top. Torching shall soften the two membranes and ensure a uniform weld.
 - .5 Cap sheet stripping shall be applied from the exterior face to extend across top of curb, down interior vertical surface and on to flat deck a distance of 150mm (6"), to the extent of area of embedded granules. Cut roll into required lengths and use width of roll (1 meter) down length of roof, maintaining specified 90 mm side laps.
 - .6 Ensure application free of without air pockets, wrinkles, fishmouths or tears.
 - .7 After installation, check all lap seams on the cap sheet.
- .12 Installation of Polymethyl Methacrylate (PMMA) Flashing Resin:
- .1 Install flashing resin as outlined in project documents and in conformance with manufacturers' recommendations.

3.6 FINISHES

- .1 Metal Cap Flashings:
 - .1 Refer to Section 07 62 00 – Sheet Metal Flashings.

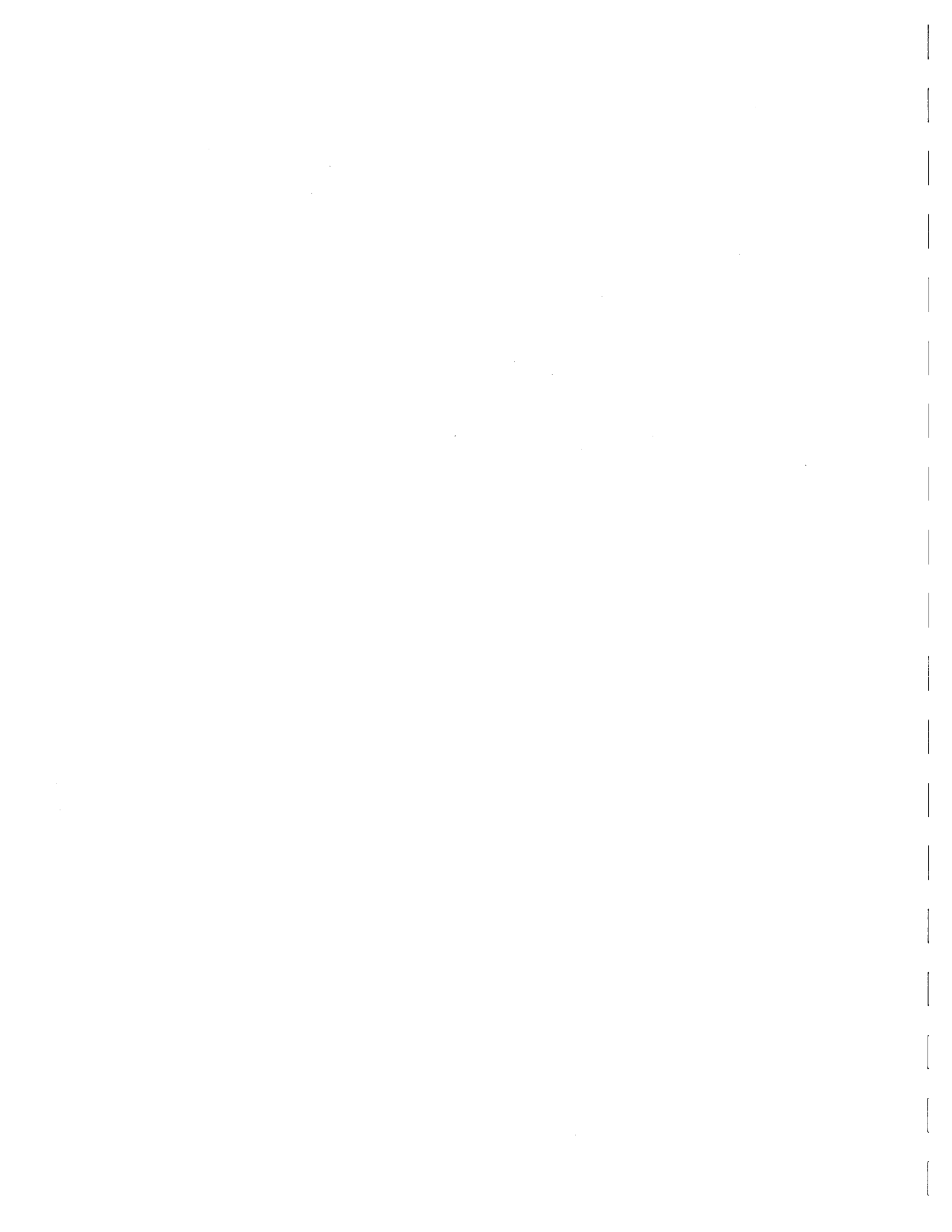
3.7 FIELD QUALITY CONTROL

- .1 The contractor is responsible to notify the Departmental Representative and membrane manufacturer 48 hours prior to the commencement of the work.
- .2 The membrane manufacturer will provide periodic review during the roofing applications as required (refer to 1.13 Manufacturers Representative).
- .3 All deficiencies are to be corrected immediately upon identification.

3.8 CLEANING

- .1 During the course of the work daily site clean-up is mandatory.
- .2 At completion of work, all refuse resulting from the work of this Section to be removed from site.
- .3 Clean, repair or replace all adjacent surfaces affected by roofing work.

END OF SECTION



1 GENERAL

1.1 SUMMARY

- .1 Work described in this section includes but is not limited to the following:
 - .1 All labour, materials, equipment and services necessary for the application of self-adhesive membrane for wall and metal roof assemblies.

1.2 REFERENCES

- .1 ASTM D412 Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
- .2 CGSB 37-GP-9 Primer, Asphalt, Unfilled, for Asphalt Roofing, Damproofing and Waterproofing.
- .3 CGSB 37-GP-15 Application of Asphalt Primer for Asphalt Roofing, Damproofing and Waterproofing.
- .4 CGSB 37.29 Rubber-Asphalt Sealing Compound.
- .5 CGSB 37-GP-56 Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

1.3 STORAGE AND HANDLING

- .1 Provide and maintain dry, off-ground weatherproof storage.
- .2 Store rolls of membrane in upright position.
- .3 Remove only in quantities for same day use.

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install membrane system when ambient temperatures are at or below 5°C for 24 hours before application, and only during dry conditions.
 - .1 Use cold weather products where required by manufacturers guidelines.
- .2 Minimum temperature for installation of primer is 5°C.
 - .1 Use cold weather products where required by manufacturer's guidelines.
- .3 Install membrane on dry substrates, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into membrane system.

- .4 If water penetrates through the membrane assembly due to inadequate protection including from interior sources, Contractor to cut and inspect damages, remove and replace all materials at his own cost, to eliminate all trace of water in the assembly.
- .5 Do not allow membrane to remain exposed longer than 6 weeks.

1.5 QUALITY ASSURANCE

- .1 Applicator: Company specializing in performing the work of this section with minimum two years documented experience. Provide list of previous projects and references upon request by the Departmental Representative.

2 PRODUCTS

2.1 MEMBRANE – BELOW METAL ROOFS AND FLASHINGS

- .1 SBS modified bitumen self adhesive membrane to meet the following minimum criteria:
 - .1 Membrane is to be 40 mils thick (including release film) and must have a release film to protect the adhesive surface.
 - .2 The membrane system must not show any signs of softening, flow or deterioration at temperatures 110 °C or below.
 - .3 Acceptable products:
 - .1 Lastobond Shield HT, by Soprema
 - .2 Blueskin PE 200 HT, by Monsey Bakor
 - .3 Jiffy Seal Ice & Water Guard HT, by ProtectoWrap
 - .4 Approved equivalent.

2.2 ACCESSORIES

- .1 Primer: High tack SBS rubber based primer: to CGSB 37-GP-9Ma as recommended by manufacturer.
- .2 Mastic sealant: As recommended by the manufacturer.
- .3 Termination bars:
 - .1 Minimum 18 Ga. for steel, 2mm (1/16") for aluminium
 - .2 G200 galvanized steel or aluminium
 - .3 38 mm (1.5") wide x continuous lengths where possible.
 - .4 Gum lip as required.
- .4 Metal termination flashings: Refer to 07 62 00 Sheet Metal Flashings.

3 EXECUTION

3.1 EXAMINATION OF SURFACES

- .1 Examine surfaces to have membrane installed and immediately inform Departmental Representative in writing of defects.

3.2 PREPARATION

- .1 Protect adjacent surfaces not designated to receive membrane.
- .2 Clean and prepare surfaces to receive membrane in accordance with manufacturer's recommendations. Surfaces are to be clean, dry and free of foreign matter.
- .3 Ensure substrate is continuous. Provide solid backing as required. Unsupported membrane of 8 mm or greater is unacceptable. Fill voids as required or reinstall sheathing to meet maximum gap requirement.
- .4 All sharp metal edges to be rounded or smoothed off to prevent puncture of membrane.

3.3 INSTALLATION

- .1 Install membrane in accordance with manufacturer's instructions. Observe temperature and humidity limitations for application.
- .2 Prime areas to receive membrane in accordance with manufacturer's recommendations. Primer must be dry prior to application of membrane. Primer is typically required on all surfaces including underlying layers of membrane. Membrane must be applied to primed area that same day.
- .3 Roll out sheets. Discard wrinkled or bubbled membrane.
- .4 Remove release paper layer. Roll out on substrate with a mechanical roller to encourage full contact bond. Use heat gun as required to achieve adequate continuous bond.
- .5 Lap sides and ends in accordance with manufacturer's instructions and with the project details. All laps to be a minimum of 50 mm.
- .6 All exposed laps except shingle laps to be masticed.
- .7 Prestrip membrane (and sheathing paper) as required to ensure shingle fashion laps at tie-ins.
- .8 Patch deficient areas with membrane extending 150 mm minimum in all direction from affected area. Seal top and sides of patch with mastic.
- .9 Extend membrane onto items protruding to or penetrating assembly and seal termination with mastic.
- .10 Ensure no membrane or membrane accessories extend to future exterior sealant locations or on finished surfaces. Clean any affected areas as required.

- .11 Install termination bars (if required) onto membrane to continuously secure as indicated and directed by Departmental Representative. Fasten as required to provide continuous support of membrane and to eliminate bowing of termination bar (minimum 150mm/6" o/c).
- .12 Seal leading edge with mastic at the end of each day's work.

**3.4 CLEAN UP AND
PROTECTION**

- .1 Clean off drips and smears of bituminous material and primers off adjacent materials immediately.
- .2 At end of each day's work, provide protection for completed work and materials out of storage.

END OF SECTION

1 GENERAL

1.1 SUMMARY

- .1 Work includes: labour, materials, equipment and services necessary to provide flashings and trim as indicated including: cap, base, cricket, saddle, roof, counter flashings, gutters and downpipes.

1.2 REFERENCES

- .1 Canadian Sheet Steel Building Institute (CSSBI) S8-2001: Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.
- .2 AAMA 621 Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates.
- .3 ASTM A792 /A792M Specification for Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process with a minimum zinc coating designation Z150.
- .4 ASTM A653/653M Specification for Sheet Steel, Zinc-Coated or Zinc-Iron Alloy Coated by the hot dip process, with a minimum zinc coating designation Z275
- .5 ASTM D523 Test Method for Specular Gloss.
- .6 ASTM B32 Specification for Solder Metal.
- .7 Aluminium Association Designation System for Aluminium Finishes.
- .8 Aluminium Association Aluminium Sheet Metal Work in Building Construction.
- .9 CSA B111 Wire Nails, Spikes and Staples.
- .10 CAN/CGSB-93.1 Sheet, Aluminum Alloy, Prefinished, Residential.
- .11 Canadian Roofing Contractors Association (CRCA).
- .12 SMACNA Architectural Sheet Metal Manual.
- .13 CGSB 1-GP-171M, Type 1 Inorganic Zinc Rich Primer
- .14 SSPC Paint 20, Type 1-B Inorganic Zinc Rich Primer
- .15 Roofing Contractors Association of British Columbia (RCABC).

1.3 SUBMITTALS

- .1 Submit duplicate 150 x 150 mm samples of each type of sheet metal material, colour and finish.
- .2 Submit documentation identifying sheet metal source, testing results to specified standards and finish.

1.4 MOCK-UPS

- .1 Provide for approval prior to fabrication and installation and as part of the exterior wall assembly, mock-up for review by the Departmental Representative, a sample of each flashing assembly detailed for the project, including cap and through wall flashing, window/door head and sill flashing, base and drip edge flashing and custom flashing fabrications.

1.5 DESIGN REQUIREMENTS

- .1 General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- .2 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - .1 Temperature Change: 67 deg C (120 deg F), ambient; 100 deg C (180 deg F), material surfaces

1.6 WARRANTY ON FINISHES

- .1 Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
- .2 Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - .1 Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - .2 Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - .3 Film Integrity: there shall be no evidence of cracking, chipping, peeling, crazing, spotting, flaking, checking or loss of adhesion.
- .3 Finish Warranty Period: 20 years from date of Substantial Completion.

2 PRODUCTS

2.1 PREFINISHED SHEET STEEL

- .1 General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- .2 Base Metal to be:

- .1 Aluminium-zinc coated (Galvalume) steel sheet conforming to the requirements of A792M with a minimum coating of AZM150.
- .2 24 gauge thickness.
- .3 Exposed Coil-Coated Finish:
 - .1 Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Dry film thickness of not less than 1.0 mil (0.025 mm) for primer and topcoat.
- .4 Color: As selected by Departmental Representative. Both top and underside of flashing exposed to view to be coated steel. Colour of sheet metal flashings are to match existing metal flashings.
- .5 Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.2 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .3 Touch-up paint: as recommended by prefinished material manufacturer.
- .4 Cleats, clips, and splice plates: of same material, coating, and temper as sheet metal, minimum 50mm wide. Thickness same as sheet metal being secured.
- .5 Fasteners:
 - .1 Into wood:
 - .1 Steel pan head screws with coarse thread for wood.
 - .1 #8 x 25mm (1", minimum) long stainless steel suitable for metal flashing application. Stainless to be 300 Series when exposed otherwise 300 or 400 Series is acceptable.
 - .2 For exposed conditions use hex-head stainless steel screws, with neoprene washer, hex heads coloured to match flashing.
 - .2 Into sheet steel:
 - .1 Steel pan head screws with fine thread for metal. Can be self tapping or self drilling.
 - .1 #8 x 13mm (1/2", minimum) long stainless steel suitable for metal flashing application. Stainless to be 300 Series when exposed otherwise 300 or 400 Series is acceptable.
 - .2 For exposed conditions use pan head stainless steel screws, with neoprene washer, heads coloured to match flashing.

- .6 Solder: to ASTM B32 Standard Specifications for Metal Solders
- .7 Touch-up paint: as recommended by prefinished material Manufacturer.
- .8 Z-girts for metal cladding attachment:
 - .1 Thickness as indicated with grades as per ASTM A446M.
 - .2 Minimum thickness: 16 Gauge minimum unless noted otherwise.
 - .3 Zinc corrosion protection at least to G90 (Z275) thickness unless indicated otherwise.

3 EXECUTION

3.1 FABRICATION

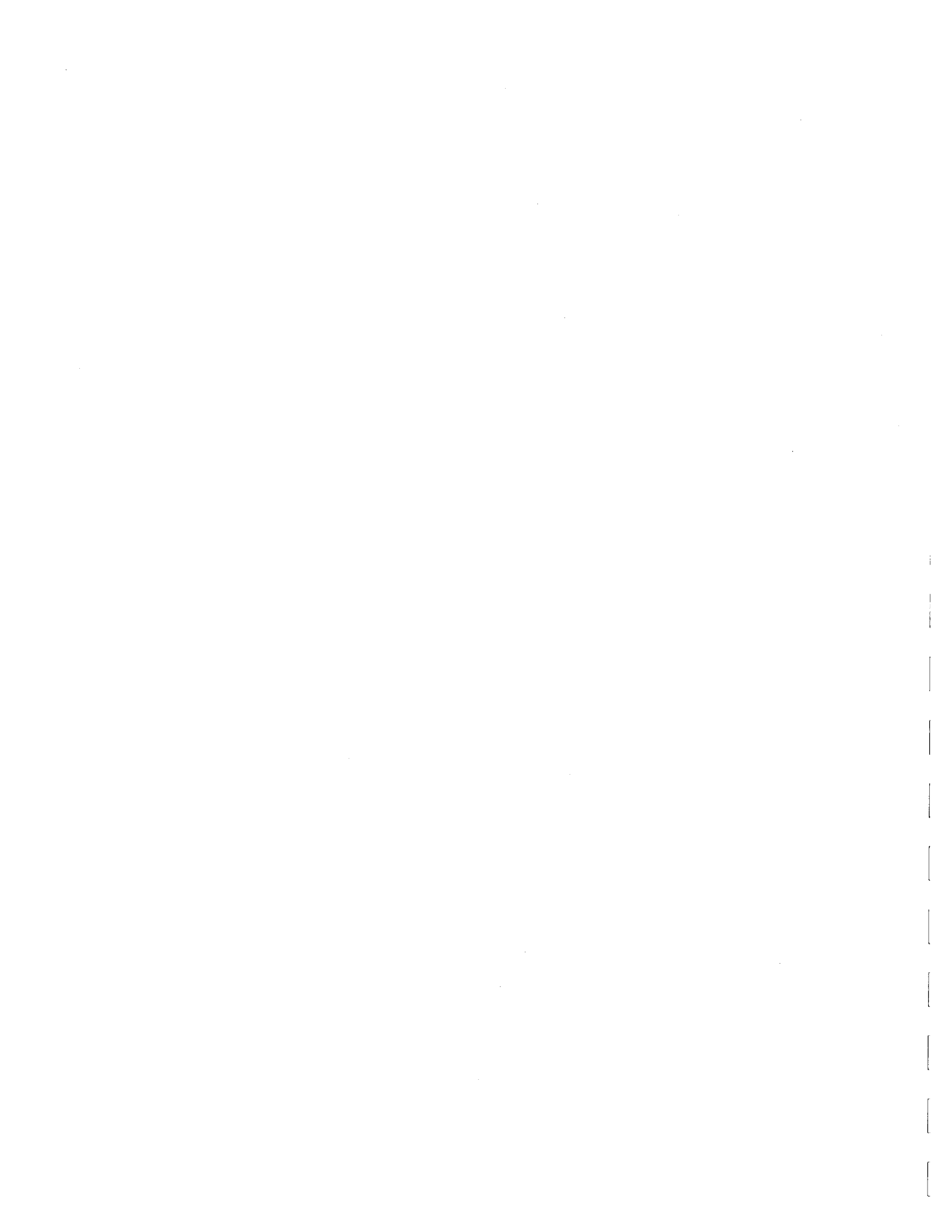
- .1 Fabricate metal flashings and sheet metal work other than aluminium in accordance with applicable CRCA 'FL' series details and SMACNA Architectural Sheet Metal Manual.
- .2 Fabricate aluminium flashings and other sheet aluminium work in accordance with Aluminium Association Aluminium Sheet Metal Work in Building Construction.
- .3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints. Use maximum length sections possible to minimize joints.
- .4 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.
- .7 Form joints between lengths of flashing sections with standing seams whenever possible. S-locks can only be used if approved by the Departmental Representative.
- .8 All exposed or visible metal flashing and trim to be finished in selected colour as indicated including exposed rear faces of end dams, joints, etc. No exposed or visible steel or aluminium flashing work to be unfinished.
- .9 Fabricate custom flashing details and saddles to minimize solder joints.
- .10 Install sealant at flashing joints.
- .11 Metal Flashings including drip edge flashing, base flashing, etc.
 - .1 Form all flashing surfaces as shown on drawings. Minimum slope of 1 in 4 to the exterior to be used where not shown.
 - .2 Form flashings, copings and fascias to profiles indicated.
- .12 Custom flashing fabrications

- .1 Shop fabricate custom flashing as indicated.
- .2 Form custom flashing fabrications to minimize the number of metal seams and joints. Whenever possible form flashing with standing or breadpan seams.
- .3 Use clinched joints whenever possible to avoid soldering.
- .4 Soldered joints must be preapproved by the Departmental Representative.
 - .1 Fully solder joints.
 - .2 Neutralize solder flux with neutralizing bath prior to painting.
- .5 Paint off site after fabrication to colour specified. Type and method of paint application must be preapproved by the Departmental Representative. Paint must be a baked on finish application after fabrication.

3.2 INSTALLATION

- .1 Install sheet metal work in accordance with RCABC details, SMACNA Architectural Sheet Metal Manual and Aluminium Sheet Metal Work in Building Construction as shown.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal as required. Secure in place and lap underlayment joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock and standing seams forming tight fit over hook strips.
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .7 Install flashings lapped “shingle” style with membranes to divert water to the exterior.
- .8 Install all flashings so that all surfaces have a minimum slope of 1:4 to the exterior.
- .9 Custom flashing fabrications
 - .1 Install custom soldered flashing fabrications as indicated.

END OF SECTION



1 GENERAL

1.1 SUMMARY

- .1 Work includes: supply and install of freestanding non-penetrating guardrail system, including pipe railings, uprights, bases, counterweights, fittings, delivery to site, installation and final inspection by manufacturer representative.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI) - A21.1 Safety Requirements for Floor and Wall Openings, Railings and Toe Boards.
- .2 American National Standards Institute (ANSI) - A58.1 Minimum Design Loads in Buildings and Other Structures.
- .3 American National Standards Institute (ANSI) - A17.1 Accessible and Usable Buildings and Facilities.
- .4 American Society of Testing and Materials (ASTM) A47 - Standard Specification for Ferrite Malleable Iron Castings.
- .5 American Society of Testing and Materials (ASTM) A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- .6 American Society of Testing and Materials (ASTM) A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .7 American Society of Testing and Materials (ASTM) A500 - Standard Specification for cold-formed welded and seamless carbon steel structural tubing.

1.3 SUBMITTALS

- .1 Manufacturer's data sheets on each product to be used, including:
 - .1 Preparation instructions and recommendations.
 - .2 Shop Drawings: Indicate profiles, sizes, connections, size and type of fasteners and accessories.
 - .3 Field Measurements: Verify field measurements prior to assembly and/or ordering.
 - .4 Storage and handling requirements and recommendations.
 - .5 Installation Instruction.
- .2 Shop Drawings: Drawings showing fabrication and installation of handrails and guardrails including plans, elevations, sections, details of components, anchor details, and attachment to adjoining units of work
- .3 Selection Samples: For each finish product specified, two complete sets of colour chips representing manufacturer's full range of available colours and patterns

1.4 QUALITY ASSURANCE

- .1 Railings Structural Requirements:
 - .1 Handrail, wall rail and guardrail assemblies and attachments shall withstand a minimum concentrated unfactored load of 1 kN (225 pounds) applied in any direction on the top rail.
 - .2 Infill area of guardrail system capable of withstanding a horizontal concentrated unfactored load of 1 kN (225 pounds) applied to one square foot at any point in the system. Load not to act concurrently with loads on top rail of system in determining stress on guardrail.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Materials to be delivered to the job site in good condition and adequately protected against damage as handrails are a finished product.
- .2 Store products in manufacturer's unopened packaging until ready for installation.

1.6 PROJECT CONDITIONS

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- .2 Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings.
 - .1 Where field measurements cannot be made without delaying the railing fabrication and delivery, obtain guaranteed dimensions in writing by the Contractor and proceed with fabrication of products to not delay fabrication, delivery and installation.
- .3 Coordinate fabrication and delivery schedule of handrails with construction progress and sequence to avoid delay of railing installation.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 Non-penetrating guardrail systems to be supplied and installed are to be produced by one the following manufacturers:
 - .1 Enviro Safety – Non-Penetrating Rooftop Guardrails
 - .2 Kee Safety – KeeGuard
 - .3 Bluewater - Safety Rail 2000
 - .4 Approved alternate. Contractor must demonstrate that alternate system proposed is in general conformance with the

criteria outlined in this specification. Supporting technical literature, data sheets and technical drawings are to be provided. Requests for alternates that are not supported with appropriate technical documentation will not be considered.

- .2 All components of non-penetrating guardrail system are to be supplied from the same manufacturer.

2.2 ROOF GUARDRAIL SYSTEMS

- .1 Non-Penetrating Guardrail System: provide freestanding non-penetrating guardrail system, including pipe railings, uprights, bases, counterweights and fittings.
 - .1 Freestanding counterweighted guardrail system with 1070 mm minimum height above walking surface to provide and to withstand a minimum unfactored point load of 1 kN (225 lbs) in any direction to the top rail.
 - .2 Pipe: Steel, Schedule 40 size 48mm (1.9") outside diameter (OD).
 - .3 Tube: Hot dipped galvanized, 48mm (1.9") OD.
 - .4 Handrail Pipe: Hot dipped galvanized tube, 42.2mm (1.66") OD. Rails are to be graspable for their length. Handrails shall be continuously graspable along their entire length.
 - .5 Counterweight Levers: Hot dipped galvanized tube, 12 gauge, 48mm (1.9") OD.
 - .6 Mounting Bases: Hot dipped galvanized steel with protective rubber gasket at underside of the component.
 - .7 Counterweights: Molded PVC with one fixing collar per counterbalance.
 - .8 Fasteners: stainless steel.

2.3 ROOF GUARDRAIL MATERIALS

- .1 Pipe:
 - .1 Steel Pipe, Schedule 40, Size: 48mm (1.9") OD.
 - .2 Steel Tube: 12 gauge, 48mm (1.9") OD.
- .2 Finish on system:
 - .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
 - .2 TGIC free factory applied powder coating.
 - .3 Approved alternate.
- .3 Fasteners:
 - .1 300 series stainless steel.

2.4 FABRICATION

- .1 Fit and shop assembly components in largest practical sizes for delivery to site.
- .2 Upright tops shall be plugged with weather and light resistant material.

- .3 Assemble components with joints tightly fitted and secure. Accurately form components to suit installation.

3 EXECUTION

3.1 PREPARATION

- .1 Prepare surfaces to receive non-penetrating guardrails using the methods recommended by the manufacturer.

3.2 INSTALLATION

- .1 Install non-penetrating guardrail system in accordance with manufacturer's instructions.
- .2 Fit exposed connections accurately together to form tight joints. For all connection, each set screw is to be tightened to 39 N-m (29 foot-pounds) of torque.
- .3 Perform cutting, and fitting required for installation of handrails. Set handrails accurately in location, alignment, and elevation, measured from established lines and levels.

3.3 PROTECTION

- .1 Protect installed products until completion of project.
- .2 Touch-up repair or replace damaged products in accordance with manufacturer's recommendations.

END OF SECTION

APPENDIX 1



PROJECT-SPECIFIC HAZARDOUS BUILDING MATERIALS ASSESSMENT – SITE REVIEW REPORT

Project:	Header House Roof at Pacific Forestry Centre		
Client:	PUBLIC SERVICES AND PROCUREMENT CANADA (PSPC)	Contract #:	R.086545.001
Stantec Site Assessor:	Steve Chou and Keith Irwin	Date of Site Visit:	June 29, 2017
Location:	506 West Burnside Road, Victoria BC	Issue Date:	July 13, 2017
		Stantec Project #:	123220922

BACKGROUND

Stantec was retained by Public Services and Procurement Canada (PSPC) to provide a Project-Specific Hazardous Building Materials Assessment pertaining to a roof replacement project planned for the Header House (subject building) at the Pacific Forestry Centre (subject facility), located in Victoria BC.

The purpose of the site review was to check for potential hazardous building materials that may require special handling and/or disposal practices in accordance with the requirements of the Canada Labour Code Part II (Canada Labour Code) and the current version of British Columbia's Occupational Health & Safety Regulation (BC Reg. 296/97), during the roof replacement project.

The information provided herein is to be considered supplemental to the following report:

- Stantec report for Project No. 1156-14042 entitled "Hazardous Building Materials Assessment; Canadian Forestry Service Center; 506 West Burnside Road, Victoria, BC" dated March 21, 2014

STANDARDS, SCOPE AND METHODOLOGY

Applicable standards for each hazardous building material considered during this assessment are summarized below, along with the scope and methodology completed pertaining to those materials, during this assessment.

- Asbestos
 - The presence of asbestos in federal workplaces, and pertaining to federally regulated workers is governed by the Canada Labour Code. The presence of asbestos in the workplace in British Columbia pertaining to provincially regulated workers is governed by BC Reg. 296/97. As primarily provincially regulated workers (e.g., contractors) are expected to carry out work activities associated with the roof replacement project, and as the provincial regulations are generally more prescriptive pertaining to asbestos (and generally include the requirements noted in the Canada Labour Code), this assessment was conducted to meet the requirements of BC Reg. 296/97.
 - According to the current version of BC Reg. 296/97, asbestos-containing material (ACM) means any material containing at least 0.5% asbestos, or vermiculite insulation with any asbestos.
 - The roof and building materials that were expected to require alteration during the roof replacement project were visually assessed for the presence of suspected ACMs.



Project number: 123220922
Inspection date: June 29, 2017
Contract Number: R.086545.001

- Stantec worked with a roofing contractor (Alpha Roofing), who created openings in the roof such that all layers of materials could be assessed, and the roofs appropriately patched/repared upon completion of assessment activities.
- Where observed, samples were collected from each "homogenous application" of suspected ACMs (materials suspected to contain asbestos that are uniform in material type, colour, texture application and estimated installation date) and submitted to EMSL Canada Inc. (EMSL) in Burnaby, British Columbia for analysis of asbestos content using polarized light microscopy (PLM) with dispersion staining, in accordance with the United States Environmental Protection Agency (EPA) 600/R-93/116 analytical method "Asbestos (bulk) by PLM." EMSL's analytical laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).
- The number of samples collected for each homogenous application of a suspected ACM was based on the recommendations provided in the WorkSafeBC publication *Safe Work Practices for Handling Asbestos, 2017* (BC Asbestos Guide) along with the assessor's experience and understanding of the consistency of the observed building material applications.
 - o When asbestos is detected in concentrations greater than one percent in one of the samples within a set that was collected to represent a "homogenous application" of a particular material (or detected in any concentration, in a set of samples collected for applications of vermiculite), the entire sample set and the entire application of that material is then considered to be an ACM.
 - o In addition to the above, a "positive stop" option was used during the laboratory analysis of the building material samples submitted for asbestos analysis. The "positive stop" option is utilized by the laboratory when asbestos is detected at a concentration of greater than one percent in one of the samples within a set that was collected to represent a "homogenous application" of that material (or in any concentration, for vermiculite). At this point, further analysis of subsequent samples within the set is deemed to be unnecessary (as the entire set will be considered an ACM, per above), and the remainder of the samples within the set are not analyzed.
- Lead
 - According to the WorkSafeBC manual titled "Lead-Containing Paint and Coatings: Preventing Exposure in the Construction Industry":
 - o The improper removal of lead paint containing 600 mg/kg lead results in airborne lead concentrations that exceed half of the exposure limit.
 - This potential for exposure exceeding half of the occupational exposure limit would be the trigger for implementation of an exposure control plan.
 - o Lead concentrations as low as 90 mg/kg may present a risk to pregnant women and children.
 - Any risk assessment should include for the presence of high risk individuals within the workplace.
 - In addition to the above, the 2017 WorkSafeBC publication *Safe Work Practices for Handling Lead* (BC Lead Guide) indicates the following:
 - o Unlike for asbestos-containing material, WorkSafeBC does not numerically define what would be considered a lead-containing paint or coating. All suspected paints or



Project number: 123220922
Inspection date: June 29, 2017
Contract Number: R.086545.001

coatings should be tested for lead because, depending on the nature of the work, even a small amount could pose a risk to workers. In order to determine which controls and personal protective equipment would be required for a particular job, a qualified person must consider this information as part of the risk assessment.

- When reviewing the above, "high risk" individuals are not expected to be present in the workplace associated with this building during building material alteration activities (i.e. roof replacement/renovation) that would create significant disturbance to paint with such individuals present. As such, Stantec will reference a value of >600 ppm in defining paints as "lead-containing" for the purpose of this report, such that appropriate risk assessments can be completed for roof replacement.
- Samples of potential lead-containing paints (LCPs) were collected from major paint applications on building materials expected to be impacted by planned roofing replacement activities. The sampling of paint applications involved the collection of paint chip samples of paint layers to the substrate, where possible. Samples collected were submitted to EMSL for analysis of total lead content using EPA Method SW 846 3050B*/7000B. EMSL's analytical laboratory is also accredited by the AIHA Environmental Lead Laboratory Approval Program (ELLAP).
- Other hazardous building materials
 - Various other hazardous building materials may be present that would have special handling and/or disposal considerations if they were to be impacted by the planned roofing renovation project including, but not limited to, electrical equipment with polychlorinated biphenyls (PCBs), mould and/or moisture impacted building materials, equipment with ozone-depleting substances, items or equipment containing mercury and building materials containing silica.
 - Assessment for the presence of other hazardous building materials was completed through visual means, as follows, specifically pertaining to building materials expected to be impacted during the planned roof replacement project:
 - o A visual review for the presence of PCBs in electrical equipment was completed. Equipment that is generally suspected of containing PCBs includes lamp ballasts, transformers, hydraulic systems, compressors, switchgear and capacitors. No sampling of dielectric fluids was undertaken as part of this assessment.
 - o The presence of suspect visible mould was assessed through visual observations. Material observed with dark-coloured staining and/or a textured and discoloured appearance is described as "suspected mould". Mould identified visually is defined as "suspected mould" unless it is confirmed as mould by laboratory analysis.
 - o An assessment for equipment likely to contain ODSs was completed. Information on the type of equipment, manufacturer and type and quantity of refrigerants was recorded, where available.
 - o An assessment for equipment that is likely to contain mercury was completed visually. Information on the type of equipment (i.e., gauges, switches, batteries, thermometers, etc.), model and serial numbers and quantities was recorded, where such information was available.






Project number: 123220922
 Inspection date: June 29, 2017
 Contract Number: R.086545.001

- o An assessment for the presence of silica was conducted. The presence of silica in building materials such as concrete, masonry, stone, terrazzo, refractory brick, ceramic tile, ceiling tile etc. was noted.

SITE REVIEW RESULTS

The table below summarize the findings of the assessment and sampling activities undertaken at the subject building.

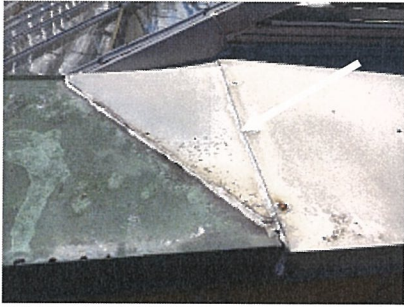


TABLE 1 – HEADER HOUSE ASSESSMENT SUMMARY

Location	Hazardous Building Material Observations	Photo	Samples collected?	Analytical Results
Roof – perimeter flashing	Suspected ACM light grey mastic applied to seams of roof flashing -will be impacted by roof replacement project.		HH-FM-01A HH-FM-01B HH-FM-01C	No Asbestos Detected
Roof – perimeter flashing	Suspected ACM dark grey mastic applied to seams of roof flashing -will be impacted by roof replacement project.		HH-FM-02A HH-FM-02B HH-FM-02C	1.0% Chrysotile (Confirmed ACM)
Roof – north east perimeter flashing	Suspected ACM brown mastic applied to seams of brown roof flashing -will be impacted by roof replacement project.		HH-FM-03A HH-FM-03B HH-FM-03C	<0.25% Chrysotile in three of three samples (Not Considered ACM – see note below table)



Project number: 123220922
 Inspection date: June 29, 2017
 Contract Number: R.086545.001




TABLE 1 – HEADER HOUSE ASSESSMENT SUMMARY

Location	Hazardous Building Material Observations	Photo	Samples collected?	Analytical Results
Roof – south perimeter upper flashing adjacent to greenhouse	Suspected ACM white (silicone-like) mastic applied to seams of upper roof flashing -will be impacted by roof replacement project.		HH-FM-04A HH-FM-04B HH-FM-04C	No Asbestos Detected
Roof – north west	Suspected ACM grey mastic applied to seams of metal vents -will be impacted by roof replacement project.		HH-VM-01A HH-VM-01B HH-VM-01C	No Asbestos Detected
Roof – north west corner	Suspected ACM white mastic applied to seams of vent -will be impacted by roof replacement project.		HH-VM-02A HH-VM-02B HH-VM-02C	<0.25% Chrysotile in one of three samples (Not Considered ACM – see note below table)



Project number: 123220922
 Inspection date: June 29, 2017
 Contract Number: R.086545.001

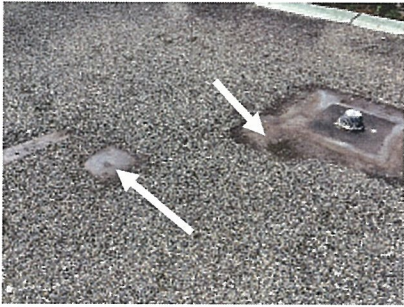


TABLE 1 – HEADER HOUSE ASSESSMENT SUMMARY

Location	Hazardous Building Material Observations	Photo	Samples collected?	Analytical Results
Roof – north east	Suspected ACM grey mastic applied to seams of J-vents and 8 feet flue -will be impacted by roof replacement project.		HH-VM-03A HH-VM-03B HH-VM-03C	No Asbestos Detected
Roof – north west	Suspected ACM red (painted white) mastic applied to seams of vent -will be impacted by roof replacement project.		HH-VM-04A HH-VM-04B HH-VM-04C	0.63% Chrysotile (Confirmed ACM)
Roof	Suspected ACM black mastic/tar applied to seams and base of lead plumbing jacks -will be impacted by roof replacement project.		HH-VM-05A HH-VM-05B HH-VM-05C HH-VJT-01A HH-VJT-01B HH-VJT-01C	3.3% Chrysotile (Confirmed ACM) Note – materials not reasonably separable – all should be considered ACM.



Project number: 123220922
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TABLE 1 – HEADER HOUSE ASSESSMENT SUMMARY

Location	Hazardous Building Material Observations	Photo	Samples collected?	Analytical Results
Roof - central	Suspected ACM black mastic applied to roof patch -will be impacted by roof replacement project.		HH-PM-01A HH-PM-01B HH-PM-01C	No Asbestos Detected
Roof	Suspected ACM roof materials present as follows: <ul style="list-style-type: none"> • Roof cap (black asphalt membrane below gravel) • Roof base (asphalt and vapour barrier) -will be impacted by roof replacement project.		HH-AM-01A,B,C HH-VB-01A,B,C	No Asbestos Detected
Roof - perimeter	Suspected lead-containing green paint on metal flashing		P-01	1400 ppm lead (Confirmed LCP)



Project number: 123220922
 Inspection date: June 29, 2017
 Contract Number: R.086545.001


TABLE 1 – HEADER HOUSE ASSESSMENT SUMMARY

Location	Hazardous Building Material Observations	Photo	Samples collected?	Analytical Results
Roof vents	Suspected lead-containing white paint on plastic vent		P-02	230 ppm lead
Roof – south perimeter upper flashing adjacent to greenhouse	Suspected lead-containing silver paint on metal flashing		P-03	110 ppm lead
Roof	Approximately six lead-containing plumbing jacks were observed throughout the roof		None	N/A



Project number: 123220922
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 Contract Number: R.086545.001

TABLE 1 – HEADER HOUSE ASSESSMENT SUMMARY

Location	Hazardous Building Material Observations	Photo	Samples collected?	Analytical Results
Roof	Silica is expected to be present in the asphalt roof (cap and base), gravel, brick and associated grout and mortar observed throughout the roof		None	N/A
Roof – other hazardous building materials	No suspected PCB-containing equipment, items-suspected to contain liquid mercury or mercury vapour, ODS-containing items, moisture-impacted building materials were observed throughout the roof	N/A	None	N/A
Interior walls and ceilings, throughout	Drywall interior walls and ceilings throughout. NOT Anticipated to be impacted during roof replacement project. Previously Identified as ACM in Stantec Report.	no photo available	N/A	3% Chrysotile (Confirmed ACM)



Project number: 123220922
Inspection date: June 29, 2017
Contract Number: R.086545.001

NOTE: The following samples collected from non-friable suspected ACMs within subject building were found to contain less than 0.5% asbestos:

- Three of three samples of brown mastic applied to seams of brown roof flashing (less than 0.25% chrysotile in each sample)
- One samples of white mastic applied to seams of vent (less than 0.25% chrysotile)

The overall numbers of samples collected for each of the above-noted materials would be adequate to appropriately characterize their asbestos contents based on their extents and published standards for sampling of homogenous applications of suspected ACMs (e.g., the Asbestos Guide). Given these analytical results, the limited amounts of asbestos detected and the non-friable nature of these materials, they would not be considered ACMs.

The certificates of analysis for the samples submitted as part of this project, as provided by EMSL, are attached to this document, for reference.

RECOMMENDATIONS

Based on the results of site review and associated sampling conducted as outlined above, the following recommendations are provided as they pertain specifically to the planned roof replacement project:

- Asbestos
 - Asbestos-containing materials that may be impacted during the roof replacement project must be handled (abated) in accordance with the requirements of BC Reg. 296/97 and the BC Asbestos Guide. This typically requires the involvement of an experienced asbestos abatement contractor.
 - Should a material suspected to contain asbestos fibres become uncovered during the roof replacement project, all work in the areas that may disturb the material should be stopped. Samples of the suspect material should be submitted for laboratory analysis to determine if asbestos fibres are present. Confirmed ACMs should be handled in accordance with the requirements of BC Reg. 296/97 and the BC Asbestos Guide.
 - Suspected ACMs deemed visually similar to the ACMs identified in this report should be considered asbestos-containing and handled as such, unless proven otherwise, through analytical testing.
 - Ensure asbestos containing waste is handled, stored, and disposed of in accordance with the requirements of the Federal Transportation of Dangerous Goods Regulation and the British Columbia Hazardous Waste Regulation (BC Reg. 63/88).
- Lead
 - If LCPs or are to be disturbed and/or removed, ensure compliance with the following:
 - o The exposure protection requirements of the BC Reg. 296/97, including the provisions of the BC Lead Guide.



Project number: 123220922
Inspection date: June 29, 2017
Contract Number: R.086545.001

- o The transportation and disposal requirements of BC Reg. 63/88.
 - o The transportation requirements of the Federal Transportation of Dangerous Goods Regulation.
- Corrective action or remedial work on paint applications containing any concentration of lead should be undertaken in a manner so as to avoid generating fine particulate matter or dust (i.e., avoid sanding). Airborne lead dust or fumes should not exceed the BC Reg. 296/97 8-hour Occupational Exposure Limit (OEL) of 0.05 milligram per cubic metre (mg/m³) during the removal of paints and products containing any concentration of lead. The use of personal protective equipment is recommended to reduce the potential for over-exposure to lead dust.
- Silica
 - If silica-containing materials within the subject building are to be disturbed and/or removed, ensure dust control measures are employed such that airborne silica dust concentrations do not exceed the exposure limit as stipulated by BC Reg. 296/97 (cristobalite and quartz—each 0.025 mg/m³). This would include, but not be limited to, the following:
 - o Providing workers with respiratory protection
 - o Wetting the surface of the materials, use of water or dust suppressing agents to prevent dust emissions
 - o Providing workers with facilities to properly wash prior to exiting the work area
- Other hazardous building materials
 - Other hazardous building materials are not anticipated to require disturbance as part of the roof replacement project. As such, no project-specific recommendations have been provided.

LIMITATIONS

In preparation of this report, Stantec used professional judgment based on experience. The work was conducted in accordance with generally accepted professional standards. Stantec relied on information gathered during the site investigation and laboratory analytical reports.

This report reflects the observations made within accessible and accessed portions of the subject building, and the results of analyses performed on the specific material sampled during the assessment. Analytical results reflect the sampled material at the specific sample locations. Destructive investigation for concealed roofing layers was not conducted.

This assessment was conducted pertaining only to the roof of the subject building, and building materials expected to be disturbed by the roof replacement project. This assessment does not constitute a comprehensive hazardous building materials assessment for the subject building.

This report has been prepared for the exclusive use of PSPC for the purpose of assessing general conditions of roofing materials at the subject building. Any use that a third party makes of this report, or reliance on, or decisions to be made on it, are the responsibility of such third parties.



Project number: 123220922
Inspection date: June 29, 2017
Contract Number: R.086545.001

Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

CLOSING

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this document, we request that we be notified immediately to reassess the information provided herein.

We trust that the document meets your current requirements. Should you have any questions or concerns regarding the above, please do not hesitate to contact the undersigned.

STANTEC CONSULTING LTD.

A handwritten signature in blue ink, appearing to read "Steve Chou".

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Attachments: Suspected ACM Bulk Sample Analytical Record (EMSL) – 6 pages
Suspected LCP Paint Chip Sample Analytical Record (EMSL) – 1 page



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EMSL Canada Order 691701358
Customer ID: 55JACQ30L
Customer PO: 123220922
Project ID:

Attn: Keith Irwin
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6
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Fax:
Collected:
Received: 7/10/2017
Analyzed: 7/11/2017
Proj: 123220922

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID:	HH-FM-01A	Lab Sample ID:	691701358-0001
Sample Description:	ROOF, SOUTH, LOWER FLASHING/LIGHT GREY MASTIC APPLIED TO SEAMS OF FLASHING		
TEST	Analyzed Date	Color	Non-Asbestos Fibrous Non-Fibrous
PLM Grav. Reduction	7/11/2017	Gray	0.0% 100%
Asbestos	Comment		
	None Detected		
Client Sample ID:	HH-FM-01B	Lab Sample ID:	691701358-0002
Sample Description:	ROOF, SOUTH, LOWER FLASHING/LIGHT GREY MASTIC APPLIED TO SEAMS OF FLASHING		
TEST	Analyzed Date	Color	Non-Asbestos Fibrous Non-Fibrous
PLM Grav. Reduction	7/11/2017	Gray	0.0% 100%
Asbestos	Comment		
	None Detected		
Client Sample ID:	HH-FM-01C	Lab Sample ID:	691701358-0003
Sample Description:	ROOF, SOUTH, LOWER FLASHING/LIGHT GREY MASTIC APPLIED TO SEAMS OF FLASHING		
TEST	Analyzed Date	Color	Non-Asbestos Fibrous Non-Fibrous
PLM Grav. Reduction	7/11/2017	Gray	0.0% 100%
Asbestos	Comment		
	None Detected		
Client Sample ID:	HH-FM-02A	Lab Sample ID:	691701358-0004
Sample Description:	ROOF, SOUTH WEST, LOWER FLASHING/DARK GREY MASTIC APPLIED TO SEAMS OF LOWER FLASHING		
TEST	Analyzed Date	Color	Non-Asbestos Fibrous Non-Fibrous
PLM Grav. Reduction	7/11/2017	Gray	0.0% 99.0%
Asbestos	Comment		
	1.0% Chrysotile		
Client Sample ID:	HH-FM-02B	Lab Sample ID:	691701358-0005
Sample Description:	ROOF, NORTH WEST, LOWER FLASHING/DARK GREY MASTIC APPLIED TO SEAMS OF LOWER FLASHING		
TEST	Analyzed Date	Color	Non-Asbestos Fibrous Non-Fibrous
PLM Grav. Reduction	7/11/2017		
Asbestos	Comment		
	Positive Stop (Not Analyzed)		
Client Sample ID:	HH-FM-02C	Lab Sample ID:	691701358-0006
Sample Description:	ROOF, NORTH WEST, LOWER FLASHING/DARK GREY MASTIC APPLIED TO SEAMS OF LOWER FLASHING		
TEST	Analyzed Date	Color	Non-Asbestos Fibrous Non-Fibrous
PLM Grav. Reduction	7/11/2017		
Asbestos	Comment		
	Positive Stop (Not Analyzed)		
Client Sample ID:	HH-FM-03A	Lab Sample ID:	691701358-0007
Sample Description:	ROOF, NORTH EAST, BROWN COLOURED LOWER FLASHING/BROWN MASTIC APPLIED TO SEAMS OF FLASHING		
TEST	Analyzed Date	Color	Non-Asbestos Fibrous Non-Fibrous
PLM Grav. Reduction	7/11/2017	Black	0.0% 100%
Asbestos	Comment		
	<0.25% Chrysotile		



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EMSL Canada Order 691701358
Customer ID: 55JACQ30L
Customer PO: 123220922
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID:	HH-FM-03B					Lab Sample ID:	691701358-0008
Sample Description:	ROOF, NORTH EAST, BROWN COLOURED LOWER FLASHING/BROWN MASTIC APPLIED TO SEAMS OF FLASHING						
TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment	
			Fibrous	Non-Fibrous			
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	<0.25% Chrysotile		
Client Sample ID:	HH-FM-03C					Lab Sample ID:	691701358-0009
Sample Description:	ROOF, NORTH EAST, BROWN COLOURED LOWER FLASHING/BROWN MASTIC APPLIED TO SEAMS OF FLASHING						
TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment	
			Fibrous	Non-Fibrous			
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	<0.25% Chrysotile		
Client Sample ID:	HH-FM-04A					Lab Sample ID:	691701358-0010
Sample Description:	ROOF, SOUTH EAST, UPPER FLASHING ADJACENT TO GREENHOUSE/WHITE(SILICONE-LIKE) MASTIC APPLIED TO SEAMS OF FLASHING						
TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment	
			Fibrous	Non-Fibrous			
PLM Grav. Reduction	7/11/2017	Gray	0.0%	100%	None Detected		
Client Sample ID:	HH-FM-04B					Lab Sample ID:	691701358-0011
Sample Description:	ROOF, SOUTH EAST, UPPER FLASHING ADJACENT TO GREENHOUSE/WHITE(SILICONE-LIKE) MASTIC APPLIED TO SEAMS OF FLASHING						
TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment	
			Fibrous	Non-Fibrous			
PLM Grav. Reduction	7/11/2017	Gray	0.0%	100%	None Detected		
Client Sample ID:	HH-FM-04C					Lab Sample ID:	691701358-0012
Sample Description:	ROOF, SOUTH EAST, UPPER FLASHING ADJACENT TO GREENHOUSE/WHITE(SILICONE-LIKE) MASTIC APPLIED TO SEAMS OF FLASHING						
TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment	
			Fibrous	Non-Fibrous			
PLM Grav. Reduction	7/11/2017	Gray	0.0%	100%	None Detected		
Client Sample ID:	HH-VM-01A					Lab Sample ID:	691701358-0013
Sample Description:	ROOF, NORTH WEST CORNER/GREY MASTIC APPLIED TO SEAMS OF METAL VENTS						
TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment	
			Fibrous	Non-Fibrous			
PLM Grav. Reduction	7/11/2017	Gray	0.0%	100%	None Detected		
Client Sample ID:	HH-VM-01B					Lab Sample ID:	691701358-0014
Sample Description:	ROOF, NORTH WEST CORNER/GREY MASTIC APPLIED TO SEAMS OF METAL VENTS						
TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment	
			Fibrous	Non-Fibrous			
PLM Grav. Reduction	7/11/2017	Gray	0.0%	100%	None Detected		
Client Sample ID:	HH-VM-01C					Lab Sample ID:	691701358-0015
Sample Description:	ROOF, NORTH WEST CORNER/GREY MASTIC APPLIED TO SEAMS OF METAL VENTS						
TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment	
			Fibrous	Non-Fibrous			
PLM Grav. Reduction	7/11/2017	Gray	0.0%	100%	None Detected		



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Customer ID: 55JACQ30L
Customer PO: 123220922
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: HH-VM-02A **Lab Sample ID:** 691701358-0016

Sample Description: ROOF, NORTH WEST CORNER/WHITE MASTIC APPLIED TO SEAMS OF PLASTIC VENTS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	White	0.0%	100%	None Detected	

Client Sample ID: HH-VM-02B **Lab Sample ID:** 691701358-0017

Sample Description: ROOF, NORTH WEST CORNER/WHITE MASTIC APPLIED TO SEAMS OF PLASTIC VENTS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	White	0.0%	100%	None Detected	

Client Sample ID: HH-VM-02C **Lab Sample ID:** 691701358-0018

Sample Description: ROOF, NORTH WEST CORNER/WHITE MASTIC APPLIED TO SEAMS OF PLASTIC VENTS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	White	0.0%	100%	<0.25% Chrysotile	

Client Sample ID: HH-VM-03A **Lab Sample ID:** 691701358-0019

Sample Description: ROOF, NORTH WEST CORNER/GREY MASTIC APPLIED TO SEAMS OF J VENTS AND 8 FEET FLUE.

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Gray	0.0%	100%	None Detected	

Client Sample ID: HH-VM-03B **Lab Sample ID:** 691701358-0020

Sample Description: ROOF, SOUTH CENTRAL/GREY MASTIC APPLIED TO SEAMS OF J VENTS AND 8 FEET FLUE.

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Gray	0.0%	100%	None Detected	

Client Sample ID: HH-VM-03C **Lab Sample ID:** 691701358-0021

Sample Description: ROOF, SOUTH CENTRAL/GREY MASTIC APPLIED TO SEAMS OF J VENTS AND 8 FEET FLUE.

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Gray	0.0%	100%	None Detected	

Client Sample ID: HH-VM-04A **Lab Sample ID:** 691701358-0022

Sample Description: ROOF, NORTH WEST/RED MASTIC APPLIED TO SEAMS OF VENTS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Gray	0.0%	99.4%	0.63% Chrysotile	

Client Sample ID: HH-VM-04B **Lab Sample ID:** 691701358-0023

Sample Description: ROOF, NORTH WEST/RED MASTIC APPLIED TO SEAMS OF VENTS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017					Positive Stop (Not Analyzed)



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EMSL Canada Order 691701358
Customer ID: 55JACQ30L
Customer PO: 123220922
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: HH-VM-04C **Lab Sample ID:** 691701358-0024
Sample Description: ROOF, NORTH WEST/RED MASTIC APPLIED TO SEAMS OF VENTS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017				Positive Stop (Not Analyzed)	

Client Sample ID: HH-VM-05A **Lab Sample ID:** 691701358-0025
Sample Description: ROOF, NORTH/CREAM/BLACK MASTIC APPLIED TO SEAMS OF LEAD PLUMBING JACKS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Gray	0.0%	96.7%	3.3% Chrysotile	

Client Sample ID: HH-VM-05B **Lab Sample ID:** 691701358-0026
Sample Description: ROOF, NORTH/CREAM/BLACK MASTIC APPLIED TO SEAMS OF LEAD PLUMBING JACKS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017				Positive Stop (Not Analyzed)	

Client Sample ID: HH-VM-05C **Lab Sample ID:** 691701358-0027
Sample Description: ROOF, NORTH/CREAM/BLACK MASTIC APPLIED TO SEAMS OF LEAD PLUMBING JACKS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017				Positive Stop (Not Analyzed)	

Client Sample ID: HH-VJT-01A **Lab Sample ID:** 691701358-0028
Sample Description: ROOF, NORTH EAST/BLACK TAR APPLIED TO BASE OF LEAD PUMBING JACKS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-VJT-01B **Lab Sample ID:** 691701358-0029
Sample Description: ROOF, NORTH EAST/BLACK TAR APPLIED TO BASE OF LEAD PUMBING JACKS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-VJT-01C **Lab Sample ID:** 691701358-0030
Sample Description: ROOF, NORTH EAST/BLACK TAR APPLIED TO BASE OF LEAD PUMBING JACKS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-PM-01A **Lab Sample ID:** 691701358-0031
Sample Description: ROOF, CENTRAL/BLACK MASTIC APPLIED TO ROOF PATCH

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	



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EMSL Canada Order 691701358
Customer ID: 55JACQ30L
Customer PO: 123220922
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: HH-PM-01B **Lab Sample ID:** 691701358-0032

Sample Description: ROOF, CENTRAL/BLACK MASTIC APPLIED TO ROOF PATCH

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-PM-01C **Lab Sample ID:** 691701358-0033

Sample Description: ROOF, CENTRAL/BLACK MASTIC APPLIED TO ROOF PATCH

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-AM-01A **Lab Sample ID:** 691701358-0034

Sample Description: ROOF, SOUTH WEST/ROOFING LAYER (TOP) - BLACK ASPHALT MEMBRANE

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-AM-01B **Lab Sample ID:** 691701358-0035

Sample Description: ROOF, SOUTH CENTRAL/ROOFING LAYER (TOP) - BLACK ASPHALT MEMBRANE

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-AM-01C **Lab Sample ID:** 691701358-0036

Sample Description: ROOF, SOUTH EAST/ROOFING LAYER (TOP) - BLACK ASPHALT MEMBRANE

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-VB-01A **Lab Sample ID:** 691701358-0037

Sample Description: ROOF, SOUTH WEST/ROOFING LAYER (BOTTOM) - ASPHALT AND VAPOUR BARRIER

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-VB-01B **Lab Sample ID:** 691701358-0038

Sample Description: ROOF, SOUTH CENTRAL/ROOFING LAYER (BOTTOM) - ASPHALT AND VAPOUR BARRIER

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	

Client Sample ID: HH-VB-01C **Lab Sample ID:** 691701358-0039

Sample Description: ROOF, NORTH WESTROOF, NORTH/ROOFING LAYER (BOTTOM) - ASPHALT AND VAPOUR BARRIER

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM Grav. Reduction	7/11/2017	Black	0.0%	100%	None Detected	



EMSL Canada Inc.

4506 Dawson Street Burnaby, BC V5C 4C1
Phone/Fax: 604-757-3158 / (604) 757-4731
<http://www.EMSL.com> / vancouverlab@EMSL.com

EMSL Canada Order 691701358
Customer ID: 55JACQ30L
Customer PO: 123220922
Project ID:

**Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British
Columbia Regulation 188/2011 via EPA 600/R-93/116 Method**

Analyst(s):

Nicole Yeo PLM Grav. Reduction (33)

Reviewed and approved by:

Nicole Yeo, Laboratory Manager
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Burnaby, BC

Initial report from: 07/11/2017 16:03:00



EMSL Canada Inc.

2756 Slough Street, Mississauga, ON L4T 1G3
Phone/Fax: 289-997-4602 / (289) 997-4607
<http://www.EMSL.com> torontolab@emsl.com

EMSL Canada Or 551707611
CustomerID: 55JACQ30L
CustomerPO: 123220922
ProjectID:

Attn: **Keith Irwin**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Received: 07/11/17 11:06 AM
Collected:

Project: 123220922

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
P-01 Site: Green paint on metal flashing - Roof, South perimeter	551707611-0001	7/11/2017		1400 ppm
P-02 Site: White paint on plastic vent - Roof, West	551707611-0002	7/11/2017		230 ppm
P-03 Site: Silver paint on metal flashing - Roof, Southeast perimeter	551707611-0004	7/11/2017		110 ppm

Rowena Fanto, Lead Supervisor
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Report Amended: 07/13/2017 07:58:36 Replaces the Inital Report 07/12/2017 08:59:35. Reason Code: Client-Change to Sample ID

NRCAN - Header House Roof Replacement
Project No.: R.086545.001
Issued for Tender – July 2017

APPENDIX 2



PRELIMINARY HAZARD ASSESSMENT FORM

Project Number:	R.086545.001
Location:	Pacific Forestry Centre, Header House, Victoria, B.C.
Date:	June 15, 2017
Name of Departmental Representative:	Patrick Truong

Site Specific Orientation Provided at Project Location Yes

Notice of Project Required Yes

NOTE:

PWGCSC REQUIRES A Notice of Project FOR ALL CONSTRUCTION WORK RELATED ACTIVITIES

NOTE:

OHS law is made up of many municipal, provincial, and federal acts, regulations, bylaws and codes. There are also many other pieces of legislation in British Columbia that impose OHS obligations.

Important Notice: This hazard assessment has been prepared by PSPC for its own project planning process, and to inform the service provider of actual and potential hazards that may be encountered in performance of the work. PSPC does not warrant the completeness or adequacy of this hazard assessment for the project and the paramount responsibility for project hazard assessment rests with the service provider.

TYPES OF HAZARDS TO CONSIDER	Potential Risk for:				COMMENTS
	PWGCSC, OGD's, or tenants		General Public or other contractors		
Examples: Chemical, Biological, Natural, Physical, and Ergonomic	Yes	No	Yes	No	Note: When thinking about this pre-construction hazard assessment, remember a hazard is anything that may cause harm, such as chemicals, electricity, working from heights, etc; the risk is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be.
Listed below are common construction related hazards. Your project may include pre-existing hazards that are not listed. Contact the Regional Construction Safety Coordinator for assistance should this issue arise.					

Typical Construction Hazards					
Concealed/Buried Services (electrical, gas, water, sewer etc)	TBD				
Slip Hazards or Unsound Footing	yes				
Working at Heights	yes				
Working Over or Around Water		no			
Heavy overhead lifting operations, mobile cranes etc.	TBD				
Marine and/or Vehicular Traffic (site vehicles, public vehicles, etc.	yes				
Fire and Explosion Hazards	TBD				



High Noise Levels	yes				
Excavations		no			
Blasting		no			
Construction Equipment	yes				
Pedestrian Traffic (site personnel, tenants, visitors, public)	yes				
Multiple Employer Worksite	yes				

Electrical Hazards					Comments
Contact With Overhead Wires	TBD				
Live Electrical Systems or Equipment	TBD				
Other:					
Physical Hazards					
Equipment Slippage Due To Slopes/Ground Conditions	TBD				
Earthquake	yes				
Tsunami	yes				
Avalanche		no			
Forest Fires		no			
Fire and Explosion Hazards	TBD				
Working in Isolation		no			
Working Alone		no			
Violence in the Workplace	yes				
High Noise Levels	yes				
Inclement weather	yes				
High Pressure Systems		no			
Other:					
Hazardous Work Environments					
Confined Spaces / Restricted Spaces PSPC employees do not enter confined space.		no			
Suspended / Mobile Work Platforms	TBD				
Other:					
Biological Hazards					
Mould Proliferations	TBD				
Accumulation of Bird or Bat Guano		no			
Bacteria / Legionella in Cooling Towers / Process Water		no			
Rodent / Insect Infestation		no			
Poisonous Plants		no			
Sharp or Potentially Infectious Objects in Wastes	yes				
Wildlife		no			
Chemical Hazards					
Asbestos Materials on Site	TBD				
Designated Substance Present	TBD				
Chemicals Used in work	TBD				



Lead in paint	TBD				
Mercury in Thermostats or Switches		no			
Application of Chemicals or Pesticides		no			
PCB Liquids in Electrical Equipment		no			
Radioactive Materials in Equipment		no			
Other:					
Contaminated Sites Hazards					
Hazardous Waste		n/a			
Hydrocarbons		n/a			
Metals		n/a			
Other:					

Security Hazards					Comments
Risk of Assault	yes				
Other:					
Other Hazards					

Other Compliance and Permit Requirements¹	YES	NO	Notes / Comments²
Is a Building Permit required?		No	
Is an Electrical permit required?	TBD		
Is a Plumbing Permit required?	TBD		
Is a Sewage Permit required?	TBD		
Is a Dumping Permit required?	TBD		
Is a Hot Work Permit required?	Yes		
Is a Permit to Work required?	Yes		Mandatory for ALL AFD managed work sites.
Is a Confined Space Entry Permit required?	Yes		Mandatory
Is a Confined Space Entry Log required	Yes		Mandatory for all Confined Spaces
Discharge Approval for treated water required			

Notes:

- (1) Does not relieve Service Provider from complying with all applicable federal, provincial, and municipal laws and regulations.
- (2) TBD means To Be Determined by Service Provider.

Service Provider Acknowledgement: We confirm receipt and review of this Pre-Project Hazard Assessment and acknowledge our responsibility for conducting our own assessment of project hazards, and taking all necessary protective measures (which may exceed those cited herein) for performance of the work.

Service Provider Name			
Signatory for Service Provider		Date Signed	
RETURN EXECUTED DOCUMENT TO PSPC DEPARTMENTAL REPRESENTATIVE PRIOR TO ANY WORK COMMENCING			

