

Parks Canada Agency

Specifications

Roofing Replacement

Glacier National Park, BC

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PART 1- GENERAL

1.1 WORK COVERED BY
CONTRACT DOCUMENTS

- .1 Work of this Contract consists of removing existing two ply torch on roofing, supplying and installing of new two ply SBS roof membrane and related components including flashing as necessary. Contractor to supply all materials, equipment, transportation, and labour necessary for execution of this work. Design drawings with dimensions are attached.

1.2 PROJECT
LOCATION

- .1 The location for this project is the Glacier National Park, Rogers Pass operational compound.

1.3 SCOPE OF WORK

A general description of that work is as follows:

1. Source and supply all necessary materials and equipment for completion of the work. All work to be done in accordance with manufacturers recommendations.
2. Roofs to be replaced on buildings: A-Apartment Block (4900 sq ft), B-Apartment Block (4900 sq ft) and Cold Garage (6600 sq ft). Dimensions are approximate and to be confirmed by the contractor during a site visit.
3. Remove existing two ply torch on down to existing donna board the will remain. All removed material to be removed from the Park and disposed properly with applicable provincial regulations.
4. Overlay Board to install over insulation to provide torch safe surface : 3/16" thick asphalt based recovery board with non-woven glass facers, as recommended by the membrane manufacturer. Install 3/16" protectoboard mechanically fastened to wood deck through donna board (A&B Block) or fastened to Q decking through donna board and 4" deck mate insulation. Fasteners to be galvanized.
5. Clean, prep and re-use drains and mechanical equipment above the roof including appropriate application of a primer.
6. Install Torchflex TP-180-SF-Base (3mm) or other SBS product approved by a Departmental Representative.
7. Provide and apply 180 flam base stripping.
8. Install Torchflex TP-250-Cap (5.0) or other SBS product approved by a Departmental Representative.

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9. Provide and apply 250 granulated stripping.
10. Install a slope package as per manufacturers recommendation on all three buildings.
11. Install insulation package 3.5" to achieve R20 value on A and B Apartment Blocks Buildings only. Insulation as approved by Departmental Representative.
12. Install new 26 gauge flashing as required. Color to be confirmed by a Departmental Representative.
13. Install 26 gauge perimeter cap flashing. Color to be confirmed by a Departmental Representative.
14. Screws and items necessary for flashing/ cap installation to be included.
15. If necessary build parapet extension as approved by a Departmental Representative.
16. Perform all surface preparation necessary for the installation.

1.4 WORK SEQUENCE

- .1 Within five calendar days from notification of award of contract, submit for Departmental Representative's approval, a construction schedule showing anticipated progress stages within the time of completion. Within the same timeframe submit a broken down lump sum to material elements and labour to satisfactory to Departmental Representative.
- .2 When Progress Schedule has been approved by Departmental Representative, the Contractor shall take all measures necessary to complete the work within the scheduled time.
- .3 The schedule may be updated as required by Departmental Representative.
- .4 Co-ordinate Progress Schedule and co-ordinate with Departmental Representative during construction.

1.5 CONSTRUCTION SCHEDULE

- .1 Start date: July 1, 2018

1.6 CONTRACTOR USE OF CONSTRUCTION SITE

- .1 Co-ordinate use of the construction site under direction of Departmental Representative.
- .2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .3 Remove or alter existing work to prevent injury or damage to portions of existing work that remain.

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1.7 CONSTRAINTS

- .1 No recreational vehicles are permitted on site.
- .2 All necessary equipment and tools are to be provided by the contractor.

1.8 TRAVEL

- .1 All travel and travel time associated with the project is part of the project and is to be included in the project's estimated price.

1.9 CONTRACTOR
RESPONSIBILITIES

- .1 Contractor Responsibilities:
 - 1. Designate submittals and delivery date for each product in the progress schedule.
 - 2. Review shop drawings, product data, samples, and other submittals. Submit to Consultant notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
 - 3. Receive and unload products at the site.
 - 4. Inspect deliveries jointly with Owner; record shortages, and damaged or defective items.
 - 5. Handle products at the site, including uncrating and storage.
 - 6. Protect products from damage, and from exposure to elements.
 - 7. Assemble, install, connect, adjust, and finish products.
 - 8. Provide installation inspections required by public authorities.
 - 9. Repair or replace items damaged by Contractor on site (under his control).
 - 10. Execute work with least possible interference or disturbance to public. Arrange with Departmental Representative to facilitate execution of work.
 - 11. Provide sanitary facilities for Contractor's use.

1.10 DOCUMENTS
REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders.
 - 5. Other Modifications to Contract.
 - 6. Field Test Reports.
 - 7. A copy of Approved Work Schedule.
 - 8. Health and Safety Plan and Other Safety Related Documents.
 - 9. Other documents as specified.

PART 2 - PART 3 -
PRODUCTS and EXECUTION

- .1 Not used.

PART 1 - GENERAL

1.1 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, affected parties not in attendance, and Departmental Representative.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents

1.2 PRECONSTRUCTION
MEETING

- .1 Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, Design Engineer and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 4 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work.
 - .3 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, and fences.
 - .4 Site security.
 - .5 Proposed changes, change orders, procedures,

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approvals required, time extensions, administrative requirements.

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

.7 Progress claims, administrative procedures, photographs, hold backs.

.8 Appointment of inspection and testing agencies or firms.

.9 Insurances, transcript of policies.

.10 Health and Safety

1.3 PROGRESS MEETINGS

.1 During course of Work, at the request of Departmental Representative, schedule progress meetings.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.3 Notify parties minimum 4 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Health and Safety

.13 Other business.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

PART 1 - GENERAL

1.1 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present data in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 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 co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.2 SAMPLES

- .1 Submit for review samples in [duplicate] as requested BY THE Departmental representative. Label samples with origin and intended use.
- .2 Deliver samples prepaid to [site office].
- .3 Notify [Departmental Representative] in writing, at

time of submission of deviations in samples from requirements of Contract Documents.

- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by [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 Work.
- .6 Make changes in samples which [Departmental Representative] may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.3 MOCK-UPS

- .1 Execute roof layering as mock-ups. Let Departmental Representative and design engineer to review that room before proceeding with the other work.
- .2 Provide mock-ups in accordance with 01 45 00 - Quality Control.

1.4 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints:
 - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: [weekly] and as required.
 - .1 Upon completion of and during the progress of: excavation, each layer of GRS, cantilever anchor, architecture stones and stairs.

1.5 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance and Parks Canada Business Licence immediately after award of Contract.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of British Columbia:
 - .1 Workers Compensation Act, RSBC 1996 - Updated 2012.

1.2 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
- .3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.
- .4 Submit copies of reports or directions issued by Federal health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 SAFETY
ASSESSMENT

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

1.4 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.5 REGULATORY
REQUIREMENTS

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

1.6 GENERAL
REQUIREMENTS

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

1.7 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.8 UNFORSEEN
HAZARDS

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

1.9 POSTING OF
DOCUMENTS

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

1.10 CORRECTION OF
NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.11 WORK STOPPAGE

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

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

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PART 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 humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.2 FIRES

- .1 Fires and burning of rubbish on site permitted only when approved by Departmental Representative.

1.3 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas designated by Departmental Representative.

1.4 DISPOSAL OF WASTE

- .1 Strictly adhere to requirements of Section 01 74 21, Construction/ Demolition Waste Management and Disposal. Do not bury rubbish and waste materials on site unless approved by Owner.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.5 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in

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accordance with local authorities' emission requirements.

- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.6
HISTORICAL/
ARCHAEOLOGICAL
CONTROL

- .1 Have a procedures in place to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.
- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

1.7 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for 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.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

- .1 Not Used.

PART 1 - GENERAL

1.1 REFERENCES

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

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or

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when located in mechanical or electrical rooms.

1.3 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify 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.
- .2 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, 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 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.
- .2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

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.

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- .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.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 PROJECT
CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at regularly scheduled times. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Dispose of waste materials and debris off site.
- .6 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times. Do not burn waste materials on site, unless approved by Departmental Representative.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Remove dirt and other disfiguration from exterior surfaces.
- .8

1.3 WASTE
MANAGEMENT AND

- .1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management

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DISPOSAL And Disposal.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

1 GENERAL

1.01 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work conduct meeting with [Departmental Representative] to review and discuss PSPC's waste management goal and Contractor's proposed Waste Reduction Workplan for Construction, Renovation and /or Demolition (CRD) waste to be project generated.
- .2 PSPC's waste management goal: to divert as much as possible of total Project Waste from landfill sites. Prior to project completion provide [Departmental Representative] documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.
- .3 Protect environment and prevent environmental pollution damage.

1.02 RELATED REQUIREMENTS

- .1 Section [_____].

1.03 REFERENCE STANDARDS

- .1 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum [2007]).
 - .2 LEED Canada-CI Version 1.0-[2007], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
 - .3 LEED Canada 2009 for Design and Construction-[2010], LEED Canada 2009 for Design and Construction Leadership in Energy and Environmental Design Green Building Rating System Reference Guide.
 - .4 LEED Canada for Existing Buildings, Operations and Maintenance-[2009], LEED Canada 2009 Leadership In Energy and Environmental Design Green Building Rating System Reference Guide.
- .2 Ontario Ministry of Environment
 - .1 Ontario 3 R's Regulations (regulation 102/94) for waste management programs applicable to construction and demolition projects greater than 2,000 m².
 - .2 Ontario Environmental Protection Act (EPA)
 - .1 Regulation 102/94, Waste Audits and Waste Reduction Workplans.
 - .2 Regulation 103/94, Source Separation Programs.
 - .3 Canadian Construction Association (CCA)
 - .1 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction.
 - .4 Public Works and Government Services Canada (PSPC)
 - .1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid Waste Management Protocol.
 - .2 CRD Waste Management Market Research Report (available from PSPC's Environmental Services).
 - .3 Sustainable Development Strategy 2007-2009: Target 2.1 Environmentally Sustainable Use of Natural Resources.
 - .1 Real Property projects over \$1 million and in communities

where industrial recycling is supported, implementation of CRD waste management practices will be completed, with waste materials being reused or recycled.

- .2 Contractually ensure resources used in construction or maintenance are consumed and recovered in a sustainable manner.

1.04 DEFINITIONS

- .1 Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the [Departmental Representative].
- .2 Class III: non-hazardous waste - construction renovation and demolition waste.
- .3 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities
- .4 Waste Source Separation Program (WSSP): implementation and co-ordination of ongoing activities to ensure designated waste materials will be sorted into pre-defined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.
- .5 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .6 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .7 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.
- .8 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.
- .9 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .10 Separate Condition: refers to waste sorted into individual types.
- .11 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.
- .12 Waste Audit (WA): detailed inventory of estimated quantities of waste materials that will be generated during construction, demolition, deconstruction and/or renovation. Involves quantifying by volume/weight amounts of materials and wastes that will be reused, recycled or landfilled. Refer to Schedule A.

- .13 Waste Diversion Report: detailed report of final results, quantifying cumulative weights and percentages of waste materials reused, recycled and landfilled over course of project. Measures success against Waste Reduction Workplan (WRW) goals and identifies lessons learned.
- .14 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating required submittal and reporting requirements.
- .15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials generated by project. Specifies diversion goals, implementation and reporting procedures, anticipated results and responsibilities. Waste Reduction Workplan (Schedule B) information acquired from Waste Audit.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Submit prior to final payment the following:
 - .1 Waste Diversion Report, indicating final quantities [in tones] by material types salvaged for reuse, recycling or disposal in landfill and recycling centres, re-use depots, landfills and other waste processors that received waste materials (See Schedule C).
 - .2 Provide receipts, scale tickets, waybills, waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.

1.11 USE OF SITE AND FACILITIES

- .1 Execute Work with minimal interference and disturbance to normal use of premises.
- .2 Maintain security measures established by facility provide temporary security measures approved by [Departmental Representative].

1.12 WASTE PROCESSING SITES

- .1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.

1.14 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by [Departmental Representative].
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

- .5 Protect structural components not removed and salvaged materials from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify [Departmental Representative].
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
- .9 Separate and store materials produced during project in designated areas.
- .10 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off site processing facility for separation.
 - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
 - .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.15 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 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
 - .6 [_____].
- .4 Remove materials on-site as Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

1.16 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work. 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 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 Retain licensed and certified inspector to perform testing to ensure remediation of all surfaces
 - .2 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that all testing has been performed.
 - .3 Request Departmental Representative inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect Work, review testing 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 inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Certificates submitted.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative.
 - .2 When work incomplete according to Departmental Representative complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

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.

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section [_____].

1.02 REFERENCE STANDARDS

- .1 Canada Green Building Council (CaGBC)
 - .1 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations (including Addendum [2007]).
 - .2 LEED Canada-NC-[2009], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations 2009.
 - .3 LEED Canada-CI Version 1.0-[2007], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Commercial Interiors.
 - .4 LEED Canada-EB: O&M-[2009], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Existing Buildings: Operations and Maintenance 2009.
- .2 CSA International
 - .1 CSA B111-[1974(R2003)], Wire Nails, Spikes and Staples.
 - .2 CSA O121-[08], Douglas Fir Plywood.
 - .3 CSA O141-[05(R2009)], Softwood Lumber.
 - .4 CSA O151-[09], Canadian Softwood Plywood.
 - .5 CAN/CSA-O325.0-[07], Construction Sheathing.
 - .6 CAN/CSA-Z809-[08], Sustainable Forest Management.
- .3 National Research Council Canada (NRC)
 - .1 National Building Code of Canada [2015] (NBC).
- .4 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-[2004], FSC Principle and Criteria for Forest Stewardship.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11-[11], Paints and Coatings.
- .6 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [2010].
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-[A2011], Architectural Coatings.
- .8 Sustainable Forestry Initiative (SFI)
 - .1 SFI-[2010-2014] Standard.

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1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for [rough carpentry work] and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Sustainable Design Submittals:
 - .1 LEED Canada submittals: in accordance with [Section 01 35 21 - LEED Requirements].
 - .2 Construction Waste Management:
 - .1 Submit project [Waste Management Plan] [Waste Reduction Workplan] highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that [50] [75]% of construction wastes were recycled or salvaged.
 - .3 Regional Materials: submit evidence that project incorporates required percentage [10] [20]% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
 - .4 Wood Certification: submit [vendor's] [manufacturer's] Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
 - .5 Low-Emitting Materials:
 - .1 Submit listing of [paints and coatings] used in building, comply with VOC and chemical component limits or restriction requirements.
 - .2 Submit listing of [composite wood products used in building, stating that they contain no added urea-formaldehyde resins,] [and] [lamine adhesive used in building, stating that they contain no urea-formaldehyde].

1.04 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Stock Materials:
 - .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use [19] mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate

1.05 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.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.
- .4 Sustainable Standards Certification:
 - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

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1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section [01 61 00 - Common Product Requirements] [and] [with manufacturer's written instructions].
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials [off ground] [indoors] [in dry location] and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect [wood] from [nicks, scratches, and blemishes].
 - .3 Replace defective or damaged materials with new.

2 PRODUCTS

2.01 MATERIALS

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-0141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, [cants,] curbs, fascia backing and sleepers:
 - .1 S2S is acceptable for [_____].
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
 - .4 Post and timbers sizes: "Standard" or better grade.
- .3 Panel Materials:
 - .1 Douglas fir plywood (DFP): to CSA 0121, standard construction.
 - .1 Urea-formaldehyde free.
 - .2 Canadian softwood plywood (CSP): to CSA 0151, standard construction.
 - .1 Urea-formaldehyde free.
 - .3 Plywood, OSB and wood based composite panels: to CAN/CSA-0325.
 - .1 Urea-formaldehyde free.
- .4 Wood Preservative:
 - .1 Surface-applied wood preservative: [clear] [coloured], [copper naphthenate] or 5% pentachlorophenol solution, water repellent preservative.
 - .2 Pentachlorophenol use is restricted to building components that are in ground contact and subject to decay or insect attack only. Where used, pentachlorophenol-treated wood must be covered with two coats of an appropriate sealer.
 - .3 Structures built with wood treated with pentachlorophenol and inorganic arsenicals must not be used for storing food nor should the wood come in contact with drinking water.
- .5 [Primers][Paints][Coatings]: in accordance with manufacturer's recommendations for surface conditions:

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- .1 Primer: VOC limit [100] g/L maximum to [GS-11] [SCAQMD Rule 1113].
- .2 Paint: VOC limit [50] [150] g/L maximum to [GS-11] [SCAQMD Rule 1113].
- .3 Coating: VOC limit [100] [275] [350] [650] g/L maximum to [GS-11] [SCAQMD Rule 1113].

2.02 ACCESSORIES

- .1 Fasteners: to CAN/CSA-G164, for [exterior work] [interior highly humid areas] [[pressure- preservative] [fire-retardant] treated lumber].
- .2 Nails, spikes and staples: to CSA B111.
- .3 Bolts: [12.5] mm diameter unless indicated otherwise, complete with nuts and washers.
- .4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, [explosive actuated fastening devices], recommended for purpose by manufacturer.

3 EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for rough carpentry installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform [Departmental Representative] of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from [Departmental Representative]].

3.02 PREPARATION

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat material [as indicated] [as follows]:
 - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
 - .2 Wood furring for [_____] on outside surface of exterior masonry and concrete walls.
 - .3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

3.03 INSTALLATION

- .1 Comply with requirements of National Building Code of Canada (NBC),

supplemented by the following paragraphs.

- .2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.
- .3 Align and plumb faces of furring and blocking to tolerance of [1:600].
- .4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using [galvanized] [steel] fasteners.
- .6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
- .7 Install sleepers as indicated.
- .8 Use caution when working with particle board. Use dust collectors and high quality respirator masks.
- .9 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .10 Countersink bolts where necessary to provide clearance for other work.

3.04 CLEANING

- .1 Progress Cleaning: clean in accordance with Section [01 74 11 - Cleaning].
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section [01 74 11 - Cleaning].
- .3 Waste Management: separate waste materials for [reuse] [and] [recycling] in accordance with Section [01 74 21 - Construction/Demolition Waste Management and Disposal] [01 35 21 - LEED Requirements].
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

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PART 2 - PRODUCTS

<u>2.1 NOT USED</u>	.1	Not Used.
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PART 3 - EXECUTION

<u>3.1 NOT USED</u>	.1	Not Used.
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1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section [_____].

1.02 REFERENCE STANDARDS

- .1 Canada Green Building Council (CaGBC)
 - .1 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations (including Addendum [2007]).
 - .2 LEED Canada-NC-[2009], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations 2009.
 - .3 LEED Canada-CI Version 1.0-[2007], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Commercial Interiors.
 - .4 LEED Canada-EB: O&M-[2009], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Existing Buildings: Operations and Maintenance 2009.
- .2 CSA International
 - .1 CSA B111-[1974(R2003)], Wire Nails, Spikes and Staples.
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 - .6 CAN/CSA-Z809-[08], Sustainable Forest Management.
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- .4 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-[2004], FSC Principle and Criteria for Forest Stewardship.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11-[11], Paints and Coatings.
- .6 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [2010].
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-[A2011], Architectural Coatings.
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 - .1 SFI-[2010-2014] Standard.

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1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for [rough carpentry work] and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Sustainable Design Submittals:
 - .1 LEED Canada submittals: in accordance with [Section 01 35 21 - LEED Requirements].
 - .2 Construction Waste Management:
 - .1 Submit project [Waste Management Plan] [Waste Reduction Workplan] highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that [50] [75]% of construction wastes were recycled or salvaged.
 - .3 Regional Materials: submit evidence that project incorporates required percentage [10] [20]% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
 - .4 Wood Certification: submit [vendor's] [manufacturer's] Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
 - .5 Low-Emitting Materials:
 - .1 Submit listing of [paints and coatings] used in building, comply with VOC and chemical component limits or restriction requirements.
 - .2 Submit listing of [composite wood products used in building, stating that they contain no added urea-formaldehyde resins,] [and] [lamine adhesives used in building, stating that they contain no urea-formaldehyde].

1.04 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Stock Materials:
 - .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use [19] mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate

1.05 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.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.
- .4 Sustainable Standards Certification:
 - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

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1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section [01 61 00 - Common Product Requirements] [and] [with manufacturer's written instructions].
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials [off ground] [indoors] [in dry location] and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect [wood] from [nicks, scratches, and blemishes].
 - .3 Replace defective or damaged materials with new.

2 PRODUCTS

2.01 MATERIALS

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-0141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, [cants,] curbs, fascia backing and sleepers:
 - .1 S2S is acceptable for [_____].
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
 - .4 Post and timbers sizes: "Standard" or better grade.
- .3 Panel Materials:
 - .1 Douglas fir plywood (DFP): to CSA 0121, standard construction.
 - .1 Urea-formaldehyde free.
 - .2 Canadian softwood plywood (CSP): to CSA 0151, standard construction.
 - .1 Urea-formaldehyde free.
 - .3 Plywood, OSB and wood based composite panels: to CAN/CSA-0325.
 - .1 Urea-formaldehyde free.
- .4 Wood Preservative:
 - .1 Surface-applied wood preservative: [clear] [coloured], [copper naphthenate] or 5% pentachlorophenol solution, water repellent preservative.
 - .2 Pentachlorophenol use is restricted to building components that are in ground contact and subject to decay or insect attack only. Where used, pentachlorophenol-treated wood must be covered with two coats of an appropriate sealer.
 - .3 Structures built with wood treated with pentachlorophenol and inorganic arsenicals must not be used for storing food nor should the wood come in contact with drinking water.
- .5 [Primers][Paints][Coatings]: in accordance with manufacturer's recommendations for surface conditions:

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- .1 Primer: VOC limit [100] g/L maximum to [GS-11] [SCAQMD Rule 1113].
- .2 Paint: VOC limit [50] [150] g/L maximum to [GS-11] [SCAQMD Rule 1113].
- .3 Coating: VOC limit [100] [275] [350] [650] g/L maximum to [GS-11] [SCAQMD Rule 1113].

2.02 ACCESSORIES

- .1 Fasteners: to CAN/CSA-G164, for [exterior work] [interior highly humid areas] [[pressure- preservative] [fire-retardant] treated lumber].
- .2 Nails, spikes and staples: to CSA B111.
- .3 Bolts: [12.5] mm diameter unless indicated otherwise, complete with nuts and washers.
- .4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, [explosive actuated fastening devices], recommended for purpose by manufacturer.

3 EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for rough carpentry installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform [Departmental Representative] of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from [Departmental Representative]].

3.02 PREPARATION

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat material [as indicated] [as follows]:
 - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
 - .2 Wood furring for [_____] on outside surface of exterior masonry and concrete walls.
 - .3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

3.03 INSTALLATION

- .1 Comply with requirements of National Building Code of Canada (NBC),

supplemented by the following paragraphs.

- .2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.
- .3 Align and plumb faces of furring and blocking to tolerance of [1:600].
- .4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using [galvanized] [steel] fasteners.
- .6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
- .7 Install sleepers as indicated.
- .8 Use caution when working with particle board. Use dust collectors and high quality respirator masks.
- .9 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .10 Countersink bolts where necessary to provide clearance for other work.

3.04 CLEANING

- .1 Progress Cleaning: clean in accordance with Section [01 74 11 - Cleaning].
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section [01 74 11 - Cleaning].
- .3 Waste Management: separate waste materials for [reuse] [and] [recycling] in accordance with Section [01 74 21 - Construction/Demolition Waste Management and Disposal] [01 35 21 - LEED Requirements].
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section [_____].

1.02 REFERENCE STANDARDS

- .1 ASTM International Inc.
- .1 ASTM C 726-[05], Standard Specification for Mineral Fiber Roof Insulation Board.
 - .2 ASTM C 728-[05], Standard Specification for Perlite Thermal Insulation Board.
 - .3 ASTM C 1177/C 1177M-[06], Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .4 ASTM C 1396/C 1396M-[06a], Standard Specification for Gypsum Board.
 - .5 ASTM D 41-[05], Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - .6 ASTM D 312-[00(2006)], Standard Specification for Asphalt Used in Roofing.
 - .7 ASTM D 448-[03a], Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
 - .8 ASTM D 2178-[04], Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
 - .9 ASTM D 6162-[00a], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
 - .10 ASTM D 6163-[00e1], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
 - .11 ASTM D 6164-[05], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
 - .12 ASTM D 6222-[02e1], Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcement.
 - .13 ASTM D 6223-[02e1], Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcement.
 - .14 ASTM D 6509-[00], Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcement.
- .2 Canadian General Standards Board (CGSB)
- .1 CGSB 37-GP-9Ma-[83], Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .2 CGSB 37-GP-56M-[80b(A1985)], Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .3 CAN/CGSB-51.33-[M89], Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .3 Canada Green Building Council (CaGBC)
- .1 LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package

- For New Construction and Major Renovations (including Addendum [2007]).
- .2 LEED Canada-CI Version 1.0-[2007], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
 - .4 Canadian Roofing Contractors Association (CRCA)
 - .1 CRCA Roofing Specifications Manual-[1997] .
 - .5 Canadian Standards Association (CSA International)
 - .1 CSA A123.21-[04], Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems
 - .2 CSA-A123.3-[05], Asphalt Saturated Organic Roofing Felt.
 - .3 CSA-A123.4-[04], Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
 - .4 CSA A231.1-[06], Precast Concrete Paving Slabs.
 - .5 CSA O121-[08], Douglas Fir Plywood.
 - .6 CSA O151-[04], Canadian Softwood Plywood.
 - .6 Factory Mutual (FM Global)
 - .1 FM Approvals - Roofing Products.
 - .7 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .8 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S701-[05], Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S702.2-[03], Standard for Mineral Fibre Thermal Insulation for Buildings.
 - .3 CAN/ULC-S704-[03], Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 - .4 CAN/ULC-S706-[02], Standard for Wood Fibre Thermal Insulation for Buildings.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Convene pre-installation meeting in accordance with [Section [01 32 16.06 - Construction Progress Schedule].

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Product Data:
 - .1 Provide [two] copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide [two] copies of WHMIS MSDS in accordance with Section [01 35 29.06 - Health and Safety Requirements] [01 35 43 - Environmental Procedures], and indicate VOC content for:
 - .1 Primers.
 - .2 Asphalt.
 - .3 Sealers.

- .4 Filter fabric.
- .3 Provide shop drawings:
 - .1 Indicate [flashing,] [control joints,] [tapered insulation] details.
 - .2 Provide layout for tapered insulation.
- .4 Samples: provide roofing samples.
- .5 Manufacturer's Certificate: certify that [products] meet or exceed [specified requirements].
- .6 Test and Evaluation Reports: submit laboratory test reports certifying compliance of [bitumens] [and] [roofing felts] [and] [membrane] with specification requirements.
- .7 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .8 Manufacturer's field report: in accordance with Section [01 45 00 - Quality Control].
- .9 Reports: indicate procedures followed, ambient temperatures and wind velocity during application, [and] [_____].
- .10 Sustainable Design Submittals:
 - .1 LEED Submittals: in accordance with [Section 01 35 21 - LEED Requirements].

1.05 QUALITY ASSURANCE

- .1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems [with [5] years [documented] experience] [approved by manufacturer].
- .2 Sustainability Standards Certification:
 - .1 Recycled Content: [provide listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of [post-consumer] [and] [post-industrial] content, and total cost of materials for project].
 - .2 Regional Materials: provide evidence that project incorporates required percentage [10] [20] % of regional materials/products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.06 FIRE PROTECTION

- .1 Fire Extinguishers:
 - .1 Maintain two fire extinguishers on the site.
 - .2 ULC labelled for A, B and C class protection.
 - .3 Size [4.5] kg [or as indicated] on roof per torch applicator, within [6] m of torch applicator.
- .2 Maintain fire watch for [1] hour after each day's roofing operations cease.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with [manufacturer's written instructions] [and][Section [01 61 00 - Common Product Requirements]] [_____].
- .2 Storage and Handling Requirements:
 - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
 - .2 Provide and maintain dry, off-ground weatherproof storage.
 - .3 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.
 - .4 Remove only in quantities required for same day use.
 - .5 Place plywood runways over completed Work to enable movement of material and other traffic.
 - .6 Store sealants at +5 degrees C minimum.
 - .7 Store insulation protected from [daylight][and] [weather] and deleterious materials.
- .3 Packaging Waste Management: remove for reuse [and return] [by manufacturer] of [pallets] [crates] [padding] [and] [packaging materials] in accordance with Section [01 74 21 - Construction/Demolition Waste Management and Disposal].
 - .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
 - .2 Fold up metal banding, flatten and place in designated area for recycling.

1.08 SITE CONDITIONS

- .1 Ambient Conditions
 - .1 Do not install roofing when temperature remains below -18 degrees C for torch application, or [-5 degrees C] [to manufacturers' recommendations] for mop application.
 - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
- .2 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.

1.09 WARRANTY

- .1 For Work of this Section [07 52 00 - Modified Bituminous Membrane Roofing], 12 months warranty period is extended to 60 months.

2 PRODUCTS

2.01 PERFORMANCE CRITERIA

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

- .2 Roofing System: to CSA A123.21 for wind uplift resistance.

2.03 DECK PRIMER

- .1 Asphalt primer to suite the application.

2.04 MEMBRANE

- .1 Base sheet: Install Torchflex TP-180-SF-Base (3mm) or other SBS product approved by a Departmental Representative
- .2 Install Torchflex TP-250-Cap (5.0) or other SBS product approved by a Departmental Representative 2.06 ADHESIVE
- .1 Adhesive for securing overlay board and insulation: [asphalt extended vulcanized adhesive, two component unit, consisting of two liquids mixed on site to produce pourable adhesive].

2.05 OVERLAY BOARD

- .1 Overlay Board: 3/16" thick asphalt based recovery board with non-woven glass facers, as recommended by the membrane manufacturer.
 - .1 Install over insulation to provide torch safe surface.

2.06 BITUMEN

- .1 Asphalt: to [CAN/CSA A123.4] [ASTM D 312], Type [2] [3].

2.07 SEALERS

- .1 Plastic cement: [asphalt] [coal tar].
- .2 Sealing compound: [____], rubber asphalt type.
- .3 Sealants: [____]. [Caulking - see Section [07 92 00 - Joint Sealants]] [____].

2.08 CARPENTRY

- .1 Refer to Section [06 10 00.01 - Rough Carpentry - Short Form].
- .2 [____].

2.09 CANT STRIPS

- .1 Cut from [pressure-treated wood] [38 mm thick] [prefabricated] [fibreboard] [fibreglass] [rigid mineral wool fibre] material, to measure 140 mm on slope.

2.10 FASTENERS

- .1 Covering to steel deck: No. 10 flat head, self tapping, Type A or AB, cadmium plated screws. Recommend FM Approved screw and plate assemblies.

- .2 Insulation to deck: coated insulation fasteners and galvanized plates must meet FM Approval for wind uplift and corrosion resistance, [as recommended by insulation manufacturer].

3 EXECUTION

3.01 QUALITY OF WORK

- .1 Do examination, preparation and roofing Work in accordance with [Roofing Manufacturer's Specification Manual] [and] [CRCA Roofing Specification Manual] [[Provincial] [Territorial] Roofing Association Manual], particularly for fire safety precautions.
- .2 Do priming in accordance with [manufacturers written recommendations].
- .3 The interface of the walls and roof assemblies will be fitted with durable rigid material [sheet metal] [plywood] providing connection point for continuity of air barrier.
- .4 Assembly, component and material connections will be made in consideration of appropriate design loads, [with reversible mechanical attachments].

3.02 EXAMINATION OF ROOF DECKS

- .1 Verification of Conditions:
 - .1 Inspect deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.
- .2 Evaluation and Assessment:
 - .1 Prior to beginning of work ensure:
 - .1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.
 - .2 Curbs have been built.
 - .3 Roof drains have been installed at proper elevations relative to finished roof surface.
 - .4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.
- .3 Do not install roofing materials during rain or snowfall.

3.03 PROTECTION OF IN-PLACE CONDITIONS

- .1 Cover walls, walks [, slopped roofs] and adjacent work where materials 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 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .5 Protect roof from traffic and damage. Comply with precautions deemed

necessary by [Departmental Representative].

- .6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.
- .7 Metal connectors and decking will be treated with rust proofing or galvanization.

3.05 DECK SHEATHING

- .1 Mechanically fasten to steel deck [Gypsum Board Sheathing] [Glass Mat Gypsum Board] [Cementitious Board] [Plywood] with [reversible mechanical attachments] [screws] to steel deck's upper rib surfaces, spaced [400] mm on centre each way.
- .2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

3.06 PRIMING DECK

- .1 Apply deck primer to [deck] [wood] [metal] [concrete] [gypsum board] [cementitious board] roofing substrate at the rate [recommended by manufacturer].

3.10 (EXPOSED) CONVENTIONAL MEMBRANE ROOFING (CMR) APPLICATION

- .1 Insulation: fully adhered, adhesive application:
 - .1 Adhere insulation to [steel deck] [laminated vapour barrier] using solvent-based adhesive.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
 - .4 Apply adhesive in continuous ribbons at 300 mm on centre.
 - .5 Separate the membrane and insulation with a drainage layer or slipsheet.
- .2 Insulation: fully adhered, bitumen application:
 - .1 Embed insulation in 1 to 1.5 kg/m² mopping of bitumen.
 - .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .3 Cut end pieces to suit.
- .3 Insulation: mechanically fastened application:
 - .1 Mechanically fasten insulation using [screws and pressure distribution plates] [reversible mechanical attachments].
 - .2 Fasten insulation as per manufacturer's written recommendations.
 - .3 Number and pattern of screws per board to meet Factory Mutual requirements.
 - .4 Place boards in parallel rows with ends staggered, and in firm contact with one another.
 - .5 Cut end boards to suit.
- .4 Tapered insulation application:
 - .1 Mop insulation to vapour retarder [and top layer of insulation to bottom layer] with hot asphalt at rate of 1 kg/m².
 - .2 Install tapered insulation as [first] [second] insulation layer, in

accordance with shop drawings. Stagger joints between layers 150 mm minimum.

- .5 Overlay Board: adhesive application:
 - .1 Adhere overlay board to insulation with vulcanized adhesive at the rate of one litre per m².
 - .2 Place boards in parallel rows with end joints staggered. Cap joints approximately 25 mm.
 - .3 Cut ends to suit and apply adhesive in continuous ribbons at 300 mm on centre.
- .6 Base sheet application:
 - .1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
 - .2 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 kg/m², at 230 degrees C.
 - .3 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.
 - .4 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
 - .5 Application to be free of blisters, wrinkles and fishmouths.
- .7 Cap sheet application:
 - .1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
 - .2 Unroll and embed cap sheet in uniform coating of asphalt applied at rate of 1.2 kg/m², EVT at point of contact.
 - .3 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
 - .4 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
 - .5 Application to be free of blisters, fishmouths and wrinkles.
 - .6 Do membrane application in accordance with manufacturer's recommendations.
- .8 Flashings:
 - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 [Nail][mop][torch][base][and][cap] sheet onto substrate in 1 metre wide strips.
 - .3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping or torch welding.
 - .4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
 - .5 Provide 75 mm minimum side lap and seal.
 - .6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
 - .7 Do work in accordance with [manufacturer's recommendations] [Section 07 62 00 - Sheet Metal Flashing and Trim].
- .9 Roof penetrations:
 - .1 Install roof drain pans, vent stack covers and other roof penetration flashings and seal to membrane in accordance with [manufacturer's recommendations and details] [and] [Section].
- .1 Inspections:
 - .1 Inspection and testing of roofing application will be carried out

by testing laboratory.

.2

3.16 CLEANING

- .1 Remove bituminous markings from finished surfaces.
- .2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their [documented] instructions.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.
- .4 Waste Management: separate waste materials for [reuse] [and] [recycling] in accordance with Section [01 74 21 - Construction/Demolition Waste Management and Disposal] [01 35 21 - LEED Requirements].
 - .1 Place materials defined as hazardous or toxic in designated containers.
 - .2 Clearly label location of salvaged material's storage areas and provide barriers and security devices.
 - .3 Ensure emptied containers are sealed and stored safely.
 - .4 Divert unused aggregate materials from landfill to local [quarry] [facility] for reuse as reviewed by [Departmental Representative].
 - .5 Unused [paint] [coating] material must be disposed of at official hazardous material collections site as reviewed by [Departmental Representative].
 - .6 Unused adhesive, sealant and [asphalt] materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
 - .7 Dispose of unused adhesive material at official hazardous material collections site approved by [Departmental Representative].
 - .8 Dispose of unused sealant material at official hazardous material collections site approved by [Departmental Representative].
 - .9 Dispose of unused asphalt material at official hazardous material collections site approved by [Departmental Representative].
 - .10 Divert unused gypsum materials from landfill to recycling facility as reviewed by [Departmental Representative].

END OF SECTION

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1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 [Section 07 46 13 Preformed Metal Siding: Siding system trim].
- .2 [Section 07 61 00 Sheet Metal Roofing: Roof system trim].

1.02 REFERENCE STANDARDS

- .1 The Aluminum Association Inc. (AAI)
 - .1 AA Aluminum Design Manual [2015] Part VIII Guidelines for Aluminum Sheet Metal Work in Building Construction.
 - .2 AAI DAF45-[2003(R2009)], Designation System for Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA)
 - .1 AAMA 611-[14] Voluntary Specifications for Anodized Architectural Aluminum.
 - .2 AAMA 621-[02] Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Substrates.
 - .3 AAMA 2603-[15], Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - .4 AAMA 2604-[13] Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 - .5 AAMA 2605-[13] Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- .3 American National Standards Institute (ANSI)
 - .1 ANSI/SPRI/FM 4435/ES-1, Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems [2011].
- .4 ASTM International
 - .1 ASTM A 240/A 240M-[16], Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .2 ASTM A 606/A 606M-[15], Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .3 ASTM A 653/A 653M-[15e1], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A 755/A 755M-[16e1] Standard Specification for Steel Sheet, Metallic coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
 - .5 ASTM A 792/A 792M-[10(2015)], Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - .6 ASTM B 32-[08(2014)], Standard Specification for Solder Metal.
 - .7 ASTM B 209-[14] Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .8 ASTM B 370-[12], Standard Specification for Copper Sheet and Strip

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- for Building Construction.
- .9 ASTM D 523-[14], Standard Test Method for Specular Gloss.
- .10 ASTM D 1970/D 1970M-[15a] Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .11 ASTM D 4587-[11] Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings.
- .12 ASTM F 1667-[15] Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .5 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-[M77], Sheathing, Membrane, Breather Type.
- .6 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual [2012].
- .7 Canadian Sheet Steel Building Institute (CSSBI)
 - .1 CSSBI S8-2008 Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.
 - .2 CSSBI B17-2002 Barrier Series Prefinished Steel Sheet: Product Performance & Applications.
 - .3 CSSBI Sheet Steel Facts #12 [2003] Fastener Guide for Sheet Steel Building Products.
- .8 CSA Group
 - .1 CSA A123.3-[05(2015)], Asphalt Saturated Organic Roofing Felt.
 - .2 CSA A123.22-[08(2013)] Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .9 FM Global
 - .1 Property Loss Prevention Data Sheets 1-49 Perimeter Flashing.
- .10 Green Seal Environmental Standards
 - .1 Standard GS-11-[2015], Paints, Coatings, Stains, and Sealers.
 - .2 Standard GS-36-[2013], Adhesives for Commercial Use.
- .11 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .12 Sheet Metal and Air Conditioning Contractors Association of North America (SMACNA)
 - .1 Architectural Sheet Metal Manual (2012)
 - .2 Residential Sheet Metal Guidelines (2001)

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature including product specifications and technical data sheets for sheet metal flashing fasteners and accessory materials. Include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit [two] copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section [01 35 29.06 - Health and Safety

Requirements] [01 35 43 - Environmental Procedures].

- .3 Shop Drawings:
 - .1 Submit shop drawings [only for sheet metal flashing and trim items that differ from those indicated in Contract Documents] [for all sheet metal fabrications].
 - .2 Indicate sheet thickness, flashing dimensions and fastenings. Include anchorage, expansion joints and other provisions for thermal movement.
 - .3 Submit manufacturer's catalogue cut sheets for manufactured items.
- .4 Samples:
 - .1 Submit [duplicate] [50 x 50] mm samples of each type of sheet metal material, finishes and colour.
- .5 Sustainable Design Submittals: in accordance with [Section 01 35 21 - LEED Requirements].

1.04 PRE-INSTALLATION MEETING

- .1 Include sheet metal flashing and trim on agenda of pre-installation meetings of affected sections.

1.05 MOCK-UPS

- .1 Include flashings in mock-ups as specified for work of other affected sections.

1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section [01 61 00 - Common Product Requirements].
- .2 Handle and store flashing materials to prevent creasing, buckling, scratching, or other damage.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for [reuse] [and] [recycling] in accordance with Section [01 74 21 - Construction/Demolition Waste Management and Disposal].

2 PRODUCTS

2.01 SUSTAINABILITY CHARACTERISTICS

- .1 Recycled content as much as possible.

2.02 BASE SHEET METAL MATERIALS

- .1 Provide sheet metal in base metal thickness specified. Where no thickness specified, provide base sheet metal in thickness recommended in SMACNA [Architectural Sheet Metal Manual] [Residential Sheet Metal Guidelines] for type of item being fabricated, but not less than the thickness required by the authority having jurisdiction.

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- .2 Zinc coated steel sheet: [_____] mm thickness, commercial quality to ASTM A 653/A 653M, with [Z275] designation zinc coating.
- .3 Aluminum-zinc alloy coated steel sheet: to ASTM A 792/A 792M, commercial quality, grade [33] [37] with [AZ150] [AZ180] coating, [regular spangle] [extra smooth] surface, [chemically treated for unpainted finish] [not chemically treated for paint finish], [_____] mm base metal thickness.
- .4 Stainless steel sheet: to [ASTM A 240/A 240M], Type [_____] with [_____] finish.
- .5 Textured stainless steel sheet: proprietary flat rolled stainless steel sheet product, random pebble pattern, standard mill product number [_____].
- .6 Weathering steel sheet: to ASTM A 606 high strength low alloy [hot] [cold] rolled architectural use grade, [1.2] mm minimum thickness.
- .7 Aluminum sheet: to ASTM B 209 [proprietary utility sheet] [plain] [embossed] pattern, [H14] temper, [[0.48] mm minimum thickness] [thickness in accordance with [AA Aluminum Design Manual Part VIII Aluminum Sheet Metal Work in Building Construction] [residential] [non-residential] guidelines] unless specified otherwise.
 - .1 For sheet aluminum fabrications to be anodized, fabricate from minimum 0.8 mm thick sheet.
- .8 Copper sheet: to ASTM B 370 temper designation [_____] with mass of [_____] kg/m² minimum mass.

2.03 PREFINISHED STEEL SHEET

- .1 Prefinished steel sheet with coating system consisting of base metal pre-treatment, primer, silicone modified polyester or polyester topcoat meeting requirements of CSSBI S8. Color as directed by a Departmental representative.

2.05 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Pourable sealer: proprietary two-part polyurethane pourable sealer designed for sealing penetration pockets.
 - .1 Maximum VOC limit [50] g/L [to SCAQMD Rule 1168] [to GSES GS-36].
- .3 Loose laid underlay for metal flashing: [dry sheathing to CAN/CGSB-51.32] [asphalt laminated 3.6 to 4.5 kg kraft paper] [No. 15 perforated asphalt felt to CSA A123.3].
- .4 Self-adhesive membrane underlay and tie-in membrane for metal flashings: To CSA A123.22 or ASTM D 1970, minimum [_____] thickness.
- .5 Sealants: [_____] in accordance with Section 07 92 00, in colour to match flashing finish colour.
- .6 Cleats and hook strips: of same material, and temper as sheet metal, minimum [[50] mm wide] [one-third width of secured flashing] [continuous]. Thickness [[_____] mm] [same as sheet metal being secured].
 - .1 [Provide continuous hook strip at outside of parapets].

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- .7 Nails: of same material as sheet metal, [ring thread] flat head roofing nails of length and thickness suitable for [metal flashing] application.
- .8 Screws: of same material as sheet metal, Suitable for substrate and material being fastened, [galvanized] and [neoprene washer].
- .9 Solder: to ASTM B 32, alloy composition Sn [_____].
- .10 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
- .11 Touch-up paint: as recommended by prefinished material manufacturer.
 - .1 Maximum VOC limit [50] [150] g/L [to Standard GS-11] [to SCAQMD Rule 1113].

2.06 FABRICATION

- .1 Fabricate sheet steel flashings and other sheet steel work [in accordance with applicable CRCA 'FL' series details] [and SMACNA [architectural] [residential] details] [as indicated].
- .2 Fabricate aluminum flashings and other sheet aluminum work in accordance with AAI-Aluminum Sheet Metal Work in Building Construction.
 - .1 For aluminum sheet metal flashing, trim and fabrications to be anodized, complete forming prior to anodizing.
- .3 Form pieces in 2400 mm maximum lengths.
 - .1 Make allowance for expansion at joints.
- .4 Hem exposed edges on underside 12 mm.
 - .1 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.

2.07 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of [_____] mm thick [[galvanized] [prefinished] [weathering] steel] [[mill finish] [anodized] [prefinished] aluminum] [copper] [stainless steel].

2.08 PANS

- .1 Form pans to receive roofing plastic from [[_____] mm thick] [[_____] kg/m²] [galvanized] [prefinished] steel [aluminum] [copper] [stainless steel] sheet metal with minimum 75 mm upstand above finished roof and [100] mm continuous flanges with no open corners.
 - .1 [Solder] [Rivet] joints.
 - .2 Make pans minimum [50] mm wider than member passing through roof membrane.

2.09 REGLETS AND CAP FLASHINGS

- .1 Form [[recessed] [surface mounted] reglets] [metal cap flashing] of [[_____] mm thick] [[_____] kg/m²] sheet metal [to be built-in [concrete] [masonry] work] for base flashings [as detailed] [in accordance with CRCA FL series details, FL [_____]].
 - .1 Provide slotted fixing holes and steel/plastic washer fasteners.
 - .2 [Cover face and ends with plastic tape].

2.10 EAVES TROUGHS AND DOWNPIPES

- .1 Form eaves troughs and downpipes from [[_____] mm thick] [[_____] kg/m²] [[galvanized] [prefinished] steel] [aluminum] [copper] [stainless steel] sheet metal [extruded vinyl] [vinyl].
- .2 Sizes and profiles [as indicated].
- .3 Provide goosenecks, [outlets], strainer baskets and necessary fastenings.
- .4 Form [600 x 600] mm splash pans from [[_____] mm thick] [[_____] kg/m²] [[galvanized] [prefinished] steel] [aluminum] [copper] [stainless steel] sheet metal [vinyl].

3.01 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.02 INSTALLATION

- .1 Install sheet metal work [in accordance with] [CRCA FL series details, FL [_____]] [AAI-Aluminum Sheet Metal Work in Building Construction] [as detailed] [as scheduled].
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal.
 - .1 Secure in place and lap joints 100 mm.
 - .2 Provide self-adhesive membrane to tie into adjacent assemblies.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.
 - .1 Flash joints using [S-lock] [standing seams] forming tight fit over hook strips, [as detailed].
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .7 Insert metal flashing [into reglets] [under cap flashing] to form weather tight junction.
- .8 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.

- .9 Caulk flashing at [reglet] [cap flashing] with sealant.
- .10 Install pans, where shown around items projecting through roof membrane.
- .11 Where flashing installed with mechanical fasteners, install fasteners in slots or oversize holes to allow expansion and contraction of flashings.
- .12 Provide isolation coating or impervious self-adhesive membrane to separate aluminum items from concrete and masonry.

3.03 EAVES TROUGHS AND DOWNPIPES

- .1 Install eaves troughs and secure to building at [750] mm on centre with eaves trough spikes through spacer ferrules.
 - .1 Slope eaves troughs to downpipes as indicated.
 - .2 [Solder] [Seal] joints watertight.
- .2 Install downpipes and provide goosenecks back to wall.
 - .1 Secure downpipes to wall with straps at [1800] mm on centre; minimum two straps per downpipe.
 - .2 [Connect downpipes to drainage system and seal joint with plastic cement].
- .3 Install splash pans as indicated.

3.04 SCUPPERS

- .1 Install scuppers as indicated.

3.05 CLEANING

- .1 Proceed in accordance with Section [01 74 11 - Cleaning].
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION