PROJECT TITLE

HARROW, ONTARIO
AGRICULTURE & AGRI-FOODS CANADA
2585 COUNTY ROAD 20

ROOF REPLACEMENT

PROJECT NUMBER

R.076726.001

PROJECT DATE

2016-04-04

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Title and description of Work.

.2 Contract Method.

.3 Work by others.

.4 Work sequence.

.5 Contractor use of premises.

.6 Owner occupancy.

.7 Alterations to existing building – Scope of Work.

1.2 PRECEDENCE

.1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises roof replacement of Agriculture & Agri-Foods Canada, located at 2585 County Road 20, Harrow, Ontario; and further identified as Harrow Agriculture.

1.5 CONTRACT METHOD

.1 Construct work under lump sum contract.

.1 Include in contract amount for remediation and repair to existing metal roof decking and wood blocking.

.1 Include for replacement of 5 m^3 (176.5 ft^3) of damaged existing wood blocking to Section 06 10 00 with new treated wood blocking.

.2 Include for remediation of steel decking by rust painting to Section 05 01 30, Level 2 remediation, on 30% of metal roof deck area.

.3 Include for remediation of steel decking by new deck overlay to Section 05 01 30, Level 3 remediation, on 10% of metal roof deck area.

.4 Include for replacement of steel decking with new to structure to Section 05 01 30, Level 4 remediation, on 5% metal roof deck.

.2 Provide Unit Prices to add to or subtract from Contract Amount for remediation of existing metal roof decking and wood blocking requiring localized repair and replacement, where discovered during performance of work.
.1 Co-ordinate remediation of existing with Unit Price Table.
.1 Replacement of damaged existing wood blocking per m^3 (35.3 ft^3) to Section 06 10 00 with new treated wood blocking.
.2 Remediation of steel decking by rust painting per m^2 (10.8 ft^2) to Section 05 01 30, Level 2 remediation.
.3 Remediation of steel decking by new deck overlay per m^2 (10.8 ft^2) to Section 05 01 30, Level 3 remediation.
.4 Replacement of steel decking with new to structure per m^2 (10.8 ft^2) to Section 05 01 30, Level 4 remediation.

1.6 COST BREAKDOWN

.1 Within 48 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating contract amount.

.2 Show separately cost of equipment purchased exempt from Ontario Retail Sales Tax under your Ontario Sales Tax licence number.

.3 Within 48 hours of acceptance of bid submit a list of subcontractors.

1.7 WORK BY OTHERS

.1 The Contractor shall for the purpose of the Ontario Occupational Health and Safety Act and Regulations for Construction Projects, and for the duration of the Work of the Contract:
.1 Assume the role of Constructor in accordance with the Authority Having Jurisdictions.
.2 Agree, in the event of two or more Contractors working at the same time and space at the work site, without limiting the General Conditions GC3.7, to the Departmental Representative's order to:
.1 Assume, as the Constructor, the responsibility for the Departmental Representative's other Contractors.

1.8 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's continued use of premises during construction.

.2 Coordinate Progress Schedule.

.3 Maintain fire access/control.

1.9 CONTRACTOR USE OF PREMISES

.1 Contractor shall limit use of premises for Work, for storage, and for access, to allow;

.1 Owner occupancy.
.2 Public usage.

.2 Coordinate use of premises under direction of Departmental Representative.

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

1.10 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.11 PROTECTION OF ROOFS

.1 Protect all roof areas from damage within area of Work and where equipment or materials are stored.

.2 Do not store equipment or materials directly on roof surface after work day has ended.

.3 Protect existing roof systems to remain against damage from traffic generated by new Work. Protect newly installed roof areas.

.4 Protect existing and newly installed roof membranes using sheets of 25mm (1”) expanded polystyrene insulation, laid over top of 13mm (0.5”) plywood, set over top of polyethylene slip sheet.

1.11 SCOPE OF WORK: LOW SLOPE ROOF REPLACEMENT

.1 On All Roof Replacement Areas: Remove existing roof gravel, projection and perimeter flashings, and old appurtenances down to expose existing roof deck in preparation for installation of a roof system in accordance with Section 07 52 00.

.2 Remove and store all existing self ballasted guard rails and accessories for re-installation into finished roof system.

.3 Remove existing roof system down to existing roof deck surface. Recycle and dispose of debris to an appropriate site to Section 01 74 20.

.1 On Metal Deck Areas: Clean dust and debris from flutes of existing roof deck with broom or vacuum.

.1 Examine and review surface of exposed metal deck for corrosion and deterioration that may impact roof system installation.

.2 Remediate corroded and damaged metal decking to Section 05 01 30.

.2 On Concrete Deck Areas: Where existing concrete deck is exposed, review surface of deck for damage and deterioration that may impact new roof system installation.

.1 Repair divots in concrete decking with quick dry mortar mix.

.4 On Metal Roof Decks: Mechanically fasten new layer of 13mm (0.5”) thick deck overlayment board over existing metal roof deck.

.5 Prime substrate and all exposed wood, concrete, gypsum board, and metal surfaces to receive new vapour retarder membrane and flashings.

.1 Allow to dry and flash-off before proceeding.

.6 Install self adhered modified bitumen vapour retarder membrane across field of each roof area.

.7 Install self adhered modified bitumen flashings along all perimeters, curbs, projections, and where indicated on detail drawings.

.8 Install a flat base insulation layer of 51mm (2.0”) polyisocyanurate insulation in ribbons of polyurethane roofing adhesive.

.9 On Sloped Metal Decks: Install a flat overlay insulation layer of 51 mm (2.0”) polyisocyanurate insulation in ribbons of polyurethane roofing adhesive.

.10 On Flat Metal Decks: Install a tapered overlay insulation layer of polyisocyanurate insulation in ribbons of polyurethane roofing adhesive. Slope at 1 or 2 % where indicated on roof plan drawings, starting from a minimum 25 mm (1.0”).

.11 Install a flat layer of 13mm (0.5”) siliconized gypsum roof board in ribbons of polyurethane roofing adhesive.

.1 Prime cover board with even coat and allow to flash-off.

.12 Install one ply of modified bitumen base sheet membrane across field of roof, self-adhered.

.13 Install one ply of self-adhered modified bitumen base sheet flashings.

.14 Install one ply of modified bitumen granular cap sheet membrane, torch applied.

.15 Install one ply of modified bitumen granular cap sheet flashings, torch applied.

.16 Install new prefinished sheet metal flashings and trim with required hook strips.

1.12 SCOPE OF WORK: ROOF ACCESSORIES

.1 Include in Contract Amount for supply and installation of roofing accessories required for complete roof system installation:

.1 Guard Rails:

.1 Supply and install roof top guard rails where indicated on roof plan drawings to meet designated guard rail requirements.

.2 Remove existing self-ballasted guard rails, store, and re-install

with membrane protection where required to meet guard rail requirements.

.3 Supply and install additional new self-ballasted guard rail systems to supplement and meet guard rail requirements.

.1 At Roof Areas 2.2, 2.3, 4.1 and 4.2, fixed custom made guard rails, similar to those existing at Roof Area 3.1, may by secured to through existing sloped metal roof areas to substitute for self-ballasted guard rails to meet guard rail requirements.

.2 Roof access ladders:

.1 Remove, disassemble, and recycle existing non-compliant roof access ladders at Roof Areas 2.2, 2.3, and 3.1. Supply and install new engineered roof access ladders as indicated in drawings to suit existing configurations.

.3 Cross-over stairs:

.1 Supply and install 2 new engineered, modular self-ballasted roof cross-over staircases from west end of Roof Area 3.1 to 4.1 and east end of Roof Area 3.1 to 4.2 as indicated in drawings. Provide walkway pads or concrete pavers to detail 26/A9 at base of staircases, both sides.

.4 Cross-over platform:

.1 Supply and install 1 engineered, modular self-ballasted roof cross-over platform to suit “Z” shaped transition between access ladders on Roof Area 1.10. Design platform similar to staircases and as indicated in drawings.

.5 Walkway pads:

.1 Supply and install new membrane walkway pads where indicated on roof plan drawings. Membrane manufacturer approved walkway pads or squares of additional cap sheet membrane to be fully bonded to finished roof membrane.

.6 Cross-over ramps:

.1 Supply and install new engineered, modular self-ballasted roof cross-over ramps where indicated on roof plan drawings and as indicated in drawings. Provide cross-over ramps along designated travel path over multi-conduit runs greater than 610 mm (2’-0”) in width.

.7 Trim overhanging trees:

.1 Provide arborist services to trim back tree branches around courtyard area overhanging roof surface. Ensure 610 mm (2’-0”) clear space above finished roof membrane.

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 ACCESS AND EGRESS

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

.2 Provide public protection at all three building entrances during performance of work with temporary hoarding or continuous barrier at roof level.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
.1 Where access to building interior is required for performance of work, provide request to Departmental Representative with 48 hours advanced notice.

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

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

.4 Contractor to provide own portable facilities for use by Contractor's personnel in assigned. Keep facilities clean and away from building. Contractor’s use of buildings sanitary facilities is prohibited.

.5 Use only ladders, scaffolding, and conveyors to access roof area from building exterior for moving workers and material.
.1 Coordinate location for setup and staging on site with Departmental Representative.
.2 Protect exterior walls at access points to approval of Departmental Representative prior to use.
.3 Accept liability for damage, safety of equipment and overloading of existing equipment.

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

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.4 EXISTING SERVICES

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

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

.3 Construct barriers in accordance with Section 01 56 00.

1.5 SPECIAL REQUIREMENTS

.1 Where feasible, carry out excessive noise generating Work Monday to Friday from 18:00 to 07:00 hours and on Saturdays, Sundays, and statutory holidays.

.2 Submit schedule in accordance with Section 01 32 16 - Construction Progress Schedule - Bar (GANTT) Chart.

.3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

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

.5 Deliver materials outside of peak traffic hours 17:00 to 07:00 and 13:00 to 15:00 unless otherwise approved by Departmental Representative.

1.6 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

.2 Security clearances:

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

.2 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

1.7 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not permitted.

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 SECTION INCLUDES

.1 Coordination Work with other contractors and work under administration of Departmental Representative.

.2 Scheduled pre-construction and progress meetings.

1.2 RELATED SECTIONS

.1 Section 01 11 00 - Summary of Work.

1.3 DESCRIPTION

.1 Coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction Work, with progress of Work of other contractors and Work under instructions of Departmental Representative.

1.4 PROJECT MEETINGS

.1 Schedule and administer project meetings throughout progress of Work weekly or as determined by Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative and consultant.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record minutes. Include significant proceedings and decisions. Identify action by parties.

.7 Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants, affected parties not in attendance, Departmental Representative and consultant.

1.5 CONSTRUCTION ORGANIZATION AND START-UP

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Contractor, major Subcontractors, field

inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Agenda to include following:
.1 Appointment of official representative of participants in Work.
.2 Schedule of Work, progress scheduling in accordance with Section 01 32 16.
.3 Schedule of submission of shop drawings, samples, colour chips in accordance with Section 01 33 00.
.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 51 00.
.5 Delivery schedule of specified equipment in accordance with Section 01 32 16.
.6 Site security in accordance with Section 01 52 00.
.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements (GC).
.8 Departmental Representative provided Products.
.9 Record drawings in accordance with Section 01 78 00.
.10 Maintenance in accordance with Section 01 78 00.
.11 Take-over procedures, acceptance, and warranties in accordance with Section 01 77 00 and 01 78 00.
.12 Monthly progress claims, administrative procedures, photographs, and holdbacks (GC).
.13 Appointment of inspection and testing agencies or firms in accordance with Section 01 45 00.
.14 Insurances and transcript of policies (GC).

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

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

.7 Comply with instructions of Departmental Representative for use of temporary utilities and construction facilities.

.8 Coordinate field engineering and layout work with Departmental Representative.

1.6 ON-SITE DOCUMENTS

.1 Maintain at job site, one copy each of the following:
.1 Contract drawings.
.2 Specifications.
.3 Amendments and addenda.
.4 Reviewed shop drawings.
.5 Change orders.
.6 Other modifications to Contract.
.7 Field test reports.

.8 Copy of approved Work schedule.
.9 Manufacturers' installation and application instructions.
.10 Labour conditions and wage schedules.
.11 Material Safety Data Sheets.
.12 Labour and Material Bonds.
.13 All applicable Municipal Permits.

1.7 SCHEDULES

.1 Submit preliminary construction progress schedule in accordance with Section 01 32 16 to Departmental Representative coordinated with Departmental Representative's project schedule.

.2 After review, revise and resubmit schedule to comply with revised project schedule.

.3 During progress of Work revise and resubmit as directed by Departmental Representative.

1.8 CONSTRUCTION PROGRESS MEETINGS

.1 During course of Work and 1 week prior to project completion, schedule progress meetings weekly.

.2 Contractor, major subcontractors involved in Work and Departmental Representative and field inspector 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 3 days after meeting.

.5 Agenda to include 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 Review proposed changes for affect on construction schedule and on completion date.
.11 Other business.

1.9 SUBMITTALS

.1 Submit preliminary shop drawings, product data and samples in accordance with Section 01 33 00 for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Departmental Representative.

.2 Submit requests for payment for review, and for transmittal to Departmental Representative.

.3 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.

.4 Process substitutions through Departmental Representative.

.5 Process change orders through Departmental Representative.

.6 Deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.

1.10 COORDINATION DRAWINGS

.1 Provide information required by Departmental Representative for preparation of coordination drawings.

.2 Review and approve revised drawings for submittal to Departmental Representative.

1.11 CLOSEOUT PROCEDURES

.1 Notify Departmental Representative when Work is considered ready for Substantial Performance.

.2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.

.3 Comply with Departmental Representative's instructions for correction of items of Work listed in executed certificate of Substantial Performance.

.4 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative's final inspection.

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 DEFINITIONS

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

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

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

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

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

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

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

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

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

1.2 REQUIREMENTS

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

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

.3 Limit activity durations to maximum of approximately 10 working days, to allow

for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Certificate of Substantial Performance and Certificate of Completion as defined times of completion are of essence of this contract.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Submit to Departmental Representative within 5 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

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

1.4 MASTER PLAN

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

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

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

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

1.5 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Permits.
.4 Mobilization.
.5 Roofing.
.6 Demobilization.

1.6 PROJECT SCHEDULE REPORTING

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

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

mitigation.

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings specified in Section 01 31 16, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

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 shop drawings, product data, samples and mock-ups 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.

.11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, and AutoCAD dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

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

.2 Submit drawings stamped and signed by professional engineer registered or

licensed in Province of Ontario of Canada.

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

.4 Allow 3 working days for Departmental Representative's review of each submission.

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

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

.7 Accompany submissions with transmittal letter, in duplicate, containing:
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

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

.9 After Departmental Representative's review, distribute copies.

.10 Submit three hard copies and one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental

Representative may reasonably request.

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

.12 Submit three hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit three hard copies and one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit three hard copies and one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit three hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

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

.17 Submit three hard copies and one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.18 Delete information not applicable to project.

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

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

.21 The review of shop drawings by Public Works and Government Services Canada

(PWGSC) is for sole purpose of ascertaining conformance with general concept.
.1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

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

.2 Deliver samples prepaid to Departmental Representative's 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 Amount. 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.

1.4 MOCK-UPS

.1 Erect mock-ups in accordance with Section 01 45 00.

1.5 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Safety and Insurance Board Experience Report.

.2 Submit transcription of insurance immediately after award of Contract.

1.6 FEES, PERMITS AND CERTIFICATES

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and permits required.

.3 Furnish certificates and permits.

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 Canadian Standards Association (CSA): Canada
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 National Building Code 2010 (NBC):
.1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.3 National Fire Code 2010 (NFC):
.1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.

.4 Province of Ontario:
.1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
.2 O. Reg. 490/09, Designated Substances.
.3 Workplace Safety and Insurance Act, 1997.
.4 Municipal statutes and authorities.

.5 Treasury Board of Canada Secretariat (TBS):
.1 Treasury Board, Fire Protection Standard April 1, 2010 www.tbs-sct.gc.ca/pol/doc-eng.aspx ?id=17316&section=text.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.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 Measures and controls to be implemented to address identified safety hazards and risks.

.3 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Building, Facility, Tenant's Emergency Procedures and Evacuation Plan in place at the site. Departmental Representative will provide Building, Facility, Tenant's Emergency Procedures and Evacuation Plan. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.

.4 Contractor's and Sub-contractors' Safety Communication Plan.

.5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Building, Facility, Tenant's Emergency Response requirements and procedures provided by Departmental Representative.

.6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.

.7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.8 Submit names of personnel and alternates responsible for site safety and health.

.9 Submit records of Contractor's Health and Safety meetings when requested.

.10 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and Consultant, weekly.

.11 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.

.12 Submit copies of incident and accident reports.

.13 Submit Material Safety Data Sheets (MSDS).

.14 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to commencement of Work.

.2 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.4 WORK PERMIT

.1 Obtain building permits related to project prior to commencement of Work.

.2 Obtain 'Permit to Work Form' from SNC-Lavalin O&M or Departmental Representative.

.3 Obtain 'Hot Work Permit' from SNC-Lavalin O&M or Departmental Representative.

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

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

1.7 REGULATORY REQUIREMENTS

.1 Comply with the Acts and regulations of the Province of Ontario.

.2 Comply with specified standards and regulations to ensure safe operations at site.

1.8 GENERAL REQUIREMENTS

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

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.

.3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.9 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

1.10 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.

.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction

Projects for the Province of Ontario.

1.11 UNFORSEEN HAZARDS

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

.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

1.12 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 of Ontario, and in consultation with Departmental Representative.

.1 Contractor's Safety Policy.
.2 Constructor's Name.
.3 Notice of Project.
.4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
.5 Ministry of Labour Orders and reports.
.6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
.7 Address and phone number of nearest Ministry of Labour office.
.8 Material Safety Data Sheets.
.9 Written Emergency Response Plan.
.10 Site Specific Safety Plan.
.11 Valid certificate of first aider on duty.
.12 WSIB "In Case of Injury At Work" poster.
.13 Location of toilet and cleanup facilities.

1.13 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.

1.14 POWDER ACTUATED DEVICES

.1 Use powder actuated devices is prohibited.

1.15 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.

.2 Assign responsibility and obligation to Health and Safety Coordinator to stop or start Work when, at Health and Safety Coordinator's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

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 GENERAL

.1 This section specifies general requirements and procedures for fire safety. Additional requirements may be specified in individual sections elsewhere in specifications.

1.2 REPORTING FIRES

.1 The Departmental Representative will co-ordinate arrangements for the Contractor to be briefed at the pre-construction meeting concerning Building's fire safety protocol.

.2 Building manager will supply a copy of "Fire Safety Emergency Evacuation Plan" in effect for this building. Contractor shall comply with outlined fire safety requirements.

.3 Know location of nearest fire alarm box and telephone, including emergency phone number.

.4 Report immediately all fire incidents to Fire Department as follows:
- .1 activate nearest fire alarm box; or
- .2 telephone.

.5 Person activating fire alarm box will remain at box to direct Fire Department to scene of fire.

.6 When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

1.3 FIRE WATCH

.1 Appoint a Fire Watch at locations where welding and soldering, torching or roofing is to take place.

.2 A dedicated Fire Watch is not required. A competent person from the workforce on site may be assigned as Fire Watch for duration of work.

.3 Assign a person who is knowledgeable in the correct use of fire extinguishers on the project.

.4 Have work inspected by the Fire Watch at least 2.0 hours after work stoppage for each work period.

1.4 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm system will not be:
- .1 obstructed;
- .2 shut-off; or
- .3 left inactive at end of working day or shift.

.2 Fire hydrants, standpipes and hose systems will not be used for other than fire-fighting purposes unless authorized by Departmental Representative.

.3 Provide and maintain free access to fire extinguishing equipment. Maintain exit facilities. Keep means of egress free from materials, equipment and obstructing.

1.5 FIRE EXTINGUISHERS

.1 Supply fire extinguishers, as necessary to protect work in progress and Contractor's physical plant on site.

1.6 INSTALLATION AND/OR REPAIR OF ROOF TO INCLUDE CONTRACTORS PHYSICAL PLANT AT SITE

.1 Ensure personnel use and take precautions as follows:
- .1 Use equipped with thermometers or gauges in good working order.
- .2 Store combustible materials away from building.
- .3 All roofing materials will be stored in location no closer than 3 m to any structures.

1.7 BLOCKAGE OF ROADWAYS

.1 Advise Departmental Representative of any work that would impede fire apparatus response. This includes violation of minimum required overhead clearance.

1.8 SMOKING PRECAUTIONS

.1 Smoking is not permitted within areas of work and site storage.

1.9 RUBBISH AND WASTE MATERIALS

.1 Rubbish and waste materials are to be kept to a minimum.

.2 Burning of rubbish is prohibited.

.3 Remove all rubbish from work site at end of work day or shift or as directed.

.4 Storage:
- .1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.
- .2 Deposit greasy or oily rags and materials subject to spontaneous

combustion in approved receptacles and remove from site daily or at the end of each shift.

1.10 FLAMMABLE AND COMBUSTIBLE LIQUIDS

.1 Handling, storage and use of flammable and combustible liquids are to be governed by the current National Fire Code of Canada.

.2 Flammable and combustible liquids such as gasoline, kerosene and naphtha will be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires permission of local building manager.

.3 Transfer of flammable and combustible liquids is prohibited within buildings or jetties.

.4 Transfer of flammable and combustible liquids will not be carried out in vicinity of open flames or any type of heat-producing devices.

.5 Flammable liquids having a flash point below 38°C such as naphtha or gasoline will not be used as solvents or cleaning agents.

.6 Flammable and combustible waste liquids, for disposal, will be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and Fire Department is to be notified when disposal is required.

1.11 HAZARDOUS SUBSTANCES

.1 Work entailing use of toxic or hazardous materials, chemicals and/or explosives, or otherwise creating hazard to life, safety or health, will be in accordance with National Fire Code of Canada.

.2 Obtain from SNC-Lavalin O&M or local building manager a "Hot Work" permit for work involving welding, burning or use of blow torches and salamanders, in buildings or facilities.

.3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of the local building manager. Contractors are responsible for providing fire watch service for work on a scale established and in conjunction with building manager at pre-construction meeting.

.4 Where flammable liquids, such as lacquers or urethanes are to be used, proper ventilation will be assured and all sources of ignition are to be eliminated. Building manager is to be informed prior to and at cessation of such work.

1.12 WELDING, BURNING AND CUTTING

.1 Contractor performing work of this section must notify Departmental Representative in advance of commencing work.

.2 Use non-combustible shields for electric and gas welding or cutting executed within 3 m of combustible material or in occupied spaces.

.3 Place cylinders supplying gases as close to work as possible. Secure cylinders in upright position, free from exposure to sun or high temperature.

.4 Locate fire extinguishing equipment near all welding, cutting and soldering operations.

.5 Contractor's mechanics shall be properly equipped with required protective clothing, including goggles or welding hood or face mask, gloves, etc.

.6 Contractor is responsible for the protection of his work and the Departmental Representative's property.

.7 Provide Fire Watch on standby with approved fire extinguisher while burning or welding is in progress.

1.13 QUESTIONS AND/OR CLARIFICATIONS

.1 Direct any questions or clarification on Fire Safety in addition to above requirements to local building manager.

1.14 FIRE INSPECTION

.1 Site inspections by building manager will be coordinated through Departmental Representative.

.2 Allow local building manager unrestricted access to work site.

.3 Co-operate with building manager during routine fire safety inspection of work site.

.4 Immediately remedy all unsafe fire situations observed by building manager.

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 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 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for new roof system and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit 2 copies of WHMIS MSDS.

.4 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review by Departmental Representative.

.5 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.6 Address topics at level of detail commensurate with environmental issue and required construction task.

.7 Include in Environmental Protection Plan:
.1 Name of person responsible for ensuring adherence to Environmental Protection Plan.
.2 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
.3 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
.4 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

1.3 FIRES

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

1.4 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 work to prevent disturbance or damage.
.1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Provide professional horticultural services to trim back tree branches overhanging close to roofs, where indicated on roof plans and where designated by Departmental Representative.

.5 Restrict tree removal to areas designated by Departmental Representative.

1.5 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
.1 Take action only after receipt of written approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.
  .1 Leave Work area clean at end of each day.

.2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

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

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
  .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply as directed by the Departmental Representative.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances or PCB's are discovered in course of work.

1.3 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions.

1.4 IAQ - INDOOR AIR QUALITY

.1 Comply with CSA-Z204-94(R1999), Guideline for Managing Indoor Air Quality in Office Buildings and CSA B651-12; including Annex A.

1.5 TAXES

.1 Pay applicable Federal, Provincial and Municipal taxes.

1.6 EXAMINATION

.1 Examine existing conditions and determine conditions affecting work.

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 SECTION INCLUDES

.1 Inspection and testing, administrative and enforcement requirements.

.2 Tests and mix designs.

.3 Mock-ups.

.4 Mill tests.

.5 Equipment and system adjust and balance.

1.2 INSPECTION

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

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

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

.4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work, above and beyond those required of the Contractor. Cost of such services will be borne by Departmental Representative.

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

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

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

1.4 ACCESS TO WORK

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

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

1.5 PROCEDURES

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

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

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

1.6 REJECTED WORK

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

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

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Amount difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

1.7 REPORTS

.1 Submit 3 copies of inspection and test reports to Departmental Representative.

.2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested and consultant.

1.8 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Departmental Representative and may be authorized as recoverable.

1.9 MOCK-UPS

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

.2 Construct in all locations acceptable to Departmental Representative as specified in specific Section.

.3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

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

.5 If requested, Departmental Representative will assist in preparing a schedule fixing dates for preparation.

.6 Mock-ups may remain as part of Work.

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 SECTION INCLUDES

.1 Temporary utilities.

1.2 RELATED SECTIONS

.1 Section 01 52 00 - Construction Facilities.

.2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

1.4 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.5 WATER SUPPLY

.1 Departmental Representative will provide continuous supply of potable water for construction use.

1.6 TEMPORARY HEATING AND VENTILATION

.1 Ventilating:
.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
.2 Ventilate storage spaces containing hazardous or volatile materials.
.3 Ventilate temporary sanitary facilities.
.4 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.2 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
.1 Conform with applicable codes and standards.
.2 Enforce safe practices.
.3 Prevent abuse of services.
.4 Prevent damage to finishes.
.5 Vent direct-fired combustion units to outside.

.3 Be responsible for damage to Work due to failure in providing adequate heat

and protection during construction.

1.7 TEMPORARY POWER AND LIGHT

.1 Departmental Representative will pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 120 volts 30 amps.

.2 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.

1.8 FIRE PROTECTION

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

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

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 SECTION INCLUDES

.1 Construction aids.

.2 Sheds and Storage.

.3 Parking.

.4 Project identification.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
.2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)
.1 CSA A23.1-09/A23.2-09(R2014), Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CSA O121-08(R2013), Douglas Fir Plywood.
.3 CSA Z797-09(R2014), Code of practice for Access Scaffold.
.4 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment, withdrawn but still available from CSA, CCOHS and Techstreet.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

1.4 INSTALLATION AND REMOVAL

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

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

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

.5 Remove from site all such work after use.

1.5 SCAFFOLDING

.1 Scaffolding in accordance with CSA Z797.

.2 Provide and maintain scaffolding, ramps, ladders, platforms, temporary stairs and conveyors.

1.6 HOISTING

.1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.

.2 Hoists/cranes shall be operated by qualified operator.

1.7 SITE STORAGE/LOADING

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

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

1.8 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

.4 Clean construction runways and taxi areas where used by Contractor's equipment.

1.9 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.10 SANITARY FACILITIES

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

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

1.11 CONSTRUCTION SIGNAGE

.1 No signs or advertisements, other than warning signs, are permitted on site.

1.12 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

.2 Protect travelling public from damage to person and property.

.3 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.4 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.5 Dust control: adequate to ensure safe operation at all times.

1.13 CLEAN-UP

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

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

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material.

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 SECTION INCLUDES

.1 Barriers.

.2 Environmental Controls.

.3 Fire Routes.

1.2 RELATED SECTIONS

.1 Section 01 51 00 - Temporary Utilities.

.2 Section 01 52 00 - Construction Facilities.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB):
- .1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
- .2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.

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

1.4 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.5 HOARDING

.1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

.2 Erect temporary site enclosure using modular freestanding fencing: galvanized, minimum 1.8 m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys. Maintain fence in good repair.

.3 Provide hoarding or continuous barrier at roof level at three existing building entrances where designated by facility manager.

1.6 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

1.7 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished openings in roofs and exposed roof decks.

.2 Design enclosures to withstand wind pressure.

1.8 DUST TIGHT SCREENS

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

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

1.9 ACCESS TO SITE

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

1.10 FIRE ROUTES

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

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.12 PROTECTION OF BUILDING FINISHES

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

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Product quality, availability, storage, handling, protection, and transportation.

.2 Manufacturer's instructions.

.3 Quality of Work, coordination and fastenings.

.4 Existing facilities.

1.2 RELATED SECTIONS

.1 Section 01 45 00 - Quality Control.

1.3 REFERENCES

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

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

.3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 The 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.

.5 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.4 QUALITY

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

.2 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.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

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

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

1.5 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any 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 Amount or Contract Time.

1.6 METRIC SIZED MATERIALS

.1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.

.2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.

.3 Claims for exemptions from use of metric sized products shall be in writing and fully substantiated with supportive documentation. Promptly submit application to Departmental Representative for consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.

.4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.

.5 Claims for additional costs due to provision of specified modular metric sized products will not be considered.

1.7 STORAGE, HANDLING AND PROTECTION

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

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

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

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

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

.6 Store rolls of roofing membrane vertically on end and keep clear of ground. Slope to shed moisture.

.7 Provide waterproof tarpauling over roofing materials in accordance with manufacturer's instructions when applicable..

.8 Store sealants, primers, adhesives, mix materials, and paints in heated and ventilated room in accordance with manufacturer's instructions when applicable. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.9 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.10 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.8 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.

1.9 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 may establish course of action.

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

1.10 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.

1.11 CO-ORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

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

1.12 CONCEALMENT

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

.2 Before installation, inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.13 REMEDIAL WORK

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

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

1.14 LOCATION OF FIXTURES

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

.2 Inform Departmental Representative of conflicting installation. Install as directed.

1.15 FASTENINGS

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

.2 Prevent electrolytic action between dissimilar metals and materials.

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

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

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

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

1.16 FASTENINGS - EQUIPMENT

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

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

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

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

1.17 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.18 EXISTING UTILITIES

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

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

PART 1 - GENERAL

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00.

.2 Submit written request in advance of cutting or alteration which affects:
- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

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

1.2 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution to Section 01 33 00.

1.3 PREPARATION

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

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

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

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

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

1.4 EXECUTION

.1 Execute cutting, fitting, and patching to complete Work.

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

.3 Uncover Work to install ill-timed Work.

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

.5 Remove samples of installed Work for testing where requested.

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

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

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

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

.10 Submit proposed materials, finishes and installation method for patching to Departmental Representative for approval, prior to patching.

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

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

.13 At penetration of fire rated wall, ceiling, or roof construction, completely seal voids with firestopping material.

.14 Pipes, conduits, ducts, and cabling on roof, to be installed above and elevated off finished membrane surface.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse, recycling, and composting in accordance with Section 01 74 20.

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 SECTION INCLUDES

.1 Progressive cleaning.

.2 Final cleaning.

1.2 PROJECT CLEANLINESS

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

.2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.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 Provide and use clearly marked separate bins for recycling. Refer to Section 01 74 20.

.6 Remove waste material and debris from site and deposit in waste container at end of each working day.

.7 Dispose of waste materials and debris at designated dumping areas off site.

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

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

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

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

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

1.3 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 other than that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

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

.7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, exterior surfaces.

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

.9 Remove dirt and other disfiguration from exterior surfaces.

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

.11 Sweep and wash clean paved areas.

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

.13 Clean roofs, downspouts, and drainage systems.

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 CONSTRUCTION & DEMOLITION WASTE

.1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. Reuse, recycle, compost, anaerobic digest or sell material for reuse except where indicated otherwise. On site sales are not permitted.

.2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.

.1 Provide facilities for collection, handling and storage of source separated wastes.

.2 Source separate the following waste:

.1 Brick and portland cement concrete.

.2 Corrugated cardboard.

.3 Wood, not including painted or treated wood or laminated wood.

.4 Gypsum board, unpainted.

.5 Steel.

.3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.

.4 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

1.2 WASTE PROCESSING SITES

.1 Province of: Ontario.

.1 Ministry of Environment and Energy, 135 St. Clair Avenue West, Toronto, ON, M4V 1P5.

.2 Telephone: 800-565-4923 or 416-323-4321.

.3 Fax: 416-323-4682.

.2 Recycling Council of Ontario: 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.

.1 Telephone: 416-657-2797.

.2 Fax: 416-960-8053.

.3 Email: rco@rco.on.ca.

.4 Internet: http://www.rco.on.ca/.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Government Chief Responsibility for the Environment.

Province	Address	General Inquires	Fax
Ontario	Ministry of Environment and Energy, 135 St. Clair Avenue West Toronto ON M4V 1P5	416-323-4321 800-565-4923	416-323-4682
	Environment Canada Toronto ON	416-734-4494	

PART 1 - GENERAL

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
.2 Request Departmental Representative's Inspection.

.2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:
.1 Work has been completed and inspected for compliance with Contract Documents.
.2 Defects have been corrected and deficiencies have been completed.
.3 Work is complete and ready for final inspection.

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

1.2 CLEANING

.1 In accordance with Section 01 74 11.

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 20.

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 SECTION INCLUDES

.1 As-built, samples, and specifications.

.2 Product data, materials and finishes, and related information.

.3 Operation and maintenance data.

.4 Warranties and bonds.

.5 Final roof review.

1.2 SUBMISSION

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

.2 Copy will be returned after final inspection, with Departmental Representative's comments.

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

.4 Submit to the Departmental Representative, final copies of maintenance manuals and documentation in English.

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

.6 If requested, furnish evidence as to type, source and quality of products provided.

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

.8 Pay costs of transportation.

1.3 FORMAT

.1 Organize data in the form of an instructional manual.

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

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

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

.5 Arrange content by process flow under Section numbers and sequence of Table of Contents.

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

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

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

.9 Provide scaled CAD files in dwg format. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, and AutoCAD dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.4 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;
- .1 Date of submission; names,
- .2 Addresses, and telephone numbers of Contractor with name of responsible parties;
- .3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:
- .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

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

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

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

1.5 AS-BUILTS AND SAMPLES

.1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
- .1 Contract Drawings.
- .2 Specifications.
- .3 Amendments and addenda.
- .4 Change Orders and other modifications to the Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.

.8 Manufacturer's certificates.

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

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

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

.5 Keep record documents and samples available for inspection by Departmental Representative.

.6 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

.7 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.6 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
.1 Measured depths of elements of foundation in relation to finish first floor datum.
.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
.4 Field changes of dimension and detail.
.5 Changes made by change orders.
.6 Details not on original Contract Drawings.
.7 References to related shop drawings and modifications.

.5 Specifications: legibly mark each item to record actual construction, including:
.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
.2 Changes made by Amendments and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.7 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 00, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.8 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

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

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

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

1.9 WARRANTIES AND BONDS

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

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

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

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

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

.6 Co-execute submittals when required.

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

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 SECTION INCLUDES

.1 Methods and procedures for deconstruction of structures and parts of structures.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.3 Federal Legislation.
.1 Canadian Environmental Assessment Act (CEAA), 1992, c. 37.
.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.3 DEFINITIONS

.1 Alternate Disposal: reuse and recycling of materials by designated facility, user or receiving organization which has valid Certificate of Approval to operate. Alternative to landfill disposal.

.2 Deconstruction: systematic dismantling of structure in a manner that achieves safe removal/disposal of hazardous materials and maximum salvage/recycling of materials.
.1 Ultimate objective is to recover potentially valuable resources while diverting from landfill what has traditionally been significant portion of waste system.

.3 Demolition: rapid destruction of structure with or without prior removal of hazardous materials.

.4 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to: corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health, well being or environment if handled improperly.

.5 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.6 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form.
.1 Recycling does not include burning, incinerating, or thermally destroying waste.

.7 Reuse: repeated use of product in same form but not necessarily for same

purpose. Reuse includes:
.1 Salvaging reusable materials from remodelling 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.

.8 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.9 Source Separation: acts of keeping different types of waste materials separate, beginning from first time they became waste.

.10 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00.

.2 Submit copies of certified used building material receipts from authorized disposal sites and reuse and recycling facilities for material removed from site to Departmental Representative upon request.
.1 Written authorization from Departmental Representative is required to deviate from facilities and receiving organizations listed in Waste Reduction Workplan.

.3 Include following information:
.1 Time and date of removal.
.2 Description of material.
.3 Weight, volume, or quantity of material.
.4 Breakdown of reuse, recycling and landfill quantities.
.5 End destination of material.

.4 Workers, haulers and subcontractors must possess current, applicable Certificates of Approval or permits to remove, handle and dispose of wastes categorized Provincially as hazardous.
.1 Provide proof of compliance within 24 hours upon written request of Departmental Representative.

1.5 QUALITY ASSURANCE

.1 Ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable provincial regulations.

1.6 STORAGE, HANDLING AND PROTECTION

.1 Do in accordance with Section 01 74 20.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Do Work in accordance with Section 01 35 43.

1.8 SITE CONDITIONS

.1 Existing Conditions.
.1 Should materials resembling spray or trowel applied asbestos or other designated substance listed as hazardous be encountered in course of deconstruction, stop work, take preventative measures, and notify Departmental Representative immediately. Do not proceed until written instructions have been received.

.2 Protection.
.1 Prevent movement, settlement or damage of adjacent structures, services, and landscaping. Repair damage caused by deconstruction as directed by Departmental Representative.
.2 Support affected structures and, if safety of structure being deconstructed appears to be endangered, take preventative measures. Cease operations and immediately notify Departmental Representative.
.3 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.

.2 Where possible use water efficient wetting equipment/trucks/attachments when minimizing dust.

.3 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Do Work in accordance with Section 01 35 29.

.2 Locate and protect utility lines. Do not disrupt active or energized utilities designated to remain undisturbed.

3.2 DISASSEMBLY

.1 Materials removed from structure are property of Departmental Representative.

.2 Throughout course of deconstruction pay close attention to connections and material assemblies. Employ workmanship procedures which minimize damage to materials and equipment.

.3 Ensure workers and subcontractors are briefed to carry out work in accordance with appropriate deconstruction techniques.

.4 Project supervisor with previous deconstruction experience be present on site throughout project.

.5 Deconstruct in accordance with CSA S350 and other applicable safety standards.

.6 Workers must utilize adequate fall protection where Departmental Representative considers it necessary.

.7 Maintain structural integrity of structure.

.8 Systematically remove finishes, furnishings, and mechanical and electrical equipment as instructed by Departmental Representative.

.9 Wherever possible, transfer material assemblies from heights to ground level for easier disassembly. Take appropriate measures to ensure safety.

.10 Separate from waste stream, material in condition suitable for reuse and/or recycling.

.11 Remove and store materials to be salvaged, in manner to prevent damage.
.1 Store and protect in accordance with requirements for maximum preservation of material.
.2 Handle salvaged materials as new materials.

.12 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete and asphalt.

.13 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

.14 Where existing materials are to be re-used in Work, use special care in removal, handling, storage and re-installation to assure proper function in completed work.

3.3 PROCESSING

.1 Designate location for processing of materials which eliminates double handling and provides adequate space to maintain efficient material flow.

.2 Separate materials to ensure best possible condition of salvaged materials.

.3 Keep processing area clean and free of excess debris.

.4 Supply separate, marked disposal bins for categories of waste material. Notify Departmental Representative prior to removal of bins from site.

.5 Separate processed materials into organized piles for stockpiling. Provide collection area for materials processed. Pile materials on pallets to facilitate transport off-site.

3.4 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

3.5 REMOVAL FROM SITE

.1 Transport material designated for alternate disposal to approved facilities and receiving organizations listed in waste reduction workplan and in accordance with applicable regulations. Do not deviate from facilities and receiving organizations listed in waste reduction workplan without prior written authorization from Departmental Representative.

.2 Dispose of materials not designated for alternate disposal in accordance with applicable regulations. Disposal facilities must be approved of and listed in waste reduction workplan. Do not deviate from disposal facilities listed in waste reduction workplan without prior written authorization from Departmental Representative.

3.6 CLEANING AND RESTORATION

.1 Keep site clean and organized throughout deconstruction.

.2 Upon completion of project, remove debris, trim surfaces and leave work site clean.

.3 Upon completion of project, reinstate areas affected by Work to condition which existed prior to beginning of Work.

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Identification of steel deck anomalies.

.2 Repair and replacement procedures.

1.2 GENERAL

.1 Where existing steel deck is exposed during roof removal and demolition in preparation for installation of a new roof system, exposed steel deck to be examined for any corrosion and deterioration that may impact integrity of new roof system.

.2 At completion of each day's demolition phase, review existing roof deck condition on all exposed areas with Departmental Representative to determine level of existing steel deck corrosion and corrective action required on various areas.

.3 Remove or repair varying degrees of corrosion identified with Departmental Representative in accordance with severity of corrosion found:

.1 Areas With No Corrosion: Clean and sweep exposed deck.

.2 Areas With Light to Moderate Corrosion: Where pitting of base metal does not exceeding 35% of deck thickness, clean, sweep, prep, and install rust inhibiting primer and paint.

.3 Areas with Severe Corrosion:

.1 On Small Areas: Clean, sweep, install rust inhibiting primer and paint, and overlay section with new metal decking.

.2 On Large Areas: Cut out bad sections and install new metal decking. Engineered shop drawings are required for attachment type and loading.

.4 Photograph and collect coupon samples as a basis for corrective actions performed. Provide copies and samples to Departmental Representative where requested.

.5 Document and chart location of deck repairs and type of repair performed in relation to roof plan. Provide roof map or diagram for deck repair and location to Departmental Representative when requested.

1.3 RELATED SECTIONS

.1 Section 09 91 13 – Exterior Painting.

1.4 REFERENCE STANDARDS

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.2 ASTM A792/A792M-10(2015), Standard Specification for Steel Sheet, 55%Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
.3 ASTM A307-14, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.

.3 Canadian Standards Association (CSA International)

.1 CSA C22.2 No.79-1978(R2013), Cellular Metal and Cellular Concrete Floor Raceways and Fittings.
.2 CAN/CSA-S16-14, Design of Steel Structures.
.3 CAN/CSA-S136-12, North American Specification for the Design of Cold Formed Steel Structural Members.
.4 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel Structures.
.5 CSA W55.3-08(R2013), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
.6 CSA W59-03(R2008), Welded Steel Construction, (Metal Arc Welding) Metric.

.4 Canadian Sheet Steel Building Institute (CSSBI)

.1 CSSBI 10M-08, Standard for Steel Roof Deck.
.2 CSSBI 12M-08, Standard for Composite Steel Deck.

.5 Canadian Roofing Contractors Association (CRCA)

.1 Roofing and Waterproofing Manual.

1.5 SHOP DRAWINGS

.1 Submit shop drawings where required for review to Section 01 33 00.

.2 Shop drawings to outline and indicate:

.1 Material types, core thickness, and finishes,
.2 Connections, lap lengths, and joint types,
.3 Method of anchorage and securement,
.4 Number, type, and location of fasteners,
.5 Support sizing, spacing, and reinforcement,
.6 Any related accessories.

.3 Only shop drawings bearing review stamps to be kept at work site.

.4 Reviews of Shop Drawings are for general conformance with design concept and general compliance with information given in contract documents. Contractor responsible for confirming, and correlating all quantities and dimensions. Review does not relieve Contractor's responsibility for compliance with intent of drawings and specifications or for accuracy of work.

1.6 PROTECTION

.1 Provide adequate protection to allow for normal operations of facility to continue during performance of work.

.2 Protect all openings and safeguard all vents, stacks, and roof drains from adverse weather, debris, and any contamination from deck rehabilitation work.

.3 Proceed with caution, especially around deck openings or at suspected weakened sections of existing roof deck. Employ warning signs, barriers, and temporary railings as warranted by existing conditions.

.4 Use equipment and methods that will not impair performance of roof deck. Damage by Contractor, or any of his workforce, to be repaired with new materials to restore items to their original condition at no additional cost.

1.7 STORAGE

.1 Provide adequate storage and protection from elements for hazardous materials at both ground and roof levels.

.2 Bring to roof only enough new material as may be required for deck rehabilitation work that day.

.3 Hazardous materials to be stored in a secure location away from public access at ground level at end of each work day.

.4 Protect steel roof deck during fabrication, transportation, site storage and erection, in accordance with CSSBI 10M.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials where possible and as required by local, provincial, and national regulations. Include in Contract Amount for all tipping fees associated with landfills and recycling depots.

.2 Fold up metal banding, flatten, and place in designated area for recycling.

PART 2 -PRODUCTS

2.1 MATERIALS

.1 Steel Roof Decking:

.1 Zinc (Z) coated steel sheet: to ASTM A653/A653M structural quality Grade 230, minimum 30% recycled content, with Z275 (G90), coating, 0.91 mm (20 gauge) minimum base steel thickness.

.2 Deck Profile: Cold rolled metal decking with profile to match existing steel deck.

.3 Where required, sections will have provisions for interlocking side joints.

.2 Sheet and Decking Accessories:

.1 Closures: in accordance with manufacturer's recommendations.

.2 Cover plates, cell closures and flashings: to ASTM A653/A653M structural quality Grade 230, minimum 30% recycled content, with Z275 (G90), coating, 0.76 mm (22 gauge) minimum base steel thickness.

.3 Primer: zinc rich, ready mix to CAN/CGSB-1.181, Ecologo certified.

.4 Welding: To CSA W59.

.5 Rust Inhibiting Coating: Two coats to Section 09 91 13.

.6 Caulking: to Section 07 92 00.

.3 Fasteners: Meeting Factory Mutual 4470 Standard for wind uplift and corrosion resistance:

.1 Screws at Deck Top Flutes:

.1 16mm (5/8”) to 32mm (1.25”) long, stainless steel, #14 self tapping AB screws with flat pan head.

.2 Screws at Deck Bottom Flutes:

.1 16mm (5/8”) to 32mm (1.25”) long, stainless steel, #14 self tapping AB screws with hex washer head.

.2 16mm (5/8”) to 32mm (1.25”) long, carbon steel with corrosion resistance coating, #10 deck screws with self tapping drill point and hex washer head

.3 Deck Fastening Pins: 4mm (3/16”) diameter shank, galvanized drive pins for deck fastening systems.

.4 Bolts and Anchor Bolts: Galvanized carbon steel, Grade A to ASTM A307.

2.2 FABRICATION

.1 Fabricate new steel deck to match thickness and profile of existing deck.

.2 Fabricate items from steel unless otherwise noted.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Do all welding work in accordance with CSA W59 unless specified otherwise.

.5 When welding, use puddle welds with a diameter of 22mm (7/8") to attach new metal decking.

.6 Provide corrosion protection and seal to exterior steel fabrications in accordance with CSA S16.

PART 3 -EXECUTION

3.1 DETERMINE LEVEL OF CORROSION

.1 On All Exposed Metal Roof Deck Areas: Review and examine surface of exposed metal roof deck with Departmental Representative to determine level of deck corrosion and corresponding corrective action required. Consult licensed Structural Engineer as required and include any related costs in Contract Amount. Refer to Table 1 – Measuring Metal Thickness below for extent of corrosion.

.1 Do not use flat faced micrometer. Use needle point micrometer only, measuring at a typical pit. For painted or primed decking, clean all coating from deck prior to measuring thickness.

.2 Table 1 – Measuring Metal Thickness:

1	2	3	4
Gauge No.	Uncoated, Minimum Thickness, mm (Inches)	Galvanized Thickness, mm (Inches)	Maximum allowable Depth of Pitting, 35% of Uncoated Metal Thickness, mm (Inches)
24	0.61 (0.0239)	0.706 (0.0278)	0.213 (0.008, 8 mils)
22	0.76 (0.0298)	0.859 (0.0338)	0.265 (0.010, 10 mils)
20	0.91 (0.0358)	1.011 (0.0398)	0.318 (0.013, 13 mils)
18	1.21 (0.0479)	1.318 (0.0519)	0.426 (0.017, 17 mils)
16	1.52 (0.0595)	1.613 (0.0635)	0.529 (0.021, 21 mils)

.1 Note: Thicknesses in Column 2 are based on industry values.

.2 Note: Values in Column 4 are measured from top surface of uncoated sheet. Clean paint, primer, and galvanizing for measurements.

3.2 LEVEL 1: NO VISIBLE CORROSION

.1 No damage found to base metal or damage to deck coating.

.2 Deck Surface Cleaning:

.1 Broom clean. Vacuum and wipe with clean cloths all flanges, webs, and ribs clear of all dust and debris.

.2 Do not use compressed air. Use leaf-type blowers only.

.3 Remove all loose dirt, debris, moisture, oil, grease, loose mill scale, welding slag, or other contaminants from surface.

Photo of Level 1: No Visible Corrosion

3.3 LEVEL 2: LIGHT TO MODERATE CORROSION

.1 Surface of coating is sporadically damaged but there is no pitting or deterioration of base metal. In areas where decking is lightly to moderately corroded, but determined to be adequate to support design loads, sweep deck clean, prime, and paint with a two coat application:

.1 Light Corrosion: Freckled corrosion.

.2 Moderate Corrosion: Coating no more than 50% damaged with pitting of base metal not exceeding 35% of deck thickness as indicated in Table 1 – Measuring Metal Thickness.

.3 Areas without corrosion do not require primer and coating application.

.2 Deck Surface Cleaning:

.1 Broom clean. Vacuum and wipe with clean cloths all flanges, webs, and ribs clear of all dust and debris.

.2 Do not use compressed air. Use leaf-type blowers only with approval of Departmental Representative.

.3 Deck Preparation and Sanding:

.1 All surfaces (top and bottom of roof deck) are to be cleaned using hand tools.

.2 Remove all loose corrosion, dirt, moisture, oil, grease, loose mill scale, welding slag, or other contaminants from surface that may inhibit bond of new coating.

.3 Remove loose rust, paint, rust scale, and mill scale, etc. by wire brushing or hand sanding. Tight corrosion (corrosion not removed by above methods) and corrosion bloom may remain.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil, and solvents before primer coat is applied and between applications of remaining coats. Apply primer or paint as soon as possible after cleaning and before further deterioration occurs.

.4 Deck Primer Application:

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces to original condition at no additional cost.

.2 Plug small holes in deck before primer and coating application. Where possible, plug holes from underside of decking. Pack openings and gaps at projections and perimeters with batt or spray urethane foam insulation to minimize seepage of primer, coatings, and related fumes into building.

.3 Review service preparation with Departmental Representative before start of primer application. Do not apply coatings when surface or ambient air temperature falls below 5ºC (41ºF).

.4 Mix two component epoxy coatings or thoroughly mix rust inhibiting primer as per manufacturer’s written instructions. Periodically mix contents of coatings during application to avoid settlement.

.5 Do not thin coating mixtures unless otherwise approved by manufacturer and Departmental Representative.

.6 Apply over prepared areas, self priming epoxy base coat to a dry thickness of 0.076 (3 mils) or rust inhibiting metal primer applied at a rate of $8m^2$/litre (330 ft^2/gallon).

.7 Apply coating by brush, roller, or airless sprayer to manufacturer's instructions.

.5 Deck Coating Application:

.1 Do not apply coatings when surface or ambient air temperature falls below 5ºC (41ºF).

.2 Sand and dust between coats where required by manufacturer to provide adequate adhesion for next coat and to remove visible defects.

.3 Mix two component epoxy coatings or thoroughly mix rust inhibiting coating to manufacturer’s instructions. Periodically mix contents of coatings to avoid settlement.

.4 Do not thin coating mixtures unless otherwise approved by manufacturer and Departmental Representative.

.5 Apply over epoxy base coat/primed areas, a single epoxy finish coat to a dry thickness of 5 mils or two coats of rust inhibiting metal coating applied at a rate of $8m^2$/litre (330 ft^2/gallon) per coat.

.6 Apply coating by brush, roller, or airless sprayer to manufacturer's instructions.

.7 Allow sufficient time for drying between coats. Dry timing affected by current weather conditions. Refer to manufacturer’s written instructions.

.8 Allow finish coating to dry-to-touch prior to allowing traffic or vapour retarder installation.

Photo of Level 2: Light to Moderate Corrosion

3.4 LEVEL 3: SEVERE CORROSION, NO HOLES OR PENETRATIONS

.1 Areas with damage to more than 50% of surface coating and with base metal pitting greater than 35% of deck thickness, as indicated in Table 1, but with no holes or full penetration corrosion:

.1 In areas where decking is severely corroded, but determined to be adequate to support design loads, sweep deck clean, prime, paint with a two coat application, and install new metal deck overlay over existing.

.2 Deck Surface Cleaning:

.1 Broom clean. Vacuum and wipe with clean cloths all flanges, webs, and ribs clear of all dust and debris.

.2 Do not use compressed air. Use leaf-type blowers only with approval of Departmental Representative.

.3 Deck Preparation and Sanding:

.1 All surfaces (top and bottom of roof deck) are to be cleaned using hand tools.

.2 Remove all loose corrosion, dirt, moisture, oil, grease, loose mill scale, welding slag, or other contaminants from surface that may inhibit bond of new coating.

.3 Remove loose rust, paint, rust scale, and mill scale, etc. by wire brushing or hand sanding. Tight corrosion (corrosion not removed by above methods) and corrosion bloom may remain.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil, and solvents before primer coat is applied and between applications of remaining coats.

.1 Apply primer or paint as soon as possible after cleaning and before further deterioration occurs.

.4 Deck Primer Application:

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces to original condition at no additional cost.

.2 Plug small holes in deck before primer and coating application. Where possible, plug holes from underside of decking..

.3 Pack openings and gaps at projections and perimeters with batt or spray urethane foam insulation to minimize seepage of primer, coatings, and any related fumes into building interior.

.4 Do not begin application of primer until surface preparation has been reviewed with Departmental Representative.

.5 Do not apply new coatings when deck surface or ambient air temperature falls below 5ºC (41ºF).

.6 Mix two component epoxy coatings or thoroughly mix rust inhibiting primer as per manufacturer’s written instructions. Periodically mix contents of coatings during application to avoid settlement.

.7 Do not thin coating mixtures unless otherwise approved by manufacturer and Departmental Representative.

.8 Apply over prepared areas, self priming epoxy base coat to a dry thickness of 0.076 mm (3 mils) or rust inhibiting metal primer applied at a rate of 8m^2/litre (330 ft^2/gallon).

.9 Apply coating by brush, roller, or airless sprayer conforming to manufacturer's application instructions.

.5 Deck Coating Application:

.1 Do not apply coatings when surface or ambient air temperature falls below 5ºC (41ºF).

.2 Sand and dust between coats where required by manufacturer to provide adequate adhesion for next coat and to remove visible defects.

.3 Mix two component epoxy coatings or thoroughly mix rust inhibiting coating as per manufacturer’s written instructions. Periodically mix contents of coatings during application to avoid settlement.

.4 Do not thin coating mixtures unless otherwise approved by manufacturer and Departmental Representative.

.5 Apply over epoxy base coat/primed areas, a single epoxy finish coat to a dry thickness of 0.127 mm (5 mils) or two coats of rust inhibiting metal coating applied at a rate of 8m^2/litre (330 ft^2/gallon) per coat.

.6 Apply coating by brush, roller, or airless sprayer conforming to manufacturer's application instructions.

.7 Allow sufficient time for drying between coats. Dry timing affected by current weather conditions. Refer to manufacturer’s written instructions.

.8 Allow finish coating to dry-to-touch prior to allowing traffic, or vapour retarder installation.

.6 New Steel Deck Overlay:

.1 Overlay existing metal deck with new steel decking. On smaller corroded areas use a minimum of 2-span condition. Larger corroded areas to require continuous 3-span overlay condition.

.1 New steel deck is to be free of dirt, scale or foreign matter prior to installation. At discretion of Departmental Representative, damaged or substandard roof deck sections are to be removed from site and replaced with new at no additional cost.

.2 Contractor to verify configuration, coverage, and span of metal decking. Submit engineered and stamped shop drawings for review prior to ordering materials.

.3 Overlay section of new galvanized steel decking over existing corroded deck with matching profile and depth. Overlay decking must bear on support steel for a minimum of 76mm (3.0").

.1 On Wide Rib Metal Deck:

.1 Use min. 0.76mm (22 gauge) intermediate rib, primed deck for 3-span condition and use min. 0.91 mm (20 gauge) for less than 3-span overlay.

.2 On Intermediate Rib Metal Deck:

.1 Use min. 0.76 mm (22 gauge) narrow rib, primed deck for 3-span condition and use min. 0.91 mm (20 gauge) for less than 3-span overlay.

.3 On Narrow Rib Deck:

.1 Do not overlay narrow rib deck. Proceed to deck replacement as outlined and specified in Level 4 – Severe Corrosion With Holes.

.4 Place steel deck sections in final position and confirm minimum bearing on the structural supports prior to securing or fastening in place.

.5 All new sections of decking to be mechanically attached to each supporting steel joist or beam underneath with self drilling screws or fastening pin system at each flute.

.1 Install deck fasteners transverse to deck run, in bottom flutes of deck at a minimum of four (4) per 915mm (36") wide deck unit.

.1 Install pan head screws at top flutes of deck as required to ensure snug fit of overlay decking into existing and to eliminate gaps and lifting at edges of overlay.

.2 Install deck fasteners longitudinal to deck run, in bottom flutes of deck at every intersection with supporting structural members beneath.

.3 Ensure new steel roof deck units are adequately fastened to structural supports. Maximum spacing of fasteners along bearing supports will be lesser of 400 mm (16”) or two deck flute spacings.

.4 All decking side laps to be mechanically attached with self drilling screws at quarter points (i.e. three between joists).

.1 Side laps of adjacent units to be fastened at intervals not greater than 915 mm (36“).

.6 Once new decking has been secured in place, all cut and exposed metal edges are to be field coated with a zinc-rich coating or primer.

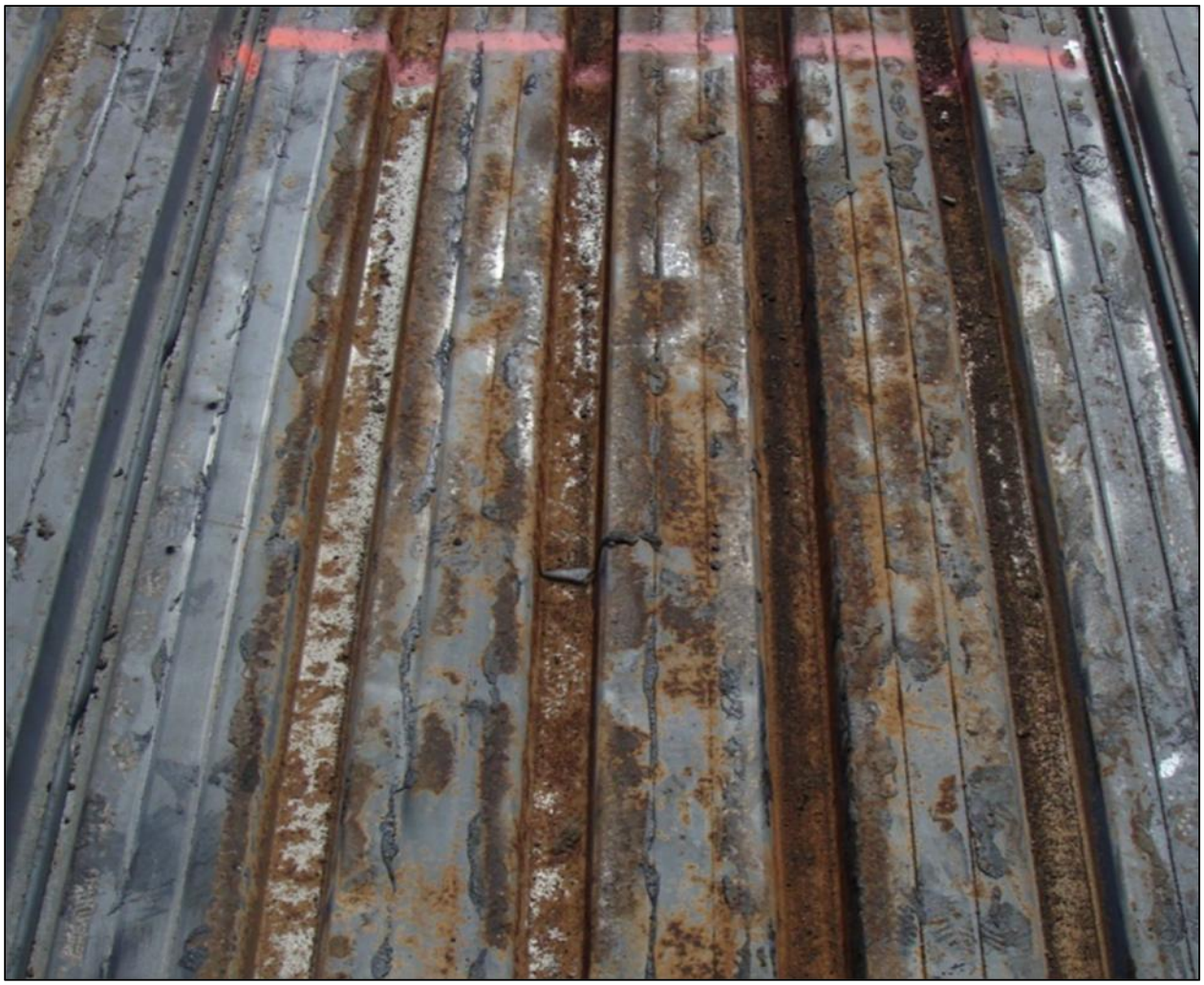

Photo of Level 3: Severe Corrosion, No Holes, or Penetrations

3.5 LEVEL 4: SEVERE CORROSION WITH HOLES

.1 Areas with existing steel deck that is severely corroded, deteriorated, pitted, and otherwise damaged with holes and penetrations through entire deck thickness.

.1 In areas where decking has corroded damage as described above, and is determined to be unsatisfactory and inadequate to support design loads for installation of new roof, sections of existing roof deck are to be removed and replaced with new materials to match existing profile.

.1 Small corroded holes and penetrations may be overlaid with new metal decking or flat sheet plate after cleaning, priming, and coating of area underneath.

.2 Large areas require complete deck removal back to structural joists and framing and installation of new decking. Provide engineered shop drawings to determine design, attachment, and loading requirements.

.2 Deck Removal and Preparation:

.1 Provide adequate interior protection over working areas to catch falling dirt and debris. Co-ordinate required work with Departmental Representative.

.2 Clear off all loose material, dirt, and debris from top surface of deck to reduce or prevent debris from falling into building interior during deck demolish.

.3 Saw-cut deck at joists using a reciprocal saw, nibbler, or other technique pre-approved by Departmental Representative. No gas cutting or abrasive cut-off saws are permitted.

.4 Shear welds or deck-to-joist screws where required for deck removal.

.5 During deck removal of corroded sections, no existing metal roof deck is to be left in a single span condition. Remove remaining section of existing metal deck and install new decking in a multi-span condition.

.6 Prior to removal, vacuum all flanges, webs, and ribs to clear off any cutting dust or debris.

.7 Carefully remove deck sections from above.

.3 New Steel Deck Installation:

.1 Where required in new engineered design, reinforce underside of metal deck opening with new steel angles and framing members.

.2 Installing new steel roof deck with matching profile to restore integrity and continuity of roof deck to original condition.

.3 Deck replacement at single span conditions will require installation of heavier gauge decking. Use new 1.52 mm or 1.21 mm (16 or 18 gauge) steel decking in accordance with printed data sheets from manufacturer of original deck.

.4 Erect all metal work square, plumb, straight and true, accurately fitted, with tight joints and intersections.

.5 All new sections of steel decking to be mechanically attached to each supporting steel joist or beam underneath at each flute. New metal deck sections may be installed by welding or mechanically attaching using Hilti deck fastening system or self drilling screws.

.1 Steel roof deck units to be adequately fastened to structural supports. Maximum spacing of fasteners along

bearing supports will be lesser of: 400 mm (16”) or two flute spacings.

.2 Where welding is specified, arc spot welds to be 20 mm (3/4”) nominal top diameter. Steel deck welder certified under CSA W47.1 for fusion welding of steel roof decks.

.3 Install deck fasteners longitudinal to deck run, in bottom flutes of deck at every intersection with supporting structural members beneath.

.4 Apply Button Punch fastening or stitch screws along side lap connections of new metal decking with original decking at a maximum spacing of 305mm (12") o.c.

.6 Once secured in place, touch up welds as required on top surface of steel roof deck with a compatible zinc-rich primer.

.7 Field apply zinc-rich coating to all cut and exposed metal edges.

Photo of Level 4: Severe Corrosion With Holes

3.6 CLEAN UP

.1 Clean up any accidental spills and leaks immediately. Follow with manufacturer’s written instructions for clean up and disposal.

.2 Perform daily and final clean-up of work area and areas surrounding site.

.3 Remove all debris from roof and site daily, and dispose of to suitable location for construction waste.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 07 52 00 – Modified Bitumen Membrane Roofing.

1.2 REFERENCES

.1 ASTM International
.1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
.3 ASTM C578-11, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
.6 ASTM D1761-12, Standard Test Methods for Mechanical Fasteners in Wood.

.2 Canadian General Standards Board (CGSB)
.1 CGSB 19-GP-5M(1984), Sealing Compound, One Component, Acrylic Base, Solvent Curing (Incorporating Amendment No. 1).

.3 American Wood Protection Association (AWPA)
.1 AWPA P5-15, Standard for Waterborne Preservatives.
.2 AWPA P8-14, Standard for Oil-Borne Preservatives.

.4 CSA International
.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
.2 CSA O80 Series-08(R2012), Wood Preservation, Includes Update No. 1 (2008).
.3 CAN/CSA-O86-09 Consolidation, Engineering Design in Wood.
.4 CSA O112-M Series-1977(R2006), CSA Standards for Wood Adhesives.
.5 CSA O121-08(R2013), Douglas Fir Plywood.
.6 CSA O141-05(R2014), Softwood Lumber.
.7 CSA O151-09(R2014), Canadian Softwood Plywood.
.8 CSA O153-M1980(R2008), Poplar Plywood.
.9 CSA O325-07(R2012), Construction Sheathing.
.10 CAN/CSA-Z809-08(R2013), Sustainable Forest Management.

.5 National Lumber Grades Authority (NLGA)
.1 Standard Grading Rules for Canadian Lumber December 1, 2010.

.6 Sustainable Forestry Initiative (SFI)

1.3 QUALITY ASSURANCE

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

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

1.4 DELIVERY, STORAGE AND HANDLING

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

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

.3 Storage and Handling Requirements:
.1 Store materials off ground, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 FRAMING STRUCTURAL AND PANEL MATERIALS

.1 Description Sustainability Characteristics:
.1 Lumber, CAN/CSA-Z809, SFI or Forestry Stewardship Council (FSC) certified.
.2 Plywood, urea-formaldehyde free, CAN/CSA-Z809, SFI or Forestry Stewardship Council (FSC) certified.

.2 Lumber: softwood, S4S, moisture content S-DRY graded and stamped in accordance with following standards:
.1 CSA O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 Framing and board lumber: in accordance with NBC, except as follows:
.1 Studs: spruce, pine or fir (SPF), 121c. "STUD".
.2 Plates: spruce, pine or fir (SPF), 124b. "No. 1" STRUCTURAL, STRUCTURAL LIGHT FRAMING AND STRUCTURAL JOISTS AND PLANKS.
.3 Exterior grade wood:
.1 Where existing damaged wood blocking in direct contact with concrete is replaced with new: use wood species and grades as specified above in paragraphs 2.1.1 and 2.1.2; pressure treated with CCA to CAN/CSA-O80-Series, minimum retention 4.0 kg/mü by assay.
.2 Preservative: chromated copper arsenate (CCA) to AWPA P5 as amended by CAN/CSA-O80-Series.

.4 Furring, blocking, nailing strips, strapping, grounds, rough bucks, bracing, bridging, curbs, fascia backing and sleepers: NLGA spruce, pine or fir (SPF), 121c. and pine, 113d.

.5 Plywood and wood based composite panels: to CSA O325.

.6 Douglas fir plywood: to CSA 0121, urea formaldehyde free.
.1 Decking: G1S Good One Side Grade. Nominal thickness 19 mm., unsanded surfaces to Tables E-1 and E-2, T&G edge.
.2 Parapet sheathing: G1S Good One Side Grade. Nominal thickness 13 mm, unsanded surfaces to Tables E-1 and E-2, square edge.

2.2 ACCESSORIES

.1 Sealants: in accordance with Section 07 92 00.

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

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

.4 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, formed to prevent dishing. Bell or cup shapes not acceptable.

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

.6 Fastener Finishes:
.1 Galvanizing: to ASTM A653/A653M, use galvanized fasteners for exterior work, framing, and treated lumber.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.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.

3.2 PREPARATION

.1 Treat wood blocking, nailers, fascia backing, and plywood material in direct contact with concrete or masonry surfaces.
.1 Treat surfaces of material with wood preservative, before installation.
.2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.
.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.3 INSTALLATION

.1 Apply dampproof flashing or sill plate gasket over concrete or masonry on which wood framing bears.

.2 Apply wood preservative to wood in contact with concrete and masonry.

.3 Treat surfaces of pressure treated wood and plywood which are cut or bored after pressure treatment with field applied wood preservative.

.4 Wood frame construction to National Building Code of Canada 2010, Division B, Part 9.

.5 Do interior and exterior millwork to AWI/AWMAC/ WI AWS Section 6.

.6 Install members true to line, levels and elevations, square and plumb to a tolerance of 1:600 and rigidly secure in place.

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

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

.9 Install roof sheathing perpendicular to framing; stagger end joints, locate ends over framing. Install in accordance with requirements of NBC.

.10 Install furring and blocking as required to space-out and support facings, fascia, soffit, siding, and other work as required.

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

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

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

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

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

.16 Secure exterior work with galvanized or non- ferrous fasteners.

.17 Apply continuous bead of sealant at junction between roof deck and abutting parapet wall and where indicated on drawings.

3.4 CLEANING

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

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

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

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

PART 1 - GENERAL

1.1 Section Includes

.1 Installation of a new roof system over prepared substrate.

.2 Existing roofing components and related appurtenances to be removed as specified in preparation for installation of a new low slope, conventional roofing system, including but not limited to:

.1 On Roof Areas 1.1, 1.2, 1.3, 1.4, 1.5, 1.9, 1.10, 2.2, 2.3, 3.1, 4.1, and 4.2:

.1 Existing flat metal roof deck,
.2 13mm (0.5”) gypsum roof board, mechanically fastened,
.3 1 ply mod. bit. vapour retarder and flashings, self-adhered,
.4 51mm (2.0”) polyiso insulation, in roofing adhesive,
.5 Tapered polyiso insulation, min. 25mm (1.0”), in adhesive,
.6 13mm (0.5”) gypsum roof board, in roofing adhesive,
.7 1 ply mod. bit. base sheet field membrane, self-adhered,
.8 1 ply mod. bit. base sheet flashings, self-adhered,
.9 1 ply mod. bit. cap sheet membrane, torched applied,
.10 1 ply mod. bit. cap sheet flashings, torched applied,
.11 Prefinished metal flashings and trim.

.2 On Roof Areas 1.6, 1.7, and 1.8:

.1 Existing sloped metal roof deck,
.2 13mm (0.5”) gypsum roof board, mechanically fastened,
.3 1 ply mod. bit. vapour retarder and flashings, self-adhered,
.4 51mm (2.0”) polyiso insulation, in roofing adhesive,
.5 51mm (2.0”) polyiso insulation, offset in roofing adhesive,
.6 13mm (0.5”) gypsum roof board, in roofing adhesive,
.7 1 ply mod. bit. base sheet field membrane, self-adhered,
.8 1 ply mod. bit. base sheet flashings, self-adhered,
.9 1 ply mod. bit. cap sheet membrane, torched applied,
.10 1 ply mod. bit. cap sheet flashings, torched applied,
.11 Prefinished metal flashings and trim.

.3 On Roof Area 2.1:

.1 Existing concrete roof deck,
.2 1 ply mod. bit. vapour retarder and flashings, self-adhered,
.3 51mm (2.0”) polyisocyanurate insulation, in roofing adhesive,
.5 Tapered polyiso insulation, min. 25mm (1.0”), in adhesive,
.5 13mm (0.5”) siliconized gypsum roof board, in roofing adhesive,
.6 1 ply modified bitumen base sheet field membrane, self-adhered,
.7 1 ply modified bitumen base sheet flashings, self-adhered,
.8 1 ply granular mod. bit. cap sheet membrane, torched applied,
.9 1 ply granular mod. bit. cap sheet flashings, torched applied,
.10 Prefinished metal flashings and trim.

1.2 REFERENCES

.1 ASTM International Inc.
.1 ASTM C1177/C1177M-13, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
.2 ASTM C1396/C1396M-14, Standard Specification for Gypsum Board.
.3 ASTM D41/D41-11, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
.4 ASTM D312/D312M-15, Standard Specification for Asphalt Used in Roofing.
.5 ASTM D6162/D6162M-00A(2015)e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
.6 ASTM D6163/D6163M-00(2015)e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.

.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-80(1985), 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 Canadian Roofing Contractors Association (CRCA)
.1 CRCA Roofing Specifications Manual-2012.

.4 Canadian Standards Association (CSA International)
.1 CSA A123.21-14, Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane Roofing Systems
.2 CSA A231.1-14/A231.2-14, Precast Concrete Paving Slabs/Precast Concrete Paving.
.3 CSA B149.1-15, Natural Gas and Propane Installation Code
.4 CSA O121-08(R2013), Douglas Fir Plywood.
.5 CSA O151-09(R2014), Canadian Softwood Plywood.

.5 Factory Mutual (FM Global)
.1 FM Approvals - Roofing Products.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.7 Underwriters Laboratories' of Canada (ULC)
.1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
.2 CAN/ULC-S702.2-10, Standard for Mineral Fibre Thermal Insulation for Buildings.
.3 CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Convene pre-installation meeting one week prior to beginning waterproofing Work, with roofing contractor's representative, consultant, and Departmental Representative in accordance with Section 01 32 16 to:
- .1 Verify project requirements and schedule.
- .2 Review installation and substrate conditions.
- .3 Co-ordination with other building subtrades.
- .4 Review manufacturer's installation instructions and warranty requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Health and Safety Plan for project: to Section 01 35 29.

.3 Product Data:
- .1 Provide two copies of most recent technical roofing components data sheets for roof system describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Provide two copies of WHMIS MSDS, and indicate VOC content for:
  - .1 Primers.
  - .2 Achieves.
  - .3 Sealants.
  - .4 Liquid applied resins.

.4 Warranties:
- .1 Sample copy of manufacturer’s System Warranty.
- .2 Sample copy of Contractor’s Workmanship Warranty.

.5 Provide shop drawings:
- .1 Indicate tapered insulation details.
- .2 Provide layout for tapered insulation.

.6 Manufacturer's Certificate: certify that products meet or exceed specified 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.

.9 Compatibility statement: written declaration that specified materials and components are compatible and meet manufacturer’s requirements for system warranty.

.10 Observation Reports: indicate materials installed, procedures followed, ambient temperatures, wind velocity during application, and weather conditions.

1.5 QUALITY ASSURANCE

.1 Installer qualifications:
.1 Company or person specializing in application of modified bituminous roofing systems with minimum 5 years documented experience and pre-approved by manufacturer for installation.
.2 Minimum three certified and carded applicators on site during performance of work.
.3 Be a member in good standing with Ontario Industrial Roofing Contractors Association (OIRCA).
.4 Arrange for final review at project completion with manufacturer’s representative.

1.6 FIRE PROTECTION

.1 Fire Extinguishers:
.1 Maintain one stored pressure rechargeable type with hose and shut-off nozzle,
.2 ULC labelled for A, B and C class protection.
.3 Size 9 kg or grater on roof per torch applicator, within 6 m (19.7 ft) of torch applicator.

.2 Maintain fire watch for 2 hours after each day's roofing operations cease.

1.7 DELIVERY, STORAGE, AND HANDLING

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

.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, weather, and deleterious materials.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets and packaging materials in accordance with Section 01 74 20.
.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.

1.8 FIELD CONDITIONS

.1 Ambient Conditions
.1 Do not install roofing when temperature remains below -18°C for torch application, or to manufacturers' recommendations.
.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.

.3 Only install as much new roofing as can be made weather-tight each day, including all flashing and detail work. All seams to be sealed or heat welded before leaving job site that work day.

.4 Arrange and plan work sequence logically to avoid use of newly installed roof as a walking surface for equipment movement and storage. Protect finished work from damage.

.5 Keep and store flammable adhesives and primers away from open flames, sparks and excessive heat.

.6 Verify functionality of existing roof drains before starting work. Report blockages in writing to Departmental Representative for corrective action prior to installation of roof system.

.7 Landscaped areas damaged by construction activities to be repaired at no additional cost to contract amount.

.8 Take precautions when using primer and adhesives at or near rooftop vents, louvres, or air intakes. Avoid odours from entering building. Coordinate operation or temporary closing-off of vents and air intakes with Departmental Representative.
.1 Install such materials outside of normal operating hours where feasible.
.2 Keep lids on cans and containers at all times when not in use.

1.9 WARRANTY

.1 For Work of this Section 07 52 00 - Modified Bituminous Membrane Roofing:

.1 Contractor Workmanship Warranty:
.1 For all low slope roof replacement areas, provide Departmental Representative with Contractor’s Warranty for Workmanship on a Canadian Roofing Contractors Association (CRCA) approved form, signed, authorized, and executed.
.2 Workmanship warranty period is extended to from 12 months to 24 months from date of Substantial Completion.

.2 Roof Replacement System Warranty:
.1 For all low slope roof replacement areas, provide Departmental Representative with manufacturer’s total system warranty for Labour, Material and Workmanship.
.2 System warranty period is extended to from 1 year to 20 years from date of Substantial Completion.

.2 Cost of all warranties to be included in Contract Amount.

PART 2 - PRODUCTS

2.1 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.

.3 All major roof system components to be supplied from same manufacturer or approved for use in system by same manufacturer to meet specified roof system warranty requirements.

2.2 CARPENTRY

.1 Refer to Section 06 10 00.

2.3 DECK OVERLAY BOARD

.1 Glass Mat, Gypsum Board: to ASTM C1177/C1177M, 12.7 mm (0.5”) thick.
- .1 Compressive strength: 3447 kPa (500 psi).
- .2 Top surface: factory pre-primed.
- .3 Panel size: 1.22 x 2.44 m (4’ x 8’), with square edges.

2.4 FASTENERS

.1 Deck screws:
- .1 FM Approved screw and plate assemblies.
- .2 Epoxy coated carbon steel or solid stainless steel, self tapping deck fasteners and galvanized plates must meet FM Approval for wind uplift and corrosion resistance.
- .3 Approved and recommended by membrane manufacturer.

2.5 DECK PRIMER

.1 Asphalt primer: Composed of SBS synthetic polymers, bitumen, adhesive enhancing resins, and volatile solvents to CGSB 37-GP-9Ma or ASTM D41/D41M for improved surface adhesion.
- .1 Approved by manufacturer for membrane attachment type.

2.6 VAPOUR RETARDER

.1 Base sheet membrane and flashing: to CGSB 37-GP-56M, glass fibres to ASTM D6163M.
- .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, glass mat reinforcement.
- .2 Type 2 - covered, self-adhered.
- .3 Class C - plain surfaced.
- .4 Grade 1 - standard service.
- .5 Top and bottom surfaces:
  - .1 sanded/polyethylene release film.
- .6 Base sheet membrane properties: to CGSB 37-GP-56M.
  - .1 Strain energy (longitudinal/transversal): 1.3/1.3 kN/m.
  - .2 Breaking strength (longitudinal/transversal): 11/8.5 kN/m.
  - .3 Ultimate elongation (longitudinal/transversal): 4/4 %.
  - .4 Tear resistance: 30 N.
  - .5 Cold bending at -30°C : no cracking.
  - .6 Softening point: 115°C.
  - .7 Static puncture resistance: 160 N.
  - .8 Dimensional Stability: 0/0 %.

2.7 ADHESIVE

.1 Adhesive for securing deck overlay board and insulation: low rise, one or two component polyurethane foamable adhesive for roofing applications.
- .1 Two component adhesive mixed on site with manufacturer’s recommended equipment.

2.8 POLYISOCYANURATE – BASE INSULATION

.1 Polyisocyanurate foam insulation:
- .1 Closed cell to CAN/ULC-S704, Type II 137.9 kPa (20 psi), bonded to inorganic coated glass facers, flame spread classification: less than 500.

.2 Base Insulation Thickness:
- .1 Roof Areas 1.1, 1.2, 1.3, 1.4, 1.5, 1.9, 1.10, 2.1, 2.2, 2.3, 3.1, 4.1, and 4.2: 51 mm (2.0”) thick, continuous flat.
- .2 Roof Areas 1.6, 1.7, and 1.8: 51 mm (2.0”) thick, continuous flat.

.3 Tapered Insulation Drain Sumps:
- .1 Prefabricated and factory cut polyisocyanurate insulation sumps at all existing roof drain locations:
  - .1 Roof Areas 1.1, 1.2, 1.3, 1.4, 1.5, 1.9, 1.10, 2.1, 2.2, 2.3, 3.1, 4.1, and 4.2: 2.44 x 2.44 m (8' x 8'), tapered from 51 mm (2.0”) at 2% down to a 610 x 610 mm (2' x 2') central flat area 32 mm (1.25”) thick.

.4 Maximum Board Size: 1.22 x 1.22 m (4’ x 4’), square edge, butt lap.

2.9 POLYISOCYANURATE – OVERLAY INSULATION

.1 Polyisocyanurate foam insulation:
.1 Closed cell to CAN/ULC-S704, Type II 137.9 kPa (20 psi), bonded to inorganic coated glass facers, flame spread classification: less than 500.

.2 Overlay Insulation Thickness:
.1 Roof Areas 1.1, 1.2, 1.3, 1.4, 1.5, 1.9, 1.10, 2.1, 2.2, 2.3, 3.1, 4.1, and 4.2: Tapered polyisocyanurate insulation boards sloped from maximum 76 mm (3.0”) down to minimum 25 mm (1.0”) thick. Remaining area receive continuous flat insulation 25 mm (1.0”) thick. Slope insulation at 1% or 2% as indicated by layout on roof plan drawings.

.2 Roof Areas 1.6, 1.7, and 1.8: 51 mm (2.0”) thick, continuous flat.

.3 Tapered Insulation Drain Sumps:
.1 Prefabricated and factory cut polyisocyanurate insulation sumps at all existing roof drain locations:
.1 Roof Areas 1.6, 1.7, and 1.8: 2.44 x 2.44 m (8' x 8'), tapered from 51 mm (2.0”) at 2% down to a 610 x 610 mm (2' x 2') central flat area 32 mm (1.25”) thick.

.4 Tapered Insulation Crickets:
.1 Provide crickets on sloped roof sections at all rooftop penetrations, sleepers, and curbs wider than 305 mm (1’-0”) to improve drainage flow. Custom cut to suit each installation location.
.2 Prefabricate crickets tapered at 8% from 51 mm (2.0”) down to 0 mm (0”) over 610mm (2’-0”), in 2.44 m (8’-0”) board lengths. Cut crickets on angle on site to suit existing condition at each location.

.5 Maximum Board Size: 1.22 x 1.22 m (4’ x 4’), square edge, butt lap.

.6 Submit tapered shop drawings for review before fabrication and delivery.

2.10 COVER BOARD

.1 Glass Mat, Gypsum Board: to ASTM C1177/C1177M, 12.7 mm (0.5”) thick.
.1 Compressive strength: 3447 kPa (500 psi).
.2 Top surface: factory pre-primed.
.3 Panel size: 1.22 x 2.44 m (4’ x 8’), with square edges.

2.11 MEMBRANE

.1 Base sheet membrane and flashing: to CGSB 37-GP-56M combination of polyester and glass fibres to ASTM D6162M.
.1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, composite glass and polyester reinforcement.
.2 Type 2 - covered, self-adhered.
.3 Class C - plain surfaced.
.4 Grade 2 - heavy duty service.
.5 Top and bottom surfaces:
.1 sanded/polyethylene release film.
.6 Base sheet membrane properties: to CGSB 37-GP-56M.

.1 Strain energy (longitudinal/transversal): 7.8/7.2 kN/m.
.2 Breaking strength (longitudinal/transversal): 15/15.5 kN/m.
.3 Ultimate elongation (longitudinal/transversal): 60/65 %.
.4 Tear resistance: 125 N.
.5 Cold bending at -30°C : no cracking.
.6 Softening point: 110°C.
.7 Static puncture resistance: 560N.
.8 Dimensional Stability: 0.2/0.1 %.

.2 Cap sheet membrane and flashing: to CGSB 37-GP-56M combination of polyester and glass fibres to ASTM D6162M.
.1 Styrene-Butadiene-Styrene(SBS) elastomeric polymer, prefabricated sheet, composite glass and polyester reinforcement.
.2 Type 1 – exposed, torch applied.
.3 Class A - granule surfaced.
.1 Colour for granular surface: chosen by Departmental Representative from standard colour range.
.4 Grade 2 - heavy duty service.
.5 Bottom surface: thermofusible polyfilm.
.6 Cap sheet membrane properties: to CGSB 37-GP-56M.
.1 Strain energy (longitudinal/transversal): 7.8/7.2 kN/m.
.2 Breaking strength (longitudinal/transversal): 15/13.5 kN/m.
.3 Ultimate elongation (longitudinal/transversal): 60/65 %.
.4 Tear resistance: 125 N.
.5 Cold bending at -30°C: No cracking.
.6 Softening point: 110°C.
.7 Static puncture resistance: 560 N.
.8 Dimensional Stability: 0.2/ 0.0 %.

2.12 PMMA RESIN FLASHINGS

.1 Flexible, polymethylmethacrylate (PMMA) based resin system combined with a thixotropic agent for use in combination with fleece fabric to form a monolithic, reinforced flashing membrane:
.1 PMMA Primer: to suit substrate surfaces, vertically and horizontally.
.2 PMMA Resin: polymethylmethacrylate based resin combined with a thixotropic agent.
.3 PMMA Catalyst: powder catalyst as recommended for humidity.
.4 Thixotropic agent: liquid additive used to increase viscosity of PMMA-based resin products.
.5 Fleece reinforcement: non-woven, 110 g/m², needle punched, polyester fabric reinforcement.
.6 Colour finish resin: pigmented, polymethylmethacrylate (PMMA) based resin for use as a wearing coat over field of finished roof membrane.
.1 Colour: chosen by Departmental Representative from standard pallet of available colours.
.7 Anti-Skid Surfacing: No. 11 ceramic granules suitable for broadcast into horizontal PMMA based wearing layer.
.1 Colour: chosen by Departmental Representative from standard pallet of available colours.
.8 Cleaning solution/solvent: clear solvent to clean and prepare transition areas of in-place catalyzed resin to receive subsequent coats of resin and to clean substrate materials to receive resin.
.9 Preparation paste: PMMA based paste used for remediation of depressions in substrate surfaces or other irregularities.

.10 Repair mortar: Two component, PMMA based, aggregate filled mortar used for remediation of depressions or patching concrete substrates.
.11 Tape: White, flexible, coated cotton cloth tape designed for treatment of insulation panel joints, deck-to-wall transitions and joints in flashing substrates.

2.13 ROOFING ACCESSORIES

.1 Retrofit roof drains: Prefabricated spun copper retrofit roof drain inserts with integral 102 mm (4.0”) wide flanges, complete with vandal-proof cast aluminum domes, brass diameter matching ferrules and related installation hardware.
.1 Use with mechanical compression seal connectors installed to drain stem throat from roof top side and inserted into existing drainage pipe.
.2 Provide internal control flow inserts at all roof drains with existing control flow devices.

.2 Roof penetrations and stacks: prefabricated units with spun aluminum or copper flashing sleeves, complete with removable caps and pre-molded insulation where indicated on drawings.

.3 Firestop Sealant: One component, neutral cure silicone sealant to ASTM E84 and CAN4-S115M, designed for firestop applications at joints and through-wall penetrations.

.4 Termination Bars: Prefabricated extruded TB-120 aluminum, 1.5mm (0.060") thick with 6 x 9.5 mm (1/4" x 3/8") slotted holes at 203 mm (8") o/c.

.5 Polystyrene Insulation:
.1 Extruded polystyrene (XPS) insulation to CAN/ULC-S701, Type 4, thickness 25 mm (1.0”), square edges.

.6 Concrete Pavers:
.1 Paving slabs: to CSA A231.1, 600 x 600 x 50 mm thick, precast concrete paving slabs having non-slip finish.

.7 Stone Wool Fibre Batt Insulation:
.1 Non-combustible, water resistant, vapour permeable, semi rigid stone wool batt insulation made from slag and basalt rock, conforming to CAN/ULC-S702.2, with a density of 45 kg/m^3 (2.8 lb/ft^3).
.2 Thickness as indicated or to fill cavity voids.
.3 Surface: unfaced.

.8 Sealing compound: rubber asphalt type as recommended by manufacturer.

.9 Walkway Pads:
.1 Walkways to consist of one additional ply of fully bonded cap sheet membrane squares or prefabricated modified bitumen roof treads approved by membrane manufacturer.
.2 Colour to be different from field membrane and as selected by Departmental Representative from standard colour range.

.10 Sealants: to Section 07 92 00.

PART 3 - EXECUTION

3.1 QUALITY OF WORK

.1 Do examination, preparation and roofing Work in accordance with roofing manufacturer's Specification Manual and CRCA Roofing Specification 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 plywood providing connection point for continuity of air barrier.

.4 Assembly, component and material connections will be made in consideration of appropriate design loads.

3.2 EXAMINATION OF ROOF DECKS

.1 Verification of Conditions:
.1 Review with Departmental Representative 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 Remediate corrosion to metal connectors and decking with rust proofing, galvanization, deck overlays, and new metal decking to Section 05 01 30.

3.3 PROTECTION OF IN-PLACE CONDITIONS

.1 Cover walls, walks , adjacent 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 Do not install roofing materials during rain or snowfall.

3.4 PREPARATION FOR ROOFING

.1 Preparation:

.1 Divide work into logical sections and only tear-off as much existing roof as can be made watertight in same working day to prevent damage to building interior.

.2 Prior to removal of any roof components, all existing openings (drains, vents, air intakes, etc.) to be covered or plugged to prevent any debris or contaminate from entering building below. All such coverings are to be removed at end of each working day and reinstalled prior to next day’s start up.

.3 Disconnect and reconnect Electrical Services and Mechanical Equipment as required. Coordinate in advance with Departmental Representative.

.1 Any rooftop equipment requiring disconnection to be responsibility of Contractor.

.2 Existing Roof Removal:

.1 On All Roof Areas: Remove existing roof system components down to expose existing roof deck in preparation for installation of new roof system.

.2 At areas designated for roof removal and replacement, remove existing projection and perimeter metal flashings, ballast, gravel, roof membrane and flashings, insulation, vapour retarder and flashings, and old appurtenances. Dispose removed items to an appropriate site for building material waste and recycling.

.3 All unused and abandoned pitch pockets, vents, curbs, sleepers, projections, etc. are to be removed from designated areas and disposed of.

.1 Obtain verification and authorization from Departmental Representative before removing and disposing of any suspected unused or abandoned projections.

.2 Install new roof decking as required to close off any deck openings prior before proceeding with new roof system installation.

.3 Substrate Review:

.1 Exposed roof deck surfaces to be reviewed by Contractor with Departmental Representative. Ensure to review entire roof area to satisfy warranty requirements of manufacturer for new roof system.

.1 Notify Departmental Representative of review at least forty-eight (48) hours prior to site review.

.2 Report anomalies found that may impact soundness and structural integrity of roof system to Departmental Representative immediately. Areas with damaged decking must be replaced or repaired before any further work may take place on that particular section.

.3 Ensure roof decks are firm, straight, smooth, dry, free of snow, ice, frost, oils, or other contaminants. Decking must be properly cleaned of any dust and debris prior to proceeding with new installation. Test whether specified adhesion to deck will be obtained where required.

.4 Prior to application of vapour retarder, examine deck and ensure any defect of level or construction is correct before proceeding with work.

.5 Verify that roof drains have been installed at proper elevations relative to finished roof surface to allow for sufficient drainage of roof surface.

.6 Review securement of existing projections and equipment (electrical conduit, gas lines, etc.). If inadequate securement is found, inform Departmental Representative and halt work around that area until situation is rectified.

.7 Review securement of existing plywood sheathing, wood blocking, and cant strips. Do not install new roofing unless such items are adequately secured to withstand stresses imposed by thermal movement of new roofing components.

3.5 CARPENTRY

.1 On All Roof Replacement Areas: Refer to detail drawings for carpentry requirements.

.2 Install wood blocking and plywood to accommodate required slopes, insulation, roofing membranes, and prefinished sheet metal and trim.

.1 Carpentry alterations to be performed to accepted trade practices.

.3 Add new wood blocking as necessary to maintain minimum heights at perimeters and roof curbs.

.1 At Existing Roof Curbs: Minimum height to be 203 mm (8”) above finished roof membrane.

.2 At metal roof curbs: Install new galvanized bent metal extension, metal C-Channel, prefab curb extension, or prefab curb adapter or reducer to raise curb as required to suit new height.

.4 At Existing Parapets: Minimum height to be 102 mm (4") above finished roof membrane, unless otherwise indicated on detail drawings.

.5 Replace any seriously damaged or deteriorated wood at perimeters and projections with new wood blocking or plywood, good one side, to match existing.

.6 Ensure existing wood blocking remaining at perimeters and curbs is securely fastened to existing substrate before installing new blocking and plywood.

.7 Install wood blocking as required to ensure that all roof curbs and sleepers supporting H.V.A.C. and mechanical equipment are level.

.8 Wood to wood, wood to metal, wood to masonry or concrete to be secured at 305 mm (12”) on center with alternating fasteners staggered.

.9 Avoid protruding fastener heads. Where possible, all fasteners to be flush with or slightly sunk below surface of wood blocking being secured.

.10 All wood blocking and plywood is to be considered part of roof, and to be made watertight by end of each work day to eliminate moisture infiltration into roof system.

3.6 DECK OVERLAY BOARD

.1 On Roof Areas 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 2.2, 2.3, 3.1, 4.1, and 4.2: Adhere a layer of deck overlay board in beads of polyurethane foamable roofing adhesive to metal roof deck as per manufacturer’s written instructions.

.2 Non-Asphaltic adhesive primer may be used to increase adhesion to metal deck or on highly absorbent substrates. Consult manufacturer on use of suitable epoxy coatings, chlorinated rubber, wash primer or other adhesive primers.

.3 Do not use wet or damaged deck overlay panels. Panels must be dry for proper installation.

.4 Custom cut deck overlay boards at perimeters and projections to suit. Install boards tightly together with no gaps between adjacent boards larger than 3 mm (0.125”).
- .1 Cut boards as required to fit snug at all perimeters, walls, and roof projections.
- .2 Cut straight lines using proper tools and snap chalk lines.
- .3 Cut boards cleanly where slope changes direction. Do not break boards by stepping on them to acquire changes in deck slope.

.5 Install sheet panels over metal decking with long axis of each sheet perpendicular to direction of deck flutes or ribs.
- .1 Align side edges of roof board panels over center of top deck flutes
- .2 Butt sheets tightly together with end joints staggered by half width of sheet.

.6 Mechanical fasteners to penetrate top flutes only, by no less than 19 mm (3/4") and by no more than 32 mm (1.25").
- .1 Check underside of metal deck before installation to eliminate damaging any existing conditions below deck.

.7 Where cover board is field primed, allow sufficient time for applied primers to dry and flash-off. Roof board surface must be thoroughly dry before installation of membrane.

3.7 VAPOUR RETARDER

.1 On All Roof Replacement Areas: Install one (1) ply modified bitumen vapour retarder with flashings as per Manufacturer’s written guidelines. Installation to be free of blisters, wrinkles and fish-mouths.
- .1 Vapour retarder must be installed on same day as primer application.
- .2 Do not install when it is raining or snowing, on wet/humid surfaces, or when inclement weather is expected shortly.
- .3 Deck substrate must be clean, dry, and free of dirt, dust, grease, or other contaminants.

.2 Primer Installation:

.1 Prime exposed surfaces to receive vapour retarder membrane and flashings. Apply primer to clean and dry surfaces with a paint brush, roller or sprayer at temperatures 0°C (31°F) and above.

.2 Apply primer at a coverage rate between of 0.1 to 0.5 L/m^2 (0.25 to 1.22 gallon/100 ft^2) as recommended by membrane manufacturer for surface type.

.3 Ensure all substrates are fully covered with primer with no areas bare and avoid pooling.

.4 Allow primer to dry completely prior to installation of new vapour retarder membrane.

.3 Field Membrane Installation:

.1 Begin application at bottom of roof slope. Position membrane rolls for alignment and unroll to apply membrane. Do not immediately remove release sheet on self-adhered membranes until satisfied with alignment.

.2 Overlap each preceding row of membrane sheet by min. 76 mm (3″) on side laps and by a min. 152 mm (6″) at end laps. Stagger end laps of adjacent rows by at least 305 mm (12″).

.3 Use a 34 kg (75 lbs) roller to press membrane down onto substrate including laps. Finish by aligning edge of roller with lower end of side laps and rolling up membrane.

.1 Do not cut membrane to remove trapped air bubbles. Squeeze out air bubbles by pushing roller to edge of laps.

.4 All side and end laps of base sheet to be heat welded or torched.

.5 Carry vapour retarder up all vertical surfaces at parapets and projections a minimum of 152 mm (6") to allow for encapsulating of new insulation with roof membrane as indicated on detail drawings.

.6 INSTALL MEMBRANE GUSSET REINFORCEMENT AT ALL INSIDE AND OUTSIDE CORNERS ON TOP OF BASE SHEET MEMBRANE.

.4 Membrane Flashing Installation:

.1 Ensure all substrates are fully covered with primer leaving no areas bare and allow to completely dry.

.2 Install membrane flashing onto substrate in strips one membrane roll wide (1 m or 40″) and extend over perimeters as shown on detail drawings

.3 Field measure and cut flashing membrane to length required for flashing at each detail and roll up for installation.

.4 Once aligned in position, peel back a portion of release sheet and press membrane onto substrate for initial adherence. Hold membrane flashing tight and peel back release sheet by pulling diagonally.

.5 Overlap each preceding flashing sheet by min. 76 mm (3″) on side laps and align bottom edge to a chalk reference line along base sheet membrane. Lap membrane flashing onto field membrane a minimum 102 mm (4″).

.6 Use a weighted roller to press membrane down onto substrate including laps. Finish by aligning edge of roller with lower end of side laps and rolling up membrane.

.1 Do not cut membrane to remove trapped air bubbles. Squeeze out air bubbles by pushing roller to edge of laps.

.7 All side and end laps of base sheet to be heat welded or torched.

3.8 BASE INSULATION

.1 On All Roof Replacement Areas: Install a layer of base insulation boards over prepared vapour retarder in accordance with insulation manufacturer's instructions.

.2 Do not install warped, curled, damaged, or wet insulation boards.

.3 Install base insulation boards in parallel rows and butt tightly together with joints staggered by one half board length.
- .1 Where multiple layers of insulation are required, stagger all board joints at least 305 mm (12”) between rows.

.4 At all existing and new roof drain locations, delete a section of base insulation in a 2.44 x 2.44 m (8' x 8') area centered around each drain.
- .1 At each drain location, install a new 2.44 x 2.44 m (8’ x 8’) prefabricated, tapered insulation drain sump over prepared substrate.

.5 Adhere base insulation to substrate using continuous beads of polyurethane foamable roofing adhesive. Follow manufacturer’s installation instructions.

.6 Install continuous ribbons of polyurethane adhesive in parallel lines to meet CSA A123.21 requirements. Use a “Z” pattern over an application area no larger than 3.66 m (12’-0”) at a time. Minimum securement pattern:
- .1 Adhesive ribbons to be no less than 13 mm (1/2”) to 19 mm (3/4”) in width at time of application.
- .2 Parallel rows of adhesive ribbons to be no more than 305 mm (1’-0”) apart in field of roof.
- .3 Along 3.05 m (10’-0”) wide perimeter zones, rows of adhesive to be no more than 127 mm (6”) apart.
- .4 Rows of adhesive to be no more than 102 mm (4”) apart in corner zones.

.7 Do not allow rising foam adhesive to skin-over. Place insulation panels immediately into wet adhesive.

.8 Walk-in board panels to ensure positive adhesion of substrate across full panel. Repeat walk-in every five (5) minutes until insulation is firmly attached.

.9 Custom cut insulation boards as required at perimeters and projections to suit. Field cuts to be neat and provide tight fit around penetrations, projections, and at perimeters.

.10 For uneven surfaces, trimming or slitting of boards may be necessary. Fill all gaps larger than 3 mm (1/8”) with insulation slivers.

3.9 OVERLAY INSULATION

.1 On All Roof Replacement Areas: Install a continuous layer of overlay insulation boards over base insulation in accordance with insulation manufacturer's instructions.

.2 Install tapered overlay insulation according to layout on reviewed shop drawings and roof plan drawing(s). Report any discrepancies to Departmental

Representative before proceeding.

.3 Do not install warped, curled, damaged, or wet insulation boards.

.4 Install overlay insulation boards in parallel rows and butt tightly together with joints staggered by one half board length.
.1 Where multiple layers of insulation are required, stagger all board joints at least 305mm (12”) between rows.

.5 Adhere overlay insulation to substrate using continuous beads of polyurethane foamable roofing adhesive. Follow manufacturer’s installation instructions.

.6 Install continuous ribbons of polyurethane adhesive in parallel lines to meet CSA A123.21 requirements. Use a “Z” pattern over an application area no larger than 3.66m (12’-0”) at a time. Minimum securement pattern:
.1 Adhesive ribbons to be no less than 13 mm (1/2”) to 19 mm (3/4”) in width at time of application.
.2 Parallel rows of adhesive ribbons to be no more than 305 mm (1’-0”) apart in field of roof.
.3 Along 3.05 m (10’-0”) wide perimeter zones, rows of adhesive to be no more than 127 mm (5”) apart.
.4 Rows of adhesive to be no more than 102mm (4”) apart in corner zones.

.7 Do not allow rising foam adhesive to skin-over. Place insulation panels immediately into wet adhesive.

.8 Walk-in board panels to ensure positive adhesion of substrate across full panel. Repeat walk-in every five (5) minutes until insulation is firmly attached.

.9 Custom cut insulation boards as required at perimeters and projections to suit. Field cuts to be neat and provide tight fit around penetrations, projections, and at perimeters.

.10 For uneven surfaces, trimming or slitting of boards may be necessary. Fill all gaps larger than 3 mm (1/8”) with insulation slivers.

.11 Install tapered insulation crickets over top of overlay insulation in ribbons of polyurethane adhesive.
.1 Provide crickets at all penetrations wider or longer than 305 mm (1’-0”) to improve drainage flow.

3.10 COVER BOARD

.1 On All Roof Replacement Areas: Install a layer of cover board panels in ribbons of polyurethane foamable roofing adhesive over rigid insulation as per manufacturer’s written instructions and to meet FM 1-90 requirements.

.2 Do not use wet or damaged cover board panels. Panels must be dry for proper installation.

.3 Determine and mark, as required, areas to receive new cover board installation to avoid over application of quick adhesive.

.4 Custom cut cover board panels at perimeters and projections to suit. Install

cover boards tightly together with no gaps between insulation boards larger than 3 mm (0.125").

.1 Cut boards as required to fit snug at all perimeters, walls, and roof projections.

.2 Cut straight lines using proper tools and snap chalk lines.

.3 Cut boards cleanly where slope changes direction. Do not break boards by stepping on them to acquire changes in deck slope.

.5 Install cover board panels in parallel rows and butt tightly together with end joints staggered by a half width of panel. Stagger panel end joints with joints of rigid insulation below by min. 152mm (6").

.6 Install continuous ribbons of polyurethane adhesive in parallel lines to meet CSA A123.21 requirements. Use a "Z" pattern over an application area no larger than 3.66 m (12'-0") at a time. Minimum securement pattern:

.1 Adhesive ribbons to be no less than 13 mm (1/2") to 19 mm (3/4") in width at time of application.

.2 Parallel rows of adhesive ribbons to be no more than 305mm (1'-0") apart in field of roof.

.3 Along 3.05 m (10'-0") wide perimeter zones, rows of adhesive to be no more than 127 mm (5") apart.

.4 Rows of adhesive to be no more than 102 mm (4") apart in corner zones. Do not allow rising foam adhesive to skin over. Place roof board panels immediately into wet adhesive.

.7 Walk-in board panels to ensure positive adhesion to substrate across full panel. Repeat walk-in every five (5) minutes until insulation is firmly attached.

.8 Where cover board is field primed, allow sufficient time for applied primers to dry and flash-off. Roof board surface must be thoroughly dry before installation of membrane.

3.11 MODIFIED BITUMEN MEMBRANE APPLICATION

.1 On All Roof Replacement Areas: Install a two (2) ply, SBS modified bitumen membrane system over top of prepared substrate. Base sheet layer to be self-adhered with self-adhered flashings. Cap sheet layer and flashings to be torch applied with torch applied flashings.

.2 All membrane and flashing applications to be free of installation defects including sags, blisters, wrinkles, and fish-mouths.

.3 General Requirements for Application:

.1 Tools, Rollers, & Squeegees: Use membrane manufacture's recommended tools and accessories. Keep tools clean during performance of work and frequently replace application roller tips and squeegee heads with new when clogged.

.2 Surface Review: Apply over wood, metal, gypsum board and concrete decks which are clean, smooth, and free of snow, ice, moisture, and debris. Concrete decks must have all holes filled with quick drying cement and rough patches removed.

.3 Application of Primer: Priming is required for all substrates prior to installation. Avoid pooling primer and allow to completely dry before membrane installation.

.4 First Roll Starting Point: Base sheet to begin at drain level with side lap aligned to center of drain. Run rolls perpendicular to slope. Cap sheet to be installed over base sheet covering base sheet overlap. Center of cap sheet to align up with center of drain.

.5 Relaxing of Roll Membrane: ALL ROLL MEMBRANES ARE TO BE FULLY UNROLLED AND ALLOWED TO RELAX FOR MINIMUM 15 MINUTES PRIOR TO INSTALLATION. Wait longer in cooler temperatures. Trace zig-zag pattern with torch over membranes covered with thermal-fusible film.

.6 Alignment of Rolls: Completely unroll first roll and align with edge of roof. Reroll membrane from both ends to center and apply as per specifications.

.7 Stagger Sheets: Offset end laps between base and cap sheets a min. of 610 mm (24”). Offset side laps between base and cap sheets a min. of 305 mm (12”), centered alignment preferred. Laps in same membrane layer to be min. 76 mm (3”) wide for side laps and min. 305 mm (12”) wide for end laps.

.8 Procedure to Seal Voids: Where voids are created by overlapping rolls of membrane, cut off corner of salvage edge where covered by next roll of material.

.9 Salvage Edge Protection: Granules along edge of membrane to be primed prior to application of adhesive to provide good adhesion of laps.

.10 Bleed-Out at Seams: When torch applying membrane, provide consistent, continuous bleed-out along all seams, no less 3 mm (1/8”) and no greater than 6 mm (1/4”) in width.

.11 All Seams: Check all seams in all sheets with a round nosed trowel while work is in progress. Repair found deficiencies immediately and before continuing roof installation.

.12 Base Sheet Seams: Butter all seams and laps. Provide additional bitumen at point of 90° upturns in base sheet flashings. Recheck self-adhered membrane seams left exposed within forty-eight (48) hours of installation to repair any revealed seam deficiencies with clean, heated trowel.

.13 Cap Sheet Seams: At all end laps and membrane flashing overlaps, degranulate area (embed granules) of surface to be bonded by embedding ceramic granules into bitumen of membrane using clean, heated trowel to push in. Measure and use straight chalk lines to mark outline of areas requiring degranulation. Achieve a uniform black surface of bitumen across 100% of embedment areas to be overlapped.

.14 Reinforcement: Required at all corners, vents, drains, HVAC units, and gravel stops.

.15 Primer Application: Sanded membrane left exposed overnight or longer to be primed before continuing membrane installation to ensure good adhesion.

.16 Torch Application: During windy periods, slow application rate down to ensure good bond with proper level of heat. Stop and periodically check for proper adhesion.

.4 Base Sheet Field Membrane, Self-adhered Installation:

.1 Prime surfaces at roof projections and around perimeters to receive new base sheet membrane and flashings.

.2 Field measure and cut membrane to length of run required and roll up for installation.

.3 Starting at low point of roof, perpendicular to slope, unroll base sheet membrane and position.

.4 Once aligned in desired position, peel back a portion of release under film and press membrane onto substrate for initial adherence. Hold

membrane tight and peel back release under film by pulling diagonally to remove fully and discard. Broom sheet into place to ensure full contact with substrate

.5 Overlap each preceding flashing sheet by min. 76 mm (3″) on side laps and align bottom edge to a chalk reference line along base sheet membrane. Lap membrane flashing onto field membrane a minimum 102 mm (4″).

.6 Use a membrane manufacturer recommended weighted roller to press membrane down onto substrate including laps. Finish by aligning edge of roller with lower end of side laps and rolling up membrane.

.1 Squeeze out air bubbles by pushing roller to edge of laps.

.7 All side and end laps of base sheet to be heat welded as required with hot air gun or torch.

.5 Base Sheet Flashing, Self-adhered Installation:

.1 Prime surfaces at roof projections and around perimeter to receive new base sheet membrane flashings.

.2 Install membrane flashing onto substrate in strips one membrane roll wide (1m or 40″) and extend over perimeters as shown on detail drawings

.3 Field measure and cut flashing membrane to length required for flashing at each detail and roll up for installation.

.4 Install base sheet flashing starting at outside face of perimeter, running across perimeter detail, and down onto flat of roof.

.5 Once aligned in position, peel back a portion of release sheet and press membrane onto substrate for initial adherence. Hold membrane flashing tight and peel back release sheet by pulling diagonally.

.6 Overlap each preceding flashing sheet by min. 76 mm (3″) on side laps and align bottom edge to a chalk reference line along base sheet membrane. Lap membrane flashing onto field membrane a minimum 102 mm (4″).

.8 Use a membrane manufacturer recommended weighted roller to press membrane down onto substrate including laps. Finish by aligning edge of roller with lower end of side laps and rolling up membrane.

.1 Squeeze out air bubbles by pushing roller to edge of laps.

.9 Provide preliminary securement of membrane on outside edge or perimeters before installation of finish metal flashings and trim. Fasten top edge of membrane flashings on outside face of perimeter details with round top nails spaced every 229 mm (9″) o/c.

.10 MEMBRANE GUSSET REINFORCEMENT TO BE INSTALLED ON TOP OF BASE SHEET MEMBRANE AT ALL INSIDE AND OUTSIDE CORNERS. DEPARTMENTAL REPRESENTATIVE TO REVIEW GUSSET INSTALLATION BEFORE INSTALLATION OF CAP SHEET MEMBRANE.

.11 All side and end laps of base sheet flashing to be heat welded as required with hot air gun or torch to satisfaction of QA Observer.

.6 Cap Sheet Field Membrane, Torch Installation:

.1 Complete installation of base sheet flashing prior to installing membrane cap sheet and cap sheet flashings.

.2 Field measure and cut membrane to length of run required and roll up for installation.

.3 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and re-roll from both ends.

.4 Unroll and install cap sheet carefully in straight and parallel rows keeping majority of flame on membrane roll.

.5 Cap sheet to be torched across flat of roof, overtop of base sheet, and terminated at perimeters and vertical surfaces ensuring a good bond.

.6 Lap sheets 76 mm (3") for side laps and a minimum 152 mm (6") for end laps. Offset joints in cap sheet 305mm (12") minimum from those of base sheet.

.7 All side and end laps of cap sheet to be heat welded with hot air gun or torch.

.7 Cap Sheet Flashing, Torch Installation:

.1 Cap sheet membrane flashing to be torched up and over perimeter details.

.2 Install membrane flashing onto substrate in strips one membrane roll wide (1m or 40”) and extend up perimeters as shown on detail drawings

.3 Field measure and cut flashing membrane to length required for flashing at each detail and roll up for installation.

.4 Set cap sheet to offset base sheet flashing joints by 50% and extend a minimum of 152 mm (6”) onto roof. All end lap joints to be a minimum 76 mm (3”).

.5 Align bottom edge to a chalk reference line along cap sheet membrane.

.6 Install cap sheet flashing onto field membrane a minimum 102 mm (4”) at base of perimeter detail. Run flashing up vertical and across perimeter detail to outside edge.

.7 Overlap each preceding cap sheet flashing sheet by min. 76 mm (3”) on side laps. Offset joints in cap sheet flashing 305 mm (12") minimum from those of base sheet flashing.

.8 Properly secure flashings to their support, without sags, blisters, fish-mouths or wrinkles with terminations as indicated on drawings and details.

.9 All side and end laps of cap sheet flashing to be heat welded with hot air gun or torch.

3.12 LIQUID APPLIED PMMA RESIN FLASHINGS

.1 On Roof Replacement Area 1.1: Where specifically indicated in detail drawings and at any other junctions where conventional installation of membrane flashings are not feasible, install new liquid applied resin flashing system.

.1 Install continuous PMMA resin flashings over top of finished modified bitumen membrane along west wall of Roof Areas 2.1 and 4.1 where indicated in detail drawings.

.2 Provide coloured and granule textured top coat.

.2 Resin system to be a layered application consisting of two coats of thixotropic catalyzed polymethylmethacrylate (PMMA) resin encapsulating a layer of polyester fleece reinforcement.

.3 Installation of liquid applied flashing system to manufacturer's written instructions.

.4 Ensure that substrates are free from gross irregularities, loose, unsound or foreign material such as dirt, ice, snow, water, grease, oil, bituminous products, release agents, laitance, paint, loose particles/friable matter, rust or any other material that would be detrimental to adhesion of catalyzed primer and/or resin to substrate.

.1 Concrete substrates to receive an application of specified PMMA roofing system to have a maximum moisture content of 6% and a maximum internal relative humidity of 75%.

.6 Preparation of Steel and/or Aluminum Substrates:

.1 Grind to generate a "white-metal" surface and remove loose particles. Extend preparation area a minimum of 13 mm (0.5”) beyond termination of roofing/flashing system. Do not used cleaner/solvent after grinding. Notch steel surfaces to provide a rust-stop where detailed.

.7 Preparation/Mixing/Catalyzing Resin Products:

.1 Pour desired quantity of resin into a clean container and using a spiral mixer or mixing paddle, stir liquid for time period specified by resin manufacturer.

.2 Calculate amount of catalyst powder needed using manufacturer's guidelines and add pre-measured catalyst to resin component.

.3 Mix again for time period specified by resin manufacturer, ensuring that product is free from swirls and bubbles.

.4 Ensure that air is not entrained into product during mixing process. To avoid aeration, do not use a spiral mixer unless spiral section of mixer can be fully contained in liquid during mixing process.

.5 Mix only enough product to ensure it can be applied before expiration of resin pot life.

.8 Primer Application:

.1 Apply primer resin using a roller or brush at minimum rate specified by primer manufacturer over poured reinforced concrete substrates.

.2 Apply primer resin using a roller or brush at increased rate specified by primer manufacturer over gypsum board and granule surfaced membrane substrates.

.3 Increase application rates over other absorbent substrates. Do not let resin pool or pond. Do not under-apply or over-apply primers as this may interfere with proper primer catalyzation.

.4 Make allowances for saturation of roller covers and application equipment.

.9 Paste Application:

.1 Allow primer to set and apply catalyzed preparation paste using a trowel.

.2 Before application of resin over catalyzed paste surface, specified cleaner/solvent, wipe surface of paste using specified cleaner/solvent and allow to dry.

.3 Treat surface again if not followed up by resin application within 60 minutes.

.10 Flashing Membrane Application:

.1 Using masking tape, mask perimeter of area to receive flashing system.

.2 Apply resin primer to substrates requiring additional preparation and allow primer to set.

.3 Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.

.4 Apply an even, generous base coat of flashing resin using a roller at minimum rate specified by resin manufacturer to prepared surfaces requiring flashing coverage.

.5 Work fleece into wet, catalyzed resin using a brush or roller to fully embed fleece in resin and remove trapped air.

.6 Lap fleece layers a minimum of 51 mm (2”) and apply an additional coat of catalyzed resin between layers of overlapping fleece.

.7 Using a roller, apply an even top coat of catalyzed resin at minimum rate specified by resin manufacturer immediately following embedment of fleece, ensuring full saturation of fleece.

.8 Ensure that flashing resin is applied to extend a 6 mm (0.25”) beyond

fleece. Remove tape before catalyzed resin sets. Make allowances for saturation of roller covers and application equipment.

.9 Should work be interrupted for more than 12 hours or surface of catalyzed resin becomes dirty or contaminated by elements, wipe surface to be lapped with new flashing resin using specified cleaner/solvent.

.10 Allow surface to dry for a minimum 20 minutes and a maximum 60 minutes before continuing work.

.11 Skid Resistant Surfacing:

.1 Over horizontal area of new resin flashing, apply an additional top coat of catalyzed roof resin at minimum rate specified by manufacturer; and broadcast granules into resin at a rate recommended by manufacturer before resin sets.

.2 Apply a clear coat of resin over granular surface if required by system manufacturer.

3.13 ROOF PENETRATIONS AND ACCESSORIES

.1 On All Roof Replacement Areas: Install vent stack flashings, support flashings, and other roof penetration flashings, and seal with roof membrane in accordance with manufacturer’s instructions and as indicated on detail drawings.

.2 Prime all metal flanges with modified bitumen compatible primer, and allow any solvents to flash-off and dry completely prior to installation.

.3 Set metal flange in bed of manufacturer recommended and system compatible roofing cement applied over base sheet membrane, ensuring a positive bond.

.4 Install an additional ply of base sheet membrane flashing over metal flange prior to installing cap sheet membrane. Additional ply of base membrane to extend minimum 152 mm (6”) past all edges of metal flange.

.5 Install cap sheet ply over base flashing ensuring a full bond to base ply membrane.

.6 Apply continuous bead of manufacturer’s recommended and system compatible sealant around penetration at point where membrane terminates.

3.14 ROOF DRAINS

.1 General Practice:

.1 Ensure roof drains, rain gutters, and down pipes are clear of debris and are free flowing prior to installation of new roof system.

.1 Any blockages are to be reported prior to start of Work. Once Work has begun, Contractor assumes responsibility for free flowing drains and clearing blockages at no additional cost to Departmental Representative.

.2 Where required for new roof drains and interior plumbing, Contractor to provide interior plumbing and hook-up to existing storm water drainage system and co-ordinate installation of same with Departmental Representative.

.2 Prior to installation of new roof, ensure that all drains are located at a height where new roof system is able to clear majority of roof top

water caused by rainfall within a seventy-two (72) hour period.

.3 Once work has begun, no roof area to be left overnight without adequate provision for drainage.

.4 Install drains in accordance with detail drawings and as per manufacturer's written instructions and guidelines.

.2 Roof Drain Installation:

.1 On All Roof Replacement Areas: Drain body insert to be secured to substrate with minimum four (4) fasteners per drain as required to properly secure drain body.

.1 At all existing roof drains, reinstate existing control flow weir devices. Supplement damaged devices with new to suit.

.2 Affix mechanical connector seal to bottom of drain stem before insert retrofit drain body down into existing storm drainage pipe.

.2 Set metal flange of drain body into continuous bed of manufacturer recommended and system compatible roofing cement applied over base sheet membrane.

.3 Mechanically secure drain body to deck and substrate with min. four (4) fasteners per drain through drain flange or by underdeck clamping ring.

.4 Install target patch of membrane reinforcement over metal drain flange. Use a square of 1 x 1 m (39″ x 39″) base sheet membrane and install over drain at a 45° angle to direction of base sheet rolls.

.5 Install cap sheet over base sheet membrane with drain in center of roll and without seams in drain area.

.1 End laps of cap sheet to be min. 915 mm (36″) from drains.

.2 Where seams of cap sheet do not align properly with drain location, install cap sheet over drain area first and picture-frame cap sheet into remainder of roof.

.3 At drain sump areas larger than 1.22 x 1.22 m (4′ x 4′), install cap sheet over sump area first without any endlaps and picture-frame into remainder of roof.

.6 Place Clamping Ring over raised bolt studs. Install stainless steel self locking nuts to tighten Clamping Ring against membrane flashings until secure.

.7 Install ballast guard strainer dome and secure with cotterless pin or wing nut screw.

3.15 MISCELLANEOUS MECHANICAL AND ELECTRICAL

.1 Contractor responsible for all Mechanical and Electrical Work required to perform complete installation of new roofing. Include for all costs associated with HVAC disconnection, removal, and reconnection, including modification of gas and conduit lines in Contract Amount.

.1 Coordinate any planned disruptions in advance with Departmental Representative to minimize inconvenience.

.2 HVAC and Rooftop Equipment: Disconnect, lift (if necessary), modify, and reconnect all Heating, Ventilation, Air Conditioning, and Mechanical units as required to for new roof system.

.1 Modify existing sleepers, curbs, and supports as required to suit new roof system installation and configuration as detailed. Ensure modified sleepers, curbs, and supports are made watertight with new membrane and flashings as required.

.2 Remove and dispose of identified and designated abandoned, redundant, and unused HVAC equipment from roof and worksite.

.3 Gas Lines and Conduits: Disconnect, modify, and reconnect all gas lines, electrical lines, and conduits as required to suit new roof installation height and configuration of projection detailing.

.1 All gas line work must be performed by a qualified Gas Fitter and must conform to requirements of CSA B149.1-15.

.2 Re-install gas lines and conduits at a height of 150 mm (6″) to 200 mm (8″) above finished roof surface. Secure all loose cabling and conduits off surface of roof membrane.

.3 Ensure that all gas line penetrations are separated from all electrical line penetrations with their own roof flashing supports. Provide any new sleeves, goosenecks, or curbs required and flash-in as indicated in detail drawings.

.4 At threaded gas line piping, which cannot be permanently enclosed or covered, construct new insulated and waterproof dog house detail with removable lid for periodic thread inspection.

.5 Paint all gas lines on areas of roof work with exterior grade, yellow paint for metal surfaces.

.4 Underdeck Securement: Where existing sections of roof decking are to be removed, ensure any cabling, conduits, and attachments (plumbing, electrical wiring, lighting fixtures, etc.) secured to underside are disconnected, removed, and relocated.

.1 Notify Departmental Representative, if necessary, to have interior services disconnected, removed, and relocated by Departmental Representative.

.5 Temporary Security: Provide overnight security, at no additional cost to Departmental Representative where removal of any venting or HVAC equipment results with an opening in roof deck that cannot be permanently sealed on same day. Security company must be preapproved by Departmental Representative in advance.

3.16 TEMPORARY WATER CUT-OFFS

.1 All membrane flashings to be installed concurrently with roof membrane to keep system watertight during performance of work.

.2 Temporary waterproof seals to be placed on daily work as required. All temporary water-stops to be constructed to provide a one hundred (100) percent watertight seal.

.3 New roofing membrane to be carried into water-stop. Water-stop to be sealed to roof deck and/or substrate to prevent water travel and infiltration under new or existing roofing.

.4 Edge of roof membrane to be sealed in a continuous heavy application of sealant. Temporary seals to be removed and cleaned up before proceeding with remaining work.

.5 When work resumes, cut out and dispose of all contaminated membrane. All sealant, contaminated membrane, insulation fillers, etc. to be removed from work area and properly disposed of off site. Reuse of these materials in new work is strictly prohibited.

.6 If inclement weather occurs while a temporary water-stop is in place, provide

all necessary labour required to monitor situation and maintain watertight condition.

.7 If any water is allowed to penetrate under newly completed roofing, then affected area to be cut out, removed, and replaced with new materials at Contractor's own expense.

3.17 METAL FLASHINGS

.1 On All Roof Replacement Areas: After installation of roof membrane and membrane flashings, install new perimeter metal and metal flashings to Section 07 62 00 and as indicated on detail drawings.

3.18 SEALANTS

.1 On All Roof Replacement Areas: After installation of roof membrane and membrane flashings, install sealants to Section 07 92 00.

3.19 FIELD QUALITY CONTROL

.1 Quality Assurance Observation:
- .1 QA Observation and testing of roofing application will be carried out by QAO agency and testing laboratory designated by Departmental Representative.
- .2 Where directed by Departmental Representative or QA Observer, provide reasonable number of roof cut-out samples in field to assess installation and repair to no additional cost to Contract Amount.
- .3 Departmental Representative will pay for testing sent out for laboratory analysis to Section 01 45 00.

.2 Cooperate with designated QA Observation agency and provide all facilities and access required to observe performance of roof work.

3.20 CLEAN UP

.1 On All Roof Replacement Areas: Clean up and remove from job site on a daily basis, all rubbish and surplus materials resulting from this work.

.2 Drag a magnetic bar across work area and grounds to ensure removal of all discarded fasteners and sharp metal debris.

.3 Remove bituminous markings from finished surfaces.

.4 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their instructions.

.5 Repair or replace defaced or disfigured finishes caused by work of this section.

.6 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.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 material must be disposed of at official hazardous material collections site as reviewed by Departmental Representative.

.6 Unused adhesive, sealant, and painting 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.

PART 1 - GENERAL

1.1 REFERENCES

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

.2 ASTM A240/A240M-15b, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
.3 ASTM A606/A606M-15, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
.4 ASTM A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.5 ASTM A792/A792M-10(R2015), Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
.6 ASTM B32-08(2014), Standard Specification for Solder Metal.
.8 ASTM D523-14, Standard Test Method for Specular Gloss.

.2 Canadian Roofing Contractors Association (CRCA)
.1 Roofing Specifications Manual 2012.

.3 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.4 Canadian Standards Association (CSA International)
.1 CSA A123.3-05(R2015), Asphalt Saturated Organic Roofing Felt.

.5 Green Seal Environmental Standards
.1 Standard GS-03-93, Anti-Corrosive Paints.
.2 Standard GS-11-97, Architectural Paints.
.3 Standard GS-36-00, Commercial Adhesives.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Product Data:

.1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and 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 43.

.3 Samples:
.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.

.4 Warranty:
.1 Submit copy of manufacturer’s material warranty for finish coating.

1.3 QUALITY ASSURANCE

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Contractor's representative and Departmental Representative in accordance with Section 01 32 16 to:
.1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Co-ordination with other building subtrades.
.4 Review manufacturer's installation instructions and warranty requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00.

.2 Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

1.5 WARRANTY

.1 Extend material warranty from one year period to forty years from date of delivery on resistance of coated finish to cracks, blisters, and peeling.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

.1 Zinc coated steel sheet: 0.66 mm (24 gauge) thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied silicone modified polyester (SMP).
.1 Class F1S.
.2 Colour selected by Departmental Representative from manufacturer's standard range.
.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
.4 Coating thickness: not less than 25 micrometres.

.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows:

.1 Outdoor exposure period 1000 hours.

.2 Humidity resistance exposure period 1000 hours.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Underlay for metal flashing: dry sheathing to CAN/CGSB-51.32, asphalt laminated 3.6 to 4.5 kg kraft paper, or No. 15 perforated asphalt felt to CSA A123.3.

.3 Sealants: 07 92 00.

.4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness 0.91 mm (20 gauge, two gauges heavier).

.5 Hook Strips: of same material, and temper as sheet metal, continuous width to match metal being secured. Thickness 0.91 mm (20 gauge, two gauges heavier).

.6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails or corrosion resistant screws of length and thickness suitable for metal flashing application.

.7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.8 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details.

.2 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

.3 Fabricate all possible work in shop in 2.44m (8') lengths by brake forming, bench cutting, drilling and shaping. On high vertical sections install metal in 1.22m (4') section as detailed. Profiled metal to be cold rolled.

.4 On coping or flashing with a horizontal dimension of 406mm (16”) or greater, fabricate metal flashings in maximum 1.22m (4’) sections.

.5 On coping or flashing with a horizontal dimension of 508mm (20”) or greater, use 25mm (1”) lock folded standing seam joints.

.6 Form bends with straight sharp lines, angles and corners into true planes, free from twists, buckles, dents and other visual distortions.

.7 Double-back exposed metal edges at least 13mm (0.5”). Raw edges will not be permitted.

.9 Supply all accessories required for installation of sheet metal work of this Section. Fabricate accessories of same materials to which they will be used.

2.5 MOCK-UPS

.1 Prepare mock-up installations of metal flashing details for review by Departmental Representative prior to installation of sheet metal flashings.
.1 Create mock-up sample of typical metal flashing, reglet flashing, and related accessories.
.2 Finished and accepted mock-ups may remain in place as part of installed work, and as reference standard for other work to be completed.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details and as detailed.

.2 Use concealed fastenings except where approved before installation and shown on drawings.

.3 Install sheet metal flashings at copings, walls, joints, roof openings and other components required to protect membrane flashings as shown on drawings, or otherwise required.

.4 Install continuous concealed hook strips at all exterior faces. Install cleats as required to protect membrane roofs and flashings from damage at lock joints and as required to permanently hold flashing in place. Secure cleats at 152mm (6”) on center in V-pattern, keeping lower fastener within 32mm (1.25”) of drip edge.

.5 Sheet metal work to be installed to cover entire area it protects and to be watertight under all service and weather conditions.

.6 Install in a uniform manner, level, true to line, free of dents, warping and distortion.

.7 Back-paint at rate of 0.12L/m2 (¼ Gal/100 ft2) with bituminous paint, sheet metal that comes into contact with another kind of metal, masonry or concrete.

.8 Install sheet metal with concealed fasteners at lock joints. Except where shown in drawings, exposed fastening will be permitted only with approval of Departmental Representative. Space all fasteners evenly in an approved manner. Use lead plugs and screws where fasteners are exposed, otherwise use concrete drive fasteners where metal flashings are installed over concrete

or masonry.

.9 Install underlay under sheet metal, installed directly over wood or masonry surfaces. Overlap joints 51mm (2") and turn up 76mm (3") at edges where horizontal surfaces intersect vertical planes.

.10 Join sheet metal by “S” lock seams, to permit thermal movement. Space joints evenly where exposed. Form inside and outside corners by means of raised seams. Lock seams to ensure water tightness. Do not use pop rivets.

.11 Slope all metal to interior to maintain minimum 4% slope. Do not form open joints or pockets that fail to drain water.

.12 Caulk all open sheet metal joints. Solder corners and other locations as required for a permanent waterproof connection.

.13 Where existing reglets can not be reused, provide new reglets sized minimum 10mm (3/8") wide, 25mm (1") deep and to suit site conditions.

.14 Clean reglets free of contaminates and dust.

.15 Wedge flashings into reglet joints with lead wedges at 229mm (9") o.c. set minimum 6mm (0.25”) from masonry surface.

.16 At reglets wider than 10mm (3/8") and deeper than 19mm (0.75") provide polyethylene rod, 25% wider than joint width. Caulk all reglets to provide a continuous waterproof seal. Use colour to match materials. Conform to manufacturer’s latest printed recommendations for use of products being employed.

.17 Carry flashings out onto roof minimum 76mm (3").

3.3 FINISH

.1 At project’s conclusion, leave surface and adjacent work areas free of damage and clean of debris. Finished surfaces of formed metal flashings to be free of oil canning, dents and be perfectly colour matched.

.2 Changes in colour between sheets and dented or oil canned surfaces that detract from visual appearance of finished product will be rejected. Remove and replace damaged, defaced or defective work.

.3 Paint all exposed metal due to cutting.

.4 After erection touch-up finish surfaces damaged during handling and erection in conformance with manufacturer’s recommendations. Refinish shop applied finishes as approved by Departmental Representative.

.5 Remove deposits or protections and wash metals left unpainted and exposed to view as specified by metal manufacturer.

3.2 CLEANING

.1 Proceed in accordance with Section 01 74 11.

.2 Daily as work proceeds and on completion, remove all surplus materials and debris resulting from foregoing work.

.3 Drag a magnetic bar across work area and grounds to ensure removal of all discarded fasteners and sharp metal debris.

.4 Remove all stains, caulking or other adhesive from all affected surfaces.

.5 Leave work areas clean, free from grease, finger marks and stains.

.6 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Materials, preparation and application for caulking and sealants.

.2 Text to complete other various Sections containing sealant or caulking specifications, including Section 07 52 00.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
.1 ASTM C919-12, Standard Practice for Use of Sealants in Acoustical Applications.
.2 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants.

.2 Canadian General Standards Board (CGSB)
.1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
.2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
.3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
.4 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 Department of Justice Canada (Jus)
.1 Canadian Environmental Protection Act, 1999 (CEPA).

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.5 Transport Canada (TC)
.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00.

.2 Manufacturer's product to describe.
.1 Caulking compound.
.2 Primers.
.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Submit manufacturer's instructions in accordance with Section 01 33 00.
.1 Instructions to include installation instructions for each product used.

1.4 QUALITY ASSURANCE/MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00.

.2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.

.3 Mock-up will be used:
.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Locate where indicated on drawings.

.5 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with sealant work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

1.5 DELIVERY, STORAGE, AND HANDLING

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

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.6 Unused sealant material 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 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Departmental Representative.

.8 Empty plastic joint sealer containers are not recyclable. Do not dispose of

empty containers with plastic materials destined for recycling.

.9 Fold up metal banding, flatten, and place in designated area for recycling.

1.7 PROJECT CONDITIONS

.1 Environmental Limitations:
.1 Do not proceed with installation of joint sealants under following conditions:
.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4°C.
.2 When joint substrates are wet.

.2 Joint-Width Conditions:
.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:
.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

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

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

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

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

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

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

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Urethane, One Part, low modulus:

.1 Non-Sag, polyurethane sealant to CAN/CGSB-19.13, MC-2-25-B-N, colour to match metal flashing.

.2 Silicones, One Part:
.1 Non-sag, mildew resistant silicone to CAN/CGSB-19.13, primerless, Type S, Grade NS, Class 25, SWRI validated.

.3 Butyl:
.1 Non-skinning, non-hardening synthetic rubber sealant to CGSB 19-GP-14M.

.4 Preformed Compressible and Non-Compressible back-up materials.
.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
.1 Extruded open or closed cell foam backer rod.
.2 Size: oversize 30 to 50%.
.2 Neoprene or Butyl Rubber.
.1 Round solid rod, Shore A hardness 70.
.3 High Density Foam.
.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/mü density, or neoprene foam backer, size as recommended by manufacturer.
.4 Bond Breaker Tape.
.1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Skylight and glazing:
.1 Sealant type: Single component neutral cure silicone sealant.

.2 Reglet and other roofing related flashing termination:
.1 Sealant type: Single component, moisture curing, polyurethane sealants.

.3 Sealant Joints and air seals: Butyl.

.4 Primer: as recommended by manufacturer.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

.2 Protect public from falling debris during installation.

.3 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. At no time shall unsealed joints be left open. If protection is required, then entire drop/bay to be adequately protected.

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave

shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup.

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

PART 1 - GENERAL

1.1 REFERENCES

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

.2 Green Seal Environmental Standards (GS)
.1 GS-36-13, Standard for Adhesives for Commercial Use.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for prefabricated roof expansion joints and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.2 Indicate size and description of components, attachment devices, and construction details.

.4 Samples:
.1 Submit duplicate 500 mm long sample of expansion joint complete with attachments, fastened to plywood backing to show joint details and end termination (end cap) details.

.5 Manufacturer's Instructions:
.1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original

factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry area.
.2 Store and protect prefabricated roof expansion joints from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials as specified in Waste Reduction Workplan in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 DESIGN REQUIREMENTS

.1 Design prefabricated roof expansion joints to maintain soundness of roofing membrane and protect building roof slab expansion joints from weather and moisture infiltration.

2.2 MATERIALS

.1 Flexible Membrane: of minimum 2 mm (0.079”) thick flexible, fully cured, vulcanized co-polymer with polyester reinforcement waterproof membrane and monolithic seams.
.1 Expansion joint width of 51 mm (2.0”), for roof to wall application.
.2 Custom end, intersections, and transitions field measured and preformed.

.2 Adhesion: compatible with torch applied roofing membrane to Section 07 52 00.

.3 Bond adhesive: type as recommended by product manufacturer.

.4 Roof nails: standard type to CSA B111.

2.3 FABRICATION

.1 Factory assemble, preform crown shape with prefabricated corner, tee intersections, splicings and roof to wall transitions.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for prefabricated roof expansion joints installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative.
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 MANUFACTURER'S INSTRUCTIONS

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

3.3 INSTALLATION

.1 Ensure roofing membrane or other weathering surfaces are applied over wood nailers as indicated.

.2 Ensure continuity of building envelope air barrier and vapour retarder systems.

3.4 CLEANING

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

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

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

.2 Repair damage to adjacent materials caused by prefabricated roof expansion joints installation.

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 05 01 30 – Maintenance of Steel Roof Deck.

1.2 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.2 The Master Painters Institute (MPI)
.1 Architectural Painting Specification Manual - 2010.
.2 Standard GPS-1-08, MPI Green Performance Standard for Painting and Coatings.

.3 National Fire Code of Canada, 2010 (NFC).

.4 Society for Protective Coatings (SSPC)
.1 Systems and Specifications, SSPC Painting Manual 2013.

1.3 QUALITY ASSURANCE

.1 Qualifications:
.1 Conform to latest MPI requirements for exterior painting work including preparation and priming.
.2 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
.3 paint materials such as linseed oil, shellac, and turpentine to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
.4 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

1.4 PERFORMANCE REQUIREMENTS

.1 Environmental Performance Requirements:
.2 Green Performance in accordance with MPI Standard GPS-1.

1.5 SCHEDULING

.1 Submit work schedule for various stages of painting to Departmental Representative for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Departmental Representative for changes in

work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about building.

1.6 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit WHMIS MSDS - Material Safety Data Sheets.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00, supplemented as follows:.
.1 Deliver and store materials in original containers, sealed, with labels intact.
.2 Labels: to indicate:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.
.3 Remove damaged, opened and rejected materials from site.
.4 Provide and maintain dry, temperature controlled, secure storage.
.5 Observe manufacturer's recommendations for storage and handling.
.6 Store materials and supplies away from heat generating devices.
.7 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.
.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
.9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative . After completion of operations, return areas to clean condition to approval of Departmental Representative.
.10 Remove paint materials from storage only in quantities required for same day use.
.11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
.12 Fire Safety Requirements:
.1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.
.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

.2 Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
.3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
.4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
.5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
.5 Empty paint cans are to be dry prior to disposal or recycling (where available).
.6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
.7 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

1.8 AMBIENT CONDITIONS

.1 Temperature, Humidity and Substrate Moisture Content Levels:
.1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting work when:
.1 Ambient air and substrate temperatures are below 10 degrees C.
.2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.
.3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
.4 Relative humidity is above 85% or when dew point is less than 3 degrees C variance between air/surface temperature.
.5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.2 Surface and Environmental Conditions:
.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
.3 Apply paint when previous coat of paint is dry or adequately cured.
.4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
.5 Do not apply paint when:
.1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.

.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.

.3 Surface to be painted is wet, damp or frosted.

.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

.7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.

.2 Paint materials for paint systems: to be products of single manufacturer.

.3 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:

.1 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.

.2 Be manufactured without compounds which contribute to smog in the lower atmosphere.

.3 Do not contain, methylene chloride, chlorinated hydrocarbons, and toxic metal pigments.

.4 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

.5 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavelant chromium or their compounds.

.6 Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61.0 degrees C or greater.

2.2 COLOURS

.1 Selection of colours will be from manufacturers full range of colours.

.2 Where specific products are available in restricted range of colours, selection will be based on limited range.

.3 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.2 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.

.3 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 EXTERIOR PAINTING SYSTEMS

.1 Galvanized Metal: not chromate passivated
.1 EXT 5.3C - Epoxy finish with primer coating.
.2 EXT 5.3E - Bituminous finish for use in low contact/low traffic areas, e.g. unexposed galvanized metal.
.3 EXT 5.3J - Waterborne light industrial coating (over waterborne primer) for moderate chemical resistance.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

.1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

.3 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and surface debris by sweeping, vacuuming, and wiping with dry, clean cloths.

.2 Wash surfaces with a biodegradable detergent and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time before commencing work.

.5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.

.6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.

.4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

.5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.6 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

3.3 EXISTING CONDITIONS

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

3.4 PROTECTION

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect building occupants and general public in and about building.

3.5 APPLICATION

.1 Method of application to be as approved by Departmental Representative. Apply paint by brush, roller, or sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush and Roller Application:
.1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
.2 Work paint into cracks, crevices and corners.
.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Departmental Representative.
.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray Application:
.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
.3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
.4 Brush out immediately runs and sags.
.5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.

.4 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.

.5 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 11.
.1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

3.7 RESTORATION

.1 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.2 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.

.3 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.