

PROJECT TITLE Burlington Canal Lift Bridge (BCLB)
1157 Beach Boulevard
Roof Anchor Installation and
VHF Antenna Replacement

PROJECT NUMBER R.089504.080

PROJECT DATE 2020-04-09

PWGSC Ontario
Region Project
R.089504.080

SEALS PAGE

SECTION 00 01 07
PAGE 1 of 1
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PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
BURLINGTON CANAL LIFT BRIDGE
ROOF ANCHOR INSTALLATION

SIGN-OFF SHEET

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<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 00 - Procurement and Contracting Requirements</u>		
00 00 00	SPECIFICATION TITLE SHEET	1
00 01 07	SEALS PAGE	1
00 01 11	LIST OF CONTENTS	1
<u>Division 01 - General Requirements</u>		
01 11 00	SUMMARY OF WORK	2
01 31 19	PROJECT MEETINGS	2
01 33 00	SUBMITTAL PROCEDURES	4
01 35 29	HEALTH AND SAFETY REQUIREMENTS	5
01 35 43	ENVIRONMENTAL PROCEDURES	3
01 41 00	REGULATORY REQUIREMENTS	2
01 45 00	QUALITY CONTROL	3
01 51 00	TEMPORARY UTILITIES	2
01 61 00	COMMON PRODUCT REQUIREMENTS	4
01 74 11	CLEANING	1
01 74 20	CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL	2
01 78 00	CLOSEOUT SUBMITTALS	4
<u>Division 02 - Existing Conditions</u>		
02 41 99	DEMOLITION	4
<u>Division 05 - Metals</u>		
05 50 00	METAL FABRICATIONS	4
05 12 33	STRUCTURAL STEEL	18
<u>Division 07 - Thermal and Moisture Protection</u>		
07 13 52	MODIFIED BITUMINOUS SHEET WATERPROOFING	6
07 62 00	SHEET METAL FLASHING AND TRIM	3
<u>Division 27 - VHF Installation</u>		
27 53 20	VHF ANTENNA	3

List of Drawings

G-01 - COVER SHEET
S-01 - GENERAL ARRANGEMENT
S-02 - PLAN AND DETAILS
E-01 - VHF ANTENNA BLOCK DIAGRAM
E-02 - VHF ANTENNA INSTALLATION DETAILS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Title and description of Work.
- .2 Work Covered by Contract Documents.
- .3 Contract Method.
- .4 Cost Breakdown.
- .5 General Requirements.
- .6 Work sequence.
- .7 Contractor use of premises.
- .8 Work Restrictions.
- .9 Owner occupancy.

1.2 PRECEDENCE

- .1 Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 WORK COVERED BY
CONTRACT DOCUMENTS

- .1 Work of this Contract comprises the installation of fall-arrest roof anchors and VHF antenna replacement on the Burlington Canal Lift Bridge, located at 1157 Beach Blvd, Hamilton, Ontario. The scope and extent of work is as shown on the Drawings.
- .2 Contractor shall refer to the Burlington Lift Bridge Lead and Asbestos Reassessment Survey 2018 as it pertains to this project. Contractor to follow requirements as outlined in report.
- .3 Work includes but is not limited to creating openings in the existing roofing, the fabrication and installation of mechanically fastened fall-arrest anchor posts to existing roof beams, and sealing any gaps between flashing, roofing, and fall-arrest anchor posts with mastic waterproofing membrane.
- .4 Work includes but is not limited to removing the existing VHF antenna on the roof of the South tower, installation of a new VHF antenna, and routing of the cables as shown on the project documents.

1.4 CONTRACT METHOD

- .1 Construct work under lump sum contract.

1.5 COST BREAKDOWN

- .1 Within 3 days of notification of acceptance of bid, furnish a cost breakdown by Section aggregating Contract Amount.

1.6 GENERAL
REQUIREMENTS

- .1 The Contractor shall verify all dimensions on site related to the Work.
- .2 Prior to beginning of the works, the Contractor shall verify all dimensions, levels and site conditions and notify the Departmental

Representative of error or omission.

- .3 The Contractor must take into consideration the site conditions and perform work using accepted construction practices and methods to the satisfaction of the Departmental Representative.
- .4 The Contractor shall supply necessary labors, material and equipment for the execution of the work shown on contract drawings.
- .5 During work, the Contractor is responsible for all damages caused to the existing properties and shall repair said damage at no cost to the Departmental Representative. The Contractor shall keep the area of work clean and free of any debris at the end of each work day.
- .6 The Contractor shall carefully inspect the site to view and assess features and difficulties that might affect the removal and installation work. No extra charge due to a mistaken evaluation will be accepted.

1.7 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Owner's continued use of premises during construction.
- .2 Coordinate Progress Schedule and coordinate with Owner Occupancy during construction.
- .3 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .4 Maintain fire access/control.

1.8 CONTRACTOR USE OF PREMISES

- .1 Coordinate use of premises under direction of Owner and/or Departmental Representative on site.

1.9 WORK RESTRICTIONS

- .1 Carry out Work from Monday to Friday from 0700 hours to 1800 hours.

1.10 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations and other construction projects.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Title and Description.
- .2 Administrative.
- .3 Preconstruction Meeting.
- .4 Progress Meeting.

1.2 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting 4 days in advance of meeting date to Departmental Representative.
- .4 PWGSC shall provide a meeting space at the Burlington Canal Lift Bridge.
- .5 Preside at meetings.
- .6 Record the minutes of meetings. Include significant proceedings and decisions. Identify actions by parties.
- .7 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

- .1 Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 2 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: contractor to provide construction schedule.
 - .3 Schedule of submission of shop drawings, samples, mock-ups, colour chips. Submit submittals in accordance with Section 01 33 00.
 - .4 Health and safety in accordance with Section 01 35 29.
 - .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .6 Record drawings and specifications in accordance with Sections 01 33 00 and 01 78 00.
 - .7 Maintenance manuals in accordance with

Section 01 78 00.

- .8 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00.
- .9 Monthly progress claims, administrative procedures, photographs, hold backs.
- .10 Appointment of inspection and testing agencies or firms.
- .11 Insurances, transcript of policies.

1.4 PROGRESS MEETINGS

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.

1.2 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 coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .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 coordinated.
- .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 minimum one reviewed copy of each submission on site.

1.3 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 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work.

- Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Allow ten (10) days for Departmental Representative's review of each submission.
 - .4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
 - .5 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.
 - .6 Accompany submissions with transmittal letter, containing:
 - .1 Appointment of official representative of participants in the Work.
 - .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.
 - .7 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.
 - .8 After Departmental Representative's review, distribute copies.
 - .9 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
 - .10 Submit 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.
- .11 Submit 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 accordance with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
 - .12 Submit 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.
 - .13 Submit 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 Safety Data Sheets concerning impedances, hazards and safety precautions.
 - .14 Submit electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .15 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
 - .16 Submit electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
 - .17 Delete information not applicable to project.
 - .18 Supplement standard information to provide details applicable to project.
 - .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, an electronic copy will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may

proceed.

- .20 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 Review does not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review to 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.

1.4 PROCEDURES

- .1 Provide procedures required as specified in the Contract documents or as directed by the Departmental Representative.

1.5 OTHER SUBMISSIONS

- .1 Provide all other submissions as required by law and the Contract documents.

1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workplace Safety and Insurance Board Experience Report.
- .2 Submit transcription of insurance immediately after Award of Contract.

1.7 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.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 National Building Code 2015 (NBC)
 - .1 NBC 2015, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .2 National Fire Code 2015 (NFC)
 - .1 NFC 2015, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
- .3 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.
- .4 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§ion=text.

1.2 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 Rescue Plan: In accordance with current regulations for Working at Heights, provide the Owner and Departmental Representative a rescue plan for workmen in the event of an emergency.
- .4 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Building, Facility and Tenant's Emergency Procedures and Evacuation Plan in place at the site. Departmental Representative will provide Building, Facility and 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.
- .5 Contractor's and Sub-contractors' Safety Communication Plan.
- .6 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 and procedures provided by Departmental Representative.

- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 3 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 days after receipt of comments from Departmental Representative.
- .8 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.
- .9 Submit names of personnel and alternates responsible for site safety and health.
- .10 Submit records of Contractor's Health and Safety meetings when requested.
- .11 Submit 1 copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.
- .12 Submit 1 copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.
- .13 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
- .14 Submit copies of incident and accident reports.
- .15 Submit Safety Data Sheets (SDS).
- .16 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 SAFETY ASSESSMENT

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

1.5 MEETINGS

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

1.6 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.

1.7 PROJECT/SITE

- .1 Work at site will involve contact with:
 - .1 Silica in concrete and concrete block.

CONDITIONS

- .2 Guano.
- .2 Contractor to refer to DSS report titled Environmental Compliance Audit - Burlington Lift Bridge, 2018 prepared by Environmental Services - Ontario Region".
- .3 Contractor to review report and become familiar with the contents and conditions affecting the work.
- .4 Where removals of Designated Substances are required, Contractor to follow procedures outlined in the appropriate legislation.

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.
- .4 Contractor shall have all required Personal Protective Equipment (PPE) while working on site, in accordance with Occupational Health and Safety Act and Regulations for Construction Projects.
 - .1 Contractor shall have all required PPE been applied while working with all electrical replacement and installation.

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.
- .4 Contractor to be aware that there will be other contractors on this site during the Work. Contractor to ensure that time and spatial separation is

maintained at all time, and where required will co-ordinate with Departmental Representative to ensure spatial separation is maintained.

1.11 UNFORESEEN
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 HEALTH AND
SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. In accordance with subsection 1.15.2, Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities associated with abatement of lead and asbestos containing materials.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and be under direction of Registered Occupational Hygienist, Certified Industrial Hygienist and site supervisor.

1.13 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 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.

1.14 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.

1.15 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 Competent Supervisor to stop or start Work when, at Competent Supervisor'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.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCE
STANDARDS

- .1 Standard Acquisition Clauses and Conditions Manual (SACC).

1.2 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably 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.

1.3 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Submit information and documents in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review by Departmental Representative.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of person responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .6 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved with authorized work areas.
 - .7 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .8 Non-Hazardous solid waste disposal plan

- identifying methods and locations for solid waste disposal including clearing debris.
- .9 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
 - .10 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.

1.4 WORK ADJACENT TO WATERWAY

- .1 Construction equipment to be operated on land only.
- .2 Waterways to be kept free of waste material and debris.

1.5 POLLUTION CONTROL

- .1 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

1.6 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 - Cleaning.
- .2 Leave Work area clean at end of each day.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste generated by this project.

-
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .5 Waste Management: separate waste materials for recycling in accordance with Section 01 74 20 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES AND
CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC) 2015, National Fire Code of Canada (NFC) 2015 and Ontario Building Code (OBC) 2016, 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, other than those identified in Section 01 35 29 are discovered in course of work.

1.3 BUILDING SMOKING
ENVIRONMENT

- .1 Comply with smoking restrictions.

1.4 RELICS AND
ANTIQUITIES

- .1 Relics and antiquities, and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tables, and similar objects found on site shall remain the property of PWGSC. Protect such articles and request directives from Departmental Representative.

1.5 IAQ - INDOOR AIR
QUALITY

- .1 Comply with CSA-Z204-94 (R1999), Guideline for Managing Indoor Air Quality in Office Buildings and CSA B651-12 (R2017).

1.6 TAXES

- .1 Pay applicable Federal, Provincial and Municipal taxes.

1.7 EXAMINATION

- .1 Examine existing conditions and determine conditions affecting work.
- .2 Upon completion of review, provide written report identifying existing conditions that may affect the work for review.
- .3 Failure to provide report, will mean that the contractor has accepted the existing and additional claim for extra costs will not be accepted.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests.

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 Contractor should retain an Independent Inspection/Testing Agencies to conduct material testing and confirm material and procedures meeting the specified requirements. All cost of such services shall be Contractor's responsibility.
- .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, offsite 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 four (4) copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.8 TESTS

- .1 Furnish test results as may be requested.
- .2 The cost of tests beyond those called for in Contract Documents or beyond those required by product requirements shall be appraised by Departmental Representative and may be authorized as recoverable.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Temporary Utilities.

1.2 SUBMITTALS

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

1.3 INSTALLATION AND
REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
.2 Remove from site all such work after use.

1.4 WATER SUPPLY

- .1 Provide continuous supply of potable water for construction use.
.2 Arrange for connection with appropriate utility company and pay all costs for installation, maintenance and removal.
.3 Pay for utility charges at prevailing rates.

1.5 TEMPORARY HEATING
AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
.3 Provide temporary heat and ventilation in enclosed areas as required to:
.1 Facilitate progress of Work.
.2 Protect Work and products against dampness and cold.
.3 Prevent moisture condensation on surfaces.
.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
.5 Provide adequate ventilation to meet health regulations for safe working environment.
.4 Maintain temperatures of minimum 10°C in areas where construction is in progress.
.5 Ventilating:
.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
.2 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
.3 Ventilate storage spaces containing hazardous or volatile materials.
.4 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
.6 Pay utility charges when temporary heat source is existing building equipment.

- .7 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.
- .8 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 TEMPORARY POWER
AND LIGHT

- .1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts, 30 amps.
- .2 Arrange for connection with appropriate utility company. Pay all costs for installation, maintenance and removal.
- .3 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

1.7 TEMPORARY
COMMUNICATION
FACILITIES

- .1 Provide and pay for temporary telephone, data hook up, and equipment necessary for own use and use of Departmental Representative.
- .2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.8 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection and equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.
- .4 Existing facilities.

1.2 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 borne by Owner 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.

1.3 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.

1.4 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.

1.5 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.

1.6 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .5 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .6 Remove and replace damaged products at own expense and to satisfaction of Departmental

Representative.

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

1.7 TRANSPORTATION

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

1.8 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.

1.9 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.

1.10 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.

1.11 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.

1.12 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as appropriate, and where they may impact the work.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

1.13 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.

1.14 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.

1.15 EXISTING
UTILITIES

- .1 When where may affect existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered or otherwise interfere with the work in this Contract, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Progressive cleaning.
- .2 Final cleaning.

1.2 PROJECT
CLEANINESS AND WASTE
REMOVAL

- .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 Provide on-site containers for collection of waste materials and debris.
- .4 Provide and use clearly marked separate bins for recycling. Refer to Section 01 74 20.
- .5 Remove waste material and debris from site and deposit in waste container at end of each working day.
- .6 Dispose of waste materials and debris off site.
- .7 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .8 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

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 Remove dirt and other disfiguration from exterior surfaces.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 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.
 - .6 Items indicated in Section 02 42 93, Deconstruction and Waste Products Workplan Summary.
- .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, Conservation and Parks, 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 or 1-888-501-9637.
 - .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 Inquiries	Fax
Ontario	Ministry of Environment, Conservation and Parks, 135 St Clair Avenue West Toronto, ON M4V 1P5 Environment and Climate Change Canada Toronto, ON	(416) 323-4321 (800) 565-4923 (416) 734-4494	(416) 323-4682

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 As-built drawings, samples, and specifications.
- .2 Product data, materials and finishes, and related information.
- .3 Operation and maintenance data.
- .4 Spare parts, special tools and maintenance materials.
- .5 Warranties and bonds.

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 Two (2) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four (4) final copies of maintenance manuals and commissioning documentation, as applicable, in English.
- .5 If requested, furnish evidence as to type, source and quality of products provided.
- .6 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .7 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 systems, 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.

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 Contract Document.

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 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.
- .3 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 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Field changes of dimension and detail.

- .2 Changes made by change orders.
- .3 Details not on original Contract Drawings.
- .4 References to related shop drawings and modifications.
- .4 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

1.7 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 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.
- .3 Additional Requirements: as specified in individual specifications sections.

1.8 MAINTENANCE MATERIALS

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.9 STORAGE, HANDLING AND PROTECTION

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.10 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 (10) 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.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- .1 This Section covers the requirements for demolition of the envelope of the existing buildings required to install fall-arrest roof anchors, as described in the drawings.

1.2 REFERENCES

- .1 CSA International
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code (NBC)
 - .1 NBC 2015, Part 8 - Safety Measures at Construction and Demolition Sites and local authority having jurisdiction.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 and 01 74 20.
- .2 10 calendar days prior to start of demolition and removals work, submit for review, drawings, diagrams or details showing sequence of disassembly work in accordance with authorities having jurisdiction.
- .3 Submit for approval, a plan showing impacts, interruptions and delays to Owners operations.
- .4 Submit to Departmental Representative, details of where rubble, debris and other materials are to be disposed. Include each disposal/reuse site location, operator's name and business address, type of license under which site operates, and criteria used by site to assess suitability of rubble, debris and other materials for disposal.

1.4 QUALITY ASSURANCE

- .1 Regulatory Requirements: Prepare waste audits, waste reduction work plans, source separation programs and recycling programs as required by jurisdictional authorities and update programs and implement such programs as required.
- .2 The demolition contractor must engage a registered professional engineer who holds a certificate of authorization and an appropriate level of liability insurance to prepare demolition procedures.

1.5 SITE CONDITIONS

- .1 Review "Hazardous Products Inventory - Burlington Lift Bridge 2018" and "Asbestos and Lead Reassessment Survey - Burlington Lift Bridge, 2018" and take precautions to protect

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Clean up rubble and debris, resulting from Work promptly and dispose at end of day or place in waste disposal bins. Empty bins on regular basis.
- .2 Stockpiling of rubble, debris, and surplus Products on Site will not be permitted.
- .3 Remove, handle and transport Products indicated to be salvaged and stored for future use. Transport Products to storage area(s) designated by Departmental Representative. Perform Work to prevent any damage to Products during removal and in storage. Products damaged during removal, will be inspected by Departmental Representative. Departmental Representative will determine extent of damage and accept or refuse Products.
- .4 List and description of items to be removed and stored or reused, but not limited to the following:
 - .1 Existing Windows, Frames, and Glazing, as indicated on drawings.
 - .2 Existing concrete masonry unit window sill.
 - .3 Existing falcon nest box.
 - .4 Existing louvres, vents and exhaust fan.

3.2 EXAMINATION

- .1 Inspect building and site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Examine adjacent areas and other installations prior to commencement of demolition and removals.
- .3 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .4 Notify and obtain approval of utility companies before starting demolition.

- .5 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
 - .1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.
 - .2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.3 PROTECTION

- .1 Do not interfere with use of adjacent structures and Work areas. Maintain free, safe passage to and from adjacent structures and Work areas.
- .2 Take precautions to support affected structures. If safety of structure being demolished, adjacent structures or services are endangered, cease demolition operations and take necessary action to support endangered item. Immediately inform Departmental Representative. Do not resume demolition until reasons for endangering have been determined and corrected and action taken to prevent further endangering.
- .3 Hang tarpaulins where debris and other materials are lowered. Build in around openings with wood and plywood at locations used for removal of debris and materials.
- .4 Supply and install adequate protection for materials to be re-used, set on ground and prevent moisture pick-up. Cover stockpiles of materials with tarpaulins.

3.4 PREPARATION

- .1 Protection of In-Place Conditions:
 - .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and parts of building to remain in place.
 - .2 Keep noise, dust, and inconvenience to occupants to minimum.
 - .3 Protect building systems, services and equipment.
 - .4 Provide temporary dust screens, covers, railings, supports and other protection as required.
 - .5 Do Work in accordance with Section 01 11 00.

3.5 DEMOLITION

- .1 Perform demolition with extreme care. Confine effects of demolition to those parts which are to be demolished.
- .2 Perform Work and prevent inconvenience to persons

-
- outside those parts which are to be demolished.
- .3 Demolish parts of structure to permit remedial Work as indicated.
 - .4 Do not overload floor or wall with accumulations of material or debris or by other loads.
 - .5 Perform Work to minimize dusting.
 - .6 Do not sell or burn materials on Site.
 - .7 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as Work progresses.
 - .8 At end of day's Work, leave Work in safe condition with no part in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements.
 - .9 Drainage and sewer system protection:
 - .1 Ensure that no dust, debris or slurry enters drainage and sewer system on Site.
 - .2 Remove and dispose of debris and slurry promptly from Site.

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

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF
WORK

- .1 This Section covers the requirements for the supply, fabrication, delivery and erection of the structural steel for the Roof Anchor Installation and VHF Antenna Installation that constitute the structural steel in the project and which are not covered elsewhere in the Contract Documents.
- .2 The Provision of all shop drawings, erection drawings, procedures and other submittals identified in this Section.
- .3 The delivery of all components identified under this Section to the site, including handling and storage (in a secure manner).
- .4 The erection of all components which are part of this Section. This includes all welding and bolting of components. Calculations of all erection stresses/deformations to be submitted to the Departmental Representative.
- .5 All testing, inspection and reporting (Quality Control) of the work, which is to be provided by the Contractor. This includes all Destructive Testing (DT) and Non-Destructive Testing (NDT), as are described in this Section or related references.

1.2 REFERENCES

- .1 ASTM International (ASTM)
 - .1 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM F3125/F3125M-19, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- .2 CSA International (CSA)
 - .1 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA S6-19 Package, Canadian Highway Bridge Design Code.
 - .3 CSA S16-19, Design of Steel Structures.
 - .4 CSA S269.1-16, Falsework and Formwork.
 - .5 CSA W47.1-19 (R2014), Certification of Companies for Fusion Welding of Steel.
 - .6 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding.
 - .7 CSA W59-18, Welded Steel Construction, (Metal Arc Welding).
 - .8 CSA W178.1 - Welding Inspection Organizations Company Certification
 - .9 CSA W178.2-18 - Certification of Welding Inspectors.
- .3 Canadian Institute of Steel Construction:
 - .1 CISC Quality Guideline for Steel Bridges, 2018.

- .4 Ontario Provincial Standard Specifications:
 - .1 OPSS 906 November 2012 Construction Specifications for Structural Steel for Bridges.
- .5 International Organization for Standardization:
 - .1 AWS D1.5 Bridge Welding Code, 2015.
- .6 American Welding Society:
 - .1 ISO/IEC 17025 Testing and Calibration Laboratories.
- .7 American Society of Mechanical Engineers:
 - .1 ASME B46.1-2009, Introduction to Surface Texture Measurement and Analysis.
- .8 Standards Council of Canada:
 - .1 CAN/CGSB 48.9712/ISO 9712-2012, Non-Destructive Testing - Qualification and Certification of NDT Personnel.
- .9 Canadian General Standards Board:
 - .1 CGSB 37-GP-56M - Membrane, Modified, Prefabricated, and Reinforced for Roofing

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Installation Meetings:
 - .1 Convene pre-installation meeting two (2) weeks prior to beginning on-site installation (erection) of structural steel, with Contractor's Representative, Subcontractor's Representative and Departmental Representative in accordance with Section 01 31 19 to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's written installation instructions and warranty requirements.
- .2 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.
- .3 Hold project meetings in accordance with Section 01 31 19.
- .4 Ensure Contractor's site supervisor, Contractor's project manager and relevant subcontractor representatives attend.
- .5 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .6 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work.
- .7 Prior to start of work in the field, convene meeting to discuss bolting, field welding and coating requirements.

1.4 ACTIONS AND INFORMATIONAL

- .1 Submit in accordance with Section 01 33 00.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed

SUBMITTALS

- product literature and data sheets for structural steel and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies of WHMIS SDS in accordance with Section 01 35 29 and Section 01 35 43.
 - .3 Fabricator to submit verification of CSA W47.1 Division 1 or 2 certification at least 4 weeks prior to beginning fabrication.
 - .4 Submit the general outline of the schedule for fabrication at least 4 weeks prior to beginning fabrication.
 - .5 Shop Drawings and Welding Procedures:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada at least 4 weeks prior to the start of fabrication.
 - .2 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
 - .3 Proposed welding procedures to be stamped by professional engineer registered or licensed in the Province of Ontario, Canada and approved by Canadian Welding Bureau. Submit proposed welding procedures 4 weeks prior to beginning fabrication.
 - .4 Submit description of methods, temporary bracing and strengthening, sequence of erection and type of equipment proposed for use in erecting structural steel.
 - .5 Shop drawings to include the following:
 - .1 Full detail dimensions and sizes of all component parts of the structure for changes in shape due to weld shrinkage and any other effects that cause finished dimensions to differ from initial dimensions.
 - .2 Erection "piece" marks.
 - .3 All necessary specifications (mill test certifications and similar) for the materials to be used and shown on the shop drawings.
 - .4 Identification of areas requiring special surface treatment. such as, but not limited to, grinding, machining and other similar treatments.
 - .5 Identification of fracture-critical and primary tension members and component parts. Attachments having a length of more than 100 mm in the direction of tension and welded to the tension zone of a fracture-critical or primary tension member to be treated as part of that member.
 - .6 Bolt installation requirements, including number of "fit-up" bolts required at each connection and any

-
- oversize or slotted holes.
- .7 Details of all welds, including but not limited to, symbols, finish, process and weld electrode grade.
 - .8 Identification of material and welds requiring non-destructive testing, including the limits of the weld undergoing testing and the frequency and type of testing (radiography, ultrasonic, visual).
 - .9 Temporary welds and whether temporary welds are to be incorporated into the final work.
 - .10 Location of shop and field splices.
 - .11 Indicate welds by CSA W59, welding symbols.
- .6 Shop drawings requiring extensive correction will be sent back for revisions and resubmission.
 - .7 Do not commence fabrication until receiving reviewed (by Departmental Representative) drawings and welding procedures. Review will be noted by stamp and signature of Departmental Representative.
 - .8 Prior to beginning welding, submit valid Canadian Welding Bureau certification for each welder and welding operator for the positions and processes intended.
 - .9 Submit certification for all welding inspectors who will work on this project.
 - .10 The fabricator to have a copy of the shop detail drawings and welding procedures at the manufacturing plant during fabrication. The Contractor shall also have a complete set of paper shop drawings on site during construction.
 - .11 Shop drawing review by the Departmental Representative is for the sole purpose of ascertaining conformance with the general design concept. This review does not mean that the Departmental Representative approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting the shop drawings, and such review does not relieve the Contractor nor the Fabricator of the responsibility for meeting all requirements of the contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or construction and for the installation of the work.
 - .12 A detailed take-off and actual weights of the structural steel including all welds, connection plates, bolts, washers and nuts will be required for the balancing calculation.
 - .13 The qualifications of the fabrication inspection company to be retained by the

- Contractor. This firm shall be independent from the Contractor and the Fabricator and be certified by the Canadian Welding Bureau for the type of Destructive and Non-Destructive Testing/Inspection being performed.
- .14 Inspector company to inspect all machined surfaces and provide written report, signed by Departmental Representative, that the surface machining meets the finish and tolerance indicated on the drawings.
 - .6 Erection Diagrams and Erection Procedures:
 - .1 Submit erection diagrams and erection procedure drawings and calculations, for information purposes only, signed and sealed by design and checking professional engineers registered or licensed in the Province of Ontario, Canada.
 - .2 Erection drawings and diagrams to include the following:
 - .1 Principal dimensions of the bridge.
 - .2 Erection piece marks, piece weights and sequence of erection.
 - .3 Size of all members.
 - .4 All field welds and field welding requirements, including identification of welds requiring non-destructive (show type of NDT to be performed) and visual testing.
 - .5 Size and type of bolts.
 - .6 Bolt installation requirements, including the number of "fit-up" bolts required at each connection and identification of oversize and slotted holes.
 - .7 Bracing during erection of structural steel and any temporary supports required to support the partially erected bridge.
 - .8 Treatment at faying surfaces for joints designed as slip critical.
 - .9 Balance details including the size/quantity of the steel counterweight.
 - .10 Locations for all cranes, lifting radius, maximum weight of components and details of outrigger supports.
 - .3 Do not commence erection until Contractor receives from the Departmental Representative reviewed erection diagrams, erection procedures, drawings and calculations.
 - .4 Maintain a paper copy of the erection diagrams and the erection procedure drawings and calculations at the site during erection.
 - .7 Mill Test Certificates:
 - .1 Submit the mill test certificates to the Departmental Representative confirming that all material is according to the contract

- documents.
- .2 Copies of the mill test certificates for all material to be used in the fabrication are to be available for review at the fabricating plant during fabrication and submitted to the Departmental Representative. The certificates to show that the material is according to the contract documents. Copies of all mill test certificates shall be maintained onsite by the Contractor. They are to be reviewed by the Contractor's fabrication testing company to verify the material is as per the project requirements.
 - .3 If the material cannot be identified by source test certificates, coupons are to be taken and tested and these test certificates are to be made available to the Departmental Representative.
 - .4 When mill test certificates originate from a mill outside of Canada or the United States of America, the Contractor is to have the information on the mill test certificate verified by testing at a Canadian laboratory. This laboratory is to be certified by an organization accredited by the Standards Council of Canada to comply with the requirements of ISO/IEC 17025 for the specific tests or type of tests required by the material standard specified on the mill test certificate. The mill test certificates are to be stamped with the name of the Canadian laboratory and appropriate wording stating that the material is according to the specified Contract requirements. The stamp is to include the appropriate material specification number, testing date (i.e., yyyy-mm-dd), and the signature of an authorized officer of the Canadian laboratory.
 - .5 All steel incorporated into the work shall be traceable to a specific mill test certificate associated with that steel component. This traceability is to be maintained by the Contractor's fabrication inspection company and submitted to the Departmental Representative.
- .8 Test Reports for Fasteners:
- .1 Submit to the Departmental Representative, proof that the bolts, nuts, and washers meet the chemical composition, mechanical properties, dimensions, workmanship, and head burst as required by ASTM F3125/F3125M, and other structural high strength bolts as

may be shown on the drawings.

- .2 For bolts, nuts, and washers supplied from a manufacturer outside Canada or the United States of America, the above information will be verified by testing at a Canadian laboratory as outlined in the Mill Test Certificates clause.
- .9 Submit a report documenting the results of the Shop Trial Assembly. Document any corrective work that was completed.
- .10 Upon completion of fabrication of the components, and prior to delivery of the components to the site, the Departmental Representative will conduct an interim inspection of the work to verify that the fabrication of components has been carried out in general conformance with the shop drawings, welding procedures, submittals and contract documents and issue the fabricator written permission to proceed with the work.
- .11 All quality control documents maintained by the Contractor's fabrication inspection company, including but not limited to, weld test reports are to be submitted to the Departmental Representative upon completion of the component fabrication and prior to the Departmental Representative's interim inspection and subsequent delivery to the site.

1.5 DELIVERY,
STORAGE, AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 and in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Ensure Departmental Representative has delivery schedules 14 days minimum prior to shipping.
- .3 Storage and Handling Requirements:
 - .1 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection of structural steel members.
 - .2 Do not notch edges of members.
 - .3 Do not cause excessive stresses.
 - .2 Mark mass on members weighing more than 3 tonnes.
 - .3 Protect unpainted weathering steel, before erection, with waterproof covering.
 - .4 Ensure that no portion of steel comes into contact with ground.
 - .1 Replace defective or damaged materials with new.
 - .5 Obtain the Departmental Representative agreement for all lifting log or other devices. Provide details for installation and removal.
- .4 Perform all work necessary to ensure safe loading, delivery, unloading, and storage of structural

- steel. Comply with any load restrictions on shipment size and weight.
- .5 Load structural steel for shipping in such a manner that it can be transported and unloaded at its destination without being excessively stressed, deformed, or otherwise damaged. Transport structural steel members with their webs in a vertical plane. When structural steel members cannot be shipped with their webs in the vertical plane, static and dynamic forces during handling, transportation, and storage are to be determined using a dynamic load allowance of 100%. Computed stresses are to be according to CSA S19, Clause 10.10 and the maximum cyclic stress range is not to exceed the constant amplitude fatigue threshold for the appropriate fatigue categories specified in CSA S19, Table 10.4. All the calculations and associated sketches, including reasons why the structural steel members cannot be shipped with the webs in the vertical plane, to be submitted by the Contractor to the Departmental Representative for review seven (7) days prior to shipping. All calculations and sketches for shipping, handling and erection are to be signed and sealed by an Engineer licensed in the province of Ontario.
 - .6 Submit Canadian Welding Bureau (CWB) accepted welding procedure specifications, data-sheets, and repair procedures for prequalification, signed and sealed by an Engineer licensed in the province of Ontario, for approval from the Departmental Representative at least 14 days prior to beginning the work.
 - .7 Advertising by means of removable signing is only permitted on elements while in transit to the specified site. Painting of advertisements directly on elements is not permitted.
 - .8 Develop Construction Waste Management Plan related to Work of this Section.
 - .9 Packaging Waste Management: remove for reuse and return by manufacture of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 20.

1.6 QUALITY ASSURANCE

- .1 Preconstruction Testing:
 - .1 Provide suitable facilities and cooperate with inspection organization and Departmental Representative in carrying out inspection and tests required.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Structural steel: to CSA G40.20/G40.21, grade 350W for W, WT and HSS sections, grade 300W for plates, angles and all other items.
- .2 High strength bolts, nuts and washers: to

ASTMF3125/F3125M and galvanized, approved by Departmental Representative.

- .3 Anchor bolts, washers and nuts: to CSA G40.20/G40.21, Grade B7 grade and galvanized, as shown on the Contract Drawings.
- .4 Welding electrodes:
 - .1 Welding electrodes: to CSA W48 series.
- .5 Hot dip galvanizing for exterior exposed elements: to ASTM A123/A123M, coating grade 85, minimum zinc coating of 600 g/m².
- .6 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents. This is for grout that is not identified on the drawings to be epoxy.
- .7 Substitution of other material for size and grade is not permitted unless approved by the Departmental Representative.

2.1 SOURCE QUALITY CONTROL

- .1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21.
- .2 Submit to Departmental Representative two (2) copies of certified mill test reports for Charpy V-notch test.
- .3 Provide suitable facilities and co-operate with Departmental Representative in carrying out inspection and tests required.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- .1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.
- .2 Verify location of substructure units, elevations of bearing seats and location of anchor bolts before erection of structural steel; report discrepancies to Departmental Representative.
- .3 Work near river banks or embankments in accordance with written instructions from Departmental Representative.
- .4 Restrict drifting during assembly to minimum required to bring parts into position without

enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.

- .1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
- .2 Ensure reamed holes are 2 mm maximum larger than bolt size used.
- .5 Fabricate and install bearings as indicated.
- .6 Place anchor bolts at elevations and locations indicated.
 - .1 Protect holes against entry of water and foreign material.
 - .2 Provide heating and protection as directed by Departmental Representative and completely fill space around anchor bolts with grout.

3.3 FABRICATION

- .1 Steel fabricator must be certified to CISC's latest Quality Guideline for Steel Bridges.
- .2 Fabrication to be in accordance with CSA W59 except where modified by CSA S6 Clause A10.1.4 and A10.1.5. Where CSA W59 does not provide guidance, the requirements of AWS D1.5 shall apply.
- .3 Do not begin fabrication until shop drawings, Contractor's quality control procedure, and welding procedures have been reviewed by the Departmental Representative.
- .4 Plate Edges:
 - .1 Plasma arc cutting of plates up to and including 20 mm in thickness is permitted. Plasma arc cutting of plates thicker than 20 mm is not permitted unless approved by the Departmental Representative. When permitted, use oxygen as the cutting gas for plasma arc cutting of plates. All edges to be free of dross.
 - .2 Inspect and repair planar discontinuities in accordance with CSA W59.
 - .3 Chamfer or radius all corners of all flanges, plates or other components 1.5 mm by grinding.
- .5 Straightening Material:
 - .1 Material with sharp kinks will be rejected. Straighten bends in material using only mechanical means or by the application of controlled heating according to CSA W59. Details of the straightening procedure, including testing requirements, to be signed and sealed by an Engineer licensed in the Province of Ontario and submitted to the Departmental Representative prior to the straightening, for information purposes only.
 - .2 Straighten only in the presence of the Departmental Representative.
 - .3 If necessary, the Departmental Representative will specify additional testing to be performed by the Contractor.

If evidence of damage is discovered; the material will be rejected and the cost of testing will be at the expense of the Contractor.

- .4 Give the Departmental Representative 7 days' notice to arrange for the inspection.
- .6 Welded Construction:
 - .1 To be in accordance with CSA W59 and CSA S19 Clause A10.1.5.
 - .2 Do welding in shop unless otherwise permitted by Departmental Representative or as may be shown on the drawings.
 - .3 Weld only at locations indicated on the approved shop drawings.
 - .4 Carry out welding by welders having a CSA W47.1 identification card valid for the type of welding to be done and for the duration of the welding work.
 - .5 The fabrication weld metal requirements, base metal repairs, and repairs of weld in fracture critical and primary tension members are to be according to CSA S19 Clause 10.23.5.
 - .6 Any company undertaking welded fabrication or erection or both is to be certified according to CSA W47.1, Division 1.
 - .7 Weld profiles in accordance with W59.
 - .8 Peening is subject to approval by the Departmental Representative, where required.
 - .9 Record stress relief-heat treatment temperatures using thermo-couples or other methods acceptable to the Departmental Representative. Maintain a record showing temperature and time data of the heat-treating operation and make record available to the Departmental Representative upon request.
 - .10 Assembly for welding:
 - .1 In accordance with CSA W59.
 - .11 Temporary welds:
 - .1 Do not use on fracture-critical and primary tension members.
 - .2 Do not use on material in compression, unless approved by the Departmental Representative.
 - .12 Weld repairs and corrections:
 - .1 Preheat requirements for welding repairs to fracture-critical and primary tension members in accordance with CSA-S6 Table 10.14.
 - .2 Welding corrections and repairs to fracture-critical and primary tension members to be according to CSA S6, Clause 10.23.5.
 - .3 Any steel members subjected to heat for shape corrections or straightening is to be allowed to cool in still air.
 - .4 Welding corrections and repairs for fracture-critical and primary tension

members:

- .1 Submit repair procedures to the Departmental Representative at least 14 days prior to beginning the work.
- .2 Approval for non-critical repairs:
 - .1 Non-critical repairs listed in CSA S19, Clause 10.23.5.
 - .2 Submit repair procedures to Departmental Representative. Repair procedure to be designed and stamped by an Engineer licensed in the Province of Ontario and recognized or a Welding Engineer by the CWB.
 - .3 Submit repair procedures to Departmental Representative. Repair procedure to be designed and stamped by an Engineer licensed in the Province of Ontario and recognized or a Welding Engineer by the CWB. Do not begin work until receiving written notice of permission to proceed from the Departmental Representative;
- .3 Approval for critical repairs:
 - .1 Critical repairs listed in CSA S19, Clause 10.23.5;
 - .2 Critical repairs to be individually reviewed by the Departmental Representative before repair welding proceeds;
- .4 Any section of weld that does not meet the acceptance standards is to be removed, re-welded, and re-examined;
- .5 Non-destructive testing of fracture critical members: maintain documentation of all visual and non-destructive testing for review and confirmation by the Departmental Representative. Submit documentation to the Departmental Representative upon completion of the project.
- .7 Bolted Construction:
 - .1 In accordance with CSA S19 Clause A10.1.6.

- .2 Ensure bolts are sufficiently long to exclude threads from shear plane.
- .3 Plasma arc cutting of holes: plasma arc cutting of holes shall only be permitted in plates up to and including 20 mm in thickness. Each member is to have an erection mark for identification. Erection mark is to be affixed in an area not exposed to view in the finished structure. Plasma arc cut holes are to be produced by mechanically guided means and the diameter of the holes are to be greater than or equal to the thickness of the plate. When plasma arc cutting of holes is permitted, the cutting gas as well as the shielding gas are to be oxygen and the surface roughness is not to exceed 13 microns (500 micro-inches) as defined in ASME B46.1. Occasional gouges not more than 1.5 mm in depth are permitted. Thermally cut holes are to be 2 mm larger than the nominal diameter of the bolt and the taper is not exceed 0.5 degrees.
- .4 Inspection as per CSA S19 as required.
- .8 A Shop Trial Assembly in accordance with CSA-S6 is mandatory. All fittings shall be checked in the shop. The fabricator shall demonstrate proper fit of all components prior to delivery on site. The procedure to demonstrate fitting shall be reviewed and approved by the Departmental Representative.
- .9 Tolerances: Dimensional and workmanship tolerances in accordance with CSA W59 and CSA-S6 Clause A10.1.7.
- .10 Steel coating:
 - .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
 - .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
 - .3 Clean surfaces to be field welded; do not paint.
- .11 Unless indicated on the Contract Drawings, the Contractor shall not bolt attachments to the exterior stringers.

3.4 INSTALLATION

- .1 Do falsework in accordance to CSA S269.1.
- .2 Do welding in accordance with CSA W59, except where specified otherwise.
 - .1 For CSA G40.20/G40.21, grade 350A steel, deposited weld metal to have Charpy V-Notch value not lower than that of steel.
 - .2 Do welding in shop unless otherwise permitted by Departmental Representative.
 - .3 Weld only at locations indicated.
- .3 High strength bolting: in accordance with CSA S6 and CSA S16. Use 'turn-of-nut' tightening method.
- .4 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.

- .5 Allowable tolerance for bolt holes:
- .1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members.
 - .2 Finish holes not more than 2 mm in diameter larger than diameter of rivet or bolt unless otherwise specified by Departmental Representative.
 - .3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.
 - .4 Centre-to-centre distance between any two groups of holes to vary not more than maximum of the following:

Centre-to-Centre distance in metres	Tolerance in minus mm
less than 10	1
10 to 20	2
20 to 30	3
 - .5 Correct mispunched or misdrilled members only as directed by Departmental Representative.
- .6 Structural member support requirements:
- .1 Install flat and smooth except as otherwise indicated.
 - .2 Correct irregularities of structural members as permitted by Departmental Representative.
- .7 Shop splices:
- .1 Use complete joint penetration groove welds finished flush.
 - .2 Details of butt joints to CSA W59.
 - .3 Use only as approved by Departmental Representative.
- .8 Camber:
- .1 Camber tolerances for plate members to be to CSA W59.
 - .2 Record measurements of camber of each member, at points indicated.
 - .3 Fabricate field splices to conform to required camber.
 - .4 Submit diagram to Departmental Representative showing camber for each structural steel member fabricated.
 - .5 Advise Departmental Representative immediately when camber of fabricated structural steel member is greater than specified tolerances.
 - .6 Submit proposal for corrective measures.
 - .7 Undertake remedial measures as approved by Departmental Representative.
- .9 Shop erection:
- .1 Support each structural steel member on its bearing points and measure and record deflection at same points indicated for measurement of camber.
 - .2 Measure deflections in plane of member web.
 - .3 Submit diagram to Departmental Representative showing deflection

- measurements for each structural steel member before delivery.
- .4 Shop erection is not required for single span structural steel members with no field splices.
 - .10 Field splices: to approval of Departmental Representative.
 - .11 Mark members in accordance with CSA G40.20/G40.21.
 - .1 Do not use die stamping.
 - .2 Place marking at locations hidden when viewed from exterior after erection when steel is to be left in unpainted condition.
 - .12 Match marking: shop mark bearing assemblies and splices.
 - .13 Steel coating: Section 09 97 19.
 - .14 Additional temporary material may be provided to ensure that the member capacities are not exceeded during erection, if approved by the Departmental Representative. Show additional material on the erection diagram.
 - .15 Notify the Departmental Representative at least 14 days prior to beginning field operations.
 - .16 Do not use welding to fill misplaced holes.
 - .17 Only perform repairs to erected material upon receiving approval from the Departmental Representative.
 - .18 Hammering that can damage or distort the members is not permitted.
 - .19 Connections:
 - .1 Drill or sub-drill and ream holes made in the field.
 - .2 Report any error that prevents the proper assembly and fitting of parts and submit the proposed method of correction to the Departmental Representative. Corrective measures to not commence until the submitted proposal is accepted.
 - .3 Field welding to be completed to the same standards as all shop welding. This includes qualification of weld, welders, all testing/inspection.
 - .4 House (with heat) all area for all field welding.
 - .20 Upon completion of erection, the Contractor is to submit to the Departmental Representative a Certificate of Conformance bearing the sign and seal of the QC Engineer, licensed in the Province of Ontario. The Certificate is to state that the Work has been carried out in general conformance with the signed and sealed shop details, welding procedures, erection diagrams, erection procedure drawings, and contract documents.

3.5 FIELD QUALITY CONTROL

- .1 Quality control to be in accordance with CSA S6 Clause A10.1.8. The acceptance standards of CSA W59 for dynamically loaded structures also apply.
- .2 In addition to quality assurance measures instituted by the Departmental Representative, the Contractor is to be responsible for the quality

-
- control procedures specified herein.
- .3 The Contractor is to retain an independent fabrication testing company certified by the CWB, to undertake the various inspections outlined in CSA W59 or this Section. Such inspection is required for all shop fabrications, field erection, field welding and bolting.
 - .4 The Contractor, in conjunction with the steel fabricator(s) and erection firm, shall submit a proposal for a Quality Control Program for the steel fabrication, delivery and erection under this Section. The following are the minimum requirements to be shown in the proposal. Sample documentation, which will be used to indicate the fulfillment of this Quality Control, is to be submitted at the time of the proposal. All submissions must be signed and stamped by a licensed Engineer (in the Province of Ontario), indicating that this Quality Engineer has reviewed all aspects of the fabrication testing company work and that the findings conform to the requirements of the contract.
 - .5 Control of material: a record for each component is to be kept to identify the material as to heat number, corresponding mill test certificate, using colour coding or other identifying markings.
 - .6 The Contractor's inspection firm is to carry out a full visual inspection of all welds, and confirmation all fabrication is within tolerance of CSA W59 (and report all observations).
 - .7 Prior to commencement of welding, the Contractor is to make available to the Departmental Representative the Canadian Welding Bureau's transferable or non-transferable identification cards for each welder or welding operator to be employed on the work. Such identification cards are to be currently valid and indicate the welding processes and the welding positions at which the personnel are qualified to weld.
 - .8 Non-destructive testing:
 - .1 Carry out all non-destructive testing of the welds for bridge structures by using radiographic, ultrasonic, magnetic particle, and liquid penetrant test methods by an independent testing organization retained and paid for by the Contractor.
 - .2 The independent organization undertaking welding testing under this subsection is to be certified for testing bridges according to CSA W178.1. The certification is to encompass at least the following methods: radiographic, ultrasonic, dye penetrant and magnetic particle.
 - .3 The independent organization's non-destructive testing technician undertaking non-destructive testing of welds under this subsection is to be certified for testing bridges according to CSA W178.2. Certification is to be to either Level II or III for the methods used, as required by

-
- CAN/CGSB 48.9712/ISO 9712.
- .4 Neither the technician nor the independent testing organization is to be changed without the approval of the Departmental Representative.
 - .5 Give at least 5 days' notice to the independent testing organization when the work is ready for testing. Include in the notice the type and quantity of work to be tested.
 - .6 Testing of welds:
 - .1 Carry out radiographic, ultrasonic, or magnetic particle testing using procedures according to OPSS 906.
 - .2 The amount and location of welding to be tested is not to be less than the following (except for built-up sections which is defined elsewhere):
 - .1 Visual inspection of all welds.
 - .2 Arc strikes are to be lightly ground and checked for cracks by magnetic particle inspection.
 - .3 Remove, re-weld, and re-examine the section of weld that does not meet the acceptance standards.
 - .7 Submit copies of all inspection reports completed by the Contractor's independent fabrication inspection company to the Departmental Representative on a weekly basis throughout fabrication. Inspection reports to be submitted under cover of a stamped and signed letter from the Contractor's Quality Engineer, licensed in the Province of Ontario, that all reports indicate general conformance with the drawings and specification.

3.6 QUALITY ASSURANCE

- .1 Visual inspection, non-destructive testing, and sampling to be done in the fabricating shop and in the field by the Departmental Representative to confirm the material supplied, fabrication and erection has been done as specified in the contract documents and as a check (Quality Assurance) of the work done by the Contractor's inspection company.
- .2 Supply electric power, scaffolding, protection from the weather, and free access for inspection and testing of material, to all aspects of the fabrication, delivery, and erection of the structural steel.

3.6 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.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 This section includes materials, equipment, labour, and services necessary for the following:
 - .1 Supply and install a pre-fabricated mineral wood board on which a SBS modified bitumen membrane is factory-applied;
 - .2 Supply and install new modified bitumen cap sheet complete with new membrane flashings at all upturns, penetrations and all other related accessories herein as specified and detailed;
 - .3 Supply and install new retrofit roof drains, pitch pockets and doghouses, and all other related accessories.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C726-17, Standard Specification for Mineral Fiber Roof Insulation Board.
 - .2 ASTM C728-17a, Standard Specification for Perlite Thermal Insulation Board.
 - .3 ASTM D41/D41M-11 (2016), Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - .4 ASTM D448-12 (2017), Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
 - .5 ASTM D449/D449M-03(2014)e1, Standard Specification for Asphalt Used in Dampproofing and Waterproofing.
 - .6 ASTM D2178/D2178M-15a, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
 - .7 ASTM D6162/D6162M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
 - .8 ASTM D6163/D6163M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
 - .9 ASTM D6164/D6164M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- .2 Canadian Roofing Contractors Association (CRCA)
- .3 Canadian Standards Association (CSA)
 - .1 CSA-A123.3-05 (R2015), Asphalt Saturated Organic Roofing Felt.
 - .2 CAN/CSA-A123.4-04 (R2018), Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
 - .3 CSA A123.23-15, Product Specification for Polymer Modified Bitumen Sheet, Prefabricated and Reinforced.

- .4 CSA A231.1-14/A231.2-14, Precast Concrete Paving Slabs/Precast Concrete Pavers.
- .4 Underwriters Laboratories' of Canada (ULC)
 - .1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S702.2-105, Standard for Mineral Fibre Thermal Insulation for Buildings.
 - .3 CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 - .4 CAN/ULC-S706.1:2016, Standard for Wood Fibre Thermal Insulation for Buildings.

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Product Data:
 - .1 Provide digital copies of most recent technical waterproofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide two copies of WHMIS MSDS in accordance with 01 35 43, and indicate VOC content for:
 - .1 Primers.
 - .2 Asphalt.
 - .3 Sealants.
 - .3 Manufacture Certificate:
 - .1 To certify that product meet or exceed specified requirements.
 - .2 Manufacturer's Installation Instructions that indicate special precautions required for seaming the membrane.
 - .3 Manufacturer's field report, in accordance with section 01 45 00. Indicating procedures followed, ambient temperatures and wind velocity during application.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00.
- .2 Operation and Maintenance Data: submit operation and maintenance data for the new roof membrane system.

1.5 FIRE PROTECTION

- .1 Fire Extinguishers:
 - .1 Maintain two stored pressure rechargeable type with shut-off nozzle on site at all times;
 - .2 ULC labelled for A, B and C class protection;
 - .3 Size 14 kg on roof per torch applicator, within 6 metres of torch applicator.
- .2 Maintain fire watch for 1 hour after each day's waterproofing operations cease.

1.6 DELIVERY, STORAGE
AND HANDLING

- .1 Provide and maintain dry, off-ground weatherproof storage.
- .2 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.
- .3 Remove only in quantities required for same day use.
- .4 Store sealants at +5 degrees C minimum.
- .5 Handle waterproofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.
- .6 Store and manage hazardous materials in accordance with Section 01 35 43.

1.7 SITE CONDITIONS

- .1 Ambient Conditions
 - .1 Do not install roofing membrane when temperature remains below -18 degrees C for torch application.
 - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
- .2 Install roofing membrane on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into waterproofing system.

1.8 WARRANTY

- .1 The Contractor shall warrant against defect, all workmanship and materials performed or supplied in respect to the installation of waterproof membrane assembly for a period of two (2) years.
- .2 Repairs will be made promptly (within 24 hours) by the contractor with no cost to the Owner within the warranty period.
- .3 System Warranty:
 - .1 The manufacturer will provide a full system labour and material warranty defective workmanship and materials for a period of TEN (10) years for watertightness of the roof membrane.
 - .2 Correct deficiencies immediately including replacement of damaged/wet components within the roof assembly. Any repair(s) required under the warranty shall be carried out in accordance with the requirements of this Specification and with the recommendations of the Departmental Representative.
 - .3 Contractor is to meet all requirements of the manufacturer to obtain the manufacturer warranty. Where conditions vary between manufacturer requirements and the specifications and drawings bring such conditions to the attention of the Departmental Representative prior to proceeding for review. The more stringent conditions will apply as determined by the Departmental Representative.
 - .4 The roof system is designated as:

- .1 The roof membrane
- .2 The insulation
- .3 Flashings;
- .4 Fasteners;
- .5 Adhesives
- .6 Edge components
- .7 Metal components
- .8 In general all items forming the roof system
- .5 Access to the roof to perform warranty review and repairs is to be performed at no additional cost to the Departmental Representative during the warranty period.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Performance Criteria
 - .1 Roofing System: capable of resisting moisture/water head of 100 mm, and preventing moisture migration to interior.
 - .2 Compatibility between components of roofing system is essential. All roof membranes, adhesives and accessories for all areas are to be supplied from the same manufacturer.
- .2 Overlay Board/Base Sheet: 12.5 mm thick mineral wool fibre insulation panel on which a SBS modified bitumen membrane is factory-applied. The top surface of the membrane is covered with a thermofusible plastic film. Base Sheet: to CSA A123.23, reinforced.
 - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, polyester reinforcement, having nominal weight of 180 g/m².
 - .2 Top thermofusible plastic film surface.
 - .3 Base sheet membrane properties: to CSA A123.23-15:
 - .1 Strain energy longitudinal/transversal:8.1/8.8kN/m.
 - .2 Breaking strength longitudinal/transversal:15.0/13.5 kN/m.
 - .3 Ultimate elongation longitudinal/transversal:60/65%.
 - .4 Tear resistance: 125 N.
 - .5 Cold bending at -30 degrees C: no cracking.
 - .6 Static puncture resistance: 560 N.
 - .7 Dimensional Stability: 0.3 %.
 - .4 ULC certification Class A.
- .3 Cap sheet membrane: to CSA A123.23, glass reinforced.
 - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, polyester having nominal weight of 250g/m².
 - .2 Type 1 fully adhered.
 - .3 Class A - granule surfaced.

- .4 Bottom surfaces Polyethylene.
- .5 Cap sheet membrane properties: to CGSB 37-GP-56M:
 - .1 Strain energy
longitudinal/transversal:13.0/10.0kN/m.
 - .2 Breaking strength
longitudinal/transversal:25.0/16.0
kN/m.
 - .3 Ultimate elongation
longitudinal/transversal:60/65%.
 - .4 Tear resistance: 125 N.
 - .5 Cold bending at -30 degrees C: no
cracking.
 - .6 Static puncture resistance: 560 N.
 - .7 Dimensional Stability: 0.2 %.
- .6 ULC certification Class A.
- .4 Adhesive for securing overlay board: asphalt
extended vulcanized adhesive, two component unit,
consisting of two liquids mixed on site to produce
pourable adhesive.
- .5 Screws: Self-tapping, coated steel screws complete
with metal washer, of sufficient length to
penetrate the corrugated metal roof deck.
- .6 Nails (for wood blocking): Nails shall be spiral
hot dipped galvanized nails. Length/diameter to suit
material being secured. Provide 38 mm minimum
embedment into substrate.

PART 3 - EXECUTION

3.1 QUALITY OF WORK

- .1 Conduct examination, preparation and
waterproofing Work in accordance with CRCA Roofing
Specification Manual.
- .2 Conduct priming for asphalt waterproofing in
accordance with manufacturer's written
recommendations.
- .3 Assembly, component and material connections will
be made in consideration of appropriate design
loads, with reversible mechanical attachments.
- .4 Ensure run-off water will be fully drained by the
existing drainage on the roof. Ensure overall roof
slope could avoid future water ponding.

3.2 PROTECTION OF IN- PLACE CONDITIONS

- .1 Cover walls, walks and adjacent work where
materials hoisted or used.
- .2 Use warning signs and barriers. Maintain in good
order until completion of Work.
- .3 Clean off drips and smears of bituminous material
immediately.
- .4 Dispose of rain water off roof and away from face
of building until roof drains or hoppers installed
and connected.
- .5 Protect roof from traffic and damage. Comply with
precautions deemed necessary by Departmental
Representative.
- .6 At end of each day's work or when stoppage occurs
due to inclement weather, provide protection for

completed Work and materials out of storage.

- .7 Metal connectors and decking will be treated with rust proofing or galvanization.

3.3 MEMBRANE APPLICATION

- .1 Overlay Board/Base Sheet Application.
 - .1 Starting at low point of roof, perpendicular to slope, mechanically fasten the overlay/base sheet membrane to the existing substrate.
 - .2 Lap sheets 75 mm for side and 150 mm for end laps. Seams to be torched.
 - .3 Application to be free of blisters, wrinkles and fishmouths.
 - .4 Conduct membrane application in accordance with manufacturer's recommendations.
- .2 Cap Sheet Application
 - .1 Starting at low point of roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
 - .2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
 - .3 Lap sheets 75 mm for side and 150 mm for end laps.
 - .4 Application to be free of blisters, wrinkles and fishmouths.
 - .5 Do membrane application in accordance with manufacturer's recommendations.
- .3 Flashings
 - .1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
 - .2 Nail sheet onto substrate in 1 metre wide strips.
 - .3 Lap flashing base sheet to membrane base sheet minimum 100 mm and seal by torch welding.
 - .4 Lap flashing cap sheet to membrane cap sheet 150 mm and torch weld.
 - .5 Provide 75 mm side lap and seal.
 - .6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
 - .7 Conduct Work in accordance with manufacturer's recommendations.
- .4 Roof Penetrations
 - .1 Install roof drain pans, vent stack covers and other roof penetration flashings and seal to membrane in accordance with the manufacturer's recommendations and details.

3.4 CLEANING

- .1 Remove bituminous markings from finished surfaces.
- .2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.

PWGSC Ontario
Region Project
R.089504.080

MODIFIED BITUMINOUS SHEET
WATERPROOFING

Section 07 13 52
Page 7
2020-04-29

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF
WORK

- .1 This section includes labour, products, and services necessary for prefinished counter flashings, gravel stops, and cap flashings, in accordance with the Contract Documents.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A606/A606M-18, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .2 ASTM C920-18, Standard Specification for Elastomeric Joint Sealants.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .3 Canadian Roofing Contractors Association (CRCA).
- .4 Standards Council of Canada
 - .1 CAN/CGSB-37.5-M89
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).

1.3 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.
- .3 Shop Drawings:
 - .1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
- .4 Samples:
 - .1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.
- .5 Quality assurance submittals: submit following in accordance with Section 01 45 00.
 - .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.4 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 11 00:

- .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.

1.5 DELIVERY, STORAGE
AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 11 00 and 01 61 00.

1.6 WARRANTY

- .1 A guarantee for a minimum period of two (2) years from date of substantial performance, as determined by Departmental Representative, must be submitted against defects in workmanship and materials. The Contractor must extend the guarantee on replaced parts and workmanship for a period of two (2) years from date of acceptance of any replacement parts and workmanship. Defects will include but will not be limited to leaking, failure to stay in place, lifting, deformation and breaking of weather-tight seals.
- .2 Repairs will be made promptly by the Contractor with no cost to Departmental Representative within the warranty period.

PART 2 - PRODUCTS

2.1 SHEET METAL
MATERIALS

- .1 Metal flashing shall be prefinished 24 gauge sheet steel conforming to ASTM A606/A606M. Finish being 2-coat factory-applied commercial/industrial finish system. Colour to be selected by Departmental Representative.

2.2 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB-37.5.
- .3 Sealants: Silicone, one-part:
 - .1 Non-sag Sealing Compound, One Component, Elastomeric, Chemical Curing to ASTM C920, colour to be selected from manufacturer's standard colour chart.
- .4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .5 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .6 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

2.3 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work, as indicated.
- .2 Form pieces in 2400 mm maximum lengths.
 - .1 Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm.
 - .1 Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

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 metal flashing in accordance with the Quality Assurance requirements specified herein, the manufacturer's recommendations and Contract Drawings.
- .2 Verify shapes and dimensions of surfaces being covered before fabricating sheet metal.
- .3 Anchor units of Work securely in place, providing for thermal expansion of metal units. Conceal fasteners where possible and set units true to line and level.
- .4 Install Work with laps, joints and seams that are watertight and weatherproof.
 - .1 Secure in place and lap joints 100 mm.
- .5 Lock end joints and caulk with sealant.
- .6 Counter Flashing:
 - .1 Coordinate installation of counter flashings with installation of assemblies being protected by counter flashing. Install counter flashings as indicated on Contract Drawings.
 - .2 Secure in a waterproof manner.
 - .3 Lap counter flashing joints a minimum of 50 mm and bed with sealant.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 11 00 and 01 74 11.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA) International
 - .1 CAN/CSA-B72-M87(R2018), Installation Code for Lightning Protection Systems.
 - .2 CSA-S37-18, Antennas, Towers, and Antenna-Supporting Structures.
 - .3 CSA-C22.2 No. 214-02, Communications Cables (Bi-National standard with UL 444).
- .2 Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA)
 - .1 TIA/EIA-568-B.1-(2001), Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.
 - .2 TIA/EIA-606-A-(2002), Administration Standard for the Commercial Telecommunications Infrastructure.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00.
- .2 Indicate:
 - .1 Dimensioned template of antenna base.
 - .2 Dimensions of structural members.
 - .3 Location of antenna base.
 - .4 Method of fastening antenna array to roof.
 - .5 Lightning protection.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Regulatory Requirements: Prepare waste audits, waste reduction work plans, source separation programs and recycling programs as required by jurisdictional authorities and update programs and implement such programs as required.
- .2 The demolition contractor must engage a registered professional engineer who holds a certificate of authorization and an appropriate level of liability insurance to prepare demolition procedures.

1.4 SITE CONDITIONS

- .1 Separate and recycle waste materials in accordance with Section 01 74 20.
- .2 Remove from site and dispose of all 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 Divert unused, metal and wiring materials from landfill to metal recycling facility as approved by the Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.
- .6 Dispose of unused paint material of at official hazardous material collections site approved by

- the Departmental Representative.
- .7 Do not dispose of unused paint material into the sewer system, into streams, lakes, onto ground or in any other location where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 ANTENNA

- .1 Minimum signal levels of:
- .1 VHF - Channels 1 - 16, + 6 dBmV.
 - .2 Inline coaxial surge protector meeting the following;
 - .1 Frequency Range 0-600Mhz, 50 Ohm.
 - .2 Specifically designed for two way radios
 - .3 Connectors for Input/output and installed in line with coax cable.
 - .4 Ground terminal.
 - .5 Compatible with VHF application and very low loss of no more than 0.1dB.
 - .3 The antenna structural shall conform to CSA-S37.
 - .4 The antennas shall be of the 2 dipole, 5.0 dBd, bi-directional, 138-174 MHz type.
 - .5 The antennas shall be capable of covering the entire 138 - 174 MHz frequency range.
 - .6 The antenna must be capable of meeting or exceeding the following environmental limits;
 - .1 Temperature range °C (°F) -40 to +60 (-40 to +140)
 - .2 Wind Loading Area (Flat Plate Equivalent) m² (ft²) 0.2 (2.14).3
 - .3 Wind Loading Area (1/2" ice) m² (ft²) 0.34 (3.71)
 - .4 Wind Loading Area (1/2" ice) m² (ft²) 0.34 (3.71)
 - .4 Rated wind velocity (no ice) km/h (mph) 225 (140)
 - .5 Rated wind velocity (1/2" radial ice) km/h (mph) 169 (105)
 - .6 Lateral thrust (100 mph No Ice) N (lbs) 342.5 (77)
 - .7 Torsional moment (100 mph No Ice) Nm (ft-lbs) 112.1 (83)
 - .8 Bending moment (100 mph No Ice) Nm (ft-lbs) 333.5 (247)
 - .9 Tip deflection (100 mph No Ice) degrees 1.02
 - .7 The antenna shall be of Sinclair manufacture, their SD212-SF2P2SNM(D04) or Departmental Representative approved equal.

2.2 WIRING

- .1 Cable installation shall conform to CSA-C22.2 No. 214, TIA/EIA-568-B.1 and TIA/EIA-606-A.
- .2 The cabling between the antennas and marine radio, connectors and combiners shall be as

- specified on the contract drawings.
- .3 Cable installation located as indicated on the contract drawings.
 - .4 The antenna cable shall be flexible low loss communications coaxial cable suitable for outdoor use with the following characteristics;
 - .1 The cable jacket shall be UV resistant polyethylene for outdoor installation.
 - .2 The cable shall have the following mechanical characteristics;
 - .1 Inner Conductor: Solid BCCAI
 - .2 Dielectric: Foam PE
 - .3 Outer Conductor: Aluminum tape
 - .4 Overall Braid: Copper
 - .5 Operating Temperature Range: -40/+85 °C
 - .3 The cable shall have the following electrical characteristics;
 - .1 Velocity Propagation: 85%
 - .2 Dielectric Constant: 1.38
 - .3 Impedance: 50 Ohms
 - .4 Capacitance: 23.9 pF/ft
 - .5 Inductance: 0.06 µH/ft
 - .6 Shielding Effectiveness: > 90 dB
 - .7 Inner Conductor DC Resistance: 1.39 Ohms/1000'
 - .8 Outer Conductor DC Resistance: 1.65 Ohms/1000'
 - .9 Voltage Withstand: 5000 volts RMS
 - .10 Jacket Spark Rating: 8000 volts RMS
 - .5 The cable shall be LMR 400 or Engineer approved equal with characteristics as described.

2.3 FABRICATION

- .1 Shop fabricate antenna supporting and mounting material.
- .2 Prepare for shipment to site in suitable length sections for ease of transportation and installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Mount antenna on antenna base in accordance with manufacturer's instructions and as described on the Contract Drawings.
- .2 Install antenna as indicated on the Contract Drawings.
- .3 Connect antenna using coaxial cable.
- .4 Optimize reception by adjusting in direction for each antenna.
- .5 Install lightning protection in accordance with CAN/CSA-B72.

3.2 FIELD QUALITY CONTROL

- .1 Megger test lightning protection system resistance to ground. Resistance value of system network: 5.0 ohms or less.

END OF SECTION