SECTION 1 GENERAL

1.1 WORK INCLUDED

.1 The Work, unless specifically stated otherwise, shall include the furnishing of all material, product, plant, labor, and transportation necessary to complete the Work. The intent is that the Contractor provides a complete job.

.2 The Work shall not be deemed complete until all components are placed in operation by the Contractor, and are operating to the satisfaction of the Contract Administrator.

.3 Any minor items of the Work not called for in the Specifications or shown on the Drawings but clearly required to meet the intent of design and normally provided for the proper operation of the Work shall be provided as if specifically called for in the Contract Documents.

.4 The use of the word "provide" means "supply and install"; or "supply labor and materials for the installation of". It does not mean supply only.

.5 Where there is an ambiguity between a Standard and any term of these Contract Documents, the Contract Administrator shall, in the first instance, give an interpretation of the intent of the Contract.

1.2 PERMITS, LICENSES, REGULATIONS, AND ACTS

.1 The Contractor shall be responsible for obtaining and paying for any and all permits or licenses as may be required for any portion of this contract. The Contractor will be responsible for meeting the requirements of all permits and licenses granted, as well as compliance with all applicable Acts and Regulations.

.2 The Contractor shall ensure compliance on their part and on the part of all of Subcontractors with Fisheries and Oceans Canada, and the Canadian Navigable Waters Act.

1.3 ENVIRONMETNAL PROTECTION

.1 No in-water works are permitted or required as part of this scope of work. All Contractor activities must conform the applicable environmental protection laws and regulations. Appendix A provides DFO’s Interim Code of Practice: Bridge Repair and Maintenance to avoid causing harm to fish and provides general advice to comply with these Acts. This document shall only be considered as advice and it shall be the Contractor’s responsibility to adhere to all required laws, acts, and regulations.

.2 Applicable codes and standards related to the Environmental Protections, particularly with regards to Ontario Provincial Standards.

.3 Any work adjacent to waterways or which may result in sediment or debris entering the waterway will require the Contractor to implement control measures to contain the debris or control the sediment. Such measures shall be installed prior to the commencement of construction.

.4 Protect trees and plants on site and adjacent properties with removal only as approved by the Contract Administrator.

1.4 WEATHER CONSTRAINTS

.1 The Contractor shall maintain safety of the Worksite with respect to wind forces acting on the work platform and enclosure system.

.2 The Contractor shall ensure that there is a weather station operating on the Bridge at all times during construction, that records the maximum 3 second gust wind speed and direction, visibility, precipitation, humidity and temperature, and reports them at intervals of not more than ten minutes. This weather station shall be calibrated and certified and the data shall be presented locally and remotely in real time. The data is to be stored from the start of mobilization to Contract to the completion of demobilization.

The data from the weather station shall be made available to the Consultant and the City remotely and in real time.

The Contractor shall install a weather station, including an anemometer, on a pole sufficiently stiff so that wind induced vibrations are not experienced and located so that it is clear and free of obstructions or shielding from structures. The anemometer shall be installed on the Bridge Deck near midspan or on one of the adjacent spans.

.3 The Contractor shall have a system of forecasting the weather to ensure that critical operations will not occur during unacceptably bad weather. Forecasting shall be accurate enough to predict the weather from the point at which the decision is made, to six hours after the anticipated end of the operation in question. Forecasting shall be conducted by an independent, competent meteorologist using sufficient available data. The Contractor shall arrange for additional data to facilitate accurate forecasting from external sources such as Environment Canada. The Contractor shall submit detailed forecasts with closure requests and shall identify activities and specified constraints for the activities.

.4 It shall be the responsibility of the Contractor to decide at any time if an operation is to proceed despite inclement weather. However, the Consultant reserves the right to veto a Closure and to suspend the Work if it determines, in its sole discretion, that proceeding during bad weather would put at risk the safety of the Bridge or the public.

Notwithstanding any other provision of the Contract Documents, there shall be no claim against Stantec or the City by the Contractor if the Consultant decides to veto a closure.

1.5 WATERCRAFT NAVIGATION

.1 The Contractor shall adhere to the Canadian Navigable Waters Act (CNWA) and shall maintain a navigable waterway beneath the Keewatin Channel Bridge with appropriate clearance signage and warnings provided upstream and downstream of the structure.

.2 At a minimum, the Contractor shall adhere to the following:

a. Maintain at site a copy of the pending Transport Canada approval documentation during construction;

b. All vessels navigating the watercourse must be allowed access through or around the worksite at all times during construction and must be assisted as necessary.

c. Signs stating “Construction Ahead” must be placed and maintained 50 metres upstream and 50 metres downstream of the work for the duration of construction within the navigable (open water) season.

i. Signs stating “Construction Ahead” must be legible from a minimum distance of 50 metres.

ii. Signs stating “Construction Ahead” must be placed on both banks of the river.

iii. Signs stating “Construction Ahead” must display black lettering on a yellow or orange background.

d. Temporary works within the wetted width of the watercourse must be marked during construction in the navigable (open water) season:

i. With cautionary buoy(s) (yellow), at each end (corner) and at any other location alongside the temporary work(s) so that the buoys are spaced not more than 10 metres apart; or

ii. With a turbidity curtain, that has a yellow or orange flotation system, which encircles the temporary work or runs from the bank upstream of the temporary work to the same bank downstream of the temporary work.

e. Temporary work(s) must be removed immediately upon completion of the permanent work.

f. The Minister or his representatives must be allowed unimpeded access to any site related to the project for inspection and/or monitoring purposes.

1.6 CONSTRUCTION SCHEDULE

.1 Upon award of the Contract the Contractor shall provide the Consultant with a detailed work schedule at least five (20) Working Days prior to the commencement of any Work on site. The Construction Schedule shall be in critical path method format showing all the principal phases of the WORK. No Progress Payment Claim shall be certified until an acceptable Construction Schedule has been received and approved by the Consultant.

.2 The Construction Schedule, as stated above, will be held as a baseline. The Construction Schedule shall be updated every two weeks against actual progress of the work by the Contractor. The updated Construction Schedules do not relieve the Contractor from the obligation of the Completion Date.

.3 If, in the opinion of the Consultant, the Construction Schedule is inadequate as a control tool or if it does not show the work being fully completed by the Contract Completion Date, the Consultant may reject it and the Contractor shall provide a Construction Schedule and work program that is acceptable to the Consultant.

.4 The Contractor shall require written permission from the City of Kenora for any work to be performed between the hours of 21:00 and 07:00. Such work shall conform to all applicable laws and by-laws.

.5 The Contractor’s schedule shall identify anticipated periods of lane restrictions during the Work.

1.7 PROJECT MEETINGS

.1 A pre-construction meeting will be arranged by the Consultant after the award of Contract.

.2 The meeting will be held at the City of Kenora office.

.3 The agenda for the Preconstruction Meeting shall include, but is not limited to, the following:

a. Confirm the superintendent, contractor's project manager, and the Consultant Resident personnel on the worksite.

b. Establish worksite protocols for communication, reporting, inspection, etc.

c. Clear up any ambiguities or questions of interpretation known at that time.

d. Review the detailed work schedule.

e. Occupational Health and Safety relationships and responsibilities.

f. Review and discuss contractor's site safety plan.

g. Discuss other responsibilities of the Owner, the contractor, and the Consultant

.4 Progress meetings will be held on a regular monthly basis or more frequently if requested by the Consultant.

.5 The Consultant will give to all parties advance notice of meeting dates, times and locations.

.6 The Contractor shall have in attendance the Superintendent, the Contractor's Project Manager and representatives of the subcontractors if requested by the Consultant.

.7 The Owner may have a representative in attendance.

.8 Construction Schedule, Occupational Health and Safety incidents, records and procedures shall be part of the agenda for every progress meeting.

.9 Minutes will be taken by the Consultant and copies will be distributed to all attendees.

1.8 FIELD ENGINEERING

.1 The Contractor shall be responsible for setting all temporary benchmarks required to complete the Work.

.2 Throughout the course of the work, the Contractor shall confirm the accuracy of their temporary benchmarks. Claims will not be entertained for work installed incorrectly due to survey error.

.3 The Contractor shall be responsible for the true and proper layout of the work and for the correctness of the location, levels, dimensions, and alignment of all aspects of the work. The Contractor shall provide all required instruments and competent personnel for performing all layouts.

.4 Should any error appear or arise in location, levels, dimensions, and/or alignments during the WORK, the Contractor shall promptly rectify such errors to the satisfaction of the Consultant at their own expense.

.5 The Consultant shall be notified at least two (2) working days prior to any Work being commenced in order to have the option to check and review all elevations and layouts at the Consultant's discretion.

1.9 TEMPORARY FACILITIES AND CONTROLS

.1 The Owner will allow the Contractor to set a worksite within the right of way. The limits of the worksite have not been noted on the Drawings.

.2 The Contractor shall have agreements in place with landowners for any work requiring access onto private property. Such agreements shall be the responsibility of the Contractor. Copies of these agreements shall be provided to the Consultant. It shall be the responsibility of the Contractor to confirm the extents and locations of all private property lines adjacent to the proposed works.

.3 The Contractor shall have exclusive use and control of the worksite, provided that the Contractor shall permit access to the Owner, the Consultant, and other contractors for purposes of inspections, reviews, tests and carrying out work related to the work.

.4 Contractor's use of the worksite for storage is limited to the areas within the right of way.

.5 During the Contractor’s use of a particular area of the worksite to execute the work, the Contractor shall be responsible primarily for security and for ensuring compliance with Health and Safety Regulations.

.6 The Contractor shall be responsible for access to the worksite by means of temporary roads, tote roads, or agreements with the appropriate authorities or land owners to use existing means of access.

.7 The Contractor shall return the areas of the worksite used for construction access, laydown, storage, etc. to the condition before the construction commenced or as agreed upon in the applicable land Owner agreement.

.8 The Contractor shall provide and pay all costs for natural gas, gasoline and other fuels, water, electricity and lighting, telephone, heating and ventilating, sanitary facilities, fire protection, temporary plants, temporary enclosures, false work, temporary construction supports, temporary excavation, access roads, and tree protection as required to complete the Work.

.9 The Contractor shall be responsible for location, protection, temporary support, removal, or replacement of existing utilities and structures, or for repair of any damage which may occur during construction including all required designs.

.10 Existing utilities that exist near or are attached to the bridges shall be safely supported and protected by the Contractor through the duration of the work and to the satisfaction of the utility Owner(s) and the Consultant.

.11 The Contractor shall pay all costs and be responsible for establishing locations and state of use of all existing utilities that may affect the Work. The Contractor shall make satisfactory arrangements with the utilities companies involved for the location, protection, and inspection of existing utilities.

.12 The Contractor shall pay all the costs involved in protection of utilities, inspection of utilities, and all costs due to delays because of existing utilities and structures.

.13 The Contractor shall provide for the uninterrupted flow of all water courses, sewers, and drains encountered during the WORK.

.14 Access shall be maintained to all existing structures such as valves, hydrants, meter chambers and control structures at all times during construction.

.15 If interruption of service provided by an existing utility is necessary, the planned shut down shall be approved by the Owner of the utilities.

.16 Unless otherwise specified the Contractor shall make arrangements for relocation of existing utilities that the Consultant requests to be relocated; and the actual relocation shall

be constructed by the Owner of the utility. The Contractor will be reimbursed the invoiced cost of the relocation. No extra payment is permitted for delays, or standby time.

.17 Controls:

a. Perform the Work in conformity with all municipal by laws with respect to noise, hours of work, night work, and holiday work.

b. Perform the Work in a manner that will not produce an objectionable amount of dust. Dust control measures shall be paid for by the Contractor.

c. Perform the Work in conformance with the applicable sections of the Provincial Regulations with respect to air and water pollution control requirements.

.18 Disposal of Wastes:

a. Burying of rubbish and waste on the worksite is not permitted.

b. Disposal of waste or volatile materials into waterways, storm or sanitary sewers is not permitted.

c. Pumping or draining water containing silt in suspension into waterways, sewers, or drainage systems is prohibited.

d. Abide by requirements of Statute, Bylaw, and Regulations respecting disposal of wastes.

e. Obtain required Permits for waste disposal.

.19 Do not operate construction equipment in waterways, nor remove borrow material nor dump fill material into waterways, except as approved and permitted by the appropriate authorities. The regulatory approvals must be strictly followed when working adjacent to the waterway.

.20 The Contractor shall maintain haul routes. They shall be kept open to traffic and shall be clean at all times. Any damage done to the haul routes by the Contractor shall be repaired as approved by the Consultant and all costs shall be borne by the Contractor.

.21 Obtain permits as required to use public roads or streets for haul routes.

.22 Special care shall be taken to avoid damage to all existing adjacent structures or properties during the course of the work. Any damage caused by the Contractor to the existing adjacent structures or properties shall be repaired at their own expense and to the satisfaction of the Consultant.

1.10 HEALTH AND SAFETY POLICY

.1 The Contractor shall adhere to the City of Kenora Health and Safety Policy and shall be responsible for all site safety aspects of the Work.

.2 During construction, health and safety meetings shall be conducted as required by the Occupational Health and Safety Act (OHSA).

1.11 MEASUREMENT FOR PAYMENT

.1 Notify the Consultant sufficiently in advance of operations to allow required measurements for payment. Unless otherwise specified, measurements shall be taken in accordance with the General and Supplementary Conditions.

1.12 DOCUMENTS REQUIRED ON SITE

.1 Maintain at the worksite at least one copy of each of the following:

a. Contract drawings

b. Specifications

c. Addenda

d. Change Orders, Field Orders, Notices

e. Reviewed shop drawings

f. Modifications to the Contract

g. Field Test Reports

h. Construction Schedule

i. Manufacturer's Installation and Application Instructions

j. Occupational Health and Safety Regulations and Workers' Compensation Board Regulations

k. Environmental Applications, Authorizations or Assessments

l. Have readily available any referenced or specified Standards.

1.13 MATERIAL AND INSTALLATION

.1 Material and product supplied and installed shall be new and shall conform to these Specifications and to the specified standards.

.2 Workmanship shall be the best quality, executed by workers experienced, and skilled in their respective trades.

.3 Ensure full cooperation among all trades and coordination of the WORK with continuous supervision.

.4 Use product for which replacement parts and service are readily available.

.5 Unless otherwise specified, comply with the manufacturer's / supplier's instructions for material or product and installation methods.

.6 Provide metal fastenings and accessories in the same texture, colour, and finish as the base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors, and spacers for securing exterior Work, or Work that may be located in a corrosive atmosphere.

.7 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Space fasteners evenly and lay out neatly.

1.14 DELIVERY AND STORAGE OF MATERIALS

.1 Deliver, store, and maintain packaged material and product with manufacturer's seals and labels intact.

.2 Prevent damage and soiling of material and product and store in accordance with instructions of the manufacturer / supplier.

.3 Provide suitable areas or buildings where storage is weatherproof, if the manufacturer / supplier recommends dry areas.

.4 Comply with Work Place Hazardous Materials Information Systems requirements.

.5 Material that is improperly stored resulting in damage due to the Contractor’s negligence shall be replaced at the Contractor’s expense.

1.15 QUALITY CONTROL

.1 The Contractor is totally responsible for the quality of material and product which the Contractor provides and for the work.

.2 The Contractor is responsible for quality control and shall perform such inspections and tests as are necessary to ensure that the Work conforms to the requirements of the Contract Documents.

.3 During the progress of the Work, a sufficient number of tests shall be performed by the Contractor to determine that material, product, and installation meet the specified requirements.

.4 Minimum requirements regarding quality control are specified in various sections of the Specifications, however, the Contractor shall perform as many inspections and tests as are necessary to ensure that the work conforms to the requirements of the Contract Documents.

.5 Testing shall be in accordance with pertinent codes and regulations, and with selected standards of the American Society for Testing and Materials (ASTM) and Canadian Standards Association (CSA).

.6 The Contractor shall retain the services of an approved third-party AMPP Level 2 or 3 inspector and pay the cost of testing services for quality control including, but not limited to, the following:

a. Primer, intermediate and topcoat thickness testing.

b. Adhesion testing of new coatings.

.7 The Contractor shall promptly process and distribute all required copies of test reports and test information. Any product that does not meet required specifications shall be replaced at the Contractor’s expense. Performing such work is not cause of an extension of the Contract Time.

.8 When tests on product, material, or completed portions of the work carried out by the Contractor or the Contractor’s testing agency or by the Owner’s testing agency yield results

not meeting the requirements of the Contract Documents, the Contractor, in addition to carrying out remedial Work or replacement of the Product or Material shall cover all costs for retesting of the remedied Work and the replacement Product and Material. Retesting shall be at the Contractor's expense.

.9 If the Contractor fails or refuses to do remedial Work or replace unacceptable material or product, the Consultant may refuse to certify payment and the Owner may refuse to make payment, in addition to any other remedies the Owner may have.

1.16 SHOP DRAWINGS

.1 The Contractor shall arrange for the preparation of clearly identified Shop Drawings and submit one (1) electronic PDF Shop Drawing to be reviewed by the Consultant.

.2 Shop Drawings shall be in accordance with the International System of Units (S.I.) metric units

.3 Prior to submission to the Consultant, the Contractor shall review all Shop Drawings. The Contractor's review of each Shop Drawing shall be indicated by stamp, with the date and signature of a responsible person.

.4 The Contractor shall submit Shop Drawings to the Consultant for review with reasonable promptness and in orderly sequence so as to cause no delay in the Work

.5 At the time of submission, the Contractor shall notify the Consultant in writing of any deviations in the Shop Drawings from the requirements of the Contract Documents.

.6 The Consultant's review shall be for conformity to the design concept and for general arrangement only and such review shall not relieve the Contractor of responsibility for errors or omissions in the Shop Drawings or of responsibility for meeting all requirements of the Contract Documents.

.7 The Contractor shall make any changes to the Shop Drawings which the Consultant may require consistent with the Contract Documents and resubmit unless otherwise directed by the Consultant.

.8 Where the Contractor is required, either by law, regulation or by the Contract to provide engineering design, they shall use the services of a Professional Engineer registered in the Province of Ontario and shall submit Shop Drawings bearing the Seal and Signature of that Registered Professional Engineer.

1.17 CONTRACT CLOSE-OUT

.1 Maintain the working area in a clean and orderly manner as the Work progresses, and upon completion of construction, remove all waste Materials, and all temporary facilities from the Worksite.

.2 Haul surplus or salvage materials that are the property of the Owner to the Owner's storage site. Remove surplus or salvaged materials belonging to the Contractor from the worksite.

.3 Clean haul routes and restore haul roads to their pre-construction condition.

.4 Broom clean paved surfaces; rake clean other surfaces of ground.

.5 The Contractor shall notify the Consultant when the Work is considered for Substantial Performance. The Contractor shall accompany the Consultant on the Substantial Performance walk-through.

.6 The Contractor shall comply with the Consultant's instructions for correction of items of Work listed to be corrected in conformance with the Contract Documents.

1.18 WARRANTY INSPECTION

.1 The Consultant shall arrange and conduct with the Owner and the Contractor a warranty inspection at the site prior to the expiration of the warranty period.

1.19 MEASUREMENT AND PAYMENT

.1 Refer to Section 5 Measurement and Payment

END OF SECTION

SECTION 2 MOBILIZATION, DEMOBILIZATION, AND SITE WORK

2.1 DESCRIPTION

.1 This Specification shall cover the Mobilization, Demobilization, and Site Work required for the Work of this project. The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

2.2 SCOPE OF WORK

.1 Mobilization, Demobilization, and Site Work shall include the Contractor's costs of mobilization at the beginning of the Work and the costs of demobilization at the end of the Work.

.2 Included in Mobilization, Demobilization, and Site Work are such items as permits, moving personnel, bonding and insurance, lodging expenses, materials, and equipment to and from the site, setting up temporary facilities, temporary land use agreements, temporary utilities, and all site preparation for performing the Work.

.3 All costs associates with site cleanup, general grading, and restoration to the original condition of the Site and any disturbed areas upon completion shall be included herein this pay item.

.4 All regulatory body required costs (material, labour) shall be included herein this pay item.

.5 The Contractor is responsible for obtaining all utility clearances and the costs associated with the clearances shall be included herein this pay item.

.6 The supply and placement of any and all erosion protection and silt fence barriers shall be considered a part of this pay item.

.7 This pay item shall include final site clean-up, grading, seeding and revegetation, and placement of Erosion Control Blanket (ECB) required to restore the worksite to preconstruction condition.

2.3 MEASUREMENT AND PAYMENT

.1 Refer to Section 5 Measurement and Payment.

END OF SECTION

SECTION 3 TRAFFIC CONTROL AND PEDESTRIAN ACCOMMODATION

3.1 DESCRIPTION

.1 This Specification shall cover all operations relating to the provision of traffic control and pedestrian accommodation for single-lane, two-way traffic operation at the bridge locations.

.2 The work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

3.2 SCOPE OF WORK

.1 Traffic control and pedestrian accommodation shall include supply, installation, operation, relocation, maintenance, and removal of all traffic control devices, portable temporary traffic signals, pedestrian accommodation devices, as well as the provision of flag persons. The provision and implementation of traffic control shall be in accordance with the Ontario Traffic Manual (OTM) Book 7 except as otherwise specified herein and directed / approved by the Contract Administrator.

.2 At least 72 hours prior to restricting traffic, notify the following:

a. Roadway Authority

b. Public Works Departments

c. Utilities Companies

d. Fire Department

e. Police Department

f. Ambulance

.3 The Contractor shall prepare and submit a Traffic Control and Pedestrian Accommodation Plan to the Consultant for review and comment at least 15 Working days prior to proceeding with on-site traffic control and pedestrian accommodation. The Contractor shall co ordinate the Work with the Consultant, and the Owner to reduce traffic and pedestrian problems.

.4 The Contractor shall be responsible for all construction zone barriers, barricades, warning signs, detours, fences, flag persons, and all other devices required to protect the public. All applicable safety standards will be followed. Under no circumstances will hand painted lettering, diagrams, or symbols be permitted.

.5 If required to complete the work, the Contractor shall design, supply, install, and remove temporary traffic signals at each end of the bridge(s) throughout the duration of construction, which will allow for one, two-way traffic lane to function to accommodate traffic in both directions.

a. The Contractor shall be responsible for traffic signal timing design and shall make required adjustments in the field to properly accommodate the flow of traffic.

b. A minimum of one, two-way traffic lane must be maintained at all times. Traffic flow shall be managed with either traffic signals or through flag person operations.

c. When performing recoating activities, the use of mobile equipment for debris removal or air purification will require staging on the bridge deck. The Contractor shall provide a sufficient traffic management plan to demarcate the staging/work area and safely manage traffic. This may involve the provision of temporary concrete barriers, or delineators, depending on the specific regulatory requirements.

d. Pedestrian accommodations to cross the bridge shall be provided throughout the duration of the project. Pedestrian accommodation shall consider the requirements needed to properly protect the public from the Construction activities, hazards, and traffic. The width of the pedestrian accommodation shall match the existing sidewalk and shall provide universal access.

3.3 MATERIALS AND EQUIPMENT

.1 The Contractor shall be responsible for the supply, safe storage, and handling of all materials and equipment set forth in this Specification.

.2 All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Consultant.

.3 All traffic control devices (signage, channelization devices, barricades), portable temporary traffic signals, and flag persons shall be in accordance with the OTM Book 7, and as specified herein.

3.4 CONSTRUCTION METHODS

.1 General

a. The Contractor shall supply and install traffic control devices and portable temporary traffic signals and have them ready for putting into operation before the work affecting vehicle and pedestrian traffic begins. The Contractor shall coordinate and undertake the installation and operation of all required traffic control devices, portable temporary traffic signals, and temporary concrete barriers. Traffic control signs shall be temporarily covered or laid down until such time as needed to be visible for the work affecting traffic.

b. Prior to setting up and after removing the traffic control installation for single-lane two-way traffic operation, both lanes of traffic must remain open at all times with the exception of temporary single lane closures as may be required by the Contractor for purposes such as loading/unloading.

c. The Contractor shall be required to arrange, coordinate, and pay for public notification via local radio stations of approved single lane closures and for advance lane closure.

.2 Maintenance

a. The Contractor shall be responsible for the maintenance of all traffic control devices and portable temporary traffic signals for the entire duration of the work so as to ensure the traffic control devices and portable temporary traffic signals are functioning as required to provide for safe traffic operation throughout the worksite at all times. The Contractor shall regularly inspect the traffic control devices and portable temporary traffic signals to ensure proper and safe conditions and shall designate personnel to undertake such inspections and implement corrective measures as required. Such

regular inspection shall be undertaken at all times during the course of the work including times when work is being undertaken at the site as well as during times when the work is temporarily shut down such as off-work hours, weekends and holidays.

b. The Contractor shall supply and install all signage and utilize flag persons as required in accordance with OTM Book 7. The Contractor shall submit and confirm the actual on-site sign locations with the Consultant prior to proceeding with installation.

3.5 MEASUREMENT AND PAYMENT

.1 Refer to Section 5 Measurement and Payment

END OF SECTION

SECTION 4 STEEL REPAIR AND PROTECTIVE COATING

4.1 DESCRIPTION

.1 This Specification shall cover the repair of select structural steel elements, the removal for the original coating system, cleaning, and preparation and installation of the new corrosion protection for the new and existing steel.

.2 The work to be done under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

.3 The work shall also include required platforms and containment to allow easy and safe access and collection of waste materials as well as requires surface preparation, necessary testing, quality reviews and pull tests of the installed coating as required to satisfy the requirements as noted within this specification.

4.2 SCOPE

.1 The work under this specification shall generally involve:

a. Mobilization/Demobilization;

b. Provision for all traffic control as required for all stages of the work;

c. Site preparation and layout;

d. Site safety and security;

e. Site survey and measurements;

f. All required submissions as noted in clause 8.3;

g. Design, fabrication, supply, install and perform daily inspections and maintenance of a work platform/access system, construction staging, and erection of temporary works and temporary containment enclosures.

h. Removal of bird droppings, nests and debris cleaning.

i. Cleaning, abrasive blasting and surface preparation for coating applications.

j. Detailing, fabrication, supply and installation of steel repairs and replacements.

k. Testing and disposal of removed materials and waste products.

l. Supply and application of protective coating.

m. Protection of existing structures during construction.

n. Provision for all repairs for incidental damages to the coating and steel elements.

o. Temporary relocation and reinstatement of electrical cables, conduits, cable trays and other utilities and services to permit the Work and reinstate after completion of the Work.

p. Temporary removals and reinstallation of structural components as indicated in the Drawings.

q. Site safety, fall protection, and prevention of any objects from falling from the bridge.

r. Maintenance of secure perimeters throughout the work.

s. Environmental protections.

t. Temporary relocation of stored material and equipment, where it hinders the work, and reinstatement at end of the Work in original condition or better.

u. Close coordination and communication with the Consultant.

v. Making good all defects, including `damage to existing facilities.

w. Clean up and reinstatement.

4.3 CONSTRUCTION SEQUENCE

.1 Construction sequence shall satisfy the requirements of the Contract documents. The containment size for each phase shall be determined by the contractor based on the allowable loads placed on the structure pre-steel repair and post-steel repair. The containment size per phase maybe limited based on the contractor's means and methods to meet any load restrictions as listed in the plans.

.2 Construction sequence for work at the Keewatin Channel Bridge shall occur in the following order:

a. Field verification and design of repairs and access/containment systems;

b. Installation of access system and containment tarps

c. Cleaning by pressure washing and removal of existing coatings by blasting

d. Prime coat of existing blasted steel area

e. Identify repair locations and repair structure steel members.

f. Steel inspection for possible additional repairs, identification by the Consultant;

g. Final, surface preparation and new coating application; stripe coats, intermediate, caulking and finish coats

h. Final cleaning and coating touch-up.

i. Removal of access system and containment tarps and demobilization.

4.4 CODE AND STANDARDS

.1 The work shall be done in compliance with the most current edition of the following references:

.2 Canadian Standards Association

a. CAN/CGSB-48.9712, Qualification and Certification of NDT Personnel.

b. Canadian Highway Bridge Design Code CAN/CSA S6:19.

c. CAN/CSA S269.1-1975 False work for Construction Purposes

d. CAN/CSA S350-M1980, Code of Practice for Safety in Demolition of Structures

e. CAN/CSA S6, Annex A10.1, Construction requirements for structural steel.

f. CAN/CSA-W59, Welded Steel Construction (Metal Arc Welding).

g. CAN/CSA-S269.2-M87 Access Scaffolding for Construction Purposes

h. CAN/CSA-W48.1-M, Filler Metal and Allied Materials for Metal Arc Welding.

i. CSA-W178.2, Certification of Welding Inspectors.

j. CSA-W47.1, Certification of Companies for Fusion of Welding of Steel.

k. CAN/CSA-Z321- Signs and Symbols for the Workplace

l. G40.20-13/G40.21.-13, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

.3 Environmental, Health and Safety, Guides, Acts and Standards

a. Government of Ontario

i. Ontario Regulation 347/90 of the Revised Regulations of Ontario, amended to Ontario Regulation 461/05 and 217/08, General – Waste Management (R.R.O., 1990, Reg. 347), under the Environmental Protection Act (EPA)

ii. Occupational Health and Safety Act, R.S.O. 1990, c. O.1

iii. Ontario Regulation 490/09 Designated Substances, under the Occupational Health and Safety Act (OHSA)

iv. O. Reg. 89/20: TRAFFIC MANAGEMENT, under the Emergency Management and Civil Protection Act, R.S.O. 1990, c. E.9

v. Dangerous Goods Transportation Act, R.S.O. 1990, c. D.1

vi. Guideline: Lead on Construction Projects, issued by the Ministry of Labor, Immigration, Training and Skills Development of Ontario (MLITSD), April 2011

b. Environmental Abatement Council of Canada (EACC):

i. Guideline: Lead Guideline for Construction, Renovation, Maintenance or Repair, January 2025

ii. Guideline: Mould Abatement Guidelines, Edition 3, 2015

c. Department of Justice Canada (Jus):

i. Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c. 34).

ii. Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

.4 ASTM International

a. ASTM A123/123M Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel.

b. ASTM A153/153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

c. ASTM A563 Standard Specification for Carbon and Alloy Steel Nuts

d. ASTM D4138, Standard Test Method for Measurement of Dry Paint Thickness of Protective Coating Systems by Destructive Means.

e. ASTM D4285, Standard Test Method for Indicating Oil or Water in Compressed Air.

f. ASTM D4414, Standard Practice for Measurement of Wet Film Thickness by Notch Gages.

g. ASTM D4417, Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel.

h. ASTM D7091, Non-destructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

i. ASTM F3125/F3125M Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength

j. ASTM F436 Standard Specification for Hardened Steel Washers

.5 SSPC The Society for Protective Coatings

a. SSPC-AB 1 Mineral and Slag Abrasives

b. SSPC-AB 2 Cleanliness of Recycled Ferrous Metallic Abrasives;

c. SSPC-AB 3 Ferrous Metallic Abrasives

d. SSPC Guide 6, Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations.

e. SSPC Guide 7, Guide for the Disposal of Lead Contaminated Surface Preparation Debris

f. SSPC-Guide 12, Guide for Illumination of Industrial Painting Projects;

g. SSPC-Guide 15, Field Methods for Extraction and Analysis of Soluble Salts on Steel and Other Nonporous Substrates;

h. SSPC-AB 1 Mineral and Slag Abrasives

i. SSPC-AB 2 Cleanliness of Recycled Ferrous Metallic Abrasives;

j. SSPC-AB 3 Ferrous Metallic Abrasives

k. SSPC-PA2 Procedure for Determining Conformance to Dry Coating Thickness Requirements

l. SSPC-PA 17, Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements

m. SSPC-SP 1 Solvent Cleaning;

n. SSPC-SP 2 Hand Tool Cleaning;

o. SSPC-SP 3 Power Tool Cleaning;

p. SSPC-SP 10 Near-White Blast Cleaning;

q. SSPC-SP 11 Power Tool Cleaning to Bare Metal;

r. SSPC-SP WJ-4, Waterjet Cleaning of Metals – Light Cleaning;

s. SSPC-SP16 Brush Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels and Non-Ferrous Metals;

t. SSPC-Technology Update No. 7 Conducting Ambient, Air, Soil and Water Sampling of Surface Preparation and Paint Disturbance Activities.

u. SSPC VIS 1 Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blasting:

v. SSPC VIS 3 Guide and Reference Photographs for Steel Surfaces Prepared by Power and Hand Tools.

.6 OPSS Ontario Provincial Standard Specifications

a. OPSS.MUNI 182 Environmental Protection for Construction in Waterbodies and on Waterbody Banks

b. OPSS.MUNI 706 Temporary Traffic Control Devices

c. OPSS.MUNI 708 Portable Temporary Traffic Signals

d. OPSS.MUNI 741 Temporary Concrete Barriers

e. OPSS.MUNI 805 Temporary Erosion and Sediment Control Measures

f. OPSS.MUNI 906 Structural Steel for Bridges

g. OPSS.MUNI 911 Construction Specification for Coating Structural Steel Systems

h. OPSS.MUNI 1441 Load Transfer Assemblies

i. OPSS.MUNI 1704 Paint Coating Systems for Structural Steel

4.5 SUBMITTALS

.1 The Contractor shall provide shop drawings and submittals per Section 4.5.1 Shop Drawings 10 working days prior to the beginning of construction.

.2 The Contractor shall prepare and submit a list of Shop drawings and include all elements required to perform the safe removal and application of the structural repairs and painting system. The list shall include critical path items and proposed delivery dates for each item. The list shall be updated regularly and shall be submitted to the Consultant on a timely basis. Shop Drawings should be submitted a minimum of 14 days ahead of the Work. The

following partial Shop Drawings list noted below but not limited to shall be forwarded to the Consultant for review;

a. Traffic and pedestrian control.

b. Scaffolding, access and platform shop drawings for phase 1, 2 and 3.

c. Structural steel mill tests.

d. Detailing and installation procedures for steel repairs.

e. Material/technical data sheets.

f. Cleaning, blasting and surface preparation for coatings application procedure.

g. Coating installation procedure.

h. Coating application and Quality Control results.

i. Coating pull testing procedures and results.

j. Waste material test results and disposal requirements.

k. Site safety and fall protection systems

.3 Work affected by the submittal or technical data sheet shall not proceed prior to the review by the Consultant. The Contractor's review shall be accompanied by a signed review stamp for all submittals prior to sending them to the Consultant. The Contractor's review represents that the necessary requirements have been determined and verified, and that each submittal has been checked and coordinated with the requirements of the Work and the Contract Documents.

.4 Submittals that have engineering content shall be stamped by a professional engineer registered in the province of Ontario, signed, dated and identified as to the specific project. Submittals with engineering content that are not stamped, signed, dates and properly identified will be returned without being reviewed and shall be considered rejected.

.5 The contractor shall verify all site measurements and coordinate with others for any affected adjacent work.

.6 The Contractor's responsibility for errors and omissions is not relieved by the review of the Consultant.

.7 The Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the Consultant's review of the submittals.

.8 The Contractor shall keep one reviewed and current copy of each submission on the construction site.

.9 The Contractor shall not construe the Consultant's review of the Contractor submittals to imply approval of any particular method or sequence for:

a. Conducting the work;

b. Addressing health issues;

c. Addressing environmental issues; or

d. Addressing safety issues.

.10 Review of the submission does not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the standard requirements, or to adequately protect the health and safety of all workers involved in the project including any members of the public who may be affected by the project. The Contractor remains solely responsible for the adequacy and completeness of the procedure, means, method and work practices, and adherence to them. Submittals shall include, but not be limited to, the following:

a. Project Shop Drawings to comply with Section 4.5.1;

b. Materials samples to comply with Section 4.5.2;

c. Project Specific Detailed Safety Plan to comply with Section 4.5.3

d. Quality Control Plan to comply with the requirements of Section 4.5.4;

e. Work plan to comply with Section 4.5.5;

f. Access and Containment Plan to comply with Section 4.5.6;

g. Emergency Containment Demobilization Plan to comply with Section 4.5.7

h. Lead Health and Safety Compliance Plan to comply with Section 4.5.8;

i. Environmental Protection Plan to comply with Section .1.

4.5.1 Shop Drawings

.1 The Contractor shall submit Shop drawings with shop and erection details.

.2 Shop drawings that have engineering content shall be signed and stamped by the Contractor's Professional Engineer registered to practice in the Province of Ontario.

.3 All temporary works and all work methods for temporary supports, utility supports and maintaining stability during demolition and restoration, bearing design and drawings shall be designed by the Contractor's Professional Engineer registered to practice in the Province of Ontario who shall affix his seal to all designs and work methods.

.4 The design of all works and work methods shall be submitted to the Consultant for review a minimum of fourteen (14) days prior to commencement of the Work. Such review shall not relieve the Contractor of any responsibility of liability in execution of the Work. The Contractor shall comply with any requirements of the Consultant following its review of the Contractor's intended temporary work and work methods.

4.5.2 Material Samples

.1 The Contractor shall submit samples in triplicate or as requested in respective specification sections for the Consultant review. Label samples as to origin and intended use in the Work.

.2 Colour and application samples for all primer and topcoats and stripe coats shall be provided prior to beginning of coating removals on-site. Samples for all coating stages shall be applied to a single 6 mm thick steel plate as in the field, with consecutive coating stages exposed; refer to Table 1 below. Each exposed sample zone shall be minimum 75 mm x 100 mm. The following demonstrates the various layers (zones) of a typical 3-coat coating system, applied to a plate 100 mm x 530 mm x 6 mm.

Table 1 - Coating sample zone description

	Sample Zone						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Steel	Top	Y	Y	Y	Y	Y	Y
Primer Stripe		Top	Y	Y	Y	Y	Y
Primer Spray			Top	Y	Y	Y	Y
Intermediate Stripe				Top	Y	Y	Y
Intermediate Spray					Top	Y	Y
Topcoat Stripe						Top	Y
Topcoat Spray							Top

.3 Materials samples for all types of coating products applied during the course of the project (primer, topcoats and stripe coats, galvanizing touch-ups, etc.) shall be supplied to the Consultant after demobilization from site. Material samples shall be supplied in 1-gallon (minimum) kits, unopened and unmixed, as delivered from the coating manufacturer. Each container shall be physically marked with product name, batch number, and expiry date, as well as project name (Keewatin). Samples shall be accompanied by copies of product data sheets (PDS), safety data sheets (SDS) and manufacturer's quality certification for the specific batches provided. Expiry date of samples shall be minimum 12 months from date of delivery to the Consultant.

.4 The Contractor shall deliver samples prepaid to the Consultant's business address.

.5 The Contractor shall notify the Consultant in writing, at the time of submission of deviations in samples from requirements of Contract Documents.

.6 Adjustments made on samples by the Consultant are not intended to change the Contract Price. If adjustments affect the value of Work, the Contractor shall state such in writing to the Consultant and obtain the Consultant's approval of the additional cost prior to proceeding with the Work.

.7 Any substitutions proposed by the Contractor shall be submitted in writing to the Consultant for review and decision

.8 The Contractor shall submit supporting technical data showing comparative data for the substitution. The acceptance of any substitutions shall not relieve the Contractor from any responsibility under the Contract.

4.5.3 Safety

.1 The Contractor shall take all precautions necessary for working on, above and around facilities being used by traffic and pedestrians/personnel.

.2 The Contractor shall take every precaution that is reasonable in the circumstances to ensure the health and safety of persons at or near the Project.

.3 The Contractor shall observe and enforce construction safety measures required by all Applicable Laws, including Federal and Provincial Acts, latest edition of National Building Code, municipal statutes and authorities and all applicable regulations and by-laws. In the event of conflict between any provisions of the above authorities, the most stringent provision shall govern.

.4 The Contractor shall be familiar with the Internal Responsibility System which is the foundation of the Occupational Health and Safety Act.

.5 The Contractor shall be responsible for safety and for compliance with all applicable health and safety acts and regulations. The Contractor shall be the "constructor" and the Consultant will be the "Owner" as defined by the Occupational Health and Safety Act.

.6 The Contractor shall indemnify and hold harmless the Consultant with respect to the Contractor's failure to comply with Applicable Laws, including Federal, Provincial, and Municipal Acts, Codes, By-Laws, Regulations, etc. including the Ontario Occupational Health and Safety Act and Regulations, that pertain to all portions of the Work.

.7 The Contractor shall pay all regulatory authorities' fines/charges against the Contractor, and/or the Consultant resulting from the Contractor's failure to comply fully with .1Section 1.2.1.

.8 The Contractor shall provide the Consultant with any warnings or compliance orders issued by the Department of Labour within 24 hours of receipt.

.9 The Contractor shall maintain first aid materials and trained first aiders at the Worksite and have a working phone turned on at all times during the course of Work.

.10 The Contractor shall conduct a hazard assessment, prepare a health and safety plan and provide copies to the Consultant at least 14 days prior to starting work. The Bridge is a high volume facility and all of the Contractor’s plans must contemplate this and protection of the public. The Contractor shall make its own assessment of all of the factors/considerations.

.11 The Contractor shall prepare and submit a health and safety Plan to the Consultant for Review. The Contractor's health and safety Plan shall address the following as a minimum:

.12 System assessments:

a. Hazard assessment process;

b. Job task analysis;

c. Job safety analysis;

d. Risk assessment progress;

e. Control measures; and

f. Permits and special procedures.

.13 Management and communication:

a. Management procedures;

b. Orientation process;

c. Safety meetings; and

d. Joint occupation health and safety committee.

.14 Validation monitoring:

a. Observation process;

b. Observer qualifications;

c. Audit process; and

d. Enforcement.

.15 Supporting programs:

a. Training programs; and

b. Trainer qualifications.

.16 Documentation control:

a. Availability of documents. e.g. toolbox meeting records, orientations and inspection reports.

.17 Incident investigation:

a. Mitigation implementation; and

b. Lessons learned.

.18 Policies:

a. Alignment with and exceed legislation and regulations.

.19 Emergency preparedness.

a. Emergency response

b. Rescue contingencies

c. Rescue procedures

d. Rescue plan

.20 The Contractor shall receive an orientation provided by the Consultant prior to starting work at the Worksite. The Contractor shall deliver an orientation to any subcontractor employed by the Contractor and records of such shall be provided to the Consultant

.21 The Contractor shall provide workers who are “competent” as defined by the Occupational Health & Safety (OH&S) Act, experienced and capable in the work to be undertaken. The Contractor shall provide evidence of OH&S training for each worker.

.22 All of the Contractor's Personnel shall wear personal protective equipment (hard hats, steel toe boots, hearing protection, safety glasses as dictated by the work), safety harness / lanyards and high visibility (yellow) safety vests. The Contractor shall take all precautions necessary for working on and below a Bridge open to vehicular traffic, adjacent traffic and adjacent or over railways and waterways.

.23 The Contractor shall acknowledge in writing that the Contractor has read and understands the Safety Policies and Procedures, Contractor Handbook of the Owner and that as a part of the obligations under this Agreement, the Contractor will abide by and respect all standards set out by the Owner’s Policies and Procedures.

.24 The Contractor shall provide the Consultant with a copy of its current Health and Safety (H&S) policy signed by senior management, and its OH&S procedures.

.25 The Contractor shall supply and maintain SDS at each Worksite for all controlled substances.

.26 When working on property used by any other private or public entity, the Contractor shall ensure that all equipment, materials, tools and personal gear are tethered to a structure or to a person, such that nothing can fall onto property or person at any time, including when it is being used or when it is being raised or lowered over traffic or people.

.27 Contractor's Personnel shall comply with the health and safety requirements outlined in the Owner's Health & Safety policy.

4.5.4 Quality Control Plan

.1 The Contractor shall develop detailed Quality Control Plans (QCP) for steel work and coating work (separately), and submit to the Consultant for Review. The Contractor shall not commence production work until the applicable QCPs have been accepted by the Consultant. QCP shall include all aspects of the quality activities to be conducted by the Contractor. The QCP shall clearly define:

a. The quality and standard operating procedures that will be followed during the execution of all project tasks;

b. The roles, responsibilities and qualifications of the personnel conducting the Contractors Quality Control (QC) activities;

c. Details in the inspection report which will be completed daily to document compliance with all technical requirements of the Specification;

d. Attach a sample Inspection Report;

e. How daily Quality Control Reports will be turned in to the Consultant every day;

f. Detail the Contractor's Non-Conformance process which will be used to identify and detail Non-Conformances. This section shall also detail how Non-Conformances will be reported to the Consultant, and addressed by the Contractor in a timely manner;

g. Attach a sample Non-Conformance Report;

h. Detail how Non-Conformances identified by the Consultant's QA team will be processed by the Contractor's quality process;

.2 The Contractor shall acknowledge that daily Quality Control Reports will be submitted to the Consultant every day.

.3 Detail the inspection and Testing Plan, which shall include:

a. The inspections that will be conducted;

b. Instrumentation used;

c. Test frequency;

d. The individual industry standard or specification that is applicable to the task being conducted;

e. The Consultant, Contractor and Coating Manufacturer's inspection hold points

.4 The following minimum coating Quality Control inspections are required each day as applicable and will be included in the Inspection and Testing Plan (ITP):

a. Pressure washing;

b. Grinding of sharp edges;

c. Solvent cleaning;

d. Proper accessibility and lighting to perform the work;

e. Removal of pack rust;

f. Ambient conditions for surface preparation;

g. Compressed air cleanliness;

h. Abrasive blast cleanliness and profile (Note: prior to production cleaning,

i. test areas must be performed to accept the degree of cleaning);

j. Remediation of chloride;

k. Confirmation of degree of cleaning, including removal of dust, prior to painting;

l. Ambient conditions for painting;

m. Verification of coating products type, Lot #, and expiry dates;

n. Mixing and thinning;

o. Application of each coat (wet film thickness, dry film thickness, coverage, continuity, and freedom from defects);

p. Dry time and cleanliness between coats;

q. Touch up of damage and areas shielded by the containment;

r. Proper installation of caulking where required;

s. Final drying and curing prior to exposure to the elements;

t. Provide detailed daily reports.

.5 The Contractor shall clearly define hold points for QA inspections and acceptance within the construction sequence.

.6 The Contractor shall allow adequate time for QA inspections and acceptance built in construction sequence and schedule.

.7 Submit Qualifications of the Painting Contractor/Subcontractor including experience, training and certifications for key personnel who are to be assigned to this scope of work. Qualifications for all personnel conducting work on the project at both the shop and/or site locations shall be provided to the Consultant QA representative onsite. The painting contractor shall demonstrate their experience through the following:

a. Current certifications for the painting contractor through SSPC-The Society for Protective Coatings (QP-1, QP-2, QP-3) or AISC Sophisticated Paint Endorsement (SPE) for fabrication shops that paint. As an alternative to the AISC SPE or QP-3

certification, the fabrication shop may contract with a certified QP-1 contractor to perform the painting.

b. Training and Certifications for Quality Control personnel including NACE CIP, SSPC PCI and SSPC BCI.

c. Training, Education, Certifications for Environmental, Health and Safety Personnel

d. Training certificates and experience of trade workers gained through organizations such as The International Union of Painters and Allied Trades (IUPAT), SSPC or others.

e. Contractors that do not possess the SSPC or AISC certifications must have (and must demonstrate) recent and relevant painting experience involving quality planning and control documentation demonstrating that the painting contractor performs painting work in accordance with detailed written quality control plans and procedures.

f. Recent field work is a minimum of 2 bridge projects spanning water in the last 5 years, each of a minimum duration of 6 months. The projects shall involve abrasive blast cleaning removal of lead paint within a ventilated containment, including all required monitoring to assure the protection of the workers and the environment, the proper handling and disposal of lead waste, and the application of a multi-coat system with a zinc primer. The project duration, contract value, and contact information for Owner representatives shall be provided.

g. Recent shop painting is a minimum of 2 bridge projects with a minimum of 50 tons of steel each in the last 5 years, blast cleaned and painted with a multi-coat system including a zinc primer. The project duration, contract value, and contact information for Owner representatives shall be provided.

h. Copies of the quality manual for cleaning, painting, and inspection shall be provided together with all forms used to document the quality of the work, and procedures for the correction of non-conforming work. The manual shall include an organization chart and the responsibilities of key personnel.

i. Training and Certifications for Quality Control personnel including NACE CIP, SSPC PCI and SSPC BCI.

j. Training, Education, Certifications for Environmental, Health and Safety Personnel

k. Training certificates and experience of trade workers gained through organizations such as the International Union of Painters and Allied Trades (IUPAT), SSPC or others."

.8 Submit materials certifications and documentation for coatings, abrasives, caulk, structural steel and weld material. Certifications, samples and documentation shall be submitted to the Consultant for Review prior to delivery of materials to site. Submission shall include:

a. Product Data Sheets for the approved paint system.

b. All published testing information, historical data, product data sheets, and application instructions. Include the Class A and Class B Certification for the primer.

c. Material characteristics of the approved paint system as submitted to NTPEP for testing and approved by NEPCOAT, together with the paint manufacturer's written certification that the paint system complies with the paint system requirements specified in this specification.

d. Note: the manufacturer must also provide a letter with each batch of material supplied to the project that certifies that the material is the same composition as the material supplied for NTPEP testing.

e. Paint manufacturer's letter verifying compliance with VOC requirements.

f. Product data sheets for the caulking material. The Contractor shall provide a letter from the paint manufacturer and the caulk manufacturer stating that the caulking is compatible with the approved paint system, and will perform properly when used between the prime and finish, or on top of the finish, with a stripe coat of finish applied over it.

g. Mill certifications and traceability information for structural steel.

h. Supplemental steel test data (as applicable).

i. Applicable CWB approved weld procedures.

4.5.5 Work Plan

.1 The Contractor shall develop a detailed work plan to be submitted to the Consultant.

.2 The Contractor shall submit the Work Plan to the Consultant for review minimum 14 days in advance of proposed use to allow for its review, comment, and revision if required, without delay to the Work.

.3 Work Plan shall include but not be limited to:

a. Proposed procedures for surface preparation (including the proposed method for chloride remediation) and proposed coating application procedures and stripe coating;

b. Proposed procedures for steel repair;

c. Provisions for overspray and blasting protection;

d. Hoisting plan for lifting of equipment and materials

e. Safety signage during blast cleaning, painting, steel repair and roadway closures;

f. Protection against and remediation for spills; etc.

4.5.6 Access and Containment Plan

.1 Submit an Access and Containment Plan for temporary structures and access system with working drawings, design calculations, weights of stored materials, weights and operational data of the proposed construction equipment to be supported on existing and temporary structures (Temporary Works) including the containment enclosure and supporting data in sufficient detail to permit a structural review of the Contractor's proposed design of temporary work/Scaffolding/Staging. All calculations and drawings prepared by the Contractor shall be designed by a Professional Engineer experienced in the type of access containment systems proposed in the plan, who shall affix his seal to all designs and work methods.

.2 The Access and Containment Plan shall be submitted sufficiently in advance (minimum 21 days in advance) of proposed use to allow for its review, comment, and revision if required, without delay to the Work.

.3 The Submittal shall detail the proposed containment enclosure and include the following information:

a. Plan and elevation of the containment enclosure in relation to the bridge structure. The type of solid or rigid floor and working platform with appropriate safety and fall protection measures. A description of the method that will be used to provide worker access to the enclosure (personnel lifts, scaffolds, staircase etc.), and the procedures and equipment that will be used to protect workers from falls shall be specified in conformance to Ontario Occupational Health and Safety Requirements. A description of the method how the debris will be collected and off-loaded, and a description of how the drainage run-off from existing deck drains and expansion joints will be routed through the enclosure.

b. Containment shall be watertight, to eliminate leakage and water ingress, including at underside of roadway expansion joint.

c. Access to all levels of containment for full duration of the project shall be possible without entering any contaminated areas. This is typically accomplished through staircase outside primary containment.

d. Plan to manage water coming off bridge structure through deck drains and through expansion joint is required.

e. The type of rigid or flexible support structure used for the floor, walls, and ceiling, including the method by which the containment enclosure materials are to be affixed to the support structure and how the support structure is to be affixed to the bridge. Welded connections and drilling holes on the permanent bridge elements will not be acceptable.

f. Drawings of the cleaning and recovery system.

g. Drawings of the protection system for the areas adjacent to and underneath the structure.

h. Location of temporary waste storage site, waste disposal site and waste transporter information.

i. A design analysis of the loads on the bridge due to the containment enclosure is required.

j. Lighting inside containment for cleaning, painting, and inspection shall be per SSPC Guide 12.

.4 The containment system shall be in accordance with SSPC Technology Guide No. 6, Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations, Class 1A, Assessment Method A, Level 2, plus Assessment Methods B, C, D, E & F. The containment system shall fully enclose the steel to be painted and not allow any material to escape the containment system. Contractor shall protect the surrounding environment from all debris or damage resulting from the Contractor’s operations.

.5 Contractor shall design the containment support system based on the capacity of the structure, area of containment, safety of construction crew and equipment, and wind speed/gust threshold specified in the next provision. The containment system shall not cause any damage to the existing structure. Attachment devices shall not mark or otherwise damage the steel member to which they are attached. Field-welding of attachments to the existing structure will not be allowed. Contractor shall not drill holes into

the existing structure or through existing structural members unless otherwise authorized by the Engineer.

.6 Emissions shall be assessed by Visible Emission Observations (Method A) Level 2, plus assessment methods C, D, E & F shall meet all requirements of SSPC Guide 6, current edition at the time of award of contract. If visible emissions occur or if failure to the containment system occurs or if signs of failure to the containment system are present, Contractor shall stop work immediately. Work shall not resume until the failure has been corrected to the satisfaction of the Engineer.

.7 Contractor will provide ground covers beneath the containment area and all equipment where spills are possible to capture inadvertent spills or leaks of debris. Extend the covers a minimum of 1.5 m beyond the area to be covered. Debris shall be removed from the covers at least once per shift, or as directed by the Engineer. If the ground beneath the structure serves as the base of the containment, install and maintain air and dust impenetrable materials such as solid plywood panels or flexible materials such as tarpaulins.

.8 The containment system shall not be removed until all cleaned and painted surface have been inspected and accepted by the Engineer.

.9 Prior to beginning work each day, all containment systems shall be inspected by the Contractor to verify they are in place and functioning properly. Any necessary maintenance to restore full function shall be completed prior to beginning work.

.10 Design analysis shall include: maximum dead and live loads of the enclosure, the workers, blast abrasive, and equipment; maximum allowable load for the floor and working platform; wind loads imposed on the structure by the enclosure; and, maximum wind velocity that the containment enclosure is designed to withstand. The Contractor shall not start the construction of any temporary work, for which working drawings are required, until the working drawings have been reviewed by the Consultant and all comments have been addressed to Consultant's full satisfaction. Such review will not relieve the Contractor of responsibility for results obtained by implementing the Work Plan, or any other responsibilities under this Contract.

.11 Drawings submitted for review shall include details necessary for the Consultant's review including: factored and unfactored horizontal loads on the bridge, wind speed limits shall be clearly shown on the drawings including maximum mean hourly wind speed and maximum 3-second gust wind speed. Drawings submitted for review shall be signed and sealed by the Contractor's Professional engineer, registered to practice in the Province of Ontario.

.12 Containment and access design, load restriction and containment design criteria shall meet all requirements of the project plans and containment notes.

4.5.7 Emergency Containment Demobilization Plan

.1 The Contractor shall submit an Emergency Demobilization Containment Plan to the Consultant for review.

.2 The Emergency Demobilization Containment Plan shall:

a. Demonstrate the Contractor's ability to remove containment in the event of an extreme weather event or other emergency;

b. Clearly define thresholds (wind speed, fire, etc.) which require emergency demobilization; and

c. Define the process that the Contractor will follow to initiate and carry out emergency demobilization.

.3 When wind events are forecast to exceed 100km/hr, or thresholds identified in Project plans, the Contractor shall:

a. Notify the Consultant in writing, minimum 12 hours in advance of forecast wind event;

b. Implement (or continue, as appropriate) Emergency Containment demobilization plan;

c. Notify the Consultant in writing when containment demobilization is complete; and

d. Notify the Consultant in writing, or any damage to the containment and structure within 12 hours of completion of wind event, and Contractor's planned date to resume regular operations.

4.5.8 Lead (Toxic Metal) Health and Safety Compliance Program

.1 The requirements identified below are based on the guidance provided in the following:

a. Guideline: Lead on Construction Projects, issued by the Ministry of Labor, Immigration, Training and Skills Development of Ontario (MLITSD), April 2011

b. EACC Guideline: Lead Guideline for Construction, Renovation, Maintenance or Repair, January 2025

c. EACC Guideline: Mould Abatement Guidelines, Edition 3, 2015

.2 The Contractor must protect the employees from exposure to any of the other toxic metals or other hazards which may be present on surfaces, in the paint and/or abrasive, as applicable, in addition to lead. Submit the following information addressing worker health and safety from exposure to lead, other toxic metals and biological contaminants (e.g. bird droppings):

a. Exposure Control Plan and Site-Specific Safe Work Practices.

i. The Contractor shall have a Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene, or Registered Occupational Hygienist (ROH) certified by the Canadian Registration Board of Occupational Hygienists develop, review, and approve their site specific written exposure control plan (ECP) and safe work practices (SWPs) to address actions that will disturb coatings containing lead and/or bird droppings and other biological wastes. The plan must include the following:

1. The CIH/ROH, or a technician working under the direction of the CIH/ROH, shall be present during the first three days of work and at least twice a month thereafter.

2. The CIH/ROH shall certify in writing during the first week of work and at the end of the work that the ECP/SWPs fully complied with all regulations and that the plans were fully implemented.

3. Daily inspections of the work area shall be made by the project "competent person". The Contractor shall have identified the

"competent person" by name in both the CIH/ROH's written ECP and the Access and Containment Plan. The ECP shall also include the "competent person's" qualifications and the frequency of inspections to be taken.

.3 The Contractor shall provide respiratory protection and protective clothing and other necessary equipment for up to 2 Owner representatives at the site.

4.6 ENVIRONMENTAL PROTECTION PLAN (EPP)

.1 The EPP shall define the Contractor's program and procedures regarding Environmental Protection and provide a comprehensive overview of known or potential environmental issues to be addressed during the Project.

.2 Minimum 14 days prior to site mobilization, the Contractor shall submit an (EPP), prepared by a qualified person, for Review by Consultant.

.3 The EPP shall include, but not be limited to:

a. Name of person(s) responsible for ensuring adherence to the EPP, i.e., the EM;

b. Name and qualifications (education and experience) of EM, including an overview if his/her role ensuring that the qualifications are met at minimum;

c. Outline of the Contractor's Environmental Protection briefings and awareness program for employees and Subcontractors;

.4 The EPP shall include the following Project specific plans:

a. Environmental Emergency and Contingency Plan;

b. Hazardous Materials Management Plan;

c. Reduce, Reuse, Recycling and Waste Disposal Plan;

d. Air Emissions Control Plan;

e. Marine Environment Protection Plan;

f. Land Based Work Plan;

g. Wildlife Management Plan;

h. Sound Mitigation Plan; and

i. Environmental Monitoring Plan.

.5 The EM shall review the EPP monthly for its appropriateness and shall ensure that all required incident response materials are on site and in adequate supply and that all Project employees, including Subcontractors, are familiar with the requirements of the plan.

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4.6.1 Environmental Emergency and Contingency Plan

.1 The Contractor shall prepare an Environmental Emergency and Contingency Plan which shall include at a minimum:

a. A list of reasonably likely environmental emergencies associated with the Project;

b. Detailed protocols for response to each potential environmental emergency;

c. A list and contact information for federal, provincial, municipal, the Consultant and the Contractor's environmental emergency first responders; and

d. The 24-hour Marine Environmental Response Numbers and procedures for reporting an incident.

4.6.2 Hazardous Materials Management Plan

.1 The Contractor shall prepare a Hazardous Materials Management Plan which shall include, but not be limited to:

a. A list of all regulated or hazardous substances associated with the Project;

b. A list of provisions for compliance with federal, provincial, and municipal laws and regulations for the storage and handling of those regulated or hazardous substances (i.e. WHMIS Safety Data Sheets);

c. Preventive handling procedures, instructions and reports to be used in the event of a spill of regulated or hazardous substances; and

d. Quantities of fuel or other hazardous materials likely to be stored on site at any one time.

.2 No fuel or other hazardous materials are to be stored at Project staging areas.

.3 Hazardous Materials are to be stored, mixed and transferred on land and not on the Bridge, to the extent practical, to aid in preventing these materials from entering any water course in the event of a spill.

.4 Regulations and Guidelines that are specific to this section of the EPP are listed below for guidance only; these include but are not limited to:

a. 2012 Emergency Response Guidebook, Transport Canada;

b. Transportation of Dangerous Goods Act, Transport Canada;

c. Ontario Regulation 347/90 of the Revised Regulations of Ontario, amended to Ontario Regulation 461/05 and 217/08, General – Waste Management (R.R.O., 1990, Reg. 347), under the Environmental Protection Act (EPA)

d. Dangerous Goods Transportation Act, R.S.O. 1990, c. D.1

e. Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

4.6.3 Reduce, Reuse, Recycling and Waste Disposal Plan

.1 In accordance with Owner's Environmental Policy, efforts shall be made to divert removed Bridge structure materials from the landfill, when possible.

.2 Hazardous materials, including lead coatings, shall be handled transported and disposed of in a safe and secure manner.

.3 Regulations and Guidelines that are specific to this section of the EPP are listed below for guidance only; these include but are not limited to:

a. Dangerous Goods Transportation Act, R.S.O. 1990, c. D.1

b. Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

c. Canadian Construction Association (CCA), A Guide on Construction Environmental Management Planning, Standard Construction Document CCA 81; and

d. CCA, A Best Practices Guide to Solid Waste Reduction, Standard Construction Document CCA 27.

.4 The Contractor shall prepare a Reduce, Reuse, Recycle and Waste Disposal Plan, in the form of a Waste Audit (See Guide on Construction Environmental Management Planning, Standard Construction Document CCA 81). This plan shall include at a minimum:

a. A list of all anticipated Project materials resulting from the removal of the existing Bridge structure;

b. Estimated material quantities; and

c. Handling options considered and end use or disposal plans for each material type.

4.6.4 Air Emissions Control Plan

.1 The Contractor shall adopt the Owner's Anti-idling Policy.

.2 The Contractor shall exercise effective dust control measures at all times. Dust and debris shall be cleaned up daily during the Work, or more often if required by the Consultant.

.3 Dust control methods shall include spraying surfaces with water or other environmentally approved product. Use purposely suited equipment or machinery and apply in sufficient quantity and frequency to provide effective result and continued dust control during the entire course of the Work. Do not use oil or any petroleum products for dust control.

.4 The protective coatings on this Bridge structure contain lead. This is considered toxic to workers and the Environment. The Contractor shall implement measures to safely contain and dispose of these and any other deleterious materials generated by his Work. It is the intention of the Consultant that no material be released into the Environment.

.5 The primary goal of the containment is to stop the escape of deleterious material from protective coating works. Secondly, it enables control of the atmosphere inside the containment, which can be an aid to blasting, coating and curing coatings. The containment typically is the industry standard shrink wrap on scaffolding.

4.6.5 Containment:

.1 The Contractor shall establish and maintain a regulated area surrounding the work site at the Action Level for lead and other toxic metals in the paint being removed. Post caution signs around each regulated area. Use the legend for the CAUTION sign as found in the EACC Guideline: Lead Guideline for Construction, Renovation, Maintenance or Repair, January 2025 as the basis, and insert the name(s) of the other toxic metals. Signs shall be posted in sufficient numbers to warn of the lead hazard and shall state in large clearly visible letters that, i) there is a lead hazard, and ii) access to the work area is restricted to persons wearing protective clothing.

.2 Visible emissions from the containment shall be no greater than Level 1 (cumulative duration of no greater than 1% of the work day) per SSPC-Technology Update No. 7. Method PD/Lead A4 of SSPC Publication 95-06 provides guidance on visible emissions assessments.

4.6.6 Air Monitoring Plan

.1 Compliance with air monitoring as described in the previous sections. Monitoring, including siting shall follow the guidance of SSPC-TU7.

.2 Sidewalk and Bikeway will remain open to the public during the Work, conduct area air monitoring on the open sidewalk and bikeway deck utilizing low flow sampling pumps for a minimum of two days per week on days that surface preparation activities occur. Locate the monitors on the deck immediately adjacent to the work area. Collect samples throughout the entire work shift using a minimum of two sampling pumps operating at a flow rate of 2.0 litres per minute. Have the laboratory provide results within 72 hours of the field sampling. Provide the test results to the Consultant within five days of sampling.

.3 If dust or debris escape the containment, stop work and undertake immediate clean up using HEPA filtered vacuuming equipment. Repair the conditions responsible for the escape before resuming the work.

.4 The collected debris and waste shall be disposed of in a safe and secure manner. Disposal of the debris collected above according to the Province of Ontario and any other such bodies as may have regulatory authority.

.5 Regulations and Guidelines that are specific to this section of the EPP include but are not limited to:

a. Ontario Environmental Protection Act, R.S.O. 1990;

b. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities, Environment Canada, 2005; and

c. Occupational Health and Safety Act, R.S.O. 1990, c. O.1

d. Guideline: Lead on Construction Projects, issued by the Ministry of Labor, Immigration, Training and Skills Development of Ontario (MLITSD), April 2011

e. EACC Guideline: Lead Guideline for Construction, Renovation, Maintenance or Repair, January 2025

.6 The Contractor shall prepare an Air Emissions Control Plan which shall include but is not limited to:

a. Detailed protocols for the management of Project related emissions, dust and particulate matter;

b. Detailed protocols for the handling of lead-based paint.

c. Engineered containment design drawings.

4.6.7 Marine Environment Protection Planning

.1 The Contractor shall ensure that equipment required is mechanically sound, having no leaking fuel tanks or hydraulic connections.

.2 All hydraulic machinery entering the watercourse uses environmentally sensitive hydraulic fluids that are non-toxic to marine life and readily or inherently biodegradable (brands such as Hydrosafe or Environs).

.3 Storage, refuelling and cleaning of all machinery and fuels shall, where practical, be completed at a minimum, 30 m away from the shore to prevent any deleterious substance from entering the water.

.4 Regulations and Guidelines that are specific to this section of the EPP are listed below for guidance only; these include but are not limited to:

a. Environment Canada, Canadian Environmental Protection Act;

b. DFO, Fisheries Act;

c. DFO, Interim Code of Practice: Bridge Repair and Maintenance

d. Transport Canada, Pollutant Discharge Reporting Regulations 1995;

e. Canadian Environmental Quality Guidelines (CCME) Water Quality for the Protection of Aquatic Life; and

.5 The Contractor shall prepare a Marine Environment Protection Plan which shall include but not be limited to:

a. Details of plans to prevent the release of silt, sediment, sediment laden water or any other deleterious substance from the Bridge, including cleaning and removal of debris, bird feces and sediment from the arch; and

b. Details of plans to contain and prevent paint particles, blasting abrasives, protective coatings, rust and grease from entering the watercourse.

4.6.8 Land Based Work Planning

.1 The EM shall be responsible for the monitoring of erosion control devices for their continued effectiveness, maintenance and stability. This may include periodic water quality sampling and analyses for total suspended solids during heavy precipitation if indicated via visual observation by the EM of turbidity in runoff from the site.

.2 The EM shall halt heavy equipment activity in construction staging areas during excessively heavy precipitation when potential for erosion is unacceptably high. The EM will advise the Contractor’s Project Manager if these conditions are occurring.

.3 If relevant, the EM shall mark clearing and grubbing limits for the Project staging area adjacent to the bridge.

.4 Land based Work or Access associated with the Project is anticipated to occur in the following staging areas:

a. Land belonging to the Owner;

b. Land belonging to third-party owners

.5 Regulations and Guidelines that are specific to this section of the EPP which are listed below are for guidance only; these include but are not limited to:

a. Environment Canada, Sections 35 and 36 of the Fisheries Act;

b. National Guide to Erosion and Sediment Control on Roadway Projects, Transportation Association of Canada (TAC).

.6 Should there be any earth movement required the Contractor shall prepare a Land Based Work Plan, which shall include but not be limited to:

a. Erosion and sediment control plan;

b. Pre- and post- construction surveys;

c. Approval requirements and processes;

d. Restoration plan;

e. Monitoring;

f. Erosion and sediment control engineered drawings for Project staging areas; and

g. Details of plans to control run-off and prevent sediment from leaving the site.

4.6.9 Wildlife Management Planning

.1 The Contractor, Subcontractors and their respective Personnel shall not harass wildlife, waterfowl, fish or marine mammals. Any contravention of environmental requirements, including employee actions, accidental or otherwise, resulting in environmental damage will not be tolerated.

.2 Regulations and Guidelines that are specific to this section of the EPP which are listed below are for guidance only; these include but are not limited to:

a. Fish and Wildlife Conservation Act;

b. Migratory Bird Convention Act;

4.6.10 Sound Mitigation Planning

.1 The Contractor shall reduce noisy work outside of the agreed upon project working hours.

.2 The Contractor shall liaise with and co-operate with Consultant in addressing public concerns and complaints related to noise and nuisance and take all necessary measures to resolve noise problems.

4.6.11 Environmental Monitoring Plan

.1 The EM will conduct visual monitoring to ensure compliance with the EPP requirements, regulatory permit terms and conditions, letters of advice/authorizations and environmental commitments through regular inspection of construction and operation activities. Through general effects monitoring, the EM shall determine if environmental impacts are occurring and if so, are they occurring at predicted levels. Effects monitoring will provide a measure of validity of the predictions and provide a means of assessing and re-evaluating whether or not mitigation has achieved it purpose.

.2 This structure is in an urban environment and it is suggested that the Contractor consider collection of background level information of possible pre-existing air, water and soil contamination as appropriate prior to commencing Work.

.3 The EM shall monitor and maintain a record of incidents pertaining to soil or water contamination that may affect any wildlife, migratory birds, and/or fish/marine mammals.

.4 Monitoring shall be sufficient to ensure that no material is released to the Environment and that levels of Contaminants in the surrounding Environment have not increased during the course of the Work. This shall include environmental sampling before and after the remediation work, as well as Quality Control of emissions during the Work.

.5 The Contractor shall test spent abrasive material and any other effluent generated by paint remediation operations to determine whether or not it requires special handling as hazardous waste. All material generated hazardous waste or not, shall be disposed of in accordance with the Ontario Environment Regulations.

.6 Fugitive emissions shall be strictly controlled during washing, cleaning and painting operations.

4.6.12 Compliance Reporting

.1 Within 60 days of the Project's Substantial Performance the EM shall complete and submit a Final Environmental Report.

.2 The Final Environmental Report will include but is not limited to:

a. A summary of environmental mitigation measures used and mitigation effectiveness;

b. Explanation of all design changes implemented/recommended for environmental reasons;

c. Summary of environmental concerns encountered, new mitigation measures taken and "lessons learned";

d. A copy of all monthly reports;

e. Colour photo history of environmental concerns encountered, mitigation measures implanted and design changes; and

f. Records of the safe disposal or recycling of all waste streams.

4.7 CONSTRUCTION FACILITIES

4.7.1 Installation and Removal

.1 The Contractor shall provide all labour tools and equipment and construction facilities required to execute the Work.

.2 The Contractor shall remove all temporary construction facilities from site after use.

4.7.2 Hoisting

.1 The Contractor shall provide, operate and maintain hoists required for moving of workers, materials and equipment.

.2 Cranes and lifts shall be operated by qualified operator(s).

4.7.3 Equipment, Tool and Materials Storage

.1 The Contractor shall assume full responsibility for storage, protection and safekeeping of materials, equipment, and products.

.2 Coatings shall be stored out of sunlight and at temperatures in compliance with the manufacturer's requirements.

.3 The Contractor shall provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.4 The Contractor shall locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities. The Contractor shall obtain and pay for additional storage on site required for the work of this contract. Coordinate location of temporary storage with Owner.

.5 The Contractor shall provide adequate strapping, padding, and dunnage, during loading and transfer of materials. Bare hooks, chains or cables shall not be used for the handling of material. If electro-magnets are used, residual magnetism shall be checked and remedied as appropriate. The Contractor shall be responsible for the cargo securing during shipping/transport, and any associated engineering.

.6 Material shall be stacked using soft-faced spacers, racks, pallets and wedges to ensure safety, and to avoid damage. If damage due to handling or conditions of storage occurs, the Contractor shall take immediate corrective action at the Contractor's sole expense.

.7 Material shall be stored safely such that during entire time of storage material is clear of the ground and water, and debris and mud cannot accumulate.

.8 All structural steel materials shall be stored above ground on supports in a way which does not cause any damage to the materials.

.9 Storage of materials shall be such that identification and inspection of each item can be easily performed.

4.7.4 Removal of Temporary Facilities

.1 Remove temporary facilities from the site when directed by the Consultant.

4.7.5 Demolition Works and Work Methods

.1 All temporary works and all work methods for bracing, shoring, and maintaining stability during demolition and restoration, shall be designed by the Contractor's Professional Engineer registered in the Province of Ontario who shall affix his seal to all designs and work methods.

.2 The design of all works and work methods shall be submitted to the Consultant for review a minimum of fourteen (14) days prior to commencement of the Work. Such review shall not relieve the Contractor of any responsibility or liability in execution of the Work. The Contractor shall comply with any requirements of Consultant following its review of the Contractor's intended temporary work and work methods.

4.8 MATERIALS

4.8.1 General

.1 All materials shall be in accordance with CAN/CSA S6 clause 10.4 "Materials" unless otherwise specified.

4.8.2 Structural Steel

.1 Structural steel shall be fabricated by a company certified to CAN/CSA W47.1.

.2 Structural steel for plates, angles and wide flange shapes shall conform to CAN/CSA G40.20/G40.21 Grade 350WT unless otherwise noted on the Drawings.

.3 Structural steel for lattice bars shall conform to CAN/CSA G40.20/G40.21 Grade 350W unless otherwise noted on the drawings.

.4 The Contractor shall submit erection diagrams, shop details, welding procedures, and erection procedure drawings and calculations to the Consultant as outlined in CSA S6:19 Annex A10.1.2 Submissions.

4.8.3 Welding

.1 Welding shall be in accordance with CSA W59 and CAN/CSA S6:19.

.2 Welding electrodes shall be suitable for the grade of steel being welded and shall conform to Canadian Standard CAN/CSA-W48.1-M.

.3 The Contractor shall prepare and submit Canadian Welding Bureau (CWB) approved welding procedures specifications, data sheets, and repair procedures for the Consultant's review.

.4 Weld procedures for welding to existing steel will require testing of existing steel to satisfy CWB; this testing will be considered part of the scope of the repair.

.5 All welding completed both onsite and in the Contractor's shop shall be completed under the supervision of a CWB W47.1 certified welding supervisor.

.6 The Contractor shall perform all testing outlined in S6:19 Annex A10.1.8.2 Non-destructive testing of welds.

.7 The Contractor's weld inspector shall be CWB certified to the requirements of CSA W178.2. and Canadian General Standard Board (CGSB) 48.9712. Level 1 CWB Inspections shall be under the direct supervision of a minimum Level 2 Inspector.

.8 The Contractor shall also perform and document results of the following inspections:

a. 100% Visual Inspection of all welds;

b. 100% Magnetic Particle Inspection of all field fillet welds;

c. 100% Ultrasonic Testing of all Complete and Partial Joint Penetration field welds.

d. 100% Visual Inspection of all locations where existing welds were removed by grinding; and

e. 100% Magnetic Particle Inspection of all locations where existing welds were removed by grinding.

4.8.4 Bolts, Nuts and Washers

.1 This specification covers the assembly of structural connections using high-strength bolts and nuts with hardened washers where initial tension in the bolt produces friction on the contact surfaces of the connected pieces sufficient in magnitude to resist shear.

.2 Connections Using High-Strength Bolts:

a. Bolts shall conform to ASTM F3125 Grade A325 Type 1 unless noted otherwise.

b. Heavy Hex Nuts shall conform to ASTM A563 Grade DH and Hardened Steel Washers shall conform to ASTM F436 Type 1.

c. ASTM A563 nuts may be substituted with ASTM A194 Grade 2H nuts with approval by the Consultant.

.3 Bolted Connections shall be in accordance to CSA S6:19 Section A.10.1.6. The contractor shall submit installation plan as stated in Section 4.5 and QC plan per Section 4.5.4 prior to installation of any bolts.

4.8.5 Coatings (Paint)

.1 All coating materials, thinners, and reducers shall be from the same manufacturer. See Table 2 for acceptable coating systems.

.2 Acceptable coating systems are approved by NEPCOAT (List 'B') – organic zinc-rich primer three-coat system; these approved coatings change from time to time, so alternative products may be found to be acceptable at time of application. Acceptable coating systems employ organic zinc primers.

.3 The Contractor shall supply all coating related materials necessary to meet the specification and complete the work.

.4 All materials used in the work shall comply with VOC emission requirements- EPA Clean Air Act 1977.

.5 The finish coat shall meet the gloss and colour requirements of Table 3.

Table 2 - Acceptable Coating Systems and Requirements

Product (OZ/EP/PU)	DFT mils (µm)	VOC g/l (lb./g) EPA Method 24	Primer Slip Rating	Primer Restrictions when Applied to Joints
Manufacturer: Carboline (NEPCOAT System)				
Primer: Carbozinc 859	3-10 (75-250)	322	B	6 mil max. DFT 4-day min. cure 10% max. thin
Intermediate: Carboline 893	3-6 (75-150)	207	-	-
Topcoat: Carboline 133 VOC	3-5 (76-127)	185 es (with exempt solvent)	-	-
Manufacturer: Carboline (NEPCOAT System)				
Primer: Carbozinc 859	3-10 (75-250)	342	B	6 mil max. DFT 4-day min. cure 10% max. thin
Intermediate: Carboline 893	3-6 (75-150)	218	-	-
Topcoat: Carboline 133 VOC	3-5 (76-127)	254	-	-
Manufacturer: Sherwin Williams (NEPCOAT System)				
Primer: Zinc Clad 4100	3-5 (75-120)	319	B	5 mil max. DFT 72 hr. cure 5% max. thin
Intermediate: Macropoxy 646 FC	3-10 (75-250)	265	-	-
Topcoat: Hi-Solids Polyurethane 250	3-4 (75-100)	234 es (with exempt solvent)	-	-
Manufacturer: Sherwin Williams (NEPCOAT System)				
Primer: Zinc Clad 4100	3-5 (75-125)	336	B	5 mil max. DFT 72 hr. cure 5% max. thin
Intermediate: Macropoxy 646 FC	3-10 (75-250)	229	-	-
Topcoat: Acrolon 218 HS	3-6 (75-150)	276	-	-
Manufacturer: Sherwin Williams (NEPCOAT System)				
Primer: Zinc Clad 4100	3-5 (75-125)	333	B	5 mil max. DFT 72 hr. cure 5% max. thin

Intermediate: Macropoxy 646 FC	3-8 (75-200)	290	-	-
Topcoat: Acrolon 218 HS	3-6 (75-150)	254	-	-
Manufacturer: PPG Industries (NEPCOAT System)				
Primer: Sigmazinc 70 DOT	2-7 (50-177)	257	B	5 mil max. DFT 72 hr. cure 5% max. thin
Intermediate: PPG DTM Epoxy 202 DOTC	4-8 (100-200)	234	-	-
Topcoat: Pitthane Ultra DOT 95-812	2-3 (50-75)	250	-	-

Table 3 - Acceptable Bridge Coating Colours and Gloss

Where Used	Gloss	RAL Number	RGB Coordinates
General Bridge Topcoat	Gloss	7040	154, 162, 164

4.8.6 Abrasive Blast Cleaning Media

.1 Blast grit shall be free from Contaminants, moisture and oils, greases and other materials that will interfere with the adhesion or longevity of the coating system to be applied.

.2 The abrasives used for all blasting shall meet the guidelines set forth in SSPC AB1 for mineral and slag abrasives, and AB3 for ferrous metallic abrasives. Any additive mixed with the abrasive shall be approved by the Engineer prior to use. The abrasives used shall produce a height of profile between 2.0 and 3.0 mils (50 µm and 75 µm).

.3 In addition, the container or bag of abrasive shall include the name of the abrasive, the name of the manufacturer, and the size of the abrasive. If any additive has been included with the abrasive, the name and the percentage of the additive shall be on the container or bag.

.4 Silica sand is not permitted to be used.

.5 Blast media shall be completely removed from containment and all surfaces cleaned prior to steel repair identifications.

4.8.7 Caulking Materials

.1 Provide caulking materials acceptable to the coating manufacturer and compatible with the coating products being applied.

.2 Supply application and installation instructions for the caulk/sealant, including but not limited to the minimum/maximum joint width and depth that can be caulked/sealed; proper size and type of backer rod, if any, needed; application in lifts, if needed; and other installation instructions from the caulk/sealant manufacturer.

.3 Include written procedures for painting the caulking/sealant, including coating and caulking/sealant drying and overcoating times for installing the sealant after the application of the intermediate coat prior to the finish. If the Contractor prefers to install the caulking/sealant after the application of the finish, provide detailed procedures for the installation, followed by the application of a stripe coat of the finish coat to the caulk/sealant after it adequately dries.

4.9 COATING REQUIREMENTS

.1 Coating materials shall be delivered to the Worksite in sealed, original, labelled containers, bearing the Manufacturer's name, type of paint, brand name, colour designation, batch number, date of manufacture and instructions for mixing, thinning, and curing. Each batch of coating shall be accompanied by product/application data sheets, SDS, and if applicable the Class B and Class A certificate for the primer.

.2 Coating materials shall be stored at all times, including onsite, in accordance with the coating Manufacturer's requirements for temperature and humidity.

.3 The system used shall be from among those as stated in Table 2 above and in the detailed coating scope below. The Consultant will unilaterally decide if a proposed alternative material is acceptable.

.4 Coatings shall not be mixed and matched. The entire coating system as outlined in Table 2 above shall be used as stated for both the shop and field work.

.5 The use of "quick cure" additive components is not permitted.

.6 Each layer of coating shall be coloured to differentiate it from the layers above and/or below, with the exception of topcoat stripe and topcoat, which shall both be coloured per Table 3, above. Each application of paint; primer, penetrating sealer, stripe coat, mid-coat and/or topcoat is considered a separate layer of coating for this specification.

.7 Field tinting is not permitted. Tinting shall be accomplished by the dry-grinding process during manufacturing.

.8 The coating system shall consist of a Zinc/Epoxy/Polyurethane (OZ/EP/PU) system. A stripe coat of primer shall be applied after the full coat of primer.

.9 Field weld surfaces shall be masked, and faying surfaces shall receive a prime coat only.

4.9.1 Surface Cleaning, Preparation and Coating

.1 The cleaning work shall consist of three phases of cleaning. Phase-One will be a dry, pre-wash cleaning, followed by two-phase water cleaning. All dry, pre-wash cleaning shall be performed prior to any water cleaning, and all water cleaning shall be performed prior to surface preparation and painting operations. With approval of the Engineer, the Contractor may break this work up into sections or bays.

a. Phase One

i. This phase shall consist of cleaning by dry methods all loose dirt and debris from all areas as noted in the plans. This phase shall be completed prior to any washing operations. Collection may include the use of brooms, brushes, shovels, wheelbarrows, buckets, vacuums, or other suitable means.

b. Phase Two

i. This phase shall consist of washing completely with low pressure plain water the entire bridge deck, curbs, parapets, sidewalks and expansion joints, and any other areas as noted in the plans. All drains shall be thoroughly flushed and shall be free flowing. All debris and trash shall be removed from the drains. At the nozzle end, the washing equipment shall have a minimum pressure of 3,000 PSI and a maximum pressure of 4,500 PSI.

c. Phase Three

i. This phase shall consist of washing with a mixture of low-pressure water and a solution of a commercial brand soluble salt remover, any areas as noted in the plans. This washing shall be accomplished with a low-pressure washer at a minimum pressure of 3,000 PSI and a maximum pressure of 4,500 PSI, at the nozzle end with the nozzle 4" to 8” from the surface. Remove all surface abnormalities such as rust scale, peeling paint, or blistered paint that would prevent the soluble salt remover from coming into contact with the salt contamination. Typically, low pressure water washing is not capable of removing intact coating material. The nozzle type shall be a rotary nozzle. The contractor shall follow the Manufacturer's recommendations or specifications for method and rate of application of the soluble salt remover. Water shall be from an approved source of drinking water, and the soluble salt remover shall be CHLOR*RID (or approved equal). The contractor is to place special emphasis on the top surface of all flanges, connection plates, bearings, and excessively rusty or pitted areas. Any areas of the structure that exhibit mineral deposits of black iron oxide called "black rust" after any abrasive blasting shall be considered contaminated with chlorides and will need an additional washing with the soluble salt remover solution and another abrasive blasting.

.2 Testing of Structural steel: The maximum level of chloride contamination shall be 5 micrograms/cm^2. Testing method shall be in accordance with The Society for Protective Coatings (SSPC) Technology Guide 15, Section 5.2.5, Latex Sleeve Methodology.

.3 In the first 150 square foot of cleaning the contractor is to determine by sufficient testing of the most deteriorated areas (after rust has been removed), the rate of application, nozzle pressure, nozzle distance from surface, and dilution ratio of mixture to achieve the desired level of cleanliness.

.4 Thereafter, the contractor is to perform test in areas designated by the Consultant to ensure that the entire structure has attained the specified level of cleanliness. The Consultant is to verify the degree of cleanliness. The Consultant's decision shall be final.

4.9.2 General Contractor Responsibility

.1 The Contractor's washing sequence and plans shall not allow the possibility of recontamination of the structure before blast cleaning and/or painting operations are completed. No cleaning shall be performed when temperatures are such that freezing could occur or that it is anticipated that temperatures could drop to freezing while the structure is wet. Equipment, methods, and materials shall meet the approval of the Consultant. All applicable Sections of the Specifications shall be followed when washing over the embankments, shorelines, roadways, navigational waterways, lots and regarding dirt and debris from cleaning, paint chips, and dirt and debris containing paint chips.

4.9.3 Surface Preparation:

.1 All structural steel shall undergo a near-white blast cleaning in accordance with SSPC SP 10. All structural steel is to include 100% of the Exterior and Interior stringers, diaphragms, floor beams, upper and lower chord members, etc. In general, all accessible steel surfaces not galvanized, aluminium, or weathering steel shall be blast cleaned. All laminar and stratified rust that has formed on the existing steel surfaces shall be removed. The Contractor is to exercise care while cleaning and painting around expansion joints, weathering steel, and galvanized surfaces. Any damage to these surfaces found by the Consultant as a result of the cleaning and painting operation shall be repaired and/or replaced, to the satisfaction of the Consultant, at the Contractor's expense.

4.9.4 New steel

.1 Fabrication, cleaning and coating of the new steel shall be performed in shop, off-site with the finished component being transported to the Bridge site and erected.

.2 The contractor may field modify plate sections and fabricated shop sections to expedite the work, that meets all the requirements of the plans and specifications. The contractor shall submit to the Consultant, for approval a detailed plan of the steel sections that are to be made on site prior to performing the work.

.3 The Contractor shall provide the Consultant minimum 36-hour notice prior to planned blasting and coating activities, so the Consultant’s QA may attend the shop.

.4 Test new steel for chlorides. When results are greater than 5 µg/cm^2, the steel shall be washed to remove non-visible chlorides to below 5 µg/cm^2.

.5 The new steel structural segments are fabricated from various steel components welded together. Weld detritus such as weld spatter shall be removed or ground smooth. Materials deposited by the welding process such as, but not limited to, excess flux oxides shall be removed prior to abrasive blasting. In addition, all sharp edges including welds shall be reduced to a minimum 2 mm radius with no burrs.

.6 Compressed air for blast cleaning and blow down shall be clean and dry by testing according to D4285.

.7 Grease, oil, and cutting fluids shall be removed by solvent cleaning in accordance with SSPC-SP1 prior to blast cleaning. The steel shall be cleaned by abrasive blasting to specified values of surface profile and cleanliness as specified.

.8 The steel shall be cleaned by abrasive blasting to specified values of cleanliness (SSPC-SP 10) and angular surface profile (50 to 100 µm [2 to 4 mils]).

.9 Final blast cleaning shall not be performed unless the temperature of the steel is at least 3°C (5°F) above the dew point temperature.

.10 Areas to be welded on site shall be left uncoated then touched up after welding and prepared on site.

.11 The final coating system shall consist of a Zinc/Epoxy/Polyurethane (OZ/EP/PU) system. A stripe coat of primer shall be applied after the full coat of primer.

.12 Field weld surfaces shall be masked, and faying surfaces shall receive a prime coat only.

.13 Primer shall be applied within 12 hours of blast cleaning and before rust back has formed. Surfaces exhibiting rust back or that are not coated within 12 hours shall be re-blast

cleaned. Coatings shall be applied within the manufacturer's written restrictions for air and surface temperature and relative humidity. The surface temperature shall be at least 3°C (5°F) above the dew point temperature. The conditions shall be maintained until the coatings have cured for exposure to weather according to the manufacturer's instructions.

.14 The Contractor shall regulate temperature and relative humidity using heaters, humidifiers, and/or dehumidifiers as required, for the full duration of blasting, coating and curing activities. Failure to maintain conditions within the Manufacturer's Recommendations shall be cause for rejection by the Consultant. Coatings not applied or cured within Manufacturer's Recommendations shall be removed and replaced at the Contractor's expense.

4.10 EXISTING STEEL

.1 The repair areas to be prepared to be coated are shown in the drawings provided and receive same the OZ/EP/PU system used for shop painting new steel.

.2 The Contractor shall provide the Consultant minimum 24-hour notice prior to planned washing, blasting or coating activities so that the Consultant's QA may attend the site.

.3 Field weld surfaces shall be masked, and faying surfaces shall receive a prime coat only. A stripe coat of intermediate shall be applied before the full coat of intermediate.

.4 Prior to beginning production work in field, site sample area(s) representative of the coating condition and surface configurations shall be blast cleaned to SSPC-SP10. SSPC-VIS 1 can be used as a visual aid in determining compliance. Work shall not proceed until the site sample area(s) are accepted by the coating manufacturer's technical representative and the Consultant. Test areas can be photographed for future reference, but in the event of a dispute, the written words of SSPC-SP10 take precedence over the photographs or SSPC-VIS 1.

a. Site sample area(s) shall be minimum 1m x 1m square, and include flat surfaces, rivet and/or bolt heads, and steel overlap areas.

b. Site sample area(s) locations shall be selected and agreed between QC representative and the Consultant's QA representative.

.5 The compressed air used for nozzle blasting shall be free of water and oil. The cleanliness of each compressed air system shall be verified at least once per shift using the blotter test in accordance with ASTM D4285, "Standard Test Method for Indicating Oil or Water in Compressed Air".

.6 Grease, oil, and cutting fluids shall be removed by solvent cleaning in accordance with SSPC-SP1 prior to blast cleaning.

.7 Painting shall not be done when the ambient temperature is below 40° F (5° C) or above 100° F (38° C), or the relative humidity above 90 percent. The temperature of the steel must be at least 5° F (3° C) above the dew point. Painting shall not be performed when the surface to be coated is sufficiently hot to cause blistering of the film or too rapid solvent release. Painting will only be permitted between the dates of April 15th through October 15th. There will be no painting permitted to occur in a heated containment.

.8 Paint and thinners shall be stored in a temperature-controlled environment between 40° F (5° C) and 100° F (38° C). At no time will paint be used beyond the manufacturer's shelf life.

.9 Additional chloride testing shall be performed on existing steel after blast cleaning, but before coating. If the results are greater than 5 µg/cm2, the surfaces shall be re-cleaned and retested at the same frequency required above.

.10 Immediately prior to coating, the steel shall meet the SSPC SP10 Near-White Blast specification, be free of dust or other surface interference material, and meet the chloride requirements of less than 5 µg/cm2. Surface cleaning shall be by blow down and vacuuming.

.11 Blast profile shall be 50 to 100 µm (2 to 4 mils) and be angular. If the steel is torch cut, grind the edge to remove the hardened steel. If grinding occurs after blast cleaning, re-blast the area. Confirm that the correct profile is achieved on this surface. Surface profile shall be measured by Methods B or C of ASTM D4417, and at the frequencies established in SSPC-PA17.

.12 The blast cleaned surface shall be painted within 24 hours. In the event rust bloom or flash rusting occurs, the affected members shall be re- cleaned by blasting. The paint shall be applied by spray methods, except those areas inaccessible to spray application may be brushed or rolled. Brushes or rollers, when used, shall have sufficient body and length of bristle or roller nap to spread a uniform coat. Small touch-up areas may be brushed or rolled, if approved by the Consultant.

.13 Use of an agitated pot shall be mandatory in spray application of zinc-rich primer. The agitator or stirring rod shall reach within 25 mm, of the bottom of the pot and shall be in motion at all times during paint application. Coatings shall be mixed in strict accordance with the coating manufacturer's written instructions. Under certain conditions, it may be necessary to thin or adjust the solvent balance of the paint. The type and amount of solvent to be used shall be that listed on the coating manufacturer's product data sheet for that material. Upon thinning, the dry film thickness requirement shall still be met by appropriately increasing the wet film thickness.

.14 Application requirements and drying times between coats shall be in accordance with the manufacturer's recommendations. Exposed steel surfaces of expansion dams shall be painted as specified for structural steel.

.15 Spray guns must be equipped with the recommended size tip for the paint product being applied and shall be held perpendicular (90 degrees) to, and at, the proper distance from the receiving surface. Complete protection shall be provided by the contractor against paint spatter, spillage, overspray, wind-blown paint, or similar releases.

.16 Appropriate containment shall be placed around the work area to protect public and private property. Staging must be adequate to provide access to all areas being painted. Violation of these requirements causing excessive paint waste will be justification for the Consultant to order the Contractor to cease all work on the project until corrective action has been taken. The method of cleaning and/or replacement shall be submitted to the Consultant in advance for approval.

.17 Faying surfaces and splice plates shall receive only primer which shall be applied and cured according to the information on the manufacturer’s Class B Certification Sheet unless otherwise noted on the Contract Drawings. The intermediate coat shall be stepped back 15 to 30 cm (6 to 12 in) from the connection area and feathered. The finish coat shall be stepped back 15 to 30 cm (6 to 12 in) from the edge of the intermediate coat and feathered. The purpose is to eliminate a butt joint of the intermediate and finish coats in the field.

4.10.1 Coating for Galvanized members

.1 Previously painted galvanized steel shall be clean and painted.

4.10.2 Painting over Galvanized Surfaces:

.1 Painting Galvanized surfaces shall be in accordance with the paint manufacturer's recommendations. Painting of existing galvanized surfaces is only allowed if the existing condition is painted. The Contractor shall review preparation and painting means and methods in the area of galvanized surfaces and propose means and methods to prevent damage that may be different than other areas of the bridge.

4.10.3 Damage to Galvanized Surfaces:

.1 The Contractor is to exercise care while cleaning and painting around expansion joints and galvanized surfaces. Any damage to the expansion joints or galvanized surfaces found by the Consultant, as a result of the cleaning and painting operation shall be repaired and/or replaced, to the satisfaction of the Consultant, at the Contractor's expense.

4.10.4 Temporary Steel

.1 All steel used for temporary works shall be coated with grey primer to CISC/CPMA 1-73a except for components identified on the Contract drawings remaining permanently attached to the structure.

.2 All temporary steel remaining in the field after construction shall be treated as new steel and coated in accordance with plans and specifications.

4.10.5 In-fill Areas in the field

.1 Sharp areas of weld shall be ground to a 2 mm radius. All weld spatter and other detritus shall be removed. Infill surfaces may be cleaned to either SSPC SP10 or SSPC SP11. Surface profile shall be a minimum 50 to 100 µm (2-4 mils) and sharp. Primer thickness shall be measured from the top of profile. This area will be filled in by lapping the successive layers of in-fill coating over the feathered edges of the existing coating. The in-fill coating shall be the OZ/EP/PU coating system.

4.10.6 Organic Zinc / Epoxy / Polyurethane System (OZ/EP/PU)

.1 This is the standard coating system for the Work. It assumes that washing and surface preparation has been done and the surface meets these Specifications immediately prior to coating application.

.2 The system consists of a stripe coat of zinc primer, full coat of zinc primer, stripe coat of epoxy intermediate, full coat of epoxy intermediate, stripe coat of urethane finish, and a full coat of urethane finish.

.3 Each coat shall be mixed, thinned, and applied according to the coating manufacturers' instructions and this specification. Required thicknesses are shown in Table 2, in Section 4.8.5 Coatings (Paint). All coats shall be free of skips, misses, dry spray, overspray, runs, sags, or other defects. Coating thickness shall be measured using wet film thickness gages according to ASTM D4414 during application. Dry film thickness shall be measured according to SSPC-PA2. Verification of gage accuracy shall be according to ASTM D7091.

In the event of a dispute, destructive testing according to ASTM D4138 can be used. The Contractor shall touch up all test areas.

.4 Stripe coats of the primer shall be applied to all edges, outside corners, seams, bolt heads and nuts, all rivet heads, edges of flanges and plates, welds, sharp edges, in general all edges, shall receive one stripe coat, by brush only, of the same primer as the Full Prime Coat. Striping shall extend a minimum of 25 mm from the edge. The prime coat shall at a minimum, be set-to-touch before the stripe coat is applied. No dry film thickness is specified for this coat. This coat shall be tinted as allowed by the manufacturer to be in contrast to the full prime coat The tinting agent shall be the paint manufacturer's approved tinting agent.

.5 Once the full coat of primer is dry-to-recoat per the manufacturer's written instructions, a stripe coat of intermediate shall be applied, followed by full application of intermediate coat. The full coat of intermediate shall be applied by spray.

.6 Once the epoxy intermediate coat is dry-to-recoat per the manufacturer's instructions, a stripe coat of urethane topcoat shall be applied, followed by the full topcoat. The full topcoat shall be spray-applied according to the Manufacturer's Product Data Sheet.

.7 All full coats shall be a colour that contrasts with the coating layer(s) above and/or below. Coating colours shall be provided in the sample described in 4.5.2.

.8 Topcoat colour shall be per Table 3, in Section 4.8.5 Coatings (Paint).

4.10.7 Faying surface

.1 Faying surfaces shall be cleaned to SSPC-SP10. The profile shall be 50 to 100 µm (2-4 mils) and sharp.

.2 Where Class B surfaces are required by the Contract Drawings, Organic Zinc Primer shall be applied to the thickness on the Class B certificate for that primer and shall be cured under conditions listed on the Class B certificate. No over thickness will be tolerated. No thinning shall be done unless it is noted in the primer's Class B certificate. Rejected faying surfaces shall be re-blasted and coated at the Contractor's expense.

.3 Where Class B surfaces are not required by the Contract Drawings, Organic Zinc Primer shall be applied to the thickness on the Class A certificate for that primer and shall be cured under conditions listed on the Class A certificate. No over thickness will be tolerated. No thinning shall be done unless it is noted in the primer's Class A certificate. Rejected faying surfaces shall be re-blasted and coated at the Contractor's expense.

4.10.8 Field touch-up of coating

.1 Damaged areas of the new OZ/EP/PU system will be assessed by the Owner's representative. Minor damage shall be repaired by taking the damaged area back to a clean, profiled metal surface, by abrasive blast cleaning to SSPC-SP10 or SSPC-SP11 then feathering out the damaged area into surrounding sound coating. Then successive layers of coating are added, each overlapping the previous by a minimum 25 mm until the coating system is fully reinstated. Note that the surrounding topcoat shall be lightly abraded to enhance the adhesion of the repair topcoat. The Consultant may at their sole discretion allow alternative repair procedures, if the damage is very minor. Major damage will be assessed on a case by case basis.

.2 Areas shielded by the containment shall be prepared with vacuum shrouded power tool to SSPC-SP11, the surrounding coating feathered, and all coats spot-applied.

.3 New steel surfaces shall be painted as a minimum unless noted otherwise (i.e. no bare surface).

4.10.9 Field installed steel and bolts

.1 Except for connections and areas to be field welded, the new steel is to be coated with the full OZ/EP/PU system. Welded areas are bare steel and connections and splice plates are primed only. New bird screens and hatch covers are to be hot dipped galvanized prior to coating.

.2 Welded areas shall be blast cleaned to SSPC-SP10 according to Section 6.7.1.5 and the surrounding coating feathered. Upon approval of, SSPC-SP11 may be used in lieu of blast cleaning. SSPC VIS 3 can be used as an aid in determining the appearance of SSPC-SP11. All three coats of the OZ/EP/PU system shall be applied, overlapping onto the surrounding feathered coating.

.3 Bolted connections and splice plates shall be pressured washed to remove dirt, dust, grease, oil, and surface interference material. The step-down area of the intermediate and overlap areas of the finish shall be sanded to remove gloss.

.4 Damage to the primer shall be prepared according to SSPC-SP11 and the area spot-primed with organic zinc.

.5 The epoxy stripe and full intermediate coats shall be applied to all exposed zinc primer, galvanized bolts, and nuts, and overlapped onto the exposed intermediate in the step-down area.

.6 The polyurethane finish shall be applied to all visible intermediate coat and overlapped onto the polyurethane.

4.10.10 High strength bolts (galvanized) – after installation

.1 These items shall be treated as follows:

.2 If used to join galvanized surfaces, no further treatment;

.3 If used to join painted surfaces, then the protruding bolts, threads and washers shall be solvent cleaned, and hand or power wire brushed according to SSPC-SP2 or SP3 to remove lubricant and rust. Slight staining from the lubricant dye is permitted to remain, if after cleaning, it is not transferred to a white cloth that is vigorously rubbed across the surface.

.4 If used to join painted and galvanized surfaces, the galvanized surface shall get no further treatment and the painted side shall be treated per b);

.5 Coating application and curing shall be as per the Manufacturer’s product data sheets.

.6 Coating damage from tensioning bolts shall be repaired at the same time as the touch up. If the area is excessive in the opinion of the Consultant’s, it shall be repaired by cleaning to SSPC SP 11, then primed, striped, mid-coated, and finally topcoated;

4.11 SPECIAL CLEANING, GRINIDING, SURFACE PREPARATION, PENETRATING SEALER, CAULKING AND PAINTING AREAS

4.11.1 Grinding and painting of sharp edges

.1 Sharp edges at floor beam cut-out troughs and the flanges of previously rusted members shall be ground to a 2 mm radius before abrasive blast cleaning. Grinding shall be controlled to eliminate the creation of additional sharp edges.

.2 After blast cleaning all coats, including stripe coats, shall be applied to these areas along with the painting of the surrounding steel. Due to accessibility of the interior of connections at pins, additional striping may be required to achieve complete and thorough coverage of these areas.

4.11.2 Removal of pack rust and painting

.1 Pack rust formed along the perimeter of mating surfaces of connected plates or shapes shall be removed to the extent feasible without mechanically detaching the mating surface. Any rust remaining after cleaning shall be tight and intact when examined using a dull putty knife. The tools used to remove these corrosion products shall be identified in the submittals and accepted by the Consultant. If the surface preparation or removal of rust results in nicks or gouges, the work shall be suspended, and the damaged areas repaired to the satisfaction of the Consultant, at the Contractor’s expense.

.2 After blast cleaning and application of Zinc Rich primer, the application of a penetrating sealer prior to intermediate coat, shall be applied to locations where pack rust is still present.

4.11.3 Inaccessible Areas

.1 The Owner intends that all areas shall be blast cleaned and receive the 2-coat system as required by 4.8 however, the existing structure does have areas where access does not permit reasonable effort to achieve the required surface preparation. Where Contractor’s QC representative and Consultant’s QA representative agree that ‘best effort’ has been applied without achieving the necessary surface preparation, then penetrating sealer shall be applied as part of the 2-coat system.

4.11.4 Caulking

.1 Caulking shall be applied before the application of the topcoat. This includes all seams between diaphragm connections to stiffeners and splices; and seams between any connection that is riveted or bolted. Any welded connections that are not fully sealed by the weld shall be caulked with a paste type caulk. The caulk shall be pressed into the seams between the adjoining surfaces, by wetted finger or specialty tool, to ensure bond and provide a smooth uniform surface. Bottom seams shall not be caulked on vertical surfaces.

.2 Caulking in a 3-coat system shall be applied after the intermediate coat has cured in accordance with the manufacturer's recommendations.

.3 The caulking material shall be compatible with the paint system being applied and letter stating compatibility submitted to the Engineer from the paint manufacturer. The caulking material shall be tested for compatibility with the paint system at the same time that the

paint is tested for intercoat compatibility. Caulking operations shall be performed only when weather conditions are within the parameters as specified above.

4.11.5 Incidental blast damage

.1 Parts of the structure not to be coated or already coated with paint or hot dip galvanizing shall be protected from over blast. Where unintended blasting causes damage, the Contractor shall repair these areas as directed by project specifications. The Contractor shall repair these areas at his expense.

.2 Incidental damage to bearings and expansion joints is not acceptable. These components cannot be easily repaired, and may be replaced at the Contractor's expense, at Consultant's sole discretion.

4.12 ACCEPTANCE OF PAINT WORKS

4.12.1 General

.1 Paint works include all aspects of coating work including washing, cleaning, coating application and curing, and caulking.

.2 The Contractor shall furnish suitable safe access and shall provide a time mutually agreed to for inspecting the structural steel prior to and after each coating. The Consultant and/or its representative shall approve all repairs.

.3 If in the opinion of the Consultant the coating has flaws other than deficiencies in the prescribed dry film thickness, the material shall be repaired or shall be removed and replaced. Defects in the film, including but not limited to runs, sags, mud-cracking, lifting, overspray, dry spray, pinholes, and holidays shall be corrected until a continuous uniform film has been applied.

.4 Excessive film thickness shall be reduced, and insufficient film thickness shall be increased. If the thickness of the finish coat is reduced, a thin coat of the finish shall be reapplied to seal the surface and to blend the area into the surrounding coating. Depending on the defect, total removal and replacement of the effected coating may be required. No unsightly runs or sags shall be visible. All "mud-cracking" and/or "dry overspray" in the paint film shall be removed. Excessive bubbles or pinholes shall not be visible in the coat after examination under 8X magnification.

.5 The following defects will be cause for rejection:

a. Runs, sags, holidays or shadowing;

b. Evidence of poor coverage at bolts, plate edges, lap joints, crevices, pockets, corners and re-entrant angles;

c. Evidence of inadequate grinding or application of caulking.

d. Surfaces which have been struck, scraped, spotted by rain or otherwise damaged;

e. Surfaces which exhibit an objectionable texture such as heavy runs and sags, orange peel, mud cracking, fish eyes, or uneven gloss;

f. Surfaces damaged by over spray; or

g. Other defects that will in the judgment of the Consultant reduce the effectiveness, the aesthetics or the longevity of the coating system.

.6 The Contractor shall demonstrate that coatings have been applied and cured in compliance with the Manufacturer's standard recommendations.

.7 The Contractor shall demonstrate that coatings applied have cured and adhered to the substrate. Locations for testing shall be coordinated with the Consultant, and testing shall be witnessed by the Consultant.

4.13 MEASUREMENT AND PAYMENT

.1 Refer to Section 5 Measurement and Payment

END OF SECTION

SECTION 5 MEASUREMENT AND PAYMENT

5.1 GENERAL

.1 This Section covers the measurement of Work done for payment purposes, and generally covers the scope of the Work included in the various items in the SCHEDULE OF PRICES.

.2 It is the intention of this contract to provide for a finished piece of Work, complete in all essentials, including all items reasonably inferable from the Contract Drawings and Specifications.

.3 The aggregate of all unit prices and lump sum payments shall constitute full compensation for the entire Work of the Contract, as shown, specified and intended.

.4 There shall be no measurement or payment for Work carried out beyond the limits defined on the Contract Drawings or as otherwise approved by Consultant.

.5 The estimated quantities shown are provided for the purposes of comparing tenders, and they are not guaranteed to be final, accurate or complete. Actual quantities may vary from those initially estimated and will not be grounds for renegotiations of tendered unit prices, except as defined in CCDC 4-2023. The unit prices shall be applicable to greater or lesser quantities. Payment shall be at the unit prices tendered.

.6 Unless otherwise specified, all materials necessary to complete the items listed in the Schedule of Quantities and Prices and the finished Work are to be new materials supplied by the Contractor and the cost of such material is to be included in the Contractor's prices.

.7 All measurements for payment purposes shall be taken jointly by the Contractor and The Owner.

.8 All measurements shall be in the plane of the finished surface unless otherwise indicated.

.9 Items indicated as provisional, if any, may or may not be included in the final scope of the Work at the sole discretion of the Owner.

.10 The following shall be considered incidental to the Work:

a. Attendance at Consultant Startup Meeting;

b. Protection of public

c. Transportation of equipment;

d. Transportation of labour to and from the site;

e. Coordination and supervision of construction,

f. All administration costs, profit and contractual warranty;

g. Drawings;

h. Labour;

i. Provision of services;

j. Colour and material samples;

k. Meetings;

l. Regular progress updates and reporting;

m. Field measurements and sketches;

n. Inspection, quantity survey and measurement assistance for the Consultant;

o. Submissions;

p. Shop drawings;

q. Project record drawings;

r. Quality control;

s. Provision of adequate heating systems for cold weather coating works;

t. Cold weather protection and curing of materials;

u. Shoring and bracing;

v. Temporary works;

w. Temporary barriers/barricades;

x. Protection, relocation, moving, storing and final location of stored equipment;

y. Reinstatement of damaged surfaces; and

z. All ancillaries required to complete the Work to the full satisfaction of the Consultant.

.11 Progress payments for lump sum items shall be approximately equivalent to the percentage of the total Work of the item completed, to the full satisfaction of the Owner, and as described under individual items.

5.2 MOBILIZATION, DEMOBILIZATION, AND SITE WORK

.1 Measurement for this item is Lump Sum

.2 Payment for this item shall be at the lump sum price bid for Item No. 1 in SCHEDULE OF PRICES.

.3 This item shall include all costs associated with mobilizing and demobilizing from project.

.4 This item shall include permits and site access, property leasing/rental, site grading, the supply and mobilization of all labour, material, equipment, and other costs associated with the Project, and shall include the demobilization of all equipment and material from the site on completion of the Work as well as all measures necessary to contain and safely dispose of hazardous materials, and to return site to initial (or better) condition.

.5 This item also includes: Storage of machinery, materials, equipment, accessories and tools appropriate to the job site. Supply of the Contractor's site trailer. All temporary services and connections, such as water, electricity and sanitation.

.6 This item also includes: Provision of all necessary guards, fencing and other security measures to protect the machinery, labour, materials, equipment, tools, access devices and any other installations. Maintenance of traffic lanes adjacent to or under work areas. Inspection of each phase of work. Snow removal from work areas, if required.

.7 Sixty percent (60%) of the price for Mobilization, Demobilization, and Site Work item shall be considered as relating to mobilization and the balance to demobilization.

A partial payment for mobilization shall be included in the first payment certificate issued for the Contract subject to the Consultant being satisfied that total mobilization has been performed. The payment amount shall be paid in part over a number of payments until totally paid out.

The payment for demobilization shall become due following substantial performance of the Work and subject to the Consultant being satisfied that full demobilization has been performed. The Consultant may, in their discretion, allow partial payment for demobilization before total demobilization has been effected.

.8 Nothing herein shall be construed to limit or preclude partial payments otherwise provided for by the contract.

.9 No deduction will be made, nor will any increase be made, in the lump sum mobilization item regardless of decrease or increase in the final total contract amount or for any other clause.

5.3 SIGNS, TRAFFIC CONTROL AND MINIMIZING TRAFFIC OBSTRUCTIONS

.1 Payment for this item shall be at the lump sum price bid for Item No. 2 in SCHEDULE OF PRICES.

.2 This item shall include all traffic control, signs, barricades, concrete barriers, cones, safety nets, safety wires and any other safety measures required that is not provided by The Owner as stated in Section 3.3. The price shall include all jersey and other traffic barriers, traffic drums, and cones, temporary steel plating and fasteners/clamps, signs, traffic control persons, vehicle marking/signage/lights and any other equipment, placement, adjustment, relocation of traffic control devices, temporary pavement markings, material or labour required to ensure full and proper traffic control and the full safety of the travelling public and work crews at all times.

.3 This item shall also include all navigation signage required by the local authority or by Nav Canada for boat safety and boat traffic during all stages of the work. This shall include costs for signage maintaining and setting up or removing of signage and also include all methods of display for beacons, printed signs etc that may require anchorage to the shore, pier or bridge.

.4 A maximum of 30% of the Lump Sum price shall be paid on the first progress claim in respect to this item and a maximum of 10% of the Lump Sum price shall be paid on each subsequent progress claim to a total not exceeding 70%. A minimum of 30% of the Lump

Sum price shall be paid on the progress claim following Substantial Performance. Total payment shall not exceed 100% of the Lump Sum price.

5.4 CONSTRUCTION LAYOUT

.1 Payment for this item shall be at the lump sum price bid for Item No. 3 in SCHEDULE OF PRICES.

.2 This item shall include:

a. Precise on-site surveys and measurements of all existing components to prepare the Contractor's Drawings and as built drawings.

b. Engineering services on site and at the Contractor's offices for calculations, sketches and drawings.

c. Review, validation and/or modification of the design shown on the Contractor's drawings

d. Review, validation and/or required modifications to the engineer’s design

.3 A maximum of 30% of the Lump Sum price shall be paid on the first progress claim in respect to this item and a maximum of 10% of the Lump Sum price shall be paid on each subsequent progress claim to a total not exceeding 70%. A minimum of 30% of the Lump Sum price shall be paid on the progress claim following Substantial Performance. Total payment shall not exceed 100% of the Lump Sum price.

5.5 FIELD OFFICE AND WEATHER MONITORING EQUIPMENT

.1 Measurement for this item is per month usage.

.2 Payment for this item shall be at the month price bid for Item No. 4 in SCHEDULE OF PRICES.

.3 This item shall include:

a. Furnishing, erecting, insuring, maintaining and removing the field office, and sanitary conveniences for the Owner; all labour and materials, and all other work necessary and incidental thereto. All cost associated with the weather monitoring system and site specific weather forecasting will be paid for by the contractor. The field office, furniture, fixtures, and facilities shall remain the property of the Contractor and shall be removed after the project has been completed. The field office shall be allowed to remain for a maximum 45 days after final acceptance of the project.

5.6 CONTAINMENT AND DISPOSAL OF WASTE MATERIAL

.1 Measurement for this item is Lump Sum

.2 Payment for this item shall be lump sum price bid for Item No. 5 in SCHEDULE OF PRICES

.3 This item shall include all labour, materials and equipment including the scaffolding, staging, access system, containment, environmental protection and monitoring, waste management, and worker protection for the work.

.4 Containment - price shall include full compensation for all labour, containment and ventilation materials and equipment; lighting; fuel; engineering; drawings; and any equipment or facilities needed to install, operate, move, maintain, clean, dismantle and remove the containment system from the project site; and documentation that the containment is installed and used per the accepted containment plan and drawings. Price includes compliance with all regulatory requirements and providing access for the Owner's representatives to conduct Quality Assurance observations.

.5 Environmental Protection - Price shall include full compensation for all labour and equipment for TSP-Lead monitoring and laboratory analysis; visual assessments of the air, ground, and water; in-process clean-up of spills or releases; and final project clean-up activities. Price includes compliance with all regulatory requirements and documentation of test and inspection results.

.6 Waste Management - Price shall include full compensation for all labour and equipment for the collection, testing, handling, storage, transportation, and disposal of all project waste, including, but not limited to: pressure washing water; spent abrasives; removed paint, rust, mill scale, and debris; used containment materials; paint and solvents; cans; rags; and discarded PPE. Price includes compliance with all regulatory requirements and documentation of proper disposal.

.7 Worker Protection - Price shall include full compensation for all labour, equipment and laboratory analysis for the protection of all the Contractor's personnel, including exposure monitoring; protective clothing and equipment; medical surveillance; hygiene facilities; laundering; and establishment and maintenance of regulated areas. Price also includes protective clothing and equipment for the Owner's Representatives. Price includes compliance with all regulatory requirements and documentation of results.

.8 Payment schedule will be agreed upon by Contractor and the Owner prior to the start of work. Percentage paid will capture percent progress of scaffold and containment erection and work performed. Total payment shall not exceed 100% of the Lump Sum price.

5.7 CONTAINMENT EMERGENCY DISMANTLING AND REINSTATEMENT (WHEN WINDS FORECASTED TO EXCEED 100KM/HR)

.1 Payment for this item shall be at unit price bid for Item No. 6 in SCHEDULE OF PRICES.

.2 This item shall include all labour, materials and equipment required for removal, repair and reinstatement of containment as defined in Section 4.5.7 (Emergency Containment Demobilization Plan).

.3 Payment will be made on the basis of the Unit price, multiplied by the number of successful removal and reinstatements completed.

5.8 BRIDGE CLEANING AND PAINTING

.1 Measurement for this item is Lump Sum

.2 Payment for this item shall be at lump sum bid for Item No. 7 in SCHEDULE OF PRICES

.3 Price includes full compensation for all labour, materials and equipment for all cleaning and painting activities, including, but not limited to: pressure washing; preparation of primed surfaces; soluble salt/chloride remediation; application of the three-coat paint system (intermediate coat) including stripe coats to all surfaces and fasteners; quality control inspections and documentation; and compliance with all requirements of regulatory agencies.

.4 The price also includes protection of all surfaces not to be painted such as utilities, bearings, expansion joints and galvanized surfaces; repair of any damage resulting from the cleaning and painting operation; repair or removal/replacement of coating work that does not meet specifications; touch-up.

.5 Payment schedule will be agreed upon by Contractor and the Owner prior to the start of work. Percentage paid will capture percent progress of bridge cleaning, surface preparation and painting of structural steel. Total payment shall not exceed 100% of the Lump Sum price.

5.9 STEEL REPAIR TYPES 1 TO 8

.1 Payment for this item shall be at unit price bid for the following:

a. Steel Repair Types 1 and 2 are subject to inspection by the Consultant prior to development of a methodology, the prices for which are to be determined during construction and in accordance with CCDC 4-2023.

b. Steel Repair Type 3 - Item No. 8 in SCHEDULE OF PRICES.

c. Steel Repair Type 4 - Item No. 9 in SCHEDULE OF PRICES.

d. Steel Repair Type 5 - Item No. 10 in SCHEDULE OF PRICES.

e. Steel Repair Type 6 - Item No. 11 in SCHEDULE OF PRICES.

f. Steel Repair Type 7 - Item No. 12 in SCHEDULE OF PRICES.

g. Steel Repair Type 8 - Item No. 13 in SCHEDULE OF PRICES.

.2 This item shall include all labour, materials and equipment required for removal, repair and reinstatement of the structural repair as detailed in the drawings.

.3 Payment will be made on the basis of the Unit price, multiplied by the number of repairs successfully removed and replaced.

5.1.10 Charges by the Consultant

.1 Costs for permits, licenses, and associated costs incurred by the Consultant will be deducted from progress payments. These charges allow the Consultant to recoup any additional costs incurred due to action (or inaction) by the Contractor.

END OF SECTION