



CITY OF MORDEN

**TENDER, CONTRACT, &
SPECIFICATION**

**ALVEY STREET (SITE 1) & PARKHILL DRIVE (SITE 2)
CROSSING REPLACEMENTS**



Tender Release: January 30, 2023

Tender Close: February 21, 2023, 12:00pm



TABLE OF CONTENTS

1	DEFINITIONS.....	1
2	TENDERING	3
2.1	Details	3
2.2	Invitaion	4
2.3	Bidding Requirements	4
2.4	Conditions of the Work.....	5
2.5	Discrepancies and Omissions	5
2.6	Addenda	5
2.7	Requests for Alternates.....	6
2.8	Bidder Qualifications and Experience	6
2.9	Subcontractors	7
2.10	Suppliers and Manufacturers.....	7
2.11	Tender Evaluation	7
2.12	Acceptance or Rejection of Tenders	8
2.13	Preliminary Construction Schedule	8
2.14	Schedule of Work	9
2.15	Existing Site Conditions	9
3	TENDER FORMS.....	10
	Contractor	10
	Owner	10
	Contract Administrator	11
	Project Description.....	11
	Basis of the Tender	11
	Schedule of Prices	13

Contract Price	17
Schedule of Completions	17
Schedule of Addenda.....	18
Bid Security.....	18
Performance Guarantee and Insurance Certificate	18
Agreement.....	19
Notice to Proceed	19
Schedule of Subcontractors	20
Schedule of Experience	21
Tender Form Approvals.....	22
Notice of Acceptance	23
Written Notice of Acceptance	23
Authorization	23
Contract.....	24
Certificate of Insurance	27
Insurance Coverage	27
Insurance Broker Information.....	28
4 GENERAL CONDITIONS.....	29
4.1 Agreement.....	29
4.2 Drawings and Instructions	29
4.3 Reference Points and Layout.....	29
4.4 Contract Execution	30
4.5 Subcontractors	31
4.6 Other Contractors	32
4.7 Indemnity.....	32
4.8 Dispute Resolution.....	32
4.9 Delays	33
4.10 Owner's Right To Do Work.....	33
4.11 Owner's Right to Terminate the Contract	34

4.12	Suspension of the Work by the Owner	35
4.13	Contractor's Right to Stop Work or Terminate the Contract.....	35
4.14	Changes in Work	36
4.15	EValuation of Changes in Work	37
4.16	Payments.....	37
4.17	Final Payment	38
4.18	Acceptance	39
4.19	Taxes and Duties	39
4.20	Laws, Regulations, Surveys and Permits	39
4.21	Occupational Health and Safety Legislation	40
4.22	Liability Insurance	41
4.22.1	Commercial General Liability Insurance:	41
4.22.2	Automobile Liability Insurance:.....	41
4.22.3	Property Insurance	42
4.23	Protection of Work and Property	43
4.24	Warranty Period.....	43
4.25	Inspection of the Work.....	44
4.26	Rejected Work.....	44
4.27	Materials Supplied by the Contractor	45
4.28	Materials Supplied by the Owner	45
4.29	Storage Facilities and Use of Premises	46
4.30	Cleanup and Final Cleaning of the Work	46
4.31	Remedies.....	46
5	PROPOSED WORK.....	47
5.1	Work Under this Contract.....	47
5.2	Work Included.....	47
5.3	Documents Required	47
5.4	Standards	47

5.5	Geotechnical Investigation.....	48
6	CONTRACTOR USE OF THE SITE.....	49
6.1	The Worksite	49
6.2	Contractor's Use of the Worksite	49
6.3	Office Facilities	49
6.4	Layout of the Work.....	49
7	ENVIRONMENTAL PROTECTION PLAN.....	51
7.1	Federal Legislation.....	51
7.2	Provincial Legislation	51
7.3	Materials Handling and Storage.....	51
7.4	Fuel Handling and Storage.....	51
7.5	Waste Handling and Disposal	52
7.6	Dangerous Goods/Hazardous Waste Handling and Disposal.....	53
7.7	Emergency Response	53
7.8	Noise.....	54
7.9	Dust.....	54
7.10	Erosion Control	54
7.11	Runoff Control	55
7.12	Vegetation	55
7.13	Landscaping	55
7.14	Night Work and Noise Limitations.....	55
8	TECHNICAL SPECIFICATION.....	56
8.1	Site Work	56
8.1.1	Description.....	56
8.1.2	Scope of Work.....	56
8.1.3	Measurement and Payment.....	56
8.2	Excavation.....	57
8.2.1	Description.....	57

8.2.2	Construction Method	57
8.2.3	Measurement and Payment.....	57
8.3	Backfill.....	58
8.3.1	Description	58
8.3.2	Materials	58
8.3.3	Equipment.....	59
8.3.4	Construction Methods	59
8.3.5	Measurement and Payment.....	60
8.4	Steel H-Piles.....	60
8.4.1	Description	60
8.4.2	Materials	60
8.4.3	Construction Methods	61
8.4.4	Measurement and Payment.....	63
8.5	Structural Concrete.....	63
8.5.1	Description	63
8.5.2	Scope of Work	63
8.5.3	Submittals	64
8.5.4	Materials	67
8.5.5	Supply of Structural Concrete.....	74
8.5.6	Measurement and Payment.....	81
8.6	Precast Concrete.....	82
8.6.1	Scope of Work.....	82
8.6.2	Submittals	82
8.6.3	Product Delivery, Storage and Handling.....	83
8.6.4	Prequalification of Manufacturer.....	83
8.6.5	Material	84
8.6.6	Fabrication	84
8.6.7	Erection.....	85
8.7	Supply and Placing Reinforcing Steel	87
8.7.1	Description.....	87
8.7.2	Materials	87
8.7.3	Construction Methods	88
8.7.4	Measurement and Payment.....	89

8.8	Structural Steel	89
8.8.1	Description	89
8.8.2	Materials	89
8.8.3	Welding	90
8.8.4	Quality Control	90
8.8.5	Welding Procedures	91
8.8.6	Submissions	91
8.8.7	Preparation of Material	91
8.8.8	Transportation, Handling and Storage	93
8.8.9	Welding of Galvanized Metal	93
8.8.10	Measurement and Payment	93
8.9	Riprap	94
8.9.1	Description	94
8.9.2	Materials	94
8.9.3	Construction Methods	94
8.9.4	Measurement and Payment	94
8.10	Bearings	95
8.10.1	Description	95
8.10.2	Material	95
8.10.3	Fabrication	95
8.10.4	Construction Methods	95
8.10.5	Quality Control	95
8.10.6	Measurement and Payment	96
8.11	Miscellaneous Metal	96
8.11.1	Description	96
8.11.2	Materials	96
8.11.3	Construction Methods	97
8.11.4	Welding	97
8.11.5	Quality Control	97
8.11.6	Qualifications of Contractor	97
8.11.7	Welding Procedures	97
8.11.8	Quality Control	98
8.11.9	Submissions	98

8.11.10	Preparation of Material.....	98
8.11.11	Assembly	99
8.11.12	Transportation, Handling and Storage	99
8.12	Chain Link Fence.....	99
8.12.1	Description	99
8.12.2	Materials	99
8.12.3	Assembly	101
8.12.4	Measurement and Payment.....	102
8.13	Gaurdrail.....	103
8.13.1	Description	103
8.13.2	Submittals	103
8.13.3	Quality Assurance	103
8.13.4	Materials	103
8.13.5	Inspection	104
8.13.6	Measurement and Payment.....	105
8.14	Waterproofing Membrane.....	105
8.14.1	Description	105
8.14.2	Procedures	105
8.14.3	Submittals – Product Specifications	105
8.14.4	Materials Testing by the Owner.....	106
8.14.5	Materials	106
8.14.6	Inspection	106
8.14.7	Surface Preparation	106
8.14.8	Installation.....	106
8.14.9	Measurement and Payment.....	107

APPENDICES

A GEOTECHNICAL INVESTIGATION

1 DEFINITIONS

The following definitions shall apply throughout the Contract Documents:

- **Engineer of Record** - shall mean the engineer that signed and sealed the drawings and specification.
- **Engineer** – shall mean WSP Canada who are authorized and appointed by the Owner to act for the purposes of this Contract within the authority and responsibility defined in the Contract Documents.
- **Contract Administrator** - shall mean WSP Canada who are authorized and appointed by the Owner to act for the purposes of this Contract within the authority and responsibility defined in the Contract Documents.
- **Owner** - shall mean an employee of the City of Morden or an agent of the Owner, specifically designated in writing by the Owner to have special responsibilities and authorities on behalf of the Owner.
- **Contractor** – shall mean the construction firm that was awarded the Work and is the General Contractor and Prime Contractor for Alvey Street and Parkhill Drive Crossing Replacement construction sites.
- **Work** - shall mean the entirety of the project described in these Contract Documents, including material, products, labour, plant, transportation and other facilities and items ancillary to the foregoing required to complete the project.
- **Project** - shall mean the total proposed construction work and labour, contemplated by the Owner.
- **Contract** – shall mean the legal agreement, signed by the Owner and the Tenderer, agreeing to undertake the Work in accordance with the Tender Documents for the Contract Price.
- **Worksite** - shall mean either Alvey Street or Parkhill Drive, or both, construction sites as per the fenced in limit the period of construction from the date of Notice to Proceed to the date of the Total Performance.
- **Superintendent** - shall mean an employee or representative of the Contractor who is specifically authorized to be in full charge of the Contractor's operations at the Worksite and is so designated in writing by the Contractor, accepted by the OWNER.
- **Subcontractor** - shall mean a company retained by the Contractor in writing, to undertake a specified portion of Work on behalf of the Contractor.
- **Tender** – shall mean the documents in which are required to be completed by the Contractor to be awarded the Work.
- **Tender Documents** - shall mean the documents that have been provided for preparation of the Tenderer's Bid. Upon successful submission and award, the Tender Documents will become the Contract.
- **Tenderer** – shall mean the construction firm that is completing the Tender Document for submission or is reviewing the Tender Document in preparation for submission.
- **Bidder** – shall mean the construction firm that is completing the Tender Document for submission or is reviewing the Tender Document in preparation for submission.
- **Bid** – shall mean completed and submitted Tender Documents by a Tenderer. Bid shall not mean compliant or non-compliant, rather a Tender submission that is being reviewed by the Owner and Contract Administrator for award.
- **Contract Price** - shall mean the total cost within the Bid plus Contract Change Orders for the proposed Work. Contract Price would include all costs for Alvey Street and Parkhill Drive Bridge

Replacements. The Contract Price may be revised based on approved Change Orders and or revised quantities assessed through Progress Payments.

- **Progress Payment** - shall mean a claim for payment for work completed prepared by the Contractor. Progress Payment is end-dated for each submission.
- **Warranty Period** - shall mean the period beginning on the date specified in the Total Performance certificate and ending after all conditions of the Contract been met, and the specified period has expired. Warranty Period for this assignment is two (2) years.
- **Field Order** - shall mean a written communication from the Owner or Contract Administrator to the Contractor, clarifying the Contract Documents, issuing additional instructions, requesting information, or ordering a change in the Work within the general scope of the Work. Field Orders cannot be issued for out of scope work.
- **Change Order** - shall mean a written communication issued by the Owner, with the agreement of the Contractor, specifying the amount and time to be added to or deducted from the Contract on account of changes in the Work described by a Notice of Contemplated Change and subsequent correspondence.
- **Contemplated Change Notice** (CCN) - shall mean a written communication from the Contract Administrator describing a change in the Work and requesting a quotation, complete with a narrative description of the proposed Work to be done by the Contractor with a specified schedule to achieve the intent of the contemplated change.
- **Plant** - shall mean collectively all tools, implements, machinery, vehicles, structures, equipment, and other things required for the execution of the Work or a portion thereof, completed by the Contractor offsite within a controlled space.
- **Material** – shall mean collectively all materials and commodities required to be furnished under the Contract for the proposed Work except those specifically stated to be provided by others.
- **Product** - shall mean a pre-engineered and or prefabricated item required as part of the Work.
- **Provide** - shall mean supply and install.
- **Substantial Performance** - shall have the meaning attributed to it in The Builders Liens Act (Manitoba).
- **Total Performance** - shall mean the entire Work has been successfully performed to the requirements of the Contract Documents and is so certified in writing by the Contract Administrator. Except for warranty items as identified in writing by the Contract Administrator, there shall be no deficiencies or defects apparent at Total Performance. Once the Total Performance certificate has been issued, the Warranty Period begins.
- **Final Performance** - shall mean the completion of all Warranty items and deficiencies. Final Performance, determined by the Contract Administrator and after two years since Total Performance was achieved, is the expiry of the Warranty Period.
- **Working Day** – shall mean a business day which work can be undertaken. Weekend and recognized holidays or statutory holidays are not considered Working Days.
- **Agreement** – shall mean the Contract, signed, and executed between the Contractor and the Owner.

2 TENDERING

2.1 DETAILS

PROJECT:	Alvey Street and Parkhill Drive Crossing Replacements
OWNER:	City of Morden Santokh Ranadhawa, M.Eng., P.Eng. Deputy City Manager srandhawa@mymorden.ca
OWNER'S ENGINEER:	WSP Canada 1600 Buffalo Place Winnipeg, Manitoba Mike Boissonneault, P.Eng., Project Manager mike.boissonneault@wsp.com
TENDER PICK-UP:	A complete set of digital copies of the tender documents is attached as posted on MERX under City of Morden's MERX Account.
GENERAL CONTRACTORS:	Open Tender
CLOSING DATE:	Tuesday, February 21, 2023 @ 12:00:00 PM (CST)
SUBMISSION LOCATION:	City of Morden, 195 Stephen Street, Morden MB, R6M 1V3
BRIEF DESCRIPTION:	Supply and construction of two new 18 metre long bridges on Alvey Street and Parkhill Drive within the City of Morden. Undertake all work necessary, including providing construction labour, material, and equipment, required for the bridge replacements.
ADDENDA:	If there are any changes in the work, an addendum will be issued prior to the tender Closing Date. All addenda shall become part of the Contract Documents, and receipt of the addenda shall be acknowledged on the Tender Form by the tenderer. Addenda will be issued on MERX and it is the responsibility of the tenderer to ensure they have received all addenda. Tenderers are advised to check regularly and shortly before the tender Closing Date.

2.2 INVITAION

The Owner, the City of Morden, offers to receive Tenders for the replacement of two existing crossings in accordance with the following Tendering Conditions:

- The Work is briefly described as follows:
 - a) **City of Morden – Alvey Street Crossing Replacement (Site #1)**

Supply and construction of a new 18 metre long x 9.6 metre wide bridge on Alvey Street within the City of Morden

Site 1 crosses the Deadhorse Creek. UTM coordinates of the site are 14U 5448712N, 0564260E.
 - b) **City of Morden – Parkhill Drive Crossing Replacement (Site #2)**

Supply and construction of a new 18 metre long x 12 metre wide bridge on Parkhill Drive within the City of Morden

Site 2 crosses the Deadhorse Creek. UTM coordinates of the site are 14U 5450222N, 0564660E.
- The Tender shall be submitted on the Tender Forms and Supplementary Tender Forms provided.
- Tenders must be received before **Tuesday February 21, 2023, at 12:00 PM Central Time**. Completed Tenders Forms must be submitted as follows:
 - i. Submitted in a sealed envelope clearly marked with the Tender title and Contractor's name and address. Tenders are to be delivered to the City of Morden. Late Tenders will not be accepted and will be returned upon request.
- Bid Bond in the amount of 10% of the minimum Tender Price plus a Consent of Surety to provide a Performance Bond in the amount of 50% of the minimum Tender Price and a Labour and Materials Payment Bond in the amount of 50% of the minimum Tender price must be submitted with the Tender.
- The Owner's Engineer and Contract Administrator is WSP Canada.
- The Owner intends to award the two bridge replacements as one Contract.
- The Owner reserves the right to reject any or all Tenders received. The Owner is not bound to accept the lowest or any Tender.

2.3 BIDDING REQUIREMENTS

- The Contractor shall complete the Schedule of Prices for the Tender. Failure to complete in full and or submission later than the Submission Deadline, with all required entries made clearly and completely, will render the Tender incomplete.
- The Tenderer's legal status and business address shall be disclosed. The Tender shall be signed by a duly authorized official and in the case of a corporation, shall be sealed with the corporate seal. The Tenderer shall also identify a contact person who is authorized to represent the Tenderer for purposes of Tender evaluation and or clarification.
- The Tendering Period shall end at the time and date specified in the "Invitation to Tender," or at an extended time and date specified in a Written Notice or Addendum. The time specified shall be the time displayed on the reception switchboard clock for hard copy delivery.
- After a Tender has been received, however prior to the expiry of the Tendering Period specified herein this contract, the Tenderer may withdraw or amend its Tender but only in accordance with the following procedure:

- Notify the Owner in writing or email of the proposed Unit Price amendment per Item of work. Hard copy amendments shall be submitted in a sealed envelop, clearly marked, submitted prior to the closing deadline. Email amendments cannot state the original Unit Price or Total Bid Price amount as per the hardcopy submission. The time and date of receipt of any notice withdrawing or amending the Tender shall be the time and date the notice is received.
- Proof of receipt of the Written Notice will be an acknowledgment by return email by the City of Morden.
- The Instructions to Tenderers are provided as information for the tendering process in the period prior to submission of a Tender. The Instructions to Tenderers are not a part of the Contract.

2.4 CONDITIONS OF THE WORK

- Tenderers shall carefully examine the Contract Documents and Work sites and shall fully educate themselves as to all existing conditions, access and limitations which may affect the execution of the proposed Works. No consideration will be given after submission of a Tender to any claim that there was any misunderstanding with respect to the conditions imposed by the Contract.
- In preparation of a Tender, Tenderers shall use only those Drawings listed in the Contract Documents that are clearly labeled "Issued for Tender" and or "Issued for Tender and Construction". Tenderers shall not rely on any drawings that are not so labeled.
- Discussions during Tender briefings or other oral discussions will not form part of the Contract or amend the Contract in anyway. Contract amendments can only be done so through Addenda issued to all Tenderers prior to closing.

2.5 DISCREPANCIES AND OMISSIONS

- If a Tenderer uncovers discrepancies, errors or omissions within the Drawings, Specifications, or other documents or has any doubt as to the meaning or intent of any part, the Tenderer is encouraged to inform the Contract Administrator. Any required revision, addition, or further clarification shall be provided by the Contract Administrator by issuing an Addendum.
- Every request for an interpretation shall be made in writing via email and forwarded to the Contract Administrator's email address provided on the Invitation to Tender. Oral discussions and clarifications shall not modify the Contract Documents.
- Responses to enquiries made which, in the judgement of the Contract Administrator, require correction or clarification to the Contract Documents will be provided to all Tenderers in writing in an Addendum.
- The Tenderer is responsible for educating themselves of the intent of the design as detailed within the Contract Documents in order to prepare and submit a complete Tender. The Tenderer shall be responsible for determining that the Work is constructable in accordance with the intent of the Issued for Tender and Construction drawings.

2.6 ADDENDA

- Any changes in the proposed Work, all Tenderers will be informed, prior to the close date, by means of an Addendum, a written communication issued by the Contract Administrator. All Addenda issued prior to the Closing Date will become a part of the Contract Document, and receipt of Addenda shall be acknowledged by the Tenderer within the Tender Documents. Failure to acknowledge receipt of an addendum may render the Tender non-compliant.
- Addenda will not be issued later than two (2) business days before the Tender closing date or provide at least two (2) business days by extending the Tender closing date.

- Addenda will be made available to download on MERX. The Tenderer is responsible for ensuring they have received all addenda and is advised to check regularly and shortly before the Tender closing date.
- After Tender Bids have been received after the Tendering Period; no changes, additions, or deletions to any Tender Bid, except those specifically provided for in the Tendering Conditions shall be made either by or on behalf of the Owner, or by or on behalf of the Tenderer.

2.7 REQUESTS FOR ALTERNATES

- The Design is based on the Plant, Materials and Methods specified in the Tender Documents. The Tenderer shall submit any request for review of equivalent alternative to WSP at least three (3) business days prior to the Tender closing date.
- Requests for consideration of alternative shall be submitted in writing and directed to WSP and shall provide sufficient information and details to enable a review of the substitute to determine the acceptability as either an approved equal or alternative.
- WSP may allow the alternative and issue a response, in writing via email, approving or rejecting the alternative to the Tenderer who requested the approval.
- Approval will be provided via email stating the proposed alternate meets the design intent of the product. Addenda will not be provided for each approved product alternate.
- The Tenderer shall use only alternatives that are confirmed by an Addendum or by written communication responding to the request for alternates.
- Whenever alternatives are accepted, the Tenderer shall be responsible for identifying all changes required in the applicable work, and all changes to any other work, which would become necessary to accommodate the substitution. The cost for making all consequent adjustments to make the proposed alternate fit into the Work, shall be deemed to be included in the Tenderer's bid price. The approved alternatives shall also be in strict accordance with the dates specified for Substantial and Total Performance. Approved alternates with longer lead time does not constitute approval of additional project schedule.
- In the event a response is not provided within the Tender period, the Tenderer shall consider the proposed alternate as rejected.
- Where the Specifications and/or Tender specifically state that an approved equal will be considered, the Tenderer may submit with the Tender a request for a review of an equal for any material item specified. If rejected, the Tenderer shall then use the originally specified product.
- In such cases, the request for consideration of an approved equal contain pertinent data such as construction and operational characteristics and any information so requested by the Contract Administrator.

2.8 BIDDER QUALIFICATIONS AND EXPERIENCE

- The Bidder shall be in good standing and properly registered, licensed or permitted by law to carry on business in Manitoba.
- The Bidder shall be financially capable of carrying out the terms of the Contract.
- The Bidder shall have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the Contract Documents.
- The Bidder shall provide a valid COR certificate administered by the Manitoba Construction Safety Association or by the Manitoba Heavy Construction Association's Safety, Health and Environment Program.

- The Bidder must submit in the Schedule of Experience examples of completed work similar in size and cost magnitude or greater to the proposed Work. The Bidder must submit at least two (2) examples of relevant previous work. If the Schedule of Experience is not filled out correctly the Owner may request additional information from the Bidder or may render the Bid as non-compliant.

2.9 SUBCONTRACTORS

- The Tenderer shall submit in the Schedule of Subcontractors the names of Subcontractors proposed for the Work.
- Where the Schedule of Subcontractors shows specific items of Work the Tenderer shall name the Subcontractor; or if the Work will not be subcontracted, they shall so indicate using the words "Own Forces".
- The Subcontractors listed in the Tender may not be changed without the written consent of the Contract Administrator. If the Contract Administrator so requires, the Tenderer shall be prepared to confirm the competence of Subcontractors prior to their acceptance on the Work.
- If at the time of Contract Award a Subcontractor named in the Tender is not acceptable to the Contract Administrator, the Tenderer shall name an alternative Subcontractor acceptable to the Contract Administrator.
 - o The Bid Depository shall be used for all Subcontracts.
 - o The most current Rules of the Bid Depository shall apply as to division of the work between Subcontractors, and as to selection of Subcontractors.
 - o Notwithstanding the Rules and Procedures of Bid Depository, the designation of the Work to close through Bid Depository shall not create any obligation on the part of the Owner to enforce those Rules and Procedures, nor create any liability of the Owner to any person, nor restrict the right of the Owner as stipulated herein below.
 - o The Subcontractors listed in the Tender may not be changed without the written consent of the Contract Administrator. If the Owner so requires, the Tenderer shall be prepared to confirm to the Contract Administrator the competence of Subcontractor to complete the Work.
 - o If at the time of award of the Contract, a Subcontractor named in the Tender is not acceptable to the Owner or Contract Administrator, the Tenderer shall name an alternate Subcontractor acceptable to the Owner/Contract Administrator at no additional cost.

2.10 SUPPLIERS AND MANUFACTURERS

- The Tenderer shall submit in the Schedule of Suppliers and Manufacturers, Material and Product names of manufacturers, and if Material and or Product are obtained through intermediate agents, the agents shall be indicated as the Suppliers.
- The Suppliers and Manufacturers named in the Tender shall not be changed without the written consent of the Contract Administrator.
- If, at the time of Contract Award a Supplier and/or Manufacturer named in the Tender is not acceptable to the Contract Administrator, the Tenderer shall name an alternative Supplier or Manufacturer acceptable to the Contract Administrator.

2.11 TENDER EVALUATION

- The Bid opening shall be a public opening at the City of Morden Civic Centre immediately after the bid closing time. The names of all Bidders with their total bid prices may be released by the Contract Administrator.

- In evaluation of Bids, the Owner may or may not apply preference for, as follows:
 - o Lowest total contract price
 - o Contractors experience as described in the Schedule of Experience. The evaluation of experience is at the sole discretion of the Owner
- If the Bid is incomplete, obscure or conditional or includes terms, additions, deletions, alterations, or other irregularities inconsistent with the Contract Documents the Bid may be rendered non-compliant and may be rejected. The Owner may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the Owner so require.
- The Owner reserves the right to change the Tender evaluation criteria order.
- In evaluation of the Bids, the Owner may, but is not obligated to, consider previous or on-going disputes from a Contractor or Subcontractor with a Bid.
- Total Bid Price evaluation will be based on a prorating of 55% for Parkhill Drive and 45% for Alvey Street Replacements.

2.12 ACCEPTANCE OR REJECTION OF TENDERS

- The Contract Administrator on behalf of the Owner will give notice of the award of the Contract or will give notice that no award will be made.
- The Owner reserves the right to reject any or all Bids, to waive irregularities and informalities at the Owner's discretion and to accept the Bid which the Owner deems to be in its best interest. The lowest Bid will not necessarily be accepted. Without limiting the generality of the foregoing, any Bid may be rejected for any of the following reasons:
 - o Incomplete Tender Documents.
 - o Bid rigging, or skewing prices from one Item of Work to another for purposes of potential quantity change and financial benefit.
 - o Schedule of Prices is not completely filled out.
 - o Obscured or irregular erasures or corrections in the Schedule of Prices.
 - o Prices omitted or unbalanced.
 - o Evidence of inadequate experience, or of inadequate capacity to perform the contract, or failure to qualify under conditions of the Tendering Requirement.
 - o Evidence of previous failure to perform adequately on similar Work.
 - o The insertion by the Bidder of conditions which vary the Tendering Requirements or the Tender Documents.
 - o The insertion of conditions within the Tender Documents for any part of the Work.
- No action of the Owner, other than a written "Notice of Acceptance" shall constitute an acceptance of a Bid submission.
- The Owner reserves the right to negotiate at the time of acceptance, with the preferred Contractor, for a lower price or improved schedule.

2.13 PRELIMINARY CONSTRUCTION SCHEDULE

An overall Preliminary Construction Schedule for the Work is included in this section and is as follows:

- Expected Award of Contract is February 23, 2023
- Construction shall be completed, and Performance achieved by:

- Completed utility exposure, embankment grading and riprap by April 1, 2023.
- The date of Substantial Performance shall be June 15, 2023.
- The date of Total Performance shall be June 30, 2023.

2.14 SCHEDULE OF WORK

- The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Working Days prior to the commencement of any Work on site.
- The Contractor shall not commence any Work until they are in receipt of the Letter of Intent as authorized by the Owner.
- The Contractor shall not commence any Work on the site until the Contract Administrator has confirmed receipt of:
 - Evidence of good standing with the Workers Compensation Board of Manitoba.
 - The Contractor's safe work plan.
 - Representative of the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.
 - Proof of project related insurances provided

2.15 EXISTING SITE CONDITIONS

- Tenderers should visit the Worksite and examine site conditions. No appointment is required to view the site.
- Tenderers may make tests, inspections, and measurements at their own expense, but such investigations must be performed under time schedules and arrangements with the Contract Administrator and must comply with the Contract Administrator's requirements.
- Tenderers declare that, in bidding for the Work and in entering into the Contract, they:
 - Have investigated the Worksite, the nature of the Work to be done and all local conditions that might affect their Bid or their performance of the Work, including:
 - The location of any utility which can be determined from the records or other information available at the offices of any public authority or person, including a municipal corporation and any board or commission thereof, having jurisdiction or control over the utility;
 - The nature of the surface and subsurface conditions at the Worksite;
 - The location, nature, quality, or quantity of the Material to be removed or to be employed in the performance of the Work;
 - The nature, quality or quantity of the Plants needed to perform the Work;
 - All matters concerning access to the Worksite, power supplies, location of existing services, utilities or Materials necessary to undertake the Work, and
 - All other matters which could in any way affect the performance of the Work
- Have not investigated the Worksite, the nature of the Work to be done or local conditions; and, in either event, assumes all risk for conditions now existing or arising in the course of the Work which have been or could have been determined through such investigation, and that they did not and does not rely upon information furnished by the Owner, or any of its servants or agents other than information furnished in writing for or in connection with the Bid or the Contract by the Engineer.

3 TENDER FORMS

CONTRACTOR

Name: _____

Address: _____

Mailing Address (if different):

Legal Status (circle one): Corporation Partnership Sole Ownership

The Tenderer hereby authorizes the following contact person to represent the Contractor:

Contact: _____

Title: _____

Mobile Number: _____

email: _____

OWNER

Name: City of Morden

Address: 195 Stephen Street, Morden MB, R6M 1V3

Client Project Manager: Santokh Randhawa, M.Eng., P.Eng.

Mobile Number:

Email: srandhawa@mymorden.ca

CONTRACT ADMINISTRATOR

Name: **WSP** Canada

Address: 1600 Buffalo Place, Winnipeg MB, R3T 6B8

Project Manager: Mike Boissonneault, P.Eng.

Mobile Number: 204.590.6606

Email: mike.boissonneault@wsp.com

Resident Engineer: Roberto Mendoza, CET

Mobile Number: 204.390.8714

Email: roberto.mendoza@wsp.com

PROJECT DESCRIPTION

The Work is briefly described as follows:

a) **City of Morden – Alvey Street Crossing Replacement (Site #1)**

Supply and construction of a new 18 metre long x 9.6 metre wide bridge on Alvey Street within the City of Morden

Site 1 crosses the Deadhorse Creek. UTM coordinates of the site are 14U 5448712N, 0564260E.

b) **City of Morden – Parkhill Drive Crossing Replacement (Site #2)**

Supply and construction of a new 18 metre long x 12 metre wide bridge on Parkhill Drive within the City of Morden

Site 2 crosses the Deadhorse Creek. UTM coordinates of the site are 14U 5450222N, 0564660E.

BASIS OF THE TENDER

- The Contractor has carefully examined the Contract Documents for the construction of the Work. All words starting with a capitalized letter and defined within the Definitions section, shall have the same meanings as the capitalized words and terms.
- The Contractor has examined the Worksite and understands the conditions under which the Work is to be performed. The Contractor has satisfied her/himself that the Work is constructable.
- The Contractor shall supply all the Material and Products, unless noted otherwise, together with all the labour, Plant, and transportation to perform the Work as described within the Contract Documents, for the prices quoted in the Schedule of Prices.
- Unit Prices shall include applicable taxes and duties and delivery to the Worksite. Allowance for handling, protection, installation, insurance, overhead and profit shall be made by the Contractor in their Unit Prices.
- Any equivalent alternatives included as part of the Bid will be subject to a final detailed review at the time of submission of Shop Drawings, and if an equivalent alternative is rejected at that time, the Contractor shall provide the item as originally specified at no charge.
- The estimated quantities for the Items of Work are approximate only and are subject to increase or decrease, and whether the quantities are increased or decreased, the unit prices stated in the Schedule of Prices shall apply, and the Contract Price shall be adjusted accordingly.

City of Morden - Alvey Street and Parkhill Drive Crossing Replacements

- The quantities for which payment will be made are to be determined by the Work performed and successfully completed by the Contractor, which shall be measured as specified herein these Tender Documents.
- If a discrepancy is found between a Unit Price and an Amount, the Unit Price shall be considered as representing the intention of the Contractor, and the Contract Administrator will recalculate the total bid price. The addition of the amounts will be corrected, and a corrected Bid Price and Contract Price will be established.
- If a discrepancy is found between the sum of the corrected Amounts and the total price shown, the sum of the Amounts, as corrected, shall be deemed to represent the intent of the Tenderer.
- If a discrepancy is found between a Lump Sum Price and the corresponding Breakdown Prices, the Lump Sum Price shall be considered as representing the intention of the Tenderer.
- If a discrepancy is found between the Schedule of Prices, Total Contract Price and the Summary of Total Prices, the Total Contract Price of each Site under the Schedule of Price shall take precedence.
- The Tenderer shall state a price in Canadian funds for each Item of Work identified within the Schedule of Prices.

SCHEDULE OF PRICES

The Contractor offers the following Schedule of Prices for performance of the Contract. Use of the MS Excel Schedule of Prices is permitted. The Tender Bid shall include a printed copy of the Excel Schedule of Prices in place of pages 13-16. The City of Morden or WSP are not responsible for errors and omissions with the electronic Schedule of Prices file.

Alvey Street Crossing Replacement (Site 1)

Item	Items of Work	Specification	Units	Quantity	Unit Price	Amount
1	Site Work	Section 8.1	LS	1		\$ -
2	Excavation	Section 8.2	m ³	1540		\$ -
3	Compacted Granular Backfill	Section 8.3	m ³	530		\$ -
4	Compacted Native Fill	Section 8.3	m ³	115		\$ -
5	Supplying Steel H Piles - HP310x110	Section 8.4	lm	180		\$ -
6	Supplying Steel H Piles - HP250x85	Section 8.4	lm	96		\$ -
7	Driving Steel H Piles - HP310x110	Section 8.4	lm	180		\$ -
8	Driving Steel H Piles - HP250x85	Section 8.4	lm	96		\$ -
9	Splicing Steel H Piles - HP310x110	Section 8.4	Each	5		\$ -
10	Supply and Install Pile Tips - HP310x110	Section 8.4	Each	12		\$ -
11	Supply and Fabrication of Structural Steel	Section 8.8	kg	5968		\$ -
12	Place Structural Steel	Section 8.8	kg	5968		\$ -
13	Supply and Install Bearings	Section 8.10	Each	18		\$ -
14	Supply of Precast Prestressed Concrete Girders - G1	Section 8.6	Each	6		\$ -
15	Supply of Precast Prestressed Concrete Girders - G2	Section 8.6	Each	2		\$ -
16	Erection of Precast Prestressed Concrete Girders	Section 8.6	Each	8		\$ -
17	Miscellaneous Grouting	Section 8.6	LS	1		\$ -
18	Supply and Install Waterproofing Membrane	Section 8.14	m ²	173		\$ -
19	Supply and Install Bridge Railing.	Section 8.8	kg	3288		\$ -
20	Supply and Install Guardrail System	Section 8.13	lm	36		\$ -
21	Supply and Install Precast Concrete Ballast Wall - N1	Section 8.6	Each	2		\$ -
22	Supply and Install Precast Concrete Ballast Wall - N1a	Section 8.6	Each	2		\$ -
23	Supply and Install Precast Concrete Backwall - N2	Section 8.6	Each	2		\$ -
24	Supply and Install Precast Concrete Backwall - N3	Section 8.6	Each	2		\$ -
25	Supply and Install Precast Concrete Wingwall - N4	Section 8.6	Each	2		\$ -
26	Supply and Install Precast Concrete Wingwall - N4a	Section 8.6	Each	2		\$ -
27	Supply and Install Riprap	Section 8.9	m ³	100		\$ -
28	Milling Bituminous Pavement	MTI 815	m ²	760		\$ -
29	Surface Preparation Type "B"	MTI 701(I)	Sta	1		\$ -
30	Remove Culverts	MTI 400	lm	12		\$ -

City of Morden - Alvey Street and Parkhill Drive Crossing Replacements

Item	Items of Work	Specification	Units	Quantity	Unit Price	Amount
31	Supply and Place Culvert	MTI 400	lm	4		\$ -
32	Concrete Curb & Gutter Type "C"	MTI 860 (I)	lm	42		\$ -
33	Restore Concrete Driveway	Section 8.5	m ³	4.6		\$ -
34	Granular Base Course	MTI 701 (I)	m ³	270		\$ -
35	Supply and Apply Prime Coat	MTI 806 (I)	L	500		\$ -
36	Bitumous Pavement Class B	MTI 801 (I)	Tonne	270		\$ -
Sub Total						\$ -
GST						\$ -
Total Bid Price - Alvey Street Crossing Replacement (Site 1)						\$ -

City of Morden - Alvey Street and Parkhill Drive Crossing Replacements

Parkhill Drive Crossing Replacement (Site 2)

Item	Items of Work	Specification	Units	Quantity	Unit Price	Amount
1	Site Work	Section 8.1	LS	1		\$ -
2	Excavation	Section 8.2	m ³	1180		\$ -
3	Compacted Granular Backfill	Section 8.3	m ³	530		\$ -
4	Compacted Native Fill	Section 8.3	m ³	115		\$ -
5	Supplying Steel H Piles - HP310x110	Section 8.4	lm	210		\$ -
6	Supplying Steel H Piles - HP250x85	Section 8.4	lm	96		\$ -
7	Driving Steel H Piles - HP310x110	Section 8.4	lm	210		\$ -
8	Driving Steel H Piles - HP250x85	Section 8.4	lm	96		\$ -
9	Splicing Steel H Piles - HP310x110	Section 8.4	Each	5		\$ -
10	Supply and Install Pile Tips - HP310x110	Section 8.4	Each	14		\$ -
11	Supply and Fabrication of Structural Steel	Section 8.8	kg	6682		\$ -
12	Place Structural Steel	Section 8.8	kg	6682		\$ -
13	Supply and Install Bearings	Section 8.10	Each	20		\$ -
14	Supply of Precast Prestressed Concrete Girders - G1	Section 8.6	Each	7		\$ -
15	Supply of Precast Prestressed Concrete Girders - G2	Section 8.6	Each	1		\$ -
16	Supply of Precast Prestressed Concrete Girders - G3	Section 8.6	Each	1		\$ -
17	Supply of Precast Prestressed Concrete Girders - G4	Section 8.6	Each	1		\$ -
18	Erection of Precast Prestressed Concrete Girders	Section 8.6	Each	10		\$ -
19	Miscellaneous Grouting	Section 8.6	LS	1		\$ -
20	Supply and Install Waterproofing Membrane	Section 8.14	m ²	172		\$ -
21	Supply and Install Bridge Railing	Section 8.8	kg	1747		\$ -
22	Supply and Install Parapet Railing	Section 8.8	kg	572		\$ -
23	Supply and Install Guardrail System	Section 8.13	lm	25		\$ -
24	Supply and Install Precast Concrete Ballast Wall - N1	Section 8.6	Each	2		\$ -
25	Supply and Install Precast Concrete Ballast Wall - N1a	Section 8.6	Each	2		\$ -
26	Supply and Install Precast Concrete Back Wall - N2	Section 8.6	Each	2		\$ -
27	Supply and Install Precast Concrete Back Wall - N3	Section 8.6	Each	2		\$ -
25	Supply and Install Precast Concrete Wingwall - N4	Section 8.6	Each	2		\$ -
26	Supply and Install Precast Concrete Wingwall - N4a	Section 8.6	Each	2		\$ -
27	Supply and Install Riprap	Section 8.9	m ³	95		\$ -
28	Supply and Place Concrete Sidewalk	Section 8.5	m ³	8.8		\$ -
29	Supply and Place Concrete Parapet Wall	Section 8.5	m ³	5.2		\$ -
30	Milling Bituminous Pavement	MTI 815	m ²	820		\$ -
31	Removing Concrete Curb and Gutter	MTI 880	lm	154		\$ -

City of Morden - Alvey Street and Parkhill Drive Crossing Replacements

Item	Items of Work	Specification	Units	Quantity	Unit Price	Amount
32	Remove Concrete Sidewalk	MTI 890	m ²	112		\$ -
33	Surface Preparation Type "B"	MTI 701(l)	Sta	0.9		\$ -
34	Remove Culverts	MTI 400	lm	12		\$ -
35	Concrete Curb & Gutter Type "C"	MTI 860 (l)	lm	140		\$ -
36	Concrete Sidewalk - 100mm	MTI 870	m ²	152		\$ -
37	Granular Base Course	MTI 701 (l)	m ³	370		\$ -
38	Supply and Apply Prime Coat	MTI 806 (l)	L	500		\$ -
39	Bitumous Pavement Class B	MTI 801 (l)	Tonne	268		\$ -
40	Supply and Install Chain Link Fence	Section 8.12	lm	20		\$ -
Sub Total						\$ -
GST						\$ -
Total Bid Price - Parkhill Drive Crossing Replacement (Site 2)						\$ -

Alvey Street Crossing Replacement (Site1) Bid Price in writing

Parkhill Drive Crossing Replacement (Site2) Bid Price in writing

CONTRACT PRICE

The Total Bid Price shall be as follows:

Alvey Street Crossing	\$ _____
Parkhill Drive Crossing	\$ _____
Total Contract Value	\$ _____

The total contract value will be subject to additions or subtractions when in written for modifications to the Work.

SCHEDULE OF COMPLETIONS

- The Contractor offers to begin the Work within the period specified in the "Notice to Proceed," and to prosecute the Work in such a manner as to achieve the following completion periods.
- The Work shall be completed by the dates of Substantial Performance and Total Performance dates specified herein these Tender Documents.
- Time is of the Essence in this Contract, and in the event that the Work is not completed within the period named above, the Contractor may be responsible for all damages accruing to the Owner due to late completion.

SCHEDULE OF ADDENDA

- The Contractor certifies that they have received the following Addenda which have been considered and considered in determining the Unit Prices within the Schedule of Prices. The Addenda were issued by or on behalf of the Owner and shall be deemed to form part of the Contract.

Addendum Number	Date Issued	Number of Pages
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

BID SECURITY

- Bidders shall provide bid security in the form of one of the following:
 - a bid bond, in the amount of at least ten percent (10%) of the Total Contract Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba.
 - an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Contract Price and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba.
 - If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Contract Price submitted.
 - All signatures on bid securities shall be original.
 - The Bidder shall sign the Bid Bond.
 - The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.
 - Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant, it will be deposited and retained by the Owner as the performance security and no further submission is required.
 - The Owner will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.
 - The bid securities of all Bidders will be released by the Owner as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.
-

PERFORMANCE GUARANTEE AND INSURANCE CERTIFICATE

- After receipt of Notice of Acceptance, the Contractor shall provide a Performance Bond in the amount of fifty percent (50%) of the minimum Contract Price and a standard Labour and Materials Payment Bond in the amount of 50% of the minimum Contract Price and the Bonds shall remain in effect for the duration of construction and the Warranty Period.

- The bonds shall be in a form that is acceptable to the Contract Administrator and shall be supplied by an agency that is acceptable to the Contract Administrator and that is licensed in the jurisdiction in which the Work is located.
 - If a Security Deposit is provided in lieu of a Performance Bond, the Security Deposit shall be retained to the end of the Warranty Period.
 - After receipt of Notice of Acceptance, the Contractor shall provide the required Insurance Certificate.
 - The costs of bonds and insurance shall be borne by the Contractor.
 - No Progress Payments shall be made until the required Bonds or Security Deposit and Insurance Certificate have been delivered to the Contract Administrator.
-

AGREEMENT

- The Contractor shall sign and return the Agreement to the Contract Administrator within five days after receipt of the Notice of Acceptance and prior to proceeding with the Work.
-

NOTICE TO PROCEED

- After acceptance, the Owner will issue a "Notice to Proceed" and the date specified in this Notice shall be the date of commencement entered into the agreement.
 - The Contractor shall not enter onto the Worksite nor commence Work before the date of commencement specified in the "Notice to Proceed."
-

PERIOD OF IRREVOCABILITY

- This Tender is irrevocable for thirty days (30) after the Tender closing date.
- The project schedule will be updated accordingly in the event of a delayed award.

SCHEDULE OF SUBCONTRACTORS

- The Contractor shall use the following Subcontractors for the proposed Work:

Portion of Work Name of Subcontractor Address

Portion of Work	Name of Subcontractor	Address

SCHEDULE OF EXPERIENCE

- The Contractor states that the following projects were completed with the Contractor acting as the Prime Contractor for the Work and the Work referenced is for Work with a similar or greater magnitude in size and contract cost.

Project Name and Location	Client	Completion Date	Description of Project

TENDER FORM APPROVALS

Names and Addresses of Corporation Officers or Members of the Organization:

Name	Address	Position
------	---------	----------

Name	Address	Position
------	---------	----------

Name	Address	Position
------	---------	----------

Signed, Sealed and Delivered by:

Signature of Witness (if no seal)

Signature of Authorized Contractor Official(s)

Print Name

Print Name

Signature

Signature

Title

Title

Corporate Seal

NOTICE OF ACCEPTANCE

WRITTEN NOTICE OF ACCEPTANCE

- For the project entitled **Alvey Street Crossing Replacement (Site 1)** and **Parkhill Drive Crossing Replacement (Site 2)** to perform the Work described herein this Contract.
- For the Total Contract Price (including GST) of: \$_____ dollars.
- Submitted to The City of Morden (OWNER)
- Is hereby accepted on this date: _____, 2023

AUTHORIZATION

- This notice of Acceptance is authorized by: _____ (OWNER)

Signature of the OWNER

(Affix Seal)

Signature of the Witness (if no seal)

CONTRACT

This Agreement made in on the _____ day of _____, 2023, between:

- The City of Morden, hereinafter called the "Owner" and
_____, hereinafter called the "Contractor"

The Agreement includes the following documents:

- **Section 1 – Definitions**
- **Section 2 – Tendering**
- **Section 3 – Tender Forms**
- **Section 4 – General Conditions**
- **Section 5 – Proposed Work**
- **Section 6 – Contractor Use of the Site**
- **Section 7 – Environmental Protection Plan**
- **Section 8 - Technical Specifications**
- **Addenda**
- **Alvey Street Crossing (Site 1) – Issued for Construction drawing set**
- **Parkhill Drive Crossing (Site 2) – Issued for Construction drawing set**
- **City of Winnipeg Standard Construction Specifications**
- **Manitoba Transportation and Infrastructure Standard Construction Specifications**

SCOPE OF THE WORK

- The Contractor agrees to furnish all Materials and Products (unless noted otherwise) together with all the equipment, labour and transportation necessary to perform the Work as described herein the Contract Documents entitled:
City of Morden, Tender Contract & Specifications – Alvey Street (Site 1) & Parkhill Drive (Site 2) Crossing Replacements
- WSP Canada relied on information provided by the Owner and or third parties on behalf of the Owner. Henceforth, WSP cannot warrant or guarantee the accuracy or reliability of all information.

COMPLETION DATES

- The Work to be performed under this Contract shall be commenced on the date specified in the "Notice to Proceed". Components shall be completed and the Work in its entirety shall be fully completed, including clean-up and rectification of all deficiencies, by the specified Total Performance.
- In the event that the Work is not completed as specified, the Contractor may become liable for any additional engineering expense and any other costs incurred to the Owner. The amount of such damages may be deducted from any monies due the Contractor.
- It is agreed between the Owner and the Contractor that in the event of such delay in completion of the date of Substantial Performance, the Owner will suffer damages estimated to be one thousand dollars (\$1,000) per day, and the Contractor agrees to pay such damages as liquidated damages.
- It is agreed between the Owner and the Contractor that in the event of such delay in completion of the date of Total Performance, the Owner will suffer damages estimated to be one thousand and

five hundred dollars (\$1500) per day, and the Contractor agrees to pay such damages as liquidated damages.

PAYMENT

- The Owner shall pay the Contractor in Canadian currency for the performance of the Contract at the Amounts within the Schedule of Prices, subject to the conditions set forth in the Contract Documents.

PERFORMANCE GUARANTEES

- The Contractor hereby deposits with the Owner a Performance Bond in the amount of fifty percent (50%) of the minimum Bid Price and a Labor and Materials Payment Bond in the amount of fifty percent (50%) of the minimum Bid Price.

WRITTEN NOTICE

- Written notice shall be deemed to have been duly served if delivered in person to the individual, or to a member of the firm, or to an officer of the corporation for which it is intended; or sent by double registered mail to its business address.
- Written Notice must be served to:

Owner:

The City of Morden,
195 Stephen Street
Morden MB, R6M 1V3

Contractor:

SIGNATURES

In witness hereof, the Parties have executed this Agreement, on _____ .

Signed, Sealed, and Delivered in the presence of:

Witness to the Signature
of the Owner: City of Morden

Signature of the OWNER with
appropriate fiscal signing Authority.

Title: _____

Title: _____

Address: 195 Stephen Street,
Morden MB, R6M 1V3

(Seal)

Witness to the Signature
of the Contractor:

Signature of the Contractor with
appropriate fiscal signing Authority.

Title: _____

Title: _____

Address: _____

(Seal)

CERTIFICATE OF INSURANCE

This is to certify that the insurances as described herein have been arranged for the insured named herein on whose behalf this Certificate is executed, and we hereby certify that such insurances are in full force and effect.

Name of insured _____

Address of insured _____

INSURANCE COVERAGE

General Liability Insurance

Wrap-up and General Liability insurance covering property damage and contractual liability.

Policy No. _____ Insurer _____

Date Effective _____ Date of Expiration _____

Limits of Liability _____ Each Person _____

Each Claim _____ Aggregate Cover _____

Inclusive Limits _____

Automotive Insurance

Automobile insurance covering all vehicles owned, operated, leased or hired.

Policy No. _____ Insurer _____

Date Effective _____ Date of Expiration _____

Limits of Liability _____ Each Person _____

Each Occurrence _____ Aggregate Cover _____

Inclusive Limits _____

If any of the policies described herein are changed, for any reason during the period of coverage, as to affect this Certificate, or if any of the policies are cancelled or terminated, 5 days written notice shall be given to the Owner and to WSP prior to such change, cancellation or termination becoming effective.

This Certificate is executed and issued to the Owner the day and date written below.

INSURANCE BROKER INFORMATION

Owner: City of Morden

Address: 195 Stephen Street
Morden MB, R6M 1V3

Date: _____

Name of Agent or Broker: _____

Address of Agent/Broker: _____

Phone No.: _____

Email: _____

Name of Authorized Office: _____

Signature: _____

4 GENERAL CONDITIONS

The contents of the Contract Documents are limited to:

- a) Contract Forms:
 - i) Tender Forms
 - ii) Notice of Acceptance
 - iii) Agreement
 - iv) Performance Bond
 - v) Labour and Materials Payment Bond
 - vi) Certificate of Insurance
- b) Conditions of the Contract:
 - i) General Conditions
 - ii) Drawings
 - iii) Specifications
 - iv) Appendices
 - v) Addenda
 - vi) Field Orders
 - vii) Change Orders

4.1 AGREEMENT

The Agreement shall be signed in ink by the Owner and the Contractor. Certified digital signature in Adobe is also acceptable.

4.2 DRAWINGS AND INSTRUCTIONS

- The Contract Administrator will furnish to the Contractor with two (2) days, working copies of the Contract Documents (2 – 24"x36" and 8 - 11"x17" drawing sets and 2 specification). Electronic copies of the drawings and specifications will be provided in addition to the hard copies.
- A current set of the complete Contract Documents, in good order, shall be kept at each worksite and shall be available there to the Contract Administrator and the Owner.
- All drawings, specifications and copies thereof furnished by the Contract Administrator are her/his property. They shall not be used on other Work and, with the exception of the signed Contract Documents set, are to be returned to the Contract Administrator on request, upon completion of the Work.

4.3 REFERENCE POINTS AND LAYOUT

- The Contract Administrator will establish temporary benchmarks for the location of principal components of the Work in reasonable proximity to the Work.
- The Contractor shall be responsible for protection and preservation of benchmarks, reference points and stakes, and legal survey pins, and in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their loss or disturbance.

- The Contractor shall provide all detailed layout of dimensions, locations, and elevations of the Work from the base lines, reference points, and benchmarks set by the Contract Administrator.
- The Contractor shall not proceed with the Work until he has received from the Contract Administrator such base lines, reference points, elevations, and other points and instructions as are required for the execution of the Work.
- The Contractor shall, before commencing Work at any point, satisfy himself as to the meaning and correctness of all stakes and instructions. No claims shall be considered for any allowance based on alleged inaccuracies, failure to read reference points correctly, or failure to interpret instructions correctly.
- If the Contractor, while executing the Work, finds any discrepancy between the drawings and the physical conditions of the locality, or any errors, omissions, or discrepancies in drawings or in the layout as given by points and instructions, he shall inform the Owner immediately in writing, and the Owner or the Contract Administrator shall promptly verify the same and issue appropriate instructions. Any Work done after discovery of errors, omissions, or discrepancies, before further Work is authorized, will be done at the Contractor's risk.

4.4 CONTRACT EXECUTION

- The Contract Administrator shall administer the Contract and shall, in the first instance, be the interpreter of the Contract and shall assess the adequacy of performance by the Contractor and Subcontractors.
- The Contract Administrator shall provide only general engineering services for the Work, including periodic visits to the Worksite to observe the progress of the Work and general conformance to the intent of the design.
- The duties, responsibilities, and limitations of authority of the Contract Administrator are defined in the Contract Documents and they may not be changed except with the written consent of the Owner. They are delegated to the Contract Administrator by the Owner.
- The efforts of the Contract Administrator shall be directed to reviewing construction progress, providing interpretation of the Contract Documents, where required, and assisting in the expeditious carrying out of the Work.
- The Contract Administrator does not guarantee the Contractor's Work nor undertake to check the quality and quantity of Work on behalf of the Contractor. The Contract Administrator is not responsible to the Contractor for discovering defects in the Work nor for advising the Contractor of defects in the Work.
- The Contractor shall provide expertise, skill and experience required for the execution of the Work.
- During execution of the Work, if the Contractor becomes aware of any error, discrepancy or omission in the drawings or the specifications, the Contractor shall immediately notify the Contract Administrator in writing and request instructions. The Contractor shall not proceed any further with that portion of the Work until he has received such instructions in writing from the Engineer of Record.
- The Contract Administrator may, by Field Order, put a hold on any portion of Work while an error, discrepancy, or omission, whether discovered by the Contractor or Contract Administrator. Such a hold order shall not constitute a basis for a claim by the Contractor for delay, unless and until it critically affects the performance of the Work and the Schedule for Completion of the Work.
- The Contractor shall designate, at the pre-construction meeting, the Contractor's Project Manager who shall have authority to sign Change Orders, attend meetings on and off the Worksite, give instructions to the Superintendent all on behalf of the Contractor and generally represent the Contractor. The Contractor shall also designate the site Superintendent and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

- The Contractor shall have complete control of the Work and shall direct and supervise the Work to ensure conformance with the intent of design as expressed in the Contract Documents. The Contractor shall be solely responsible for construction means, methods, techniques, sequences, and procedures, and for coordinating the various aspects of the Work.
- The Contractor shall have the sole responsibility for the design, erection, operation, maintenance and removal of temporary structures and other temporary facilities, and for the design and execution of methods required in their use.
- When required by law or requested by the Contract Administrator, the Contractor shall engage and pay for registered professional engineer to perform the design of temporary facilities and methods of execution to ensure safety and satisfactory performance.
- When required by the Specifications or drawings, the Contractor shall submit to the Contract Administrator a written description and Drawings to show its proposed methods and means for doing certain specified items of the Work. These submissions are to be made to allow the:
 - o Determine the general conformance of the proposed means and methods with the intent of the design.
 - o Determine whether there are or could be any serious affects of a permanent nature on the Work, the Worksite, or the contiguous area outside the Worksite.
- The Owner or Contract Administrator may, but they are not obligated to, comment on or reject the proposed means and methods.
- The Contract Administrator may stop the Contractor from implementing the proposed means and methods by issuing a Field Order.
- The Contractor shall employ a competent Superintendent who shall attend the Worksite while Work is being performed. The Superintendent shall be acceptable to WSP and shall not be removed or changed without justification.
- The Superintendent shall represent the Contractor at the Worksite and additional instructions given to her/him by the Contract Administrator shall be deemed to have been given to the Contractor.
- Nothing contained in the Contract Documents shall be construed to form any contractual obligation between WSP and the Contractor.

4.5 SUBCONTRACTORS

The Contractor shall preserve and protect the rights of the Owner with respect to all Work performed under the Contract and shall:

- Require all Subcontractors to perform Work in accordance with and subject to the terms and conditions of the Contract.
- Be as fully responsible to the Owner for acts and omissions of Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the Contractor.
- Incorporate all terms and conditions of the Contract Documents into all Subcontract Agreements he enters with her/his Subcontractors, insofar as they are applicable.
- The Contractor shall employ those Subcontractors proposed in the Schedule of Subcontractors as accepted by the Contract Administrator prior to Contract execution.
- Nothing contained in the Contract Documents shall create any contractual obligation between any Subcontractor and the Owner.

4.6 OTHER CONTRACTORS

- The Owner shall coordinate the any other work activities on the Worksite with the Contractor prior to any other works completed.
 - The Contractor will evaluate any proposed other works within the Worksite for potential impacts to the project schedule and construction methodology.
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4.7 INDEMNITY

- The Contractor shall indemnify and hold harmless the Owner, WSP Canada and all representatives or employees of the Owner, from and against all third-party actions, claims, demands or suits, or payments, losses, judgment, or expenses arising out of or in consequence of the acts, omissions, or negligence of the Contractor in performing the Work during the period of performance of the Work and during the Warranty Period.
 - In the event of such a third-party action, claim, demand or suit, the OWNER shall give written notice thereof to the Contractor and the Contractor shall thereupon defend against or otherwise dispose of the same, and shall pay any losses, judgments, and expenses promptly after they are determined.
 - If the Contractor fails, refuses or neglects to defend, or otherwise dispose of such third-party action, claim, demand, or suit, within reasonable time and within legal time constraints, the Owner may dispose of such action, claim, demand, or suit on such terms as the Owner, in his/her sole discretion, shall deem reasonable. The Contractor shall thereupon, and forthwith, pay to the Owner the sums paid out by the Owner and all reasonable costs incurred by the Owner in disposing of the matter, including the Owner's legal costs on the Solicitor and Client basis.
 - The obligation of the Contractor to indemnify the Owner shall not apply to liability arising out of acts, omissions, or negligence of the Owner, WSP Canada or any other representative or employee of the Owner.
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4.8 DISPUTE RESOLUTION

- The Contract Administrator shall, in the first instance, interpret the Contract and make any determinations for which he is responsible and which he is authorized to make under the Contract. Should either the Contractor or the Owner dispute the written interpretation or determination made by the Contract Administrator in the first instance, that party shall, within six (6) calendar days of receiving the determination or interpretation, submit to the Contract Administrator a written notice of her/his dispute setting out all the relevant details.
- Upon receipt of a Notice of Dispute, the Contract Administrator immediately notify in writing the other party to the Contract and provide to the other party a copy of the Notice of Dispute.
- The Owner and the Contractor shall, within six (6) calendar days of receiving such notification, review the dispute jointly and attempt a resolution by negotiation.
- If the Owner and the Contractor are not able to resolve the dispute by negotiation, they may, by mutual agreement, engage a mediator to assist them in further negotiation towards reaching a resolution.
- Alternatively, or after mediation has failed, the Owner and the Contractor may, by mutual agreement, submit the dispute to arbitration under the laws of the jurisdiction in which the Work is situated. Insofar as it is compatible with the law in the jurisdiction in which the Work is situated, the Recommended Procedures for Arbitration of Construction Disputes of the Canadian Construction Association, the most current edition, shall be followed. The arbitrator's decision shall be binding.

- Alternatively, the Contractor or the Owner may commence an action at law with respect to the dispute if it cannot be resolved by negotiation either with or without mediation.
- Neither negotiation with or without mediation, nor arbitration, shall be conditions precedent to proceeding with an action at law.
- If the dispute is not resolved promptly, the Contract Administrator shall give instructions in writing to the Contractor to do such Work or to take such actions or refrain from taking such actions as may be required to avoid delay, mitigate damage, and continue the proper performance of the Work pending resolution of the dispute. The Contractor shall act promptly in accordance with such instructions and by so doing shall not jeopardize any claim he may have with respect to the dispute.

4.9 DELAYS

- In the event the Contractor is delayed in the performance of the Work by failure of the Owner to make decisions respecting the Work, late delivery of materials furnished by the Owner or acts or omissions by the Owner, or by strikes or lock outs of the Owner's forces, the Contractor shall be compensated for any additional costs thereby incurred, and the completion date shall be revised accordingly. The amount of the compensation and the extent of change in completion date shall be determined, upon review of a claim submission from the Contractor, by the Contract Administrator.
- In the event the Contractor is delayed in the performance the Work by weather, labour disputes, strikes or lock outs of the Contractor's forces, or delay by common carriers, the Contractor shall not be compensated for any additional costs thereby incurred, nor shall the completion dates be changed, because it is agreed that the Contractor is more competent than the Owner to assess the probability and impact of these events. The Contractor's forces in this context include all Subcontractors and suppliers.
- If the Contractor is delayed in the performance of the Work by a Stop Work Order issued by a court or other public authority and provided that such Order was not issued because of any act or fault of the Contractor, or of anyone employed by him directly or indirectly, then the Contractor shall be entitled to claim compensation for additional costs thereby incurred, and the completion date be revised accordingly. The amount of compensation and the extent of change in completion date shall be determined in the first instance by the Contract Administrator.
- The Contractor shall provide to the Contract Administrator timely written notice of all delays for which it is the Contractor's intention to claim either an extension of completion time or costs resulting from the delay or both.
- Impact delays are those delays which arise out of the Owner's requirement.
- Impact delays may be:
 - o certain to occur,
 - o foreseeable, but not certain to occur, or
 - o not foreseeable.
- At the time of submitting a claim, the Contractor shall identify her/his intention, if any, to claim for impact delays, and provide justification for such claims or intentions to claim so that these can be negotiated and agreed upon in a Change Order.
- No claim for impact delays shall be valid or enforceable except as provided for in a Change Order.

4.10 OWNER'S RIGHT TO DO WORK

- In the event the Contractor should refuse to supply adequate workmanship for the scheduled performance of the Work, or neglect to prosecute the Work properly, or fail to perform any of the

provisions of the Contract, then the Owner may give written notice to the Contractor and her/his Surety that the Contractor is in default of her/his contractual obligations, and instruct her/him to correct the default within five (5) business days.

- In the event the correction of the default cannot be completed within the five (5) business days specified, the Contractor shall follow the Owner's instruction if she/he:
 - o Commences the correction of the default within the specified time.
 - o Provides the Owner with an acceptable schedule for such correction.
 - o Completes the correction in accordance with such schedule.
- In the event the Contractor fails to comply with the requirements of the General Conditions, the Owner may, without prejudice to any other right or remedy he may have, correct such default, and may deduct the cost thereof from the payment then or thereafter due the Contractor. The Contract Administrator shall, in the first instance, determine that both the corrective action and the amount subsequently charged to the Contractor reasonable.

4.11 OWNER'S RIGHT TO TERMINATE THE CONTRACT

In the event the Contractor:

- Is adjudged bankrupt, or make a general assignment for the benefit of creditors, or if a receiver is appointed on account of his insolvency; or
- Fail to make sufficient payments due to her/his creditors for supplies and labour required for Work; or
- Disregard laws or ordinances, or the Contract Administrator's instructions; or
- Abandon the Work, or fail to adhere to the Work Schedule to such an extent that there is danger of failing to meet Completion dates; or
- Otherwise violate the fundamental conditions of the Contract
- In the event the Contract Administrator shall, by written notice, instruct the Contractor to correct the default within five (5) business days. If the default is not corrected within five (5) business days, then the Owner may, without prejudice to any other right or remedy she/he may have, terminate the Contractor's right to continue the Work.
- In the event the Owner terminates the Contractor's right to continue with the Work or terminates the Contract under the conditions set out above, and if the performance Warranty is unconditional, the Owner shall be entitled to:
 - o Take possession of the premises, supplies, and utilize them to finish the Work by whatever method he may deem expedient but without undue delay or expense; and
 - o Withhold any further payments to the Contractor until the Work is finished; and
 - o Upon completion of the Work, determine the full cost of finishing the Work as certified by the Contract Administrator, including compensation to WSP for additional services and a reasonable allowance as determined by the Contract Administrator to cover such costs, and charge the Contractor the amount by which the full cost exceeds the unpaid balance of the Contract Price; or
 - o if such cost of finishing the Work is less than the unpaid balance of the Contract Price, the difference shall be paid to the Contractor; and
 - o On expiry of the Warranty Period, charge the Contractor the cost of corrections required under the warranty.

- The Contractor's obligation under the Contract as to the quality of that portion of the Work and warranty of that portion of the Work performed by the Contractor prior to termination of the Contractor's right to continue with the assignment shall continue in force after the termination.
 - If the Contractor has provided a Performance Bond, the Owner has the option of:
 - o Terminating the Contractor's right to continue with the Work,
 - o Terminating the Contract,
 - o Exercising the Owner's rights in accordance with conditions of the Performance Bond.
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4.12 SUSPENSION OF THE WORK BY THE OWNER

- The Owner may suspend the execution of the Work by giving written notice to the Contractor to that effect.
 - The Contractor, upon receiving such written notice, shall immediately suspend all operations except those necessary for the care and preservation of the portions of the Work already executed, and continue activities to ensure safety to the public of unfinished or protected hazard.
 - During the period of suspension, the Contractor shall not remove from the Worksite any part of the Work or any without the written approval from the Contract Administrator.
 - If the Contractor is delayed in performance of the Work by a suspension of the Work by the Owner and if the period of suspension is thirty (30) calendar days or less, the Contractor is entitled to an extension by the period of suspension plus seven (7) calendar days.
 - After thirty (30) calendar days, of suspension of the Worksite the Owner at its sole option shall:
 - o Negotiate terms under which the Contractor shall continue with the execution of the Work and the Contractor shall then resume operations in accordance with the terms of that negotiation; or
 - After thirty (30) calendar days of suspension of the Work, the Contractor shall be allowed to remove any or all her/his equipment and supplies from the Worksite without further approval from the Owner.
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4.13 CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT

- If the Owner should be adjudged bankrupt or makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of his insolvency, the Contractor may, without prejudice to any other right or remedy he may have, by giving the OWNER five (5) days written notice, terminate the Contract.
- If the Work should be stopped or otherwise delayed for a period of thirty days or more under an order of any court, or other public authority, and provided that such order was not issued as the result of any act or fault of the Contractor or of anyone directly or indirectly employed by him, the Contractor may, without prejudice to any other right or remedy she/he may have, by providing written notice to terminate the Contract.
- The Contractor may notify the Owner in writing, with a copy to the Contract Administrator, that the Owner is in default of his contractual obligations if:
 - o If WSP Canada fails to certify a Progress Payment Certificate in accordance with these General Conditions; or,
 - o The Owner, subject to requirements of these General Conditions, fails to pay to the Contractor when due, any amount certified by the Contract Administrator, or awarded by arbitrators.

- Such written notice shall advise the Owner that if such default is not corrected within fifteen (15) calendar days from the receipt of the written notice the Contractor may, without prejudice to any other right or remedy he may have, stop the Work, and terminate the Contract.
- If the Contractor terminates the Contract under the conditions set out above, she/he shall be paid for all Works performed, procured materials, and expected profits for the Work.

4.14 CHANGES IN WORK

- The Contract Administrator may order changes in the Work through additions, deletions, modifications, or variations without invalidating the Contract. The value of such changes shall be considered in ascertaining the final amount of the Contract Price. All such Work shall be executed under the conditions of the Contract. No extension of the scheduled completion date shall be made on account of changes in the Work unless expressly provided for in the Change Order.
- No changes in the Work shall be made unless pursuant to a Field Order or a Change Order and no payment shall be made, or credit given unless authorized by an approved Change Order.
- The Contract Administrator shall have no authority to issue Change Orders without prior approval by the Owner. The Contract Administrator and the Contractor shall approve and sign every Change Order prior to execution of the new work task.
- The Contractor may, in writing, propose changes in the Work, including the amount of additional payment or credit entailed in the proposal. If the Contract Administrator accepts the proposal, the Owner and the Contractor will authorize a Change Order for this work.
- When the Owner or Contract Administrator desires to make a change in the Work, they shall issue a Contemplated Change Notice (CCN) to the Contractor and the Contractor shall return to the Owner a fee and schedule for the proposed work. If the fee and schedule for the CCN is accepted, the change in the Work will be authorized via an approved Change Order.
- In the event the Contractor claims that any instruction by drawings, or otherwise, involves a change in Work under the Contract, she/he may submit to the Contract Administrator, in writing a claim for the potential out of scope work. No such claim will be valid unless accepted by the Contract Administrator, then formalized through the Change Order process.
- Impact costs are those costs and delays which arise from the Contract Administrator's requirement of the Contractor to perform changes in the Work, which directly impact the performance of other parts of the Work as specified.
 - At the time that the Contractor submits a quote for a CCN, there may be an expected impact cost associated with work performed. Such costs shall be stated separately in the CCN estimate with justification of their validity and quantum, so that the Owner can accept, reject, or negotiate the fee or schedule of the new work proposed.
 - There may be expected some impact costs which have some probability of occurring, but not a certainty. The Contractor's response to the CCN shall describe the cost and schedule impacts if any. An estimate (if possible) of the probability of occurrence and an estimate of quantum of costs of the impacts.
 - There may occur some impacts which could not have been foreseen at the time of submission of the CCN and therefore the Contractor shall refer to that possibility as best as possible in the CCN response.

4.15 EVALUATION OF CHANGES IN WORK

- The evaluation of changes in the Work due to differences between actual measured quantities at the time of construction and the approximate estimated quantities shown in the Tender shall be determined based on the Unit Prices named in the Tender. No Change Order is required.
- The value of a deletion or addition of Work within the scope of the Contract shall be done using the Unit Price for that item of work.
- When there are changes in the Work which are not covered by Unit Prices named in the Tender, the valuation of such changes shall be determined by:
 - o An agreement on a Lump Sum in each instance between the Owner and the Contractor, or
 - o Contractor's cost plus 20% for supplies and standard labour rates, or
 - o On a Contractor's cost basis as follows:
 - Payroll Cost of Labour, defined as direct wages and salaries for the hours worked, plus 25% to cover Workers' Compensation, unemployment insurance, vacation pay, paid statutory holidays and other valid payroll burdens; plus
 - Cost of providing room and board for labour, if room and board is normally provided by the Contractor; plus
 - The Contractor's cost for supplies to the Worksite; plus
 - Twenty percent (20%) fee on the sum of the above three items, to cover office and general overhead, use of small tools and profit. Overhead includes the cost of superintendence, foremen, timekeepers and other administrative and supervisory personnel and their vehicles and other job site costs, plus all office overhead costs; plus
 - A 15% markup on materials and Subconsultants; plus
- The choice of evaluation methods shall be made by the Contract Administrator at her/his sole discretion.
- When a change in the Work, is being done on a cost basis, the Contractor shall submit to the Contract Administrator daily an accounting for Work done on the preceding working day. The accounting shall include a listing of the hours of labour and a list of the material costs procured. Work eligible expenses shall be provided as well. The Contract Administrator may, each day, check the supplied documentation and validate if it is numerically correct and she/he will sign (digital or in ink) and return to the Contractor and copy the Owner. Only those items which are eligible in accordance with the Contract shall be certified for payment by a Change Order.
- If, on any day, the Contractor fails to submit an account of the change in Work completed, those costs will not be considered for payment until such time accounting documents have been provided to the Contract Administrator and accepted.

4.16 PAYMENTS

- At the end of each month during the performance of Work, the Contractor shall prepare a Progress Estimate for that portion of the Work done during that month.
- A holdback of 7.5% of the total value of that portion of Work performed to the end of that month, as shown on the Progress Estimate, shall be retained for various purposes of the Owner, including conformance with the lien enactment, along with any other deductions from the Progress Estimate which may be warranted or may be required in accordance with conditions of this Contract.

- The Contractor's Progress Estimate shall be reviewed by the Contract Administrator based on observations she/he has made during construction inspection of that portion of the Work for which payment is being requested. The Contract Administrator shall sign and return the Progress Estimate to the Contractor for acceptance and signature.
- After receipt of the Contractor's signed Progress Estimate, the Owner shall make payment to the Contractor in the amount on the signed Progress Estimate.
- The Owner may withhold payment on any Progress Estimate as may be necessary or prudent to protect herself/himself from loss on account of:
 - o Unsatisfactory progress by the Contractor.
 - o Defective Work which is not remedied.
 - o Claims filed, or reasonable expectation that claims will be filed, against the Owner or the Contractor.
 - o The failure of the Contractor to make payments properly to Subcontractors or suppliers.
 - o Damages caused by the Contractor to public infrastructure or other contractors
 - o When the conditions have been removed, payment shall be made of accounts withheld
- In the event that the Work has been nearly completed, but minor items remain uncompleted, and deficiencies have not all been rectified, the Owner may withhold payment in amounts sufficient, in the estimation of the Contract Administrator, to ensure that the Contractor will complete such items and rectify such deficiencies in a timely manner. When the deficiencies have been rectified, the deficiency holdback applied shall be released.
- The Contractor may claim the Holdback, either in total, or in increments, in accordance with the Manitoba Lien Act.
- The Owner shall pay the Contractor for Holdback release after the following conditions have been satisfied:
 - o The Contract Administrator has issued a Certificate of Substantial Performance in accordance with requirements of the Lien Act.
 - o The Contractor has submitted a Certification from the Worker's Compensation Board stating that all assessments due to them from the Contractor are currently paid.
 - o The Contractor has filed with the Owner, a Statutory Declaration that, except for Holdbacks retained by the Owner, all payments have been made to eligible Lien claimants and that there are no liens existing against the premises of the Work.
 - o The Statutory Declaration shall be dated 5 business days after the latest date for filing Liens in accordance with the applicable Lien Act.
- Final Payment and holdback release do not constitute a waiver of the Warranty Period, nor shall they or attendant acts of the Contract Administrator prejudice their rights under any requirement of the Contract, nor relieve the Contractor of her/his responsibilities thereunder.

4.17 FINAL PAYMENT

- Upon receipt of written notice from the Contractor that the Work is complete, that all deficiencies have been rectified, and all cleanup finished, the Contract Administrator shall inspect, and when she/he finds the Work complete under the Contract, she/he will issue the Total Performance Certificate. The date specified within this Certificate shall be the date of commencement of the Warranty Period.

- If, upon inspection, the Contract Administrator determines that the Work is not completed, an instruction to the Contractor will be issued with a list of Work items to be completed or other deficiencies.
 - Final Payment shall be made on the Contractor's last Progress Estimate after the date of the Total Performance and after the following conditions have been satisfied:
 - o The Contractor has submitted to the Owner a certificate by the Worker's Compensation Board that all assessments due to them from the Contractor have been paid.
 - o The Contractor has submitted to the Owner a Statutory Declaration stating that all claims for payment for supplies and labour incurred by the Contractor directly or indirectly on account of the Work have been paid no liens exist against the premises in respect of anything done or furnished under this Contract, all claims and demands for payment in connection with this Contract have been submitted and approved, thus establishing the final Contract Price and the amount of the Final Payment.
 - o The Statutory Declaration shall be dated five (5) business days after expiry of the limitation period for filing liens in the jurisdiction where the Work has been performed.
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4.18 ACCEPTANCE

- Upon the expiration of the Warranty Period, the successful conclusion of any tests required by the Contractor, and satisfactory performance under operating conditions meeting the Work performance Warranty, the Owner shall accept the Work and an Acceptance Certificate be issued.
 - Acceptance can only be obtained once all warranty related defects have been corrected and the date is post the Warranty Period date.
 - The issuance of an Acceptance Certificate shall not release the Contractor from responsibility for any defects in her/his Work or materials for which the Contractor may in future be found liable in a court of law or otherwise.
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4.19 TAXES AND DUTIES

- The Contractor shall pay all government sales taxes, customs duties and excise taxes and comply with laws, Acts, and regulations for collection and remittance of taxes with respect to the Contract.
 - Where an exemption of government sales taxes, customs duties or excise taxes is applicable to the Contract by way of the Contractor filing claims for or cooperating fully with the Owner and the proper authorities in seeking to obtain such refunds, if applicable.
 - The Federal Goods and Services Tax (GST) or the Harmonized Sales Tax (HST) is included in the Bid Price and in the Contract Price.
 - The Contractor shall show separately on each Progress Estimate the amount of GST or HST required by the Act for the total amount of the Progress Estimate before Holdback deduction. GST or HST on the net amount of payment after Holdback deduction will be paid to the Contractor by the Owner in addition to the net payment of each Progress Estimate.
 - GST or HST applicable to the Holdback will be paid to the Contractor upon release of the Holdback. The Contractor shall remit the GST or HST in accordance with the Act.
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4.20 LAWS, REGULATIONS, SURVEYS AND PERMITS

- The Laws and Regulations of Manitoba, Canada and local Bylaws shall govern.
 - The Contractor shall obtain all permits, licenses, and certificates, and pay all fees required for the performance of the Work.
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- The property lines and right-of-way shown on the drawings shall only be considered as approximate. The Contractor shall site verify the location of all property lines and limits adjacent to the Work and shall confine their Work is within the Owner right-of-way or property.
- The Owner shall obtain all easements and rights of way, and the Contractor shall have free use thereof for the purposes of this Contract, provided that such use shall not interfere with or impede the operation of any other contractors or workers employed by the Owner, nor conflict with conditions of easement agreement or right of way limits. The Contractor shall indemnify and defend the Owner against any claims, demands, or losses due to failure to meet all conditions of an easement agreement.
- The Contractor shall give all required notices, and comply with all laws, ordinances, regulations, codes, and orders of all authorities having jurisdiction relating to the Work, to preservation of public health, and to construction safety. If the Contractor observes anything within the Contract be at variance with the foregoing, she/he shall promptly notify the Contract Administrator in writing and shall await instructions. If the Contractor performs any Work, knowing it to be contrary to such laws, ordinances, regulations, codes, or orders, and without giving notice to and requesting instructions from the Contract Administrator, he/she shall bear all costs arising therefrom.
- The Contractor shall make all arrangements with local authorities, operating departments, railway and highway officials, utility and service companies and the like, for detours, crossings, traffic control and similar requirements relating to performance of the Work, and she/he shall at her/his own cost observe their requirements and regulations.

4.21 OCCUPATIONAL HEALTH AND SAFETY LEGISLATION

- The Contractor shall be primarily responsible for ensuring compliance with the applicable Occupational Health and Safety enactment and Regulations thereunder on the Worksite.
- The Contractor shall provide the Contract Administrator a Safe Work Plan at least five (5) working days prior to the commencement of any work on the site.
- In any case where, pursuant to the provisions of the applicable Occupational Health and Safety Act or its Regulations, an order is given to the Contractor or to one of her/his Subcontractors with respect to their operations under this Contract to cease operations for any reason (for examples, because of failure to install or adopt safety devices or appliances or methods as directed or required by the Act or Regulations thereunder, or because conditions of immediate danger exist that would be likely to result in injury to any person), the Contractor shall immediately obey such order and shall immediately take whatever steps are necessary to eliminate the cause of the order.
- In the event that the Contract Administrator discovers a dangerous condition which in the Contract Administrator's opinion is likely to result in injury to any person, and there is no one in authority from the Contractor available or capable of removing the danger resultant from the Contractor's operations, and no Officer of the Crown is available to take charge, then the Contract Administrator may
 - o issue a Field Order to vacate the area of danger.
 - o issue a Field Order requiring the immediate correction of the dangerous condition; and
 - o notify the appropriate Officer under the applicable Occupational Health and Safety Act, and no such action by the Contract Administrator shall in any way remove the responsibility for the matter from the Contractor.
- In the event that the Contract Administrator discovers a dangerous condition which is likely to result in damage to any property, and there is no one in authority from the Contractor available or capable of removing the danger, and no Officer of the Crown is available to take charge, then the Contract Administrator may issue Written Notice to the Contractor and may immediately arrange for the removal of this danger and the Contractor shall be liable for the costs of such arrangements. The

action by the Contract Administrator shall not relieve the Contractor of responsibility for injury, loss of life, or damage which may occur in that situation.

- In the event that the Contractor refuses or fails to comply with an order under the Act or Regulations thereunder, so that the performance of the Work is stopped, the Owner may, upon written notice, terminate the Contract and proceed in accordance with the General Conditions.
- No action or lack of action by the Contract Administrator or the Owner under any of the provisions of this Section shall relieve the Contractor of her/his responsibilities.

4.22 LIABILITY INSURANCE

4.22.1 COMMERCIAL GENERAL LIABILITY INSURANCE:

- The Contractor shall provide and maintain, either by way of a separate policy or by an endorsement to its existing policy, Commercial General Liability Insurance in a form and with an insurer acceptable to the Contract Administrator and subject to limits of not less than five million dollars (\$5,000,000) inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof.
- The insurance shall be in the joint names of the Contractor, the Owner and the Contract Administrator shall also cover as Unnamed Insureds. All Subcontractors and anyone employed directly or indirectly by the Contractor to perform a part of the Work and including suppliers while on the Worksite.
- The Commercial General Liability Insurance shall include coverage for:
 - o Premises and operations liability
 - o Products and operations liability
 - o Contractual liability
 - o Cross liability
 - o Hoist liability, as applicable
 - o Contingent employer's liability
 - o Personal injury liability arising of false arrest, detention or imprisonment or malicious prosecution, libel, slander, or defamation of character; invasion of privacy, wrongful eviction, or wrongful entry.
 - o Temporary shoring, blasting, excavating, underpinning, demolition, pile driving and caisson work, and or work below ground surface, tunneling and grading, as applicable.
 - o Non owned automobile liability.
 - o Unlicensed vehicle liability.
- Commercial General Liability Insurance shall remain in effect continuously until the Construction Completion Certificate has been issued and then throughout the warranty period.

4.22.2 AUTOMOBILE LIABILITY INSURANCE:

- The Contractor shall provide and maintain liability insurance in respect of owned, non owned and leased or rented licensed vehicles, aircraft or watercraft used or to be used by the Contractor directly or indirectly in the performance the work. The limit of liability shall be subject to limits of not less than two million dollars (\$2,000,000) inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence.

- Automobile liability insurance shall be maintained continuously until the end of the Warranty Period.
 - The Contractor shall provide the Contract Administrator and Owner with a copy of the Certificate of Insurance prior to the commencement of the Work.
 - All liability insurance policies shall contain an endorsement to provide all Named Insureds with prior notice of material changes and cancellations. Such endorsement shall be in the following form: "It is understood and agreed that the coverage provided by this policy will not be changed or amended materially nor cancelled until 30 days after written notice of such change or cancellation shall have been given to all Named Insureds."
 - All deductibles shall be borne by the Contractor.
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4.22.3 PROPERTY INSURANCE

- The Contractor shall provide and maintain property (course of construction) insurance in a form and by an insurer acceptable to the Contract Administrator insuring the full value of the Work in the amount of the Contract Price. The policies shall include as named insureds the Contractor, the Owner, and the Engineer. The policies shall also include as unnamed insureds all Subcontractors, the Owner, and the Engineer.
- Such coverage shall be provided for by a standard All Risks Course of Construction Insurance, including flood and earthquake and with only the following exclusions:
 - o Any loss of use or occupancy howsoever caused.
 - o Penalties for non completion of or delay in completion of contract or non compliance with contract conditions.
 - o Cost of making good faulty or defective workmanship, material, construction, or design, but this exclusion shall not apply to damage resulting from such faulty or defective workmanship, material, construction, or design.
 - o Wear and tear, normal upkeep, inherent vice, latent defect, vermin or normal making good, but this exclusion shall not apply to damage resulting from wear and tear, normal upkeep, inherent vice, latent defect, vermin or normal making good.
 - o Loss or damage caused by war, invasion, act of foreign enemy, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection, or military power.
 - o Loss or damage caused by contamination by radioactive materials.
 - o Loss or damage caused by frost or freezing caused by natural forces unless resulting from a peril insured hereunder.
 - o Mysterious disappearance of property (except property in the custody of carriers or bailees for hire) or shortage disclosed by taking inventory.
 - o Mechanical breakdown, but this exclusion shall not be deemed to exclude loss or damage arising because of mechanical breakdown.
 - o Infidelity of the Insured's employees.
- Property Insurance shall cover:
 - o All labour and supplies of any nature whatsoever, the property of the Insureds or of others for which the Insureds may have assumed responsibility, to be used in or pertaining to the site preparations, demolition of existing structures, erection and/or fabrication and/or reconstruction and/or repair of the Work while on the site or in transit.
 - o The installation, testing and any subsequent use of machinery and equipment including boilers, pressure vessels or vessels under vacuum related to the Work.
 - o Damage caused by an accident.

- Such coverage shall exclude construction machinery, equipment, temporary structural and other temporary facilities, tools, and supplies used in the construction of the Work.
- The Contractor shall provide the Contract Administrator and Owner with three certified copies of the Certificate of Insurance prior to the commencement of the Work and shall promptly provide the Contract Administrator and Owner with a certified true copy of each insurance policy.
- Policies provided shall contain an endorsement to provide all Named Insureds with prior notice of changes and cancellations. Such endorsement shall be in the following form: "It is understood and agreed that the coverage provided by this policy will not be changed or amended in any way nor cancelled until 30 days after written notice of such change or cancellation shall have been given to all Named Insureds."
- All such insurance shall be maintained continuously until the date of the Total Performance date. All such insurance shall provide for the Owner to take occupancy of the Work or any part thereof during the term of this insurance. Any increase in the cost of this insurance arising out of such occupancy shall be at the Owner's expense.
- The policies shall provide that, in the event of a loss, payment for damage to the Work shall be made to the Owner and the Contractor as their respective interests may appear. The Contractor shall act on behalf of the Owner and himself for the purpose of adjusting the amount of such loss with the Insurers. On the determination of the extent of the loss, the Contractor shall immediately proceed to restore the Work and shall be entitled to receive from the Owner the amount to restore the Work upon appraisal. Damage shall not affect the rights and obligations of either party under the Contract except that the Contractor shall be entitled to such reasonable extension of time for Completion of the Work as the Contract Administrator may determine in the first instance and subject to General Condition.
- The Contractor and Subcontractors may be applicable and shall be responsible for any deductible amounts under the policies and for providing such additional insurance as may be required to protect them against loss on items excluded from the policies.
- All deductibles shall be borne by the Contractor.

4.23 PROTECTION OF WORK AND PROPERTY

- The Contractor shall continuously maintain adequate protection of all the Work from damage and protect the Owner's property from damage or loss arising in connection with this Contract. The Contract shall make good any such damage or loss.
- The Contractor shall provide and maintain all passageways, guard fences, lights and other facilities for protection required by public authority or local conditions, or laws and regulations.
- The Contractor shall also protect all the property outside of the Work from damage because of her/his operations. Any such damage shall be corrected by the Contractor at their own expense.
- In the event of an emergency affecting the safety of life, or of the Work, or adjoining property, the Contractor, without special instruction or authorization from the Contract Administrator, shall act at her/his discretion to prevent such threatened loss or injury. Liability for payment for such action and the amount thereof shall be determined in the first instance by the Contract Administrator.
- The Contractor is responsible for identifying the location of all utilities and utility requirements in the project area and providing required protection to said utilities as instructed by the utility owners or as noted within the Contract Documents.

4.24 WARRANTY PERIOD

- The Warranty Period shall begin on the date specified in the Total Performance Certificate.
- The duration of the Warranty Period shall be two (2) years.

- The Contractor shall correct, at her/his own expense, any defects in the Work due to faulty products or workmanship appearing within the Warranty Period.
- The Contractor shall correct or pay for any damage to the Work or other property resulting from such defects or their correction.
- The Contract Administrator shall notify the Contractor promptly of such defects. If the Contractor does not undertake repairs to be start within ten (10) business days after such notice, the Owner shall have the right to purchase required supplies and retain another construction company to execute the noted defects. The cost shall be the responsibility of the Contractor or his/her Surety.
- Where repairs must be made immediately by reason of an emergency existing or otherwise, the Owner shall have the right to undertake such repairs and charge the cost to the Contractor, except that the Owner shall immediately notify the Contractor. Owner retain forces shall withdraw from the repair work and as soon as the Contractor's forces are available for the repair work.
- The Contractor shall be responsible for all costs attributable to defective Work, supplies, including the cost of engineering required for investigation of any repair of defects in Work.
- Prior to expiry of the Warranty Period, the Owner shall notify the Contractor in writing of any final tests which the Contractor may be required to carry out under the Contract. The Contractor shall arrange to have such tests carried out promptly, and to provide opportunity for the Owner to inspect or supervise such tests.
- Prior to expiry of the Warranty Period, the Owner shall advise the Contractor of defects which the Contractor is required to remedy under the Contract, and the Contractor shall promptly remedy such defects. The Warranty Period shall not expire until all such defects are remedied.

4.25 INSPECTION OF THE WORK

- The Engineer of Record and Contractor Administrator and her/his representatives shall always have access to The Work whenever it is in preparation or progress and the Contractor shall provide proper facilities for such access and for inspection. The Contract Administrator shall have authority to reject Work which does not conform to the requirements of the Contract.
- If the specifications, the Contract Administrator's instructions, laws, ordinances, or any public authority require any part of the Work to be specially tested or approved, the Contractor shall give the Contract Administrator timely notice of her/his readiness for inspection.
- Inspections by the Contract Administration shall be made promptly. If any part of the Work should be covered up without approval or consent, it shall be uncovered, upon request, for examination at the Contractor's expense.
- Supplies used in the Work are subject to inspection and approval of the Contract Administrator at her/his discretion. Condemned products shall be removed without delay, and in the event the Contractor fails to do so, after having been advised, the rejected product may be destroyed or removed by the Owner and the cost shall be charged to the Contractor.
- The Contract Administrator shall inspect the Work for the purpose of promoting effective completion of the Work until Total Performance has been achieved. Inspection or lack of it shall not relieve the Contractor of her/his responsibility to perform the Work in accordance with the Contract.

4.26 REJECTED WORK

- Defective Work which has been rejected by the Contract Administrator as failing to conform to the intent of design as expressed in the Contract Documents whether the result of poor workmanship, use of defective supplies, or damage through carelessness or other act or omission of the Contractor, and whether incorporated in the Work or not, shall be removed promptly from the premises by the Contractor and replaced or re executed promptly at the Contractor's expense.

- Work that has not been rejected specifically by the Contract Administrator shall not therefore be deemed accepted or approved by the Contract Administrator.
- If in the opinion of the Contract Administrator it is not expedient to correct defective Work or Work was not done in accordance with the intent of design as expressed in the Contract, the Owner may deduct from the Contract Price the difference in value between of Work and the specified Work within the Contract. The difference shall be determined in the first instance by the Contract Administrator.

4.27 MATERIALS SUPPLIED BY THE CONTRACTOR

- The Contractor shall fully use materials and products of Canadian manufacture practicable.
- Unless otherwise specified, all materials shall be new and of good quality. The Contractor shall furnish satisfactory evidence as to the kind and quality of the materials. The Contractor shall be responsible for replacement at her/his own cost of all materials that are found to be defective.
- The Contractor shall be responsible for the safe storage of materials and products until it has been incorporated into the Work.
- Where, in the specifications or on the drawings, any material or method is specified, the Contractor may not use another material or product unless accepted by the Contract Administrator. The Contractor shall submit in writing an application for review to the Contract Administrator. All submissions shall be accompanied by sufficient data including the following:
 - o Transportation and site delivery
 - o Manufacturer
 - o Technical Data and Specifications in accordance with the International System of Units (S.I.) Metric Units
 - o Specified material, product, or method for which the alternative is submitted
 - o Where required by the Contractor Administrator, samples shall be submitted.
- Whenever alternatives of materials or methods are accepted, whether because of an alternate request by the Contractor, the Contractor, shall guarantee that the performance of the alternative material, or method shall be equivalent or superior to what was originally specified.
- Whenever an alternate is accepted, the Contractor shall be responsible for making all consequent adjustments, at her/his own expense, to make the alternative fit into the Work as specified.

4.28 MATERIALS SUPPLIED BY THE OWNER

- The Owner undertakes to supply only such materials and or manufactured products as noted in the Contract Documents as being provided by the Owner.
- It shall be the responsibility of the Contractor to arrange for and schedule delivery and storage of materials supplied by the Owner.
- The Contractor is responsible all supplies furnished by the Owner which shall begin at the time and placement of delivery to the Worksite, shop, or plant. Materials already on the site shall become the Contractor's responsibility on the date specified in the Notice to Proceed. The Contractor shall be responsible for unloading all supplies and the Contractor and Contract Administrator shall both independently review the delivered supplies for any defects. Any material installed by the Contractor shall, in the event it is found defective, be replaced by the Contractor at her/his expense.

4.29 STORAGE FACILITIES AND USE OF PREMISES

- Should the Contractor require additional facilities or areas for purposes of storage, she/he shall make all the necessary arrangements with the Owner.
 - The Contractor shall confine the storage of supplies and the operations of her/his workers to limits indicated by law, ordinances, permits or directions of the Contract Administrator.
 - The Contractor shall enforce all regulations and rules for the Worksite regarding signs, advertisements, fires, smoking, and storage of inflammable products and disposal of wastes.
 - All storage facilities and use of premises used by the Contractor shall be returned to their pre-construction / pre-mobilization condition upon completion. Any pre-negotiated agreements with landowners shall be completed in accordance with the clause's agreement. Returning the areas damaged or affected by the Contractor shall be completed to the satisfaction of the Contract Administrator. The costs to return the areas to their pre-existing condition shall be borne entirely by the Contractor.
 - All products and materials shall be stored, handled, and transported in accordance with the manufacturer's recommendations.
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4.30 CLEANUP AND FINAL CLEANING OF THE WORK

- The Contractor shall maintain the Worksite in a tidy condition, free from accumulation of waste products and debris caused by the construction operations.
 - When Work is fully completed, the Contractor shall remove all surplus supplies from the Worksite. She/he shall also remove any waste products and debris, other than those caused by the Owner or their employees. He shall generally leave the Worksite in a neat and orderly condition.
 - Upon completion of the work and demobilization, the Contractor shall restore all existing facilities.
-

4.31 REMEDIES

- The specific remedies to which the Contractor and the Owner may resort under the terms of the Contract Documents are cumulative and are not intended to be exclusive of any other remedies to which the Contractor and the Owner may be lawfully entitled in a case of breach or threatened breach of any covenant, term, or provision of the Contract.
- The waiver by the Owner or Contract Administrator of any breach of any covenant or warrant in the Contract shall not be construed as a waiver of any future breach of the same terms of the Contract, and the approval by the Owner or Contract Administrator of any act by the Contractor or Subcontractor shall not be construed as an approval to any subsequent similar acts by the Contractor or Subcontractor.

5 PROPOSED WORK

5.1 WORK UNDER THIS CONTRACT

The Work under this Contract generally consists of the following:

- **City of Morden – Alvey Street Crossing Replacement (Site #1)**
Supply and construction of a new 18 metre long x 9.6 metre wide Prestressed Precast Concrete Girder bridge on Alvey Street within the City of Morden
 - **City of Morden – Parkhill Drive Crossing Replacement (Site #2)**
Supply and construction of a new 18 metre long x 12 metre wide Prestressed Precast Concrete Girder bridge on Parkhill Drive within the City of Morden
-

5.2 WORK INCLUDED

- The Work shall include the replacement of the stream crossings over Deadhorse Creek as described above.
 - The Work, unless specifically stated otherwise, shall include the furnishing of all supplies, labour, and transportation necessary to complete the Work at both sites (Site 1 & 2). The intent is that the Contractor provides a complete job.
 - The Work shall not be deemed complete until the crossing structures are in place, operational and accepted by the Contract Administrator.
 - Any minor item of the Work not called for herein 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.
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5.3 DOCUMENTS REQUIRED

Maintain at each Worksite at least one (1) copy of each of the following:

- Contract Drawings (site specific)
 - Specifications
 - Addenda
 - Change Orders, Field Orders, Notices
 - Reviewed Shop Drawings
 - Field Test Reports
 - Construction Schedule
 - Manufacturer's Installation and Application Instructions
 - Occupational Health and Safety Regulations and Workers' Compensation Board Regulations
 - Regulatory Agency approval letters and/or letters of advice
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5.4 STANDARDS

- Wherever Standards (e.g., CSA, ASTM, and others), are referred to in these Contract Documents the current edition at the date of closing of Tender shall be used for the Work.
 - Where there is a clear conflict between the referenced Standard and the Contract Documents, the Contract Documents shall apply.
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- 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 requirements.

5.5 GEOTECHNICAL INVESTIGATION

- Geotechnical Investigation for the Proposed Alvey Street and Parkhill Drive Crossing Replacements was prepared by WSP Canada.
- The soils information presented in the Geotechnical Report is preliminary and is for design purposes and WSP cannot guarantee the information is free from errors or discrepancies.
- In the event the Contractor wishes to undertake additional site investigations, no test hole shall be drilled without the approval of the Contract Administrator.
- Contractor shall make her/his own investigation as to the soil conditions, which will be encountered in the Work. WSP assumes no responsibility for failure or neglect on the part of the Contractor to determine the working conditions at the Site.
- The signed and sealed geotechnical reports, entitled “Geotechnical Investigation Morden Bridges Replacement Alvey Street” and “Geotechnical Investigation Morden Bridges Replacement Parkhill Drive” dated December 20, 2022, have been included in Appendix A.

6 CONTRACTOR USE OF THE SITE

6.1 THE WORKSITE

- The Owner will allow the Contractor to set a work site within the road right-of-way. The limits of the worksite have not been noted on the Drawings.
- 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 Contract Administrator. It shall be the responsibility of the Contractor to confirm the extents and locations of all private property lines adjacent to the proposed works.
- The Worksite shall be secure by fencing in an attempt to prevent public access.

6.2 CONTRACTOR'S USE OF THE WORKSITE

- The Contractor shall have exclusive use and control of the Worksite, provided that the Contractor shall permit access to the Owner, Contract Administrator, and utility owners for purposes of inspections, reviews, tests and carrying out Work.
- Unless otherwise agreed with the Owner, the Contractor shall give 48 hours notice to the Owner before entering a particular area of the Worksite to execute the Work.
- Up to the end of the Period of Notice and after the Contractor has fully completed its operations in a particular area, the Owner shall have use of the area and shall be responsible for Health and Safety Requirements and security in that area.
- 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.
- The Contractor shall be responsible for access to the Worksite by means of temporary roads, tote roads, or agreements with the appropriate authorities or landowners to use existing means of access.
- 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 landowner agreement.

6.3 OFFICE FACILITIES

- The Contractor shall allow the Contract Administrator and her/his representative's use of the Contractor's office facilities as required for the duration of construction.
- The Contractor shall supply a desk, printer, water cooler, mini refrigerator for use by the Contract Administrator.
- The Contractor's site trailer shall be furnished with a separate room for use by the Contract Administrator complete with power and WIFI.

6.4 LAYOUT OF THE WORK

- WSP Canada will provide initial layout of Working Points and offsets for both sites. Data point coordinates and elevations will be provided to the Contractor. In the event the Contractor finds an error, discrepancy or issue with the initial layout provided by WSP Canada, the Contractor shall notify the Contract Administrator immediately and cease the Work until further direction.

City of Morden - Alvey Street and Parkhill Drive Crossing Replacements

- The Contractor shall be responsible for the layout of the Work thereafter the initial layout provided by WSP Canada. The Contractor is responsible thereafter for the correctness of the location, levels, dimensions, and alignment of all aspects of the Work. She/he shall provide all required instruments and competent personnel for performing all layouts.
- Should any error appear or arise in location, levels, dimensions, and/or alignments while the Work, the Contractor shall promptly rectify such errors to the satisfaction of the Contract Administrator, at her/his own expense.
- The Contract Administrator shall be notified at least one (1) business day prior to any Work being commenced in order to have the option to check and review all elevations and layouts at her/his discretion.
- The Contractor shall carefully protect and preserve all benchmarks, stakes, and other items used in giving the basic data. Any such benchmarks or stakes removed or destroyed by the Contractor, without the consent of the Contract Administrator, shall be replaced by the Contract Administrator at the expense of the Contractor.

7 ENVIRONMENTAL PROTECTION PLAN

The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the Environmental Protection Plan as herein specified.

The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work. Some are available for viewing at the office of the Contract Administrator.

7.1 FEDERAL LEGISLATION

- Canadian Environmental Assessment Act (CEAA) c.37
 - Fisheries Act c.F14
 - Transportation of Dangerous Goods Act and Regulations c.34
 - Navigable Waters Protection Act
 - And any other applicable Acts, Regulations, and By-laws
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7.2 PROVINCIAL LEGISLATION

- The Dangerous Goods Handling and Transportation Act D12
 - The Endangered Species Act E111
 - The Environment Act c.E125
 - The Fire Prevention Act F80
 - The Manitoba Heritage Resources Act H39-1
 - The Manitoba Noxious Weeds Act N110
 - The Manitoba Nuisance Act N120
 - The Public Health Act c.P210
 - The Workplace Safety and Health Act W210 and current applicable associated regulations (Note: Provincial regulations updated as of September 1999)
 - The Manitoba Stream Crossing Guidelines for the Protection of Fish Habitat, Manitoba Natural Resources, 1996 and any other applicable Acts, Regulations, and By-laws
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7.3 MATERIALS HANDLING AND STORAGE

- Storage of construction materials shall be confined to the defined storage areas as shown on the Drawings.
 - Construction materials shall not be deposited or stored on riverbanks or river shorelines unless written acceptance from the Contract Administrator is received in advance.
-

7.4 FUEL HANDLING AND STORAGE

- The Contractor shall obtain all necessary permits from Manitoba Environment for the handling and storage of fuel products and shall provide copies to the Contract Administrator.
 - All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.
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- Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.
- The Contractor shall ensure that any temporary fuel storage areas established for construction of the project are contained by an impermeable dike and are located a minimum distance of 100 m away from the high-water line of the Icelandic River. Dykes shall be designed, constructed, and maintained to retain not less than 100% of the capacity of the total number of containers or 110% of the largest container, whichever is greatest. The dykes shall be constructed of clay or similar impervious material. If this type of material is not available, the dyke shall be constructed of locally available material and lined with high-density polyethylene (HDPE). Furthermore, the fuel storage area(s) shall be secured by a barrier such as a high fence and gate to prevent vandalism.
- The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.
- Products transferred from the fuel storage area(s) to specific work Sites shall not exceed the daily usage requirement.
- When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.
- Refuelling of mobile equipment and vehicles shall take place at least 100 m from a watercourse
- The area around storage Sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.
- A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on Site. The Contractor shall ensure that additional material can be made available on short notice.

7.5 WASTE HANDLING AND DISPOSAL

- The construction area shall be always kept clean and orderly during and at completion of construction.
- At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction Site, other than at a dedicated storage area as may be approved by the Contract Administrator.
- The Contractor shall, during and at the completion of construction, clean-up the construction area and all resulting debris shall be deposited at a Waste Disposal Ground operating under the authority of Manitoba Regulation #150/91. Exceptions are liquid industrial and hazardous wastes which require special disposal methods (refer to Section 30.5.D) in Manitoba Regulation #150/91.
- Indiscriminate dumping, littering, or abandonment shall not take place.
- No on-site burning of waste is permitted.
- Waste storage areas shall not be located to block natural drainage.
- Runoff from a waste storage area shall not be allowed to cause siltation of a watercourse.
- Waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
- Equipment shall not be cleaned near watercourses; contaminated water from onshore cleaning operations shall not be permitted to enter watercourses.
- Discharge from any dewatered areas shall be released into a well-vegetated area, filter bag, settling basin, or storm sewer system to remove suspended material and other deleterious substances from the discharge before it finds its way into any watercourse.

7.6 DANGEROUS GOODS/HAZARDOUS WASTE HANDLING AND DISPOSAL

- Dangerous goods/hazardous waste are identified by and shall be handled according to The Dangerous Goods Handling and Transportation Act and Regulations.
 - The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.
 - The Contractor shall have on Site staff that is trained and certified in the handling of the dangerous/hazardous goods, when said dangerous/hazardous goods are being utilized on Site for the performance of the Work.
 - Different waste streams shall not be mixed.
 - Disposal of dangerous goods/hazardous wastes shall be at approved hazardous waste facilities.
 - Liquid hydrocarbons shall not be stored or disposed of in earthen pits on Site.
 - Used oils shall be stored in appropriate drums, or tankage until shipment to waste oil recycling centres, incinerators, or secure disposal facilities approved for such wastes.
 - Used oil filters shall be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.
 - Dangerous goods/hazardous waste storage areas shall be located at least 100 m away from the highwater line and be diked.
 - Dangerous goods/hazardous waste storage areas shall not be located to block natural drainage.
 - Runoff from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.
 - Dangerous goods/hazardous waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
-

7.7 EMERGENCY RESPONSE

- The Contractor shall ensure that due care and caution is taken to prevent spills.
- The Contractor shall report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety to Manitoba Conservation, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 945-4888.
- The Contractor shall designate a qualified supervisor as the on-Site emergency response coordinator for the project. The emergency response coordinator shall have the authority to redirect manpower to respond in the event of a spill.
- Prevent spill material from entering waterways and utilities by diking
- Resume any effective action to contain, clean up, or stop the flow of the spilled product.
- When dangerous goods are used on Site, materials for containment and cleanup of spill material (e.g., absorbent materials, plastic oil booms, and oversized recovery drums) shall be available on Site.
- Minor spills of such substances that may be contained on land with no significant impact on the environment may be responded to with in-house resources without formal notification to Manitoba Environment.

7.8 NOISE

- The Contractor shall be responsible for scheduling Work to avoid potential noise problems and/or employ noise reduction measures to reduce noise to acceptable limits. The Contractor shall also demonstrate to the Contract Administrator that Works to be performed during the night-time period, on Sundays, and Holidays shall not exceed the approved limit.
-

7.9 DUST

- Dust control practices implemented by the Contractor during construction shall include regular street cleaning and dampening of construction access roads and Work areas with water or approved chemicals at an adequate frequency to prevent the creation of dust.
 - Only water or chemicals approved by the Contract Administrator shall be used for dust control. The use of waste petroleum or petroleum by-products is not permitted.
 - The Contractor shall ensure that trucks which are used to haul excavated material and backfill material to and from the work Site utilize tarpaulin covers during transport to prevent material from falling onto the street and creating dust.
 - Stockpiled soils shall be covered with tarpaulin covers to prevent the creation of dust.
-

7.10 EROSION CONTROL

- Plan in and near water works to avoid the restricted in-water construction window for Deadhorse Creek (no in-water works from April 1st to June 15th of any given year) as per the Manitoba Restricted Activity Timing Window for the Protection of Fish and Fish Habitat (DFO, 2013) for spring spawning species (i.e., northern pike).
- The Contractor shall develop a sediment control plan prior to beginning construction to the satisfaction of the Contract Administrator.
- Exposure of soils along riverbank slopes shall be kept to the minimum practical amount, acceptable to the Contract Administrator. The cover of trees and undergrowth shall be preserved to the maximum extent possible.
- Sediment control fencing, or other such erosion control structures, shall be employed wherever construction activity increases the potential for runoff to carry sediment into a drainage channel or other watercourse. The Contractor shall inspect all such structures daily during heavy construction activity in the areas of the structures and after a heavy rainfall to ensure their continued integrity.
- All areas disturbed during construction shall be landscaped and revegetated with native and/or introduced plant species to restore and enhance the Site and to protect against soil erosion unless otherwise indicated.
- The disturbed surface shall be revegetated so as to create a dense root system in order to defend against soil erosion on the right-of-way, stream banks, and any other disturbed areas susceptible to erosion.
- The loss of topsoil and the creation of excessive dust by wind during construction shall be prevented by the addition of temporary cover crop, water, or tackifier, if conditions so warrant.
- Effective sediment and erosion control measures (e.g., straw mulch, erosion control blankets, interceptor ditches) are used both during construction and until vegetation is re-established to prevent sediment-laden runoff from entering the Red River.
- The Contractor shall routinely inspect all erosion and sediment control structures and immediately carry out any necessary maintenance. Several inspections shall be performed during rainy days.

7.11 RUNOFF CONTROL

- Measures shall be undertaken to ensure that runoff containing suspended soil particles is minimized from entering the river to the extent possible to the satisfaction of the Contract Administrator.
 - Areas that are heavily disturbed and vulnerable to erosion or gullyng shall be diked to redirect surface runoff around the area prior to spring runoff.
 - Construction activities on erodible slopes and riverbanks shall be avoided during spring runoff and heavy rainfall events.
 - Soil and fill shall not be stockpiled on immediate riverbank areas.
 - Dispose of and stabilize all excavated materials above the highwater mark or top of bank.
-

7.12 VEGETATION

- Leaf spurge, a Tier 21 Noxious Weed was observed near the crossing location. Care needs to be taken when mobilizing on site to clean equipment and prevent further spread of the species.
 - Works should avoid removal or disturbance of bank, shoreline, or water body materials outside of the construction footprint.
 - The Contractor shall protect plants or trees which may be at risk of accidental damage. Such measures may include protective fencing or signage and shall be approved in advance by the Contract Administrator.
 - Herbicides and pesticides shall not be used adjacent to any surface watercourses.
 - Trees or shrubs shall not be felled into watercourses.
 - Areas where vegetation is removed during clearing, construction, and decommissioning activities, shall be revegetated as soon as possible in accordance with the landscaping plans forming part of the contract, or as directed by the Contract Administrator.
 - Trees damaged during construction activities shall be examined by bonded tree care professionals; viable trees damaged during construction activities shall be pruned according to good practice by bonded tree care professionals.
 - Damaged trees which are not viable shall be replaced at the expense of the Contractor.
-

7.13 LANDSCAPING

- Construction waste (excluding common construction gravel, sand, etc.) shall be removed to a minimum depth of 600 mm below final grade in all areas that are to be backfilled with suitable material and revegetated in accordance with the City of Winnipeg Standard Construction Specifications.
 - The Contractor shall adhere to the landscaping plan for maintenance of initial stages and development stages of the plant community.
-

7.14 NIGHT WORK AND NOISE LIMITATIONS

- The Contractor is advised that possible noise level problems may limit her/his Work activities on Sundays and at night. The Contractor must request and receive approval from the Contract Administrator at least 48 hours in advance of any Contract Work to be undertaken on Sundays or at night. It will be the Contractor's responsibility to schedule work activities to minimize potential problems and/or to employ noise-reduction measures to lower the noise to an acceptable level.
-

8 TECHNICAL SPECIFICATION

8.1 SITE WORK

8.1.1 DESCRIPTION

- This Specification shall cover the 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, silt fence, dewatering, environmental mitigation measures, site office, equipment, tools, supplies, mobilization and demobilization, and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.
-

8.1.2 SCOPE OF WORK

- 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.
 - Included in Site Work are all permits, insurance, bonding, moving personnel, materials, and equipment to and from the Site, setting up temporary facilities, temporary utilities, and all Site preparation for performing the Work.
 - The Contractor shall discuss with the City of Morden a laydown area and confirm the laydown area is within public property, not private land.
 - All costs associated with embankment grading, topsoil and seeding on the regraded abutment embankments, removal of trees and shrubs as required, environmental regulation requirements, restoration to the original condition of the Site, lifting and raising any catch basins, valve boxes or catch pits and any disturbed areas upon completion shall be included herein this pay item.
 - Costs associated with soft dig exposure of all underground utility lines and services noted on the drawings within the project limits shall be included as part of Site Work.
 - Seeding of grassed areas for the restoration of the Site shall be in accordance CW 3520 – R7. Further to CW 3520 – R7 all seeding works shall be considered incidental to Site Work.
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8.1.3 MEASUREMENT AND PAYMENT

METHOD OF MEASUREMENT

- Site Work, as defined in this Specification, is a Lump Sum pay item. No measurement will be made for this work.
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BASIS OF PAYMENT

- Site Work will be paid for at the Contract Lump Sum Price for "Site Work", which price shall be payment in full for performing all operations herein described in this Specification. Partial payment will be made on progress estimates at the Contract Administrator's judgement.

8.2 EXCAVATION

8.2.1 DESCRIPTION

This Specification shall cover all operations related to excavation for abutment construction as shown on the drawings.

MATERIALS

- The Contractor shall be responsible for the excavation stockpiling and removal of all materials as set forth in this Specification. Materials to be stockpiled shall be handled in careful and workmanlike manner, to the satisfaction of the Contract Administrator. The excavated material shall be disposed to an acceptable landfill fill or as directed by the Owner.
-

EXCAVATION

- Excavated material shall include the excavation to the noted limits on the drawings of existing native material and all other material of whatever character which may be encountered. Limits of excavation not shown for the abutments as it is at the contractor's discretion.
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EQUIPMENT

- All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.
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8.2.2 CONSTRUCTION METHOD

SCOPE OF WORK

- Excavation: The excavation of material to a depth as shown on the Drawings for the abutments and piers.
 - The Contractor is responsible for controlling the limits of excavation and shall account for additional excavation to accommodate backfill compaction and or overall bridge construction methodology. No additional payment will be made for over excavation. No additional payment will be made for additional Backfill for over excavation.
 - Off-site disposal of all excavated materials if required
 - Dewatering and or precipitation removal of the excavations as may be required for construction of the structure in the dry.
-

8.2.3 MEASUREMENT AND PAYMENT

METHOD OF MEASUREMENT

- Excavation, as defined in this Specification, will be measured on a volume basis. The volume of material excavated will be measured within the field via survey by the Contract Administrator.
-

BASIS OF PAYMENT

- Excavation will be paid for at the Contract Unit Price for “Excavation”, which price shall be payment in full for performing all operations herein described. The number of cubic metres of excavated material paid for will be the volumetric difference between initial and final survey. Interim payments can be made based on interim surveys.
-

8.3 BACKFILL

8.3.1 DESCRIPTION

- This Specification shall cover backfill around the abutment substructure units.
 - The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, construction of the access path, equipment, tools, supply, and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.
-

8.3.2 MATERIALS

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

HANDLING AND STORAGE OF MATERIALS

- All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.
 - All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the testing laboratory designated by the Contract Administrator. There shall be no charge to the City of Morden or WSP Canada for any materials taken by the Contract Administrator for testing purposes or the costs associated with testing from the testing agency.
 - All material shall be accepted by the Contract Administrator at least seven (7) days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, do not conform to the Specification detailed herein, or are found to be defective in manufacture, or have become damaged in transit, storage or handling operation, then such material shall be rejected by the Contract Administrator and replaced by the Contractor at their own expense.
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GRANULAR BACKFILL MATERIAL

- Granular backfill material shall be clean and free from organic material, meeting the following gradation requirements:

Canadian Metric Sieve Size	Percent Passing by Weight
50,000	100
20,000	75 – 100
5,000	45 – 85
2,500	35 – 55
315	15 – 35
160	5 – 20
80	0 – 7

8.3.3 EQUIPMENT

- All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.
-

8.3.4 CONSTRUCTION METHODS

- The work shall comprise of the supply, placement and compaction of granular and native clay backfill material.
-

BACKFILL OPERATIONS

- The Contract Administrator shall be notified at one (1) working day in advance of any backfilling operation. No backfill shall be placed against any concrete until approved by the Contract Administrator and in no case before cylinders show the concrete strength to be at least 25 MPa.
 - Within abutment wingwalls and backwall, the contractor shall use granular material described herein above to the elevations shown on the drawings. Outside of the abutments, native backfill material shall be placed and compacted to the limits shown on the Drawings.
 - The Contractor shall be required to provide necessary water or equipment during compaction of backfill material to achieve the required densities.
 - The Contractor shall place granular backfill material in 200 mm lifts and shall compact each lift. The backfill shall be compacted to 100% Standard Proctor.
-

QUALITY CONTROL

- All workmanship and materials furnished and supplied under this Specification and subject to close and systematic inspection and testing by the Contract Administrator including all operation from the selection and production of materials through to final acceptance of the specified Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or acceptance that may have previously been given. The Contract Administrator reserves the right to reject any materials or works, which are not in accordance with requirements of this Specification.
 - All granular material supplied and placed under this Specification shall be subject to testing and acceptance by the Contract Administrator in accordance with this Specification.
 - The Standard Proctor Density for granular backfill and native clay material shall be determined at the optimum moisture content in accordance with standard laboratory Proctor Compaction Test Procedure.
 - The field density of native backfill layer shall be 98% of the applicable Proctor Density as specified herein this Specification.
 - Granular backfill shall be compacted to 100% Standard Proctor.
 - Quality control test will be used to determine the acceptability of each backfill layer, as placed and compacted by the Contractor before any succeeding layer may be applied.
 - Maximum layer thickness is 300mm, unless noted otherwise.
 - The field density of the compacted layers shall be verified by Field Density Tests in accordance with ASTM Standard D155560-64, test for Density of Solid in Place by the Sand-Cone Method, or equivalent as accepted by the Contract Administrator.
 - The frequency and number of tests to be made shall be as determined by the Contract Administrator. The Contractor is responsible for all testing costs. The Contractor may select the Testing Agency upon acceptance from the Contract Administrator.
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- Soil compaction test would be taken typically every second layer.
- Holes made by removal of samples from the layer shall be promptly filled by the Contractor with appropriate material and thoroughly compacted so as to conform in every way with the adjoining compacted material.
- Any backfill material that does not meet the gradation and/or compaction requirements of the Specification shall be removed and replaced by the Contractor at their own expense, to the satisfaction of the Contract Administrator.

8.3.5 MEASUREMENT AND PAYMENT

METHOD OF MEASUREMENT

- Backfill, as defined in this Specification, will be measured on a volume basis. The volume of backfill material will be measured within the field via survey completed by the Contract Administrator.

BASIS OF PAYMENT

- Backfill will be paid for at the Contract Unit Price for the "Items of Work", noted below, which price shall be payment in full for performing all operations herein described. The number of cubic metres of placed material paid for will be the volumetric difference between excavation and final survey. Interim payments can be made based on interim surveys.

Items of Work

- Compacted Granular Backfill
- Compacted Native Backfill

8.4 STEEL H-PILES

8.4.1 DESCRIPTION

- This section specifies requirements for the supply and driving of steel H piles including final cut off of piles at the required elevation.
- The work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, required field splices, supply and installation of driving shoes, weld testing, supply, and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

8.4.2 MATERIALS

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

HANDLING AND STORAGE

- The method of handling and storing the steel piles shall be such as to eliminate impact damage, dents, longitudinal and torsional deformation, and corrosion. Any pile excessively damaged or deformed through negligence or improper handling operations shall be immediately removed from the site and replaced with good condition piles by the Contractor at her/his own expense.

EQUIPMENT

- All pile driving equipment shall be of such a capacity that the required bearing penetration will be obtained without undue damage being done to the pile. Piles shall be driven by a hammer with a rated energy of 40,000 N-m.
- Only fixed lead pile drivers shall be used, unless the Contract Administrator gives approval for other types of equipment, hanging or swinging leads will only be approved if they are so constructed that they can held in a fixed position during the driving operations. All leads shall be of such construction as to drive the piles to their true and correct alignment as indicated on the Drawings. The Contractor shall furnish the Contract Administrator with the manufacturer's specifications and catalogue for all steam, diesel or air hammers used, showing all the data necessary for computing the bearing value of piles driven. Gravity or drop hammers shall be weighted in the presence of the Contract Administrator, or a certificate of weight shall be furnished to the Contract Administrator. Hammers so weighted shall have the exact weight stamped on them. A gravity hammer shall have a minimum weight of 1,350 kg exclusive of pile cap. Water jets shall not be used, unless the Contract Administrator agrees that such use is necessary or desirable. The heads of concrete piles shall be protected by a cap of a design approved by the Contract Administrator. The bottom of the cap shall have a recess with a cushion of rope or other material next to the pile head and the top of the cap shall have a timber shock block.

STEEL H-PILES

- The Rolled Steel HP section shall be HP 310x110 and HP 250x85 as shown on the drawings which shall conform to CSA-G40.20/CSA-G40.21
- Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this specification.
- Submit mill test certificates for the material supplied as requested by the Contract Administrator.
- Pile tips shall be APF HARD-BITE 77750-B Drive Shoes. Driving shoes are required for all bridge piles.
- All field splices shall meet the requirements of CSA-W59

8.4.3 CONSTRUCTION METHODS

- 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.

LOCATION AND ALIGNMENT OF PILES

- The piles shall be driven in the positions shown on the Drawings or as directed by the Contract Administrator. Piles shall be driven vertically unless shown otherwise on the Drawings. Batter piles shall be driven to the batter specified and shall not be jacked or pulled into their final positions.

DRIVING OF PILES

- The piles shall be driven in the positions shown on the drawings or as directed by the Contract Administrator. All piles shall be driven vertically unless shown otherwise on the Drawings. Piles shall be placed not more than 2 percent out of plum (for vertical piles) and not more than 75 mm off centre, measured as time of cut-off. Rather than reject misaligned piles, the Contract Administrator may decide to increase the size of the pile caps to accommodate the misaligned pile. In this case,

the total cost of such a change, including engineering and construction costs shall be deducted from the monies owing to the Contractor.

- All piles shall be driven to refusal as end bearing piles, as determined by the Contract Administrator. The final set for the piles shall be three (3) consecutive sets of 12 blows per 25 mm. Definition of refusal to be 12 blows per 25mm for three (3) consecutive sets with a drive energy of 50kJ.
- The Contractor will be required to remove any surface and/or shallow depth obstruction to obtain the required penetration of the pile.
- Piles covering a large area or in groups, shall be driven working out from the centre of the area or group to ensure that the piles at the boundaries are in their correct final positions.
- If, during the piling operations, upheaval of piles occurs, the Contractor will be required to re-drive the lifted piles down to their original elevations. The Contractor will also be required to excavate material, which has boiled up during pile driving operations. The elevation of all piles previously driven or re-driven shall be observed to detect uplift. If uplift of 5 mm or more occurs in any pile, that pile shall be re-driven to its original elevation and thereafter to the required final driving resistance.
- Driving of all piles shall be continuous without intermission until the pile has been driven to final elevation. The tops of the piles shall be maintained at or above a point located a minimum of 400mm above cut-off elevation.
- Where boulders or other obstructions make it difficult to drive certain piles in the location shown and to the proper bearing strata or depth, the Contractor shall resort to all usual methods to install piles as required, including spudding, predrilling, jetting or other feasible means. If, in the judgement of the Contract Administrator, the Contractor is unable to complete properly any pile or piles driven to replace the original pile in the Contract, the Contractor shall abandon that pile. Piles abandoned because of obstructions encountered before reaching the accepted bearing strata shall be cut off at the cut-off elevation and paid for as outlined hereinafter.
- After piles have been driven to the required penetration (and if required re-driven), the Contractor shall mark the required cut-off elevation on each pile. The top of all piles shall be neatly cut off (true to level) at the cut-off elevation.

QUALITY ASSURANCE

- All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given.
- The Contract Administrator may request weld testing for one or all field splices completed for installation of the Steel H-Piles. Welds for the installation of the driving shoes may also be tested at random, upon request from the Contract Administrator. Costs associated with testing are incidental to Supply and Install Steel H-Piles.
- The Contractor may select the testing agency, upon acceptance from the Contract Administrator.
- The Contract Administrator shall be afforded full access for the inspection and control testing of the field welds at site, or wherever the work is completed, to determine whether the welds are in accordance with this Specification.
- The Contractor shall mark 300 mm increments on each pile, with spray paint, over the entire length of each pile, prior to placement of the pile.
- The Contract Administrator will keep a record of each, and every pile driven. The records shall give the date, time, the diameter, length, location, type, total depth of penetration, rate of penetration, number of blows per 300 mm, refusal counts, steam, air or diesel pressure and kind

and size of hammer used in driving, any unusual phenomena shall be noted and recorded, especially if the indicate possible damage to the pile.

- Energy output of driving equipment at the time of final set shall be carefully recorded, along with the final penetration readings and reported immediately to the Contract Administrator. The required set per blow will be subject to approval by the Contract Administrator, showing regard to the specific driving equipment and piles permitted.

8.4.4 MEASUREMENT AND PAYMENT

METHOD OF MEASUREMENT

- Supply and Drive Steel H-Piles shall be measured on a linear metre basis. The number of linear metres to be paid for shall be the total number of linear metres acceptably supplied and installed in accordance with this Specification and accepted by the Contract Administrator. No reduction will be made for pile cut-offs post refusal.
- Supply and Install Pile Tips shall be measured on a unit basis. Then number of units to be paid for shall be the total number of Pile Tips supplied and installed in accordance with the Specifications and accepted by the Contract Administrator.

BASIS OF PAYMENT

- Supply and drive Steel H-Piles shall be paid for at the Contract Unit Price per linear metre for “Supply” and “Drive” Steel H-Piles measure as specified herein, which price shall be payment in full for the supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.
- Supply and Install Pile Tips shall be paid for at the Contract Unit Price for each Pile Tip “Supplied” and “Installed” measure as specified herein, which price shall be payment in full for the supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

8.5 STRUCTURAL CONCRETE

8.5.1 DESCRIPTION

- This Specification shall cover all operations relating to the preparation of Portland Cement structural concrete for, and all concreting operations related to, the construction of structural concrete Works, as specified herein and as shown on the Drawings.
- The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, chamfers, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

8.5.2 SCOPE OF WORK

The Work under this Specification shall involve the following structural concrete Works:

- (i) Precast Concrete Abutment and Wingwalls
- (ii) Precast Concrete Girders
- (iii) Parapet Wall
- (iv) Sidewalks

- (v) Miscellaneous concrete and grouting
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8.5.3 SUBMITTALS

- The Contractor shall submit to the Contract Administrator for review and approval, at least five (5) Business Days prior to the commencement of any scheduled Work on the Site, a proposed schedule, including methods and sequence of operations.
 - The Contractor shall submit to the Contract Administrator for review and approval, at least five (5) Business Days prior to the commencement of any Work on Site, the proposed materials to be used.
-

CONCRETE MIX DESIGN REQUIREMENTS

- The Contractor shall submit a concrete mix design statement to the Contract Administrator for each of the concrete types specified herein that reflects the specified performance properties of the concrete. The mix design statement shall contain all the information as outlined on the concrete mix design statement as shown on the Manitoba Ready Mix Concrete Association website (www.mrmca.com). In addition, the mix design statement must indicate the expected method of placement (buggies, chute, or pump). If pumping methods are to be used, the method of placement must include a clear description of the pumping methods (line, vertical drop, length of hose, etc.).
- The Supplier shall submit directly, in confidence, to the Contract Administrator, the concrete mix designs for each of the concrete types specified herein. The purpose of this confidential submission will be for record keeping purposes only. The concrete mix design shall contain a description of the constituents and proportions, and at the minimum the following:
 - o Cementitious content in kilograms per cubic metre or equivalent units, and type of cementitious materials.
 - o Designated size, or sizes, of aggregates, and the gradation.
 - o Aggregate source location(s).
 - o Weights of aggregates in kilograms per cubic metre or equivalent units. Mass of aggregates is saturated surface dry basis.
 - o Maximum allowable water content in kilograms per cubic metre or equivalent units and the water/cementitious ratio.
 - o The limits for slump.
 - o The limits for air content; and
 - o Quantity of other admixtures.
 - o The concrete mix design statements must be received by the Contract Administrator a minimum of ten (10) Business Days prior to the scheduled commencement of concrete placement for each of the concrete types. The concrete mix designs must be received by the Contract Administrator a minimum of five (5) Business Days prior to the scheduled commencement of concrete placement for each the concrete types.
 - o The mix design statement shall also include the expected slump measurement for each concrete type. The tolerances for acceptance of slump measurements in the field, by the Contract Administrator, shall be in accordance with CSA A23.1-04 Clause 4.3.2.3.2.
 - o Any change in the constituent materials of any approved mix design shall require submission of a new concrete mix design statement, mix design, and mix design test data. If, during the progress of the Work, the concrete supplied is found to be unsatisfactory for any reason, including poor workability, the Contract Administrator may require the Contractor to make any necessary adjustments and associated resubmissions.

CONCRETE MIX DESIGN TEST DATA

- The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the scheduled commencement of concrete placement, test data showing that the concrete to be supplied will meet the performance criteria stated in this Specification for each concrete type.
- The Contractor shall submit at a minimum, the test data to prove that the minimum compressive strength, flexural strength for Fibre Reinforced Concrete (FRC) only, air content, and slump of the concrete to be supplied meets or exceeds the performance criteria. In addition, test data shall be submitted to support requirements for post-cracking residual strength index (R_i) and fibre dispersion in accordance with the Canadian Highway Bridge Design Code (CHBDC) CAN/CSA-S6-06, Section 15, Fibre Reinforced Structures, Clause 16.6
- All tests shall be based on the concrete samples taken from the point of discharge into the formwork. For example, at the concrete chute from the delivery truck if being placed by buggies, or at the end of the pump line should the Contractor choose to pump the concrete into place.
- The Contractor shall furnish, in writing to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the scheduled commencement of concrete placement, the location of the sources where aggregate will be obtained in order that some may be inspected and tentatively accepted by the Contract Administrator. Changes in the source of aggregate supply during the Contract shall not be permitted without notification in writing to and the expressed approval of the Contract Administrator.
- The Contractor shall submit to the Contract Administrator for review and approval recent test information on sieve analysis of fine and coarse aggregates in accordance with CSA Standard Test Method A23.2A.
- The Contractor shall submit to the Contract Administrator for review and approval recent test information on tests for organic impurities in fine aggregates for concrete, in accordance with CSA Standard Test Method A23.2-7A.
- The Contractor shall submit to the Contract Administrator for review and approval recent test information on relative density and absorption of coarse aggregate, in accordance with CSA Standard Test Methods A23.2-12A.
- The Contractor shall submit to the Contract Administrator for review and approval recent test information on resistance to degradation of large-size coarse aggregate by abrasion and impact in the Los Angeles Machine, in accordance with CSA Standard Test Method A23.2-16A.
- The Contractor shall submit to the Contract Administrator for review and approval recent test information on potential alkali reactivity of cement aggregate combinations (mortar bar method), in accordance with CSA Standard Test Method A23.2-20A.
- The Contractor shall submit to the Contract Administrator copies of all material quality control test results.

NOTIFICATION OF READY-MIX SUPPLIER

- The Contractor shall submit to the Contract Administrator the name and qualifications of the Ready-Mix Concrete Supplier that she/he is proposing to use, at least ten (10) Business Days prior to the scheduled commencement of concrete placement. The Contract Administrator will verify the acceptability of the Supplier and the concrete mix design requirements. Acceptance of the Supplier and the concrete mix design(s) by the Contract Administrator does not relieve or reduce the responsibility of the Contractor or Supplier from the requirements of this Specification.

TEMPORARY FALSE WORK, FORMWORK AND SHORING WORKS

- The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the scheduled commencement of concrete placement, detailed design calculations and Shop Drawings for any temporary Works, including false work, formwork, and shoring, that are sealed, signed, and dated by a Professional Engineer licensed to practice in the Province of Manitoba.
- All forms shall be of wood, metal or other materials as approved by the Contract Administrator.
- The false work, formwork, and shoring for these Works shall be designed by a Professional Engineer registered in the Province of Manitoba. False work shall be designed according to the requirements of CSA S269.1, "False Work for Construction Purposes." The Shop Drawings shall bear the Professional Engineer's seal. Shop Drawings submitted without the seal of a Professional Engineer will be rejected. The submission of such Shop Drawings to the Contract Administrator shall in no way relieve the Contractor of full responsibility for the safety and structural integrity of the formwork and shoring.
- The false work, formwork, and shoring for these Works shall be designed to safely support all vertical and lateral loads until such loads can be supported by the concrete all in accordance with CSA Standard CAN/CSA S269.3.
- The loads and lateral pressures outlined in Part 3, Section 102 of "Recommended Practice for Concrete Formwork", (ACI 347) and wind loads as specified by the National Building Code shall be used for design. Additional design considerations concerning factors of safety for formwork elements and allowable settlements outlined in Section 103 of the above reference shall apply.
- Formwork shall be designed to provide chamber, where applicable, to maintain the specified tolerance to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete, due to construction loads.
- Slots, recesses, chases, sleeves, inserts, bolts, hangers, and other items shall be accommodated in the design, in coordination and cooperation with the trade concerned. No openings in structural members are to be shown on the Shop Drawings without the prior written approval of the Contract Administrator.
- Shores shall be designed with positive means of adjustment (jacks or wedges). All settlement shall be taken up before or during concreting as required.
- Mud sills of suitable size shall be designed beneath shores, to be bedded in sand or stone, where they would otherwise bear on soil. The soil below shores must be adequately prepared to avoid settlement during or after concreting. Shores must not be placed on frozen ground.
- Shores shall be braced horizontally in two directions and diagonally in the same two vertical planes so that they can safely withstand all dead and moving loads to which they will be subjected.
- All exposed edges shall be chamfered 20 mm unless otherwise noted on the Drawings.
- Formwork shall be designed to have sufficient strength and rigidity so that the resultant finished concrete conforms to the shapes, lines, and dimensions of the members shown on the Drawings.
- Forms shall be designed to be sufficiently tight to prevent leakage of grout or cement paste.
- Shop Drawings shall show design loads, type, and number of equipment to be used for placing the concrete, method of construction, method of removal, type and grade of materials, and any further information that may be required by the Contract Administrator. The Contractor shall not proceed with any Work on site until the Shop Drawings have been reviewed and approved in writing by the Contract Administrator.
- For timber formwork and false work, the Shop Drawings shall specify the type and grade of lumber and show the size and spacing of all members. The Shop Drawings shall also show the type, size and spacing of all ties or other hardware, and the type, size and spacing of all bracing.

8.5.4 MATERIALS

GENERAL

- All materials supplied under this Specification shall be of a type approved by the Contract Administrator and shall be subject to inspection and testing by the Contract Administrator.
- The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

HANDLING AND STORAGE OF MATERIALS

- All materials shall be handled and stored in a careful and workmanship like manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with CSA Standard CAN/CSA-A23.1.
- Concrete materials susceptible to frost damage shall be protected from freezing.
- Concrete shall have nominal compressive strengths (f'c) and meet the requirements for hardened concrete as specified in the table below. Requirements for Hardened Concrete is as follows:

Type of Concrete	Location	Nominal Compressive Strength	Class of Exposure	Air Content Category	Max Aggregate Size	Cement
Precast Girders	Superstructure	50	C-1	1	14	GU
Precast/CIP Walls	Abutments	35	S-1	2	20	HS
Curbs, Sidewalks	Superstructure /Roadway	30	C-1	1	10	GU

AGGREGATES

- All aggregates shall be handled to prevent segregation and inclusion of any foreign substances, and to obtain uniformity of materials. The two sizes of coarse and fine aggregates, and aggregates secured from different sources, shall be piled in separate stockpiles. The site of the stockpiles shall be cleaned of all foreign materials and shall be reasonably level and firm or on a built-up platform. If the aggregates are placed directly on the ground, material shall not be removed from the stockpile within 150 mm of the ground level. This material shall remain undisturbed to avoid contaminating the aggregate being used with the ground material.
- The potential for deleterious alkali-aggregate reactivity shall be assessed in accordance with CSA A23.2-27A-04. Current (less than 18 months old) test data evaluating the potential alkali-silica reactivity of aggregates tested in accordance with CSA A23.2-14A or CSA A23.2-25A is required.
- Petrographic analysis when performed shall be in accordance with MTO (Ministry of Transportation Ontario) Lab Test Method LS 609. The (weighted) petrographic number shall not exceed 130.

FINE AGGREGATE

- Fine aggregate shall meet the grading requirements of CSA A23.1, FA1, be graded uniformly and not more than 3% shall pass a 75 um sieve. Fine aggregate shall consist of sand, stone, screenings, other inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated grains free from injurious amounts of dust, lumps, shale, alkali, organic matter, loam, or other deleterious substances.
 - Tests of the fine aggregate shall not exceed the limits for standard requirements prescribed in CSA A23.1.
-

COARSE AGGREGATE - STANDARD

- The maximum nominal size of coarse aggregate shall be 20 mm and meet the grading requirements of CSA A23.1, Table 11, Group I. Coarse aggregate shall be uniformly graded and not more than 2% shall pass a 75 um sieve. Coarse aggregate shall consist of crushed stone or gravel or a combination thereof, having hard, strong, durable particles free from elongation, dust, shale, earth, vegetable matter or other injurious substances. Coarse aggregate shall be clean and free from alkali, organic or other deleterious matter; shall have a minimum of two fractured faces; and shall have an absorption not exceeding 3%.
 - The aggregate retained on the 5 mm sieve shall consist of clean, hard, tough, durable, angular particles with a rough surface texture, and shall be free from organic material, adherent coatings of clay, clay balls, an excess of thin particles or any other extraneous material.
 - Coarse aggregate when tested for abrasion in accordance with ASTM C131 shall not have a loss greater than 30%.
 - Tests of the coarse aggregate shall not exceed the limits for standard requirements prescribed in CSA A23.1, for concrete exposed to freezing and thawing.
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ADMIXTURES

- Air-entraining admixtures shall conform to the requirements of ASTM C260.
 - Chemical admixtures shall conform to the requirements of ASTM C494 or C1017 for flowing concrete.
 - All admixtures shall be compatible with all other constituents. The addition of calcium chloride, accelerators and air-reducing agents, will not be permitted, unless otherwise approved by the Contract Administrator.
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CEMENTITIOUS MATERIALS

- Cementitious materials shall conform to the requirements of CSA-A3001 and shall be free from lumps.
 - Should the Contractor choose to include a silica fume admixture in the concrete mix design, the substitution of silica fume shall not exceed 8% by mass of cement.
 - Should the Contractor choose to include fly ash in the concrete mix design, the fly ash shall be Class C-1 or F and the substitution shall not exceed 30% by mass of cement.
 - Cementitious materials shall be stored in a suitable weather-tight building that shall protect these materials from dampness and other destructive agents. Cementitious materials that have been stored for a length of time resulting in the hardening, or the formation of lumps, shall not be used in the Work.
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WATER

- Water to be used for all operations in the Specification, including mixing and curing of concrete or grout, surface texturing operations, and saturating the substrate shall conform to the requirements of CSA A23.1-04 and shall be free of oil, alkali, acidic, organic materials or deleterious substances. The Contractor shall not use water from shallow, stagnant or marshy sources.
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CORROSION INHIBITOR

- Corrosion inhibitor shall be MCI 2005 NS, or equal as accepted by the Contract Administrator, in accordance with B6. Dosage shall be 1 L/m³.
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SYNTHETIC FIBRES

- The synthetic fibres shall consist of 100% virgin polypropylene or 100% virgin polyolefin high performance macro synthetic fibres or equal as accepted by the Contract Administrator, in accordance with B6. The dosage shall be designed by the Contractor to meet the requirements for post-cracking residual strength index (R_i) and fibre dispersion in accordance to the CHBDC CSA-S6-06, Fibre-Reinforced Structures, Clause 16.6. The post-cracking residual strength index (R_i) shall be determined in accordance with ASTM C1609.
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FORMWORK

- Form sheeting plywood to be covered with form liner or to be directly in contact with soil shall be exterior Douglas Fir, concrete form grade, conforming to CSA Standard O121-M1978, a minimum of 20 mm thick.
 - Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.
 - No formwork accessories will be allowed to be left in place within 50 mm of the surface following form removal. Items to be left in place, must be made from a nonrusting material or galvanized steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.
 - Forms for exposed surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.
 - Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand without distortion all the forces to which the forms shall be subjected.
 - Walers shall be SPF No. 2 or better.
 - Stay-in-place formwork or false work is not acceptable and shall not be used by the Contractor unless specifically shown on the Drawings.
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PERMEABLE FORMWORK LINER

- Formwork liner shall be Texel Drainform, Hydroform, or equal as accepted by the Contract Administrator, in accordance with B6. This formwork liner shall be used on all exposed substructure and superstructure formed surfaces, except soffit surfaces, or where a normal form finish is specified.
 - Paper-lined forms shall be used on all soffit surfaces, such as deck slab overhangs. The Contractor shall provide conclusive evidence that the paper-lined form proposed for use will not stain or otherwise blemish the hardened concrete surface.
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CURING COMPOUND

- Curing compounds shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309-98a.
 - Curing compound for approach slabs and slope paving shall be resin-based and white-pigmented.
 - WR Meadows 1215 WHITE Pigmented Curing Compound is an approved product, or equal as accepted by the Contract Administrator, in accordance with B6.
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CURING BLANKETS

- Curing blankets for wet curing shall be 100 percent polyester, 3 mm thick, white in colour. An approved product is "Mirafi Geotextile P150". Alternately, a 10 oz burlap, 5 mil polyethylene, curing blanket white in colour shall be used; "Curelap" manufactured by Midwest Canvas, together with a second layer of burlap, or equal as accepted by the Contract Administrator, in accordance with B6.
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PENETRATING CONCRETE SEALER

- Sealing compounds shall be penetrating type, silane sealers, conforming to NCHRP Report 244, for water absorption.
 - Further to Report 244, sealers shall provide a minimum of 75 percent reduction in water absorption after surface abrasion.
 - Concrete shall be cured and dry before application of the sealer. Surfaces must be free of dust, oil, grease, rubber tire residue, curing compounds, paint, or other contaminants prior to application. Any curing compound or other contaminants shall be removed using a method that does not damage the concrete surface finish. The cleaning procedures require the prior acceptance of the Contract Administrator. Sandblasting will not be allowed. Application of the sealer shall be in accordance with the manufacturer's written instructions.
 - Penetrating concrete sealer shall be applied to the top surface of the pier lookout deck slab.
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BONDING AGENTS

- Latex bonding agent shall be Acryl-Stix, SikaCem 810, or equal as accepted by the Contract Administrator, in accordance with B6. Polyvinyl acetate-based latexes will not be permitted. Planicrete AC by MAPEI is approved for use as a latex bonding agent on concrete greater than 28 days in age. Latex Bonding Agent shall be applied on the existing pier transfer beam prior to casting the new transfer beam.
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EPOXY, GROUT AND ADHESIVE

- Epoxy adhesive for bonding concrete to steel shall be one of the following approved products: Sternson ST432 or ST433, Dural Duralbond, Capper Capbond E, Sikadur 32 Hi-bond, Concessive 1001 LPL, Meadows Rezi-Weld 1000, or equal as accepted by the Contract Administrator, in accordance with B6.
 - Epoxy grout shall be one of the following approved products: Sternson Talygrout 100, Sika Sikadur 42, CPD Epoxy Grout by Specialty Construction Products, Meadows Rezi-Weld EG-96, or equal as accepted by the Contract Administrator, in accordance with B6.
 - Cementitious grout shall be nonshrink and non-metallic. Approved products are Sternson M-bed Standard, Specialty Construction Products CPD Non-Shrink Grout, Sika 212 Non-Shrink Grout, or equal as accepted by the Contract Administrator, in accordance with B6. The minimum compressive strength of the grout at 28 days shall be 40 MPa.
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- Patching mortar shall be made of the same material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted, and the mortar shall consist of not more than 1 part cement to 2 parts sand by damp loose volume. White Portland Cement shall be substituted for a part of the grey Portland Cement on exposed concrete in order to produce a colour matching the colour of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling or placing.

FLEXIBLE JOINT SEALANT

- Flexible joint sealant for all horizontal, vertical, and sloping joints shall be guaranteed non-staining, grey polyurethane, accepted by the Contract Administrator and applied in strict accordance with the details shown on the Drawings and the Manufacturer's instructions including appropriate primers if recommended. Approved products are Vulkem 116 by Mameco, Sonolastic NP1 by Sonneborn, Sikaflex-1a by Sika, Bostik 915 by Bostik, or equal as accepted by the Contract Administrator, in accordance with B6.

FIBRE JOINT FILLER

- Fibre joint filler shall be rot-proof and of the preformed, nonextruding, resilient type made with a bituminous fibre such as Flexcell and shall conform to the requirements of ASTM Standard D1751-99 or equal as accepted by the Contract Administrator, in accordance with B6.

PRECOMPRESSED FOAM JOINT FILLER

- Precompressed expanding filler shall be compressed to 20% of its expanded width and be a polyurethane foam, impregnated throughout with a latex modified asphalt. Approved products are "Emseal" by Emseal Corporation. Manufacturer's recommended primer and topcoat are to be used.

BACKUP ROD

- Backup rod shall be preformed compressible polyethylene, urethane, neoprene, or vinyl foam backer rod, extruded into a closed cell form and oversized 30 to 50%.

EXPANSION BOARD CAP

- The expansion board cap shall be installed between the fibre joint filler and backup rod. The approved product is Greenstreak Expansion Board Cap No. 941.

GALVANIZED DOWELS AND GALVANIZED EXPANSION SLEEVES

- Dowels and expansion sleeves shall be fabricated in accordance with CSA Standard CAN/CSA-G30.18-M92.
- The dowels shall be galvanized in accordance with CSA Standard G164-M92, to a minimum net retention of 600 g/m².

MISCELLANEOUS MATERIALS

- Miscellaneous materials shall be of the type specified on the Drawings or as accepted by the Contract Administrator.

EQUIPMENT

- All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.
 - The Contractor shall have sufficient numbers of internal concrete vibrators and experienced operators on site to properly consolidate all concrete in accordance with ACI 309. The type and size of vibrators shall be appropriate for the application, the size of the concrete placement, and the amount of reinforcing and shall conform to standard construction procedures.
 - The Contractor shall use rubber coated vibrators for consolidating concrete containing epoxy-coated reinforcing steel, such as in locations that the existing deck reinforcing is exposed.
 - The Contractor shall always have standby vibrators available during concrete placement.
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TEMPORARY FALSE WORK, FORMWORK, AND SHORING

- The Contractor shall construct false work, formwork and shoring for the new deck slab concrete overhangs strictly in accordance with the approved Shop Drawings.
- All forms shall be of wood, metal or other materials as approved by the Contract Administrator. No formwork shall extend beneath the underside of the girders.
- The false work, formwork, and shoring for these Works shall be erected, and braced, as designed, and maintained to safely support all vertical and lateral loads until such loads can be supported by the concrete.
- Forms shall be constructed and maintained so that the completed Work is within minus 3 mm or plus 6 mm of the dimensions shown on the Drawings.
- Formwork shall be cambered, where necessary to maintain the specified tolerance to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete, due to construction loads.
- Slots, recesses, chases, sleeves, inserts, bolts, hangers, and other items shall be formed or set in coordination and cooperation with the trade concerned. No openings shall be made in structural members that are not shown on the Shop Drawings without the prior written approval of the Contract Administrator.
- Shores shall be provided with positive means of adjustment (jacks or wedges). All settlement shall be taken up before or during concreting as required.
- Mud sills of suitable size shall be provided beneath shores, bedded in sand or stone, where they would otherwise bear on soil. The soil below shores must be adequately prepared to avoid settlement during or after concreting. Shores must not be placed on frozen ground.
- Shores shall be braced horizontally in two directions and diagonally in the same two vertical planes so that they can safely withstand all dead and moving loads to which they will be subjected.
- Formwork shall have sufficient strength and rigidity so that the resultant finished concrete conforms to the shapes, lines, and dimensions of the members shown on the Drawings.
- Forms shall be constructed so as to be sufficiently tight to prevent leakage of grout or cement paste.
- Form panels shall be constructed so that the contact edges are kept flush and aligned.
- Forms shall be clean before use. Plywood and other wood surfaces shall be sealed against absorption of moisture from the concrete by a field applied form coating or a factory applied liner as accepted by the Contract Administrator.

- Where prefabricated panels are used, care shall be taken to ensure that adjacent panels remain flush. Where metal forms are used, all bolts and rivets shall be counter sunk and well ground to provide a smooth, plane surface.
- Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be commercially manufactured types. The portion remaining within the concrete shall leave no metal within 50 mm of the surface when the concrete is exposed to view. Spreader cones on ties shall not exceed 25 mm in diameter. Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface. All fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type. Cavities shall be filled with cement mortar and the surface left sound, smooth, even and uniform in colour.
- Formwork shall be constructed to permit easy dismantling and stripping, and such that removal will not damage the concrete. Provision shall be made in the formwork for shores to remain undisturbed during stripping where required.
- It shall be permissible to use the forms over again where possible to a maximum of three uses, provided they are thoroughly cleaned and in good condition after being removed from the former portions of the Work. The Contract Administrator shall be the sole judge of their condition and her/his decision shall be final regarding the use of them again.
- Where required by the Contract Administrator, the Contractor shall cast test panels not using less than two panels of representative samples of the forms he proposes for reuse and shall strip them after 48 hours for the Contract Administrator to judge the type of surface produced.
- All form lumber, studding, etc., becomes the property of the Contractor when the Work is finished, and it shall be removed from the concrete and the site by the Contractor after the concrete is set, incidental to the work of this Specification, and the entire site shall be left in a neat and clean condition.

CONCRETE CONSTRUCTION JOINTS

- Concrete construction joints shall be located only where shown on the Drawings or as otherwise directed in writing by the Contract Administrator. Concrete construction joints shall be formed at right angles to the direction of the main reinforcing steel. All reinforcing steel shall be continuous across the joints.
- Forms shall be re-tightened, and all reinforcing steel shall be thoroughly cleaned at the joint prior to concreting.
- After the forms are stripped off the construction joint, the entire face of the joint, including the reinforcing steel, shall be thoroughly cleaned down to sound concrete and the surface roughened.
- Refer to, "Preparation for Concreting Against Hardened Concrete", for the requirements to prepare the hardened concrete at a construction joint for receiving new concrete.

PERMEABLE FORMWORK LINER

- Permeable formwork liner shall be used on all exposed surfaces, except on soffit surfaces, or surfaces where a normal architectural form finish is specified.
- The permeable formwork liner shall be used for only one (1) application.
- The supply, setup, application, and removal of permeable formwork liner shall be considered incidental to the placement of structural concrete, and no separate measurement or payment shall be made for this Work.

8.5.5 SUPPLY OF STRUCTURAL CONCRETE

- All structural concrete shall be supplied from a plant certified by the Manitoba Ready Mix Concrete Association. The Contractor, upon request from the Contract Administrator, shall furnish proof of this certification.
- All mixing of concrete must meet the provisions of CSA A23.1.
- The maximum time allowed for all types of concrete to be delivered to the Site of the Work, including the time required to discharge, shall not exceed 120 minutes after batching. Batching of all types of concrete is considered to occur when any of the mix ingredients are introduced into the mixer, regardless of whether the mixer is revolving. For concrete that includes silica fume and fly ash, this requirement is reduced to 90 minutes.
- Each batch of concrete delivered to the Site shall be accompanied by a time slip issued at the batching plant, bearing the time of batching. In hot or cold weather, or under conditions contributing to quick stiffening of the concrete, a time less than 120 and/or 90 minutes may be specified by the Contract Administrator. The Contractor will be informed of this requirement 24 hours prior to the scheduled placing of concrete.
- To avoid the reduction of delivery and discharge time in hot weather, the Contractor will be allowed to substitute crushed ice for a portion of the mixing water provided the specified water/cementitious ratio is maintained. All the ice shall be melted completely before discharging any of the concrete at the delivery point.
- The concrete, when discharged from truck mixers or truck agitators, shall be of the consistency and workability required for the job without the use of additional mixing water. If the slump of the concrete is less than that designated by the mix design statement, then water can be added on site provided the additional water meets the requirements of CSA A23.1. If additional water is to be added on site, it must be done under the guidance of the Suppliers' designated quality control person. The Supplier shall certify that the addition of water on site does not change the Mix Design for the concrete supplied. Any other water added to the concrete without such control will be grounds for rejection of the concrete by the Contract Administrator.
- A record of the actual proportions used for each concrete placement shall be kept by the Supplier and a copy of this record shall be submitted to the Owner upon request.

DELIVERY OF CONCRETE

- The Contractor shall satisfy himself that the Concrete Supplier has sufficient plant capacity and satisfactory transporting equipment to ensure continuous delivery at the rate required. The rate of delivery of concrete during concreting operations shall be such that the development of cold joints will not occur. The methods of delivering and handling the concrete shall facilitate placing with a minimum of rehandling, and without damage to the structure or the concrete.

CONCRETE PLACEMENT SCHEDULE

- The Contractor shall submit to the Contract Administrator the proposed concrete placement schedule for all concrete placements for review and approval. If, in the opinion of the Contract Administrator, the volume of the placement is deemed larger than can be placed with the facilities provided, the Contractor shall either:
 - Limit the amount to be placed at any time (using adequate construction joints).
 - Augment her/his facilities and Plant in order to complete the proposed placement.
 - In the case of continuous placing, provide additional crews and have adequate lighting to provide for proper placing, finishing, curing, and inspecting; and

- The Contractor shall adhere strictly to the concrete placement schedule, as approved by the Contract Administrator.

PREPARATION FOR CONCRETING AGAINST HARDENED CONCRETE

- All hardened concrete against which new concrete is to be placed shall be prepared in the following manner:
- Concrete shall be removed to sound concrete or to the limits as shown on the Drawings, whichever is greater. The resulting surface shall be roughened to remove latent cement and miscellaneous debris.
- All existing surfaces and exposed reinforcing steel are to be sandblasted to reveal a clean substrate and kept clean until concrete placement. Sandblasting shall be followed by a high-pressure water wash to remove all residues.
- Immediately prior to placing new concrete, bonding grout shall be thoroughly brushed onto the entire surface of the existing hardened concrete in a thin and even coating that will not run or puddle.

PLACING STRUCTURAL CONCRETE

- The Contractor shall notify the Contract Administrator at least one (1) Working day prior to concrete placement so that an adequate inspection may be made of formwork, shoring, reinforcement, deck joints, mechanical screed setup, movable hoarding, and related Works. No concrete pour shall be scheduled without the prior written approval of the Contract Administrator.
- Placement of slab and overlay concrete shall not be permitted when the surface moisture evaporation exceeds 0.75 kg/m²/h. Fog misting is mandatory regardless of drying conditions. The Contractor shall use fog misting operations as accepted by the Contract Administrator.
- The nomograph, of CSA Standard A23.1 shall be used to estimate surface moisture evaporation rates.
- Equipment for mixing or conveying concrete shall be thoroughly flushed with clean water before and after each pour. Water used for this purpose shall be discharged outside the forms. Pumping of concrete will be allowed for all concrete. All equipment and processes are subject to acceptance by the Contract Administrator.
- Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent segregation and a marked change in consistency.
- Runways for concrete buggies and all pumping equipment shall be supported directly by the formwork and not on reinforcement.
- Before depositing any concrete, all debris shall be removed from the space to be occupied by the concrete, and any mortar splashed upon the reinforcement or forms shall be removed.
- Formwork liners shall be cooled immediately prior to placing concrete by spraying with cold water.
- Placing of concrete, once started, shall be continuous. No concrete shall be placed on concrete which has sufficiently hardened to cause the formation of seams or "cold joints" within the section. If placing must be interrupted, construction joints shall be located where shown on the Drawings or as accepted by the Contract Administrator.
- Concrete shall be placed as nearly as possible in its final position. Rakes or mechanical vibrators shall not be used to transport concrete.
- The maximum free drop of concrete into the forms shall not be greater than 1.5 m, otherwise rubber tubes or pouring ports spaced not more than 1.5 m vertically and 2.5 m horizontally shall be used.

The Contractor shall obtain the Contract Administrator's acceptance, prior to pouring concrete, of all placing operations.

- All concrete, during and immediately after depositing, shall be consolidated by mechanical vibrators so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into the corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Mechanical vibrators shall have a minimum frequency of 7000 revolutions per minute immersed.
- Vibrators shall be inserted systematically into the concrete at intervals such that the zones of influence of the vibrator overlap (generally 300 to 900 mm). Apply the vibrator at any point until the concrete is sufficiently compacted (5 to 15 seconds), but not long enough for segregation to occur. The vibrators shall be inserted vertically and withdrawn out of the concrete slowly. Spare vibrators in good working condition shall be kept on the job site during all placing operations.
- Concrete shall not be placed during rain or snow unless adequate protection is provided for formwork and concrete surfaces, to the satisfaction of the Contract Administrator.
- Before any concrete is placed for the approach slabs, abutment roof slab, or Bridge deck slab, the Contractor shall demonstrate to the satisfaction of the Contract Administrator before each pour that all necessary adjustments have been made to provide the required camber, crown, slab thickness, and concrete cover. This demonstration may be carried out by means of an attachment securely fastened to the finisher's strike-off machine and moving the machine and the strike-off across the deck over the reinforcing steel with a minimum 3 mm clearance between the steel and attachment.

FINISHING OF CONCRETE SURFACES

- The Contractor shall ensure that sufficient personnel are provided for the finishing of the slab surfaces. In the event that the depositing, vibrating, and screeding operations progress faster than the concrete finishing, the Contractor shall reduce the rate of concrete placement or cease the depositing of concrete until the exposed area of unfinished concrete has been satisfactorily minimized. The Contract Administrator's judgement in this matter shall be final and binding on the Contractor. All loads of concrete that exceed the 120-minute discharge time limit during the delay, while the finishing operations catch up, shall be rejected.

Type 1 Finish – Exposed Formed Surfaces

- A permeable formwork liner finish shall be applied to all exposed formed surfaces including all exposed concrete surfaces not included in Type 2, Type 3, Type 4 finishes, but excluding soffit surfaces where an architectural form finish is specified.
- Exposed surfaces imply all surfaces exposed to view including surfaces to 300 mm below finish grade elevations.
- All surfaces to receive a formwork liner finish shall be formed using an approved permeable formwork liner.
- The surfaces shall be patched as specified in this Specification.

Type 2 Finish – Unformed Surfaces

- All unformed concrete surfaces shall be finished as outlined hereinafter.
- Screeding of all unformed concrete surfaces shall be performed by the sawing movement of a straightedge along wood or metal strips or form edges that have been accurately set at required elevations.
- Screeding shall be done on all concrete surfaces as a first step in other finishing operations. Screeding shall be done immediately after the concrete has been vibrated.

- After screeding, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared. Concrete surfaces after floating shall have a uniform, smooth, granular texture.

GENERAL CURING REQUIREMENTS

- The use of curing compound shall not be allowed on concrete areas that are to receive additional concrete, moist curing, dampproofing, a waterproofing membrane, or an asphalt overlay.
- Freshly finished concrete shall have either a curing compound applied or shall be moist cured by immediately applying wet curing blankets to the exposed concrete surface immediately following finishing operations for at least seven (7) consecutive days thereafter. Construction joints shall be cured by means of wet curing blankets only.
- Curing compound shall be applied at the rate required by ASTM P198 for the accepted product. The compound must be applied uniformly and by roller. Spraying of the compound will not be permitted.
- Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping, running water, vibration, and mechanical shock. No machinery shall travel in the vicinity of freshly placed concrete for a period of 24 hours. Concrete shall be protected from freezing until at least 24 hours after the end of the curing period.
- Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3°C in one hour or 20°C in 24 hours.
- Care shall be exercised to ensure that the polyester curing blanket is well drained and that it is placed as soon as the surface will support it without deformation. The Contractor shall ensure that water from the polyester curing blankets does not run into areas where concrete placement and finishing operations are underway. If this occurs, concrete placement shall stop until the problem is corrected satisfactory to the Contract Administrator.
- Formed surfaces shall receive, immediately after stripping and patching, the same curing as finished surfaces.
- For curing of barriers, formwork shall remain in place for six (6) consecutive days following concreting. The top surface of the concrete surface shall be moist cured during this timeframe.

FORM REMOVAL

- The Contractor shall notify the Contract Administrator at least one (1) Working Day prior to form removal. The Contractor shall not commence any form removal operations without the prior written approval of the Contract Administrator.
- All forms shall remain in place and the concrete shall not be loaded for a minimum of seven (7) days after initial concrete placement, unless otherwise authorized by the Contract Administrator in writing.
- Notwithstanding the above, the minimum strength of in-place concrete prior to removal of vertical forms for abutments shall be 25 MPa, with the added provision that the member shall be of sufficient strength to safely carry its own weight, together with super-imposed construction loads. Bridge deck overhang forms shall remain in place to support construction live loads during the placement of traffic barriers.
- Field-cured test specimens' representative of the cast-in-place concrete being stripped shall be tested as specified in this Specification to verify the concrete strength.

PATCHING OF FORMED SURFACES

- The Contractor shall notify the Contract Administrator at least one (1) Working Day prior to removal of forms. Immediately after forms have been removed and before the Contractor commences any surface finishing or concrete patching operations, all newly exposed concrete surfaces shall be inspected by the Contract Administrator.
- Any repair or surface finishing started before this inspection may be rejected and required to be removed.
- Patching of formed surfaces shall take place within 24 hours of formwork removal.
- All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back 75 mm from the surface before patching.
- Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter, voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched, then applying bonding grout followed by patching mortar. Bonding grout shall be well brushed onto the area immediately prior to patching. When the bonding grout begins to lose the water sheen, the patching mortar shall be thoroughly trowelled into the repair area to fill all voids. It shall be struck off slightly higher than the adjacent concrete surface and left for one hour before final finishing, to facilitate initial shrinkage of the patching mortar. It shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification. The final colour shall match the surrounding concrete.
- Concrete shall be cast against forms which will produce plane surfaces with no bulges, indentations, or protuberances other than those shown on the Drawings. All objectionable fins, projections, offsets, streaks, or other surface imperfections on the concrete surface shall be removed by means acceptable to the Contract Administrator. Cement washes of any kind shall not be used.
- The arrangement of panel joints shall be kept to a minimum. Panels containing worn edges, patches, or other defects which will impair the texture of concrete surfaces shall not be used.

COLD WEATHER CONCRETING

- The requirements of CSA Standard A23.1 shall be applied to all concreting operations during cold weather, i.e., if the mean daily temperature falls below 5°C during placing or curing.

HOT WEATHER CONCRETING

- The requirements of this section shall be applied during hot weather, i.e., air temperatures forecast to go higher than 27°C during placing.
- Concrete at discharge shall be at as low a temperature as possible, preferably as low as 15°C, but not above 25°C. Concrete containing silica fume shall be between 10°C minimum and 18°C maximum at discharge. Aggregate stockpiles should be cooled by water sprays and sun shades.
- The Contractor shall use cold water and/or ice in the mix to keep the temperature of the fresh concrete down, if required. Ice may be substituted for a portion of the mixing water; provided it has melted by the time mixing is completed.
- Form and conveying equipment shall be kept as cool as possible before concreting by shading them from the sun, painting their surfaces white and/or the use of water sprays.
- Sun shades and wind breaks shall be used as required during placing and finishing.
- Work shall be planned so that concrete can be placed as quickly as possible to avoid "cold joints".

- The Contract Administrator's acceptance is necessary before the Contractor may use admixtures such as retardants to delay setting, or water reducing agents to maintain Workability and strength, and these must appear in the Mix Design Statement submitted to the Contract Administrator.
- Hot weather curing shall follow immediately after the finishing operation.
- When the air temperature is at or above 25°C, curing shall be accomplished by fog misting and by using saturated absorptive fabric, in order to achieve cooling by evaporation. Note that fog misting is mandatory for all deck slab and sidewalk slab pours at all temperatures.
- Mass concrete shall be water cured for the basic curing period when the air temperature is at or above 20°C, in order to minimize the temperature, rise of the concrete.
- When the air temperature is forecast to rise to 25°C or higher during the placing period, provisions shall be made by the Contractor for protection of the concrete in place from the effects of hot and/or drying weather conditions. Under severe drying conditions, the formwork, reinforcement, and concreting equipment shall be protected from the direct rays of the sun or cooled by mist fogging and evaporation, to the satisfaction of the Contract Administrator.
- The temperature of the concrete as placed shall be as low as practicable and in no case greater than the following temperatures, as shown in the below table.
- Acceptable Concrete Temperature for the indicated size of the concrete section shall be as follows:

Thickness of Section	Temperature	
	Less than (m)	Minimum (°C)
0.9	10	27
1.2	5	25

CONCRETE QUALITY

- All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified Work.
- The Contractor shall be wholly responsible for the control of all operations incidental thereto, notwithstanding any inspection or acceptance that may have been previously given. The Contract Administrator reserves the right to reject any materials or Works, which are not in accordance with the requirements of this Specification.
- Quality Assurance testing shall be undertaken by the Contract Administrator. Quality Control testing shall be undertaken by the Contractor. All Quality Control costs, i.e. concrete testing, shall be the responsibility of the Contractor.
- The Contractor shall allow the Contract Administrator free access to all parts of the Work at all times. The Contractor shall supply samples to the Contract Administrator or his inspector for testing purposes as required. There will be no charge to the City for samples taken.
- All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Quality Assurance Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City of Winnipeg for any materials taken by the Contract Administrator for testing purposes.
- All materials shall conform to CSA Standard A23.1.
- All testing of materials shall conform to CSA Standard A23.2.

- All materials shall be submitted to the Contract Administrator for acceptance at least twenty (20) Business Days prior to its scheduled incorporation into any construction. If, in the opinion of the Contract Administrator, such materials, in whole or in part, do not conform to the Specifications detailed herein or are found to be defective in manufacture or have become damaged in transit, storage, or handling operations, then such material shall be rejected by the Contract Administrator and replaced by the Contractor at his own expense.

QUALITY ASSURANCE AND QUALITY CONTROL

- The Contract Administrator shall be afforded full access for the inspection and control and assurance testing of concrete and constituent materials, both at the site of Work and at any plant used for the production of concrete, to determine whether the concrete is being supplied in accordance with this Specification.
- The Contract Administrator reserves the right to reject concrete in the field that does not meet the Specifications.
- The Contractor shall provide, without charge, the samples of concrete and the constituent materials required for Quality Assurance tests and provide such assistance and use of tools and construction equipment as is required.
- Quality Assurance and control tests will be used to determine the acceptability of the concrete supplied by the Contractor.
- The Contractor will be required to undertake Quality Control tests, of all concrete supplied. All test results are to be copied to the Contract Administrator immediately after the tests have been performed.
- The frequency and number of concrete Quality Control tests shall be in accordance with the requirements of CSA Standard A23.1. An outline of the quality tests is indicated below.
- Slump tests shall be made in accordance with CSA Standard Test Method A23.2-5C, "Slump of Concrete". If the measured slump falls outside the limits in E10.4 of this Specification, a second test shall be made. In the event of a second failure, the Contract Administrator reserves the right to refuse the use of the batch of concrete represented.
- Air content determinations shall be made in accordance with CSA Standard Test Method A23.2-4C, "Air Content of Plastic Concrete by the Pressure Method". If the measured air content falls outside the limits in (a) of this Specification, a second test shall be made at any time within the specified discharge time limit for the mix. In the event of a second failure, the Contract Administrator reserves the right to reject the batch of concrete represented.
- The air-void system shall be proven satisfactory by data from tests performed in accordance with the test method of ASTM C457. The spacing factor, as determined on concrete cylinders moulded in accordance with CSA Standard Test Method A23.2-3C, shall be determined prior to the start of construction on cylinders of concrete made with the same materials, mix proportions, and mixing procedures as intended for the project. If deemed necessary by the Contract Administrator to further check the
- Contract Administrator to further check the air-void system during construction, testing of cylinders may be from concrete as delivered to the job Site and will be carried out by the Contract Administrator. The concrete will be considered to have a satisfactory air-void system when the average of all tests shows a spacing factor not exceeding 230 microns with no single test greater than 260 microns.
- Rapid chloride permeability testing shall be performed in accordance with ASTM C 1202.
- Testing for post-cracking residual strength index of FRC shall be tested as follows. One set of five concrete beam specimens, 100 mm by 100 mm by 350 mm long, shall be tested to failure using the same test set up in ASTM C 1399-04 without the steel plate. The average of the peak loads is the cracking load of the concrete (P_{cr}), and shall be provided to the Contract Administrator. A

second set of five concrete beam specimens shall be tested to failure in accordance with ASTM C 1399-04. The average of the peak loads is the post cracking load of the concrete (P_{pcr}). The Contractor shall submit a summary of the results of all post-cracking residual strength index tests.

- Samples of concrete for test specimens shall be taken in accordance with CSA Standard Test Method CSA-A23.2-1C, "Sampling Plastic Concrete".
- Test specimens shall be made and cured in accordance with CSA Standard Test Method A23.2-3C-04, "Making and Curing Concrete Compression and Flexure Test Specimens".
- Compressive strength tests at twenty-eight (28) days shall be the basis for acceptance of all concrete supplied by the Contractor. For each twenty-eight (28) day strength test, the strength of two companion standard-cured test specimens shall be determined in accordance with CSA Standard Test Method A23.2-9C, "Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the average of the strengths of the two specimens. A compressive strength test at seven (7) days shall be taken, the strength of which will be used only as a preliminary indication of the concrete strength, a strength test being the strength of a single standard cured specimen.
- Compressive strength tests on specimens cured under the same conditions as the concrete Works shall be made to check the strength of the in-place concrete so as to determine if the concrete has reached the minimum allowable working compressive strength as specified in Table 1 of this Specification and also to check the adequacy of curing and/or cold weather protection. At least two (2) field-cured test specimens shall be taken to verify strength of the in-place concrete. For each field-cured strength test, the strength of field-cured test specimens shall be determined in accordance with CSA Standard Test Method A23.2-9C-04, "Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the strength of the specimen.

CORRECTIVE ACTION

- If the results of the tests indicate that the concrete is not of the specified quality, the Contract Administrator shall have the right to implement additional testing, as required, to further evaluate the concrete, at the Contractor's expense. The Contractor shall, at his own expense, correct such Work or replace such materials found to be defective under this Specification in an acceptable manner to the satisfaction of the Contract Administrator.

8.5.6 MEASUREMENT AND PAYMENT

METHOD OF MEASUREMENT

- The supply and placement of structural concrete shall be measured on a volume basis for each category of concrete. The volume to be paid for shall be the total number of cubic metres of structural concrete supplied and placed in accordance with this Specification and accepted by the Contract Administrator, as computed from Drawing dimensions. No volume deductions will be made for chamfers, reinforcing steel, structural steel, bolts or voids of seventy-five (75) mm in diameter or less.

BASIS OF PAYMENT

- The supply and placement of structural concrete will be paid for at the Contract Unit Prices per cubic metre for "Structural Concrete" of the various bridge components listed below, measured as specified herein, which price shall be payment in full for supplying all materials, including reinforcing steel, shop drawing, installation of miscellaneous metals, preparation and for performing all operations herein described and all other items incidental to this item of Work.

- All formwork materials, accessories, heating, and hoarding are incidental to the supply and placement of structural concrete and no payment shall be made for this Work unless indicated otherwise.

Items of Work

- Alvey – Miscellaneous Grouting
- Parkhill – Supply and Place Concrete Parapet Wall
- Parkhill – Supply and Place Concrete Sidewalk
- Parkhill – Miscellaneous Grouting

8.6 PRECAST CONCRETE

- This section specifies requirements for the manufacture, delivery, erection, and final installation of precast concrete units as shown on the Drawings.
- The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, chamfers, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.
- This Specification shall be read in conjunction with Section 7.X Concrete

8.6.1 SCOPE OF WORK

The Work under this Specification shall involve the following structural concrete Works:

- (i) Precast Concrete Abutment and Wingwalls
- (ii) Precast Concrete Girders

8.6.2 SUBMITTALS

- The Contractor shall submit to the Contract Administrator for review and approval, at least five (5) Business Days prior to the commencement of any scheduled Work on the Site, a proposed schedule, including methods and sequence of operations.
- The Contractor shall submit to the Contract Administrator for review and approval, at least five (5) Business Days prior to the commencement of any Work on Site, the proposed materials to be used.
- The Contractor shall submit all requested Structural Concrete submittals.
- The Contractor shall submit at least ten (5) working days prior to stressing the stressing calculations which shall be stamped, signed, and dated by a Professional Engineer registered or licensed to practice in the Province of Manitoba and include the following:
 - o Copies of the stressing sequence and of the strand elongation calculations as well as all data required for checking these calculations. Separate elongation calculations will be required for each significant variation in the modulus of elasticity of the strand.
 - o A calibration graph for each jack, calibrated not more than 6 months prior to stressing operation.
 - o The proposed method and sequence of stressing and de-stressing operations.
 - o The anchorage losses experienced by the Contractor under similar loading applications, and the proposed method of measuring the anchorage losses during the stressing operation

- A copy of the proposed "Record of Lateral Post-Tensioning" form to be used by the Contractor.

QUALITY CONTROL AND ASSURANCE

- It is the responsibility of the Contractor to determine the number of test cylinders required. At a minimum, test cylinders will be required for review by the Contract Administrator: prior to transfer of pretensioning forces, to confirm 28-day strength, before subjecting the concrete to freezing temperatures, and prior to being hauled to site. Test cylinders to be prepared, cured, and tested in accordance with CSA A23.2.

8.6.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- All loading, transporting, and erecting of the girders shall be under the direction of a Professional Engineer, registered in the Province of Manitoba. The Professional Engineer shall have 10 years experience in bridge girder loading, transporting, and erecting and shall be present for girder loading, transporting, and erecting.
- The Contractor shall be responsible for the design, supply, installation and removal of all temporary bracing and lateral stability bracing for girders as may be required during all the Contractor's handling operations, including loading, transporting, storing, and erecting of the girders.
- The precast concrete members shall not be transported until the 70% of the concrete design strength (f'c) has been reached.
- Lifting device details to be submitted for review and approval by the Contractor Administrator.
- The lifting devices shall be of such nature that prevent twisting, racking or other distortions while handling, storing, moving, and erecting the precast units. The devices shall be anchored fully to the main body of concrete. The precast units shall only be lifted by the lifting devices.
- The Contractor is responsible for storage of precast units from completion. Provide blocking to support units at bearing locations that are approximately the same as the bearing locations when the unit is in final position.
- The Contractor is responsible for the safe storage of all precast and miscellaneous items from the completion of their fabrication until they are required for erection.
- Precast elements to be transported or stored shall be maintained in an upright position and shall be support within the intended bearing area. Supports for storage and for lifting procedures shall prevent any twisting or other distortion that may result in damage to the precast unit.
- The Contractor shall submit the route for transporting the girders including traffic control procedures as part of the proposed loading and transporting procedure. Include a traffic control plan that includes the use of trained flagmen and proper advance signage.
- Contractor shall submit erection plan which shall include equipment, equipment specifications, travel path, and crane position for CONTRACT ADMINISTRATOR review. Tracked equipment is not permitted on the bridge.

8.6.4 PREQUALIFICATION OF MANUFACTURER

- All precast elements within the scope of this Specification and Drawings shall be fabricated by a manufacturing plant certified according to CSA-A23.4, Precast Concrete – Materials and Construction.
- Steel fabricators for steel components shall be approved by the Canadian Welding Bureau under CSA-W47.1.

8.6.5 MATERIAL

- Uncoated, low-relaxation, seven wire strand, manufactured, and supplied according to ASTM A416 with minimum ultimate tensile strength of 1860 MPa.
 - Mix design shall conform to the specified requirements within section 8.5 Structural Concrete.
 - Recesses at the ends of the girder to facilitate positioning of the prestressing strands will not be allowed.
 - Forms shall be mortar tight and sufficiently rigid to prevent distortion during construction of the unit.
-

8.6.6 FABRICATION

TOLERANCES

- The Contractor shall meet the minimum Dimensional Tolerances for all precast concrete members. The requirements are as follows:
 - o Length: ± 8 mm
 - o Width: ± 3 mm
 - o Depth: ± 6 mm
 - o Duct Location: surface to duct ± 10 mm
 - o Prestressing Steel Location: ± 3 mm
 - o Reinforcing Steel Location: ± 20 mm, unless adjusting for inserts or prestressing strand
 - o Camber/Reverse Camber: ± 6 mm
 - o Sweep: ± 50 mm per 100 m (from average value)
 - o Warpage or Tilt of Ends: ± 6 mm
 - o Out of Flatness of Bearing Areas 2 mm
 - o Dowel Holes: out of plumb, maximum 5 mm, out of position, maximum 5 mm
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CAST IN MATERIAL

- Locate accurately and secure firmly to avoid movement during concrete placement.
 - Clean weld plates and fixtures of all concrete.
 - Maintain distance from forms by means of stays, blocks, ties, hangers, or other approved supports. Chairs which are in contact with exterior surfaces of the concrete shall be galvanized metal or plastic.
-

STRESSING

- Submission of stressing calculations to the Contract Administrator shall in no way relieve the Fabricator of the full responsibility of the stressing operations. The initial force in each strand shall be as shown on the Drawings or as specified by the Contract Administrator.
 - Stressing strands shall not be stressed more than 12 hours prior to being encased in concrete. The stress in the stressing strands shall be measured both by jacking gauges and by elongation of the strands.
 - All stressing strands shall be checked for wire breaks before placement of concrete.
 - The fabricator shall record the actual jack gauge readings, measure gross elongation, measured anchorage losses, and calculate the actual net elongation for each strand.
 - A copy of the record of pretensioning shall be submitted to the Contract Administrator upon completion of the pretensioning of each girder.
-

- The transfer of the pretensioning force to the girders shall not be carried out until the concrete has reached the minimum compressive strength as shown on the Drawings or as specified by the Contract Administrator. The cylinders used to determine this strength shall be cured under the same circumstances as the concrete of the girder.
- A pre-calibrated pressure gauge, tension meter or load cell shall be used as a check on the elongation, the accuracy of which shall be verified by the Contractor whenever the Contract Administrator considers it necessary.
- The actual net elongation of a strand shall not vary from the required net elongation by more than 3.5 mm. The actual anchorage losses encountered shall be used to modify the gross elongation required, if the actual net elongations are consistently greater or less than the required net elongation.
- At no time shall the actual jack pressure exceed the pressure corresponding to the calculated gross elongation by the 5 percent. If the required gross elongation is not obtained by stressing to this maximum allowable jack pressure at one end of the member, it will be necessary to complete the stressing from the other end of the member.
- Tensioning shall be carried out in a manner such that the jack is coaxial with the tendon or strand. If the strands are tensioned individually, care shall be taken to ensure the unravelling of the strand does not take place.

SURFACE FINISH

- Prepare a "Broom" finish to top surface of all precast girders.
- The lateral connection blockout in concrete that contains the lateral connection angles shall have roughened exposed aggregate surface using a set retarder. Contractor shall submit proposed methods and materials to achieve this surface finish to the Contact Administrator for review and acceptance.
- The pre-tensioning strands shall be cut flush with the end of the girder unless otherwise noted on the Drawings. The exposed ends of the pretensioning strands and a minimum 50 mm strip of concrete adjacent to the strands, shall be cleaned by an abrasive blast to remove all dirt and residue. The cleaned surface shall be coated immediately with one thick coat of zinc-rich paint or other waterproofing material approved by the Engineer.
- Upon removal of the forms, the Contract Administrator inspect the concrete for any defects. Any defects found shall be repaired as directed by the Engineer. The intent is for the final concrete surface to have a smooth and uniform finish.

CURING

- Curing shall be to CSA A23.1 unless noted otherwise.
- Cure all units under conditions as similar as practicable to minimize differential cambers, shrinkage, etc.
- If steam or radiant heat curing is used, carry out according to CSA-A23.4. Take particular care that heat is not applied too soon after casting, that rapid changes in temperature are avoided, and that stress is transferred to the unit as soon as practicable after discontinuing heat.
- Do not expose units to temperature below 0°C until the specified 28-day strength has been attained.

8.6.7 ERECTION

- Establish all lines, dimensions and marks required to ensure that units will be installed in correct position.

- Install bearing pads, dowels, and other items as required.
- Install units in correct position relative to the supports and to each other.
- Grout as shown on the Drawings. Mix design, procedure and curing methods to be submitted for review by the Contract Administrator.
- Welding of connections shall be to CSA-W59.

METHOD OF MEASUREMENT

- The supply and placement of Precast Concrete shall be measured on a unit basis for each category of concrete. The amount to be paid for shall be the total number of units fabricated, supplied, and installed in accordance with this Specification and accepted by the Contract Administrator, as computed from Drawings.

BASIS OF PAYMENT

- The supply and placement of Precast Concrete members will be paid for at the Contract Unit per unit cubic metre for "Structural Concrete" of the various bridge components listed below, measured as specified herein, which price shall be payment in full for supplying all materials, including reinforcing steel, shop drawing, installation of miscellaneous metals, preparation and for performing all operations herein described and all other items incidental to this item of Work.
- All formwork materials, accessories, heating, and hoarding are incidental to the supply and placement of structural concrete and no payment shall be made for this Work unless indicated otherwise.

Items of Work

- Alvey – Supply of Prestressed Precast Concrete Girders – G1
- Alvey – Supply of Prestressed Precast Concrete Girders – G2
- Alvey – Erection of Prestressed Precast Concrete Girders
- Alvey – Supply and Install Precast Concrete Ballast Wall – N1
- Alvey – Supply and Install Precast Concrete Ballast Wall – N1a
- Alvey – Supply and Install Precast Concrete Backwall – N2
- Alvey – Supply and Install Precast Concrete Backwall – N3
- Alvey – Supply and Install Precast Concrete Wingwall – N4
- Alvey – Supply and Install Precast Concrete Wingwall – N4a

- Parkhill – Prestressed Precast Concrete Girder – G1
- Parkhill – Prestressed Precast Concrete Girder – G2
- Parkhill – Prestressed Precast Concrete Girder – G3
- Parkhill – Prestressed Precast Concrete Girder – G4
- Parkhill – Erection of Prestressed Precast Concrete Girders
- Parkhill – Supply and Install Precast Concrete Ballast Wall – N1
- Parkhill – Supply and Install Precast Concrete Ballast Wall – N1a
- Parkhill – Supply and Install Precast Concrete Backwall – N2
- Parkhill – Supply and Install Precast Concrete Backwall – N3
- Parkhill – Supply and Install Precast Concrete Wingwall – N4
- Parkhill – Supply and Install Precast Concrete Wingwall – N4a

8.7 SUPPLY AND PLACING REINFORCING STEEL

8.7.1 DESCRIPTION

- This Specification covers the supply, fabrication, and placement of all reinforcing steel.
 - 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.
-

8.7.2 MATERIALS

- The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.
 - All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with the latest edition of CSA Standard CAN3-A23.1, Storage of Materials, except as otherwise specified herein.
 - Unless otherwise indicated on the Drawings, all reinforcing steel shall be 400W hot dip galvanized reinforcing steel in accordance with CSA G30.18 and CSA G164. Reinforcing steel shall be deemed to include all reinforcing bars, tie-bars, and dowels. All reinforcing steel shall conform to the requirements of CSA Standard G30.18. Grade 400W, Billet-Steel Bars for concrete reinforcement. If, in the opinion of the Contract Administrator, any reinforcing steel provided for the concrete works exhibits flaws in manufacture or fabrication, or in the coating, such material shall be immediately removed from the Site and replaced with acceptable reinforcing steel.
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BAR ACCESSORIES

- Bar accessories shall be of a type approved by the Contract Administrator and shall be non-rusting. They shall be made from Type 316 stainless steel or hot-dip galvanized steel, or, in the case of chairs, from High Performance Concrete (HPC) or PVC.
- Bar accessories shall include bar chairs, spacers, clips, wire ties, wire (18 gauge minimum), or other similar devices that may be approved by the Contract Administrator. The supplying and installation of bar accessories shall be deemed to be incidental to the supplying and placing of reinforcing steel.
- Epoxy resin shall be of a type listed in the approved products list, Specification CW 3710 conforming to the requirements of ASTM Standard C881. Type 1, Grade 3 epoxy shall be used for bonding reinforcing steel into hardened concrete.
- Bonding agents for bonding reinforcing steel into holes in hardened concrete other than epoxy resin may be permitted provided that they develop a minimum pullout resistance of 50 kN within 48 hours after installation. Alternative bonding agents are listed in the approved products list.
- Field-applied galvanizing, to touch-up damaged hot-dip galvanizing, metalizing, or field welds, shall be done with self-fluxing, low temperature, zinc-based alloy rods in accordance with ASTM A780-01 (2005) for "Repair of Damage Hot-Dip Galvanized Coatings."
- Approved products are:
 - o Galvalloy as manufactured by Metalloy Products Company, P.O. Box No. 3093, Terminal Annex, Los Angeles, California: and

- Welco Gal-Viz Galvanizing Alloy, as manufactured by Thermocoate Welco, Highway 161 York Road, Kings Mountain, North Carolina. Locally, both products are available from Welder Supplies Limited, 25 McPhillips Street, Winnipeg.

8.7.3 CONSTRUCTION METHODS

FABRICATION OF REINFORCING STEEL

- Fabricate reinforcing steel in accordance with CSA Standard G30.18 to the lengths and shapes as shown on the Drawings.

PLACING OF REINFORCING STEEL

- Place reinforcing steel accurately in the positions shown on the Drawings and retain in such positions by means of a sufficient number of bar accessories so that the bars shall not be moved out of alignment during or after the depositing of concrete. The Contract Administrator's decision in this matter shall be final.
- Reinforcing steel shall be free of all foreign material in order to ensure a positive bond between the concrete and steel. Remove any dry concrete, which may have been deposited on the steel from previous concrete placement, before additional concrete may be placed. Intersecting bars shall be tied positively at each intersection.
- Make splices in reinforcing steel only where indicated on the Drawings. Obtain prior approval of the Contract Administrator where other splices must be made. Welded splices shall conform to CSA Standard W186, and are subject to prior written approval of the Contract Administrator.
- Reinforcing steel shall not be straightened or rebent in a manner that will injure the metal. Bars with bends not shown on the Drawings shall not be used. Heating of reinforcing steel will not be permitted without the prior approval of the Contract Administrator. Give a minimum of twenty-four (24) hours' advance notice to the Contract Administrator prior to the placing of any concrete to allow for inspection of the reinforcement.

REQUIREMENTS FOR SHOP DRAWINGS

- The Contractor shall arrange for the preparation of clearly identified shop drawings and submit shop drawings via to prints to be retained by the Contract Administrator plus the number of copies required by the Contractor.
- The Contractor shall provide clearly identified Product Data and submit two prints to be retained by the Engineer plus the number of copies required by the Contractor.
- Shop drawings shall be accurately drawn to a scale sufficiently large to show all areas, laps, bends, etc. of the reinforcing steel.
- Shop drawings shall be in accordance with the International System of Units (S.I.) metric units.
- The Contractor shall make any changes in shop drawings which the Contract Administrator may require consistent with the Contract Document and resubmit unless otherwise directed by the Contract Administrator.

QUALITY CONTROL/QUALITY ASSURANCE

- After all concrete reinforcement has been placed, a final inspection shall be made prior to the placement of concrete to locate any damage or deficiencies. All visible damage or any deficiencies shall be repaired to the satisfaction of the Contract Administrator before concrete is placed.

- Afford the Contract Administrator full access for the inspection and control testing of reinforcing steel; both at the Site of Work and at any plant used for the fabrication of the reinforcing steel, to determine whether the reinforcing steel is being supplied in accordance with this Specification.
- Quality control testing will be used to determine the acceptability of the reinforcing steel supplied by the Contractor.
- The Contractor shall provide, without charge, the samples of reinforcing steel required for quality control tests and provide such assistance and use of tools and construction equipment, as is required.

8.7.4 MEASUREMENT AND PAYMENT

METHOD OF MEASUREMENT

- The supplying and placing of Reinforcing Steel is incidental to “Structural Concrete”. No measurement will be made for this work.

BASIS OF PAYMENT

- The supplying and placing of Reinforcing Steel will be paid for as part of “Structural Concrete”. No separate payment will be made for supply and installation of reinforcing steel.

8.8 STRUCTURAL STEEL

8.8.1 DESCRIPTION

- This Specification shall cover supply, fabrication, testing, galvanizing, transportation, handling, erecting, field splicing and delivery of structural steel.
- The work includes design, installation, and removal of any bracing or other measures necessary to ensure stability of the steel framework during construction.
- 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.

8.8.2 MATERIALS

- The Contractor shall be responsible for the supply, safe storage and handling of all miscellaneous metal materials as set forth in this Specification.
- All materials supplied under this Specification shall be of a type accepted by the Contract Administrator and shall be subject to inspection and testing by the Contract Administrator.
- Unless otherwise specified, all steel shall conform to the requirements of CSA Standard CAN/CSA-G40.21, Grade 350W.
- All items supplied under this Specification shall be hot-dip galvanized in accordance with CSA Standard G164 to retention of 600 gm/m². All metal surfaces to be galvanized shall be thoroughly cleaned of rust, rust scale, mill scale, dirt and other contaminants by commercial sand, grit or shot blasting and/or pickling prior to galvanizing. Heavy deposits of oil and grease shall be removed with solvents prior to blasting or pickling.

- Field-applied galvanizing, to touch-up damaged hot-dip galvanizing on-site and to galvanize field welds, shall be done with self fluxing, low temperature, zinc-based alloy rods in accordance with ASTM A780-80 for "Repair of Damaged Hot Dip Galvanizing Coating". Accepted products are Galvalloy as manufactured by Metalloy Products Company, P.O. Box No. 3093, Terminal Annex, Los Angeles, California, and Welco Gal-Viz Galvanizing Alloy, as manufactured by Thermocote Welco, Highway 161 York Road, Kings Mountain, North Carolina. Locally, both products are available from Welder Supplies Limited, 25 McPhillips Street, Winnipeg, Manitoba.
- All bolts, nuts, and washers to be hot dip galvanized.
- Structured bolts shall meet the requirements of ASTM F3125 (formerly A325) C/W ASTM A563 Grade DH Heavy hex nuts and ASTM F436 Hardened Steel Washers.
- Manufactures compliance certificates for bolts, nuts and washers are to be submitted for Contract Administrator approval.
- Bolts to be shipped as a unit.
- Bolts to be installed by the turn of nut method.
- Only Canadian or American made F3125 bolts permitted.
- Non-shrink grout shall be supplied as specified in "Structural Concrete".
- All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

8.8.3 WELDING

- Welding shall conform to CSA-W59. All work is to be performed by a firm certified by the Canadian Welding Bureau to the requirements of Division 2 (minimum) of CSA W47.1.
- Welding operators employed on the work are to be currently qualified by the C.W.B. Qualification is to have been issued within two years of the commencement of fabrication.
- Trim and bevel ends and other items to enable satisfactory welding.
- Keep all paint back from areas requiring welding after fabrication.
- Tack welds are not permitted unless the weld is incorporated into the final weld.
- Field welds must be completed by a firm certified by CWB, Division 2, CSA W47.1.

8.8.4 QUALITY CONTROL

- All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified work.
- The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or acceptance that may have been previously given. The Contract Administrator reserves the right to reject any materials or works, which are not in accordance with the requirements of this Specification.
- A minimum of 2% of the welded connections will be tested by Mag-Particle methods.
- 100% of the welded connections shall be visually inspected by the fabricator or a representation, complete with documentation and photographs.
- If requested by the Contract Administrator, additional inspections of the welds shall be made using visual and or Mag-Particle methods.
- The inspector shall be certified in accordance with CSA 178.

- All field splices will be tested via Mag-Particle.
- All costs associated with testing is incidental to the fabrication of the truss superstructure.
- The Inspection / Weld Testing Agency may be selected by the Contractor upon approval from the Contract Administrator.
- The Contractor shall allow the Contract Administrator and the testing company free access to all parts of the work at all times.
- The Contractor shall produce evidence that his plant is recently fully approved by the C.W.B. to the requirement of CSA Standard 47.1, Division 2.
- The Contractor shall produce evidence that all welding operators to be employed on the work are currently qualified by the C.W.B. at the time of fabrication and in the processes in which they are to be employed on the work. Such qualification shall have been issued within two years of the commencement of fabrication.
- The Contractor shall also produce evidence relative to each operator, that he has been executing satisfactory welding in the required processes within the six-month period before the award of this contract.

8.8.5 WELDING PROCEDURES

- The Contractor shall submit copies of the welding procedures, which he intends to use, for examination and acceptance by the Contract Administrator.
- Such procedures shall be accompanied by documentary proof that they have been qualified previously by the C.W.B. at the plant where the work is to be carried out.

8.8.6 SUBMISSIONS

- At least seven (7) days prior to the scheduled commencement of any fabrication, the qualifications of Contractor, the qualifications of operator, the shop drawings, mill certificates, welding procedures, and welding consumable certificates shall be submitted to the Contract Administrator for her/his acceptance.
- The shop drawings shall clearly show shapes, weights, dimensions, detail, connection (including proper CSA welding identification), bolt holes, and accessories.
- Calculated mass of miscellaneous metal for each shop drawing following shop drawing final acceptance shall be submitted.
- Shop drawings shall include details of all temporary bracing systems required for stability during construction and shall show the extent of prior work that is required to be in place for the temporary bracing system.
- The Contract Administrator may request a sealed shop drawing or sketch, from a Registered Professional Engineer in the Province of Manitoba, of the proposed detail revision if, in the opinion of the Contract Administrator, the change could impact the structural performance of the connection.
- Fabrication executed before Contractor Administrator's review of the shop drawings shall be at the Contractor's own risk.

8.8.7 PREPARATION OF MATERIAL

- Unless otherwise noted, all steel components shall be sandblast cleaned after fabrication in accordance with the Steel Structures Painting Council Standard (SSPC) No. SP6. Essentially this is a surface from which all oil, grease, dirt, rust, scale, and foreign matter have been completely

removed except for slight shadows, streaks, or discolorations caused by rust stain or mill scale oxide binder.

- Any damage on galvanized metal shall be given one coat of touch-up coating for galvanized metal.
- Steel items to be bent shall be bent by methods that will not injure the metal. The steel shall not be heated unless permission is given by the Contract Administrator. Any damage to the galvanizing surface shall be repaired in accordance with Clause E15.2 of this Specification.
- The edges of plates or sections which are to weld together shall be prepared by sawing, shearing, flame-cutting, machining, chipping or arc air gouging to the details shown on the shop drawings. Surfaces and edges to be welded shall be smooth, uniform, and free from thins, tears, cracks, and other defects, which would adversely affect the quality or strength of the weld. Surfaces to be welded shall also be free from loose scale, slag, rust, grease, moisture, or other material that will prevent proper welding. Mill scale that withstands vigorous wire brushing, alight film of drying oil or a thin rust inhibitive coating may remain.
- Surfaces within 50 mm of any weld location shall be free from any paint or other material that would prevent proper welding or produce objectionable fumes while welding.
- Edges of material thicker than specified in the following list shall be trimmed if and as required to produce a satisfactory welding edge wherever a weld along the edge is to carry calculated stress:
 - o Sheared edges of material thick than 12 mm
 - o Rolled edges of plates (other than Universal Mill Plates) thicker than 9 mm
 - o Toes of angles thicker than 16 mm
 - o Universal Mill Plates or edges of flanges of wide section thicker than 25 mm.
 - o Edges may be prepared by oxygen cutting, providing that a smooth and regular surface free from cracks and notches is secured, and providing that an accurate profile is secured using mechanical guide. Freehand cutting shall be done only where accepted by the Contract Administrator.
- Steel may be cut to size by sawing, shearing or machining.
- No welding shall be done when the temperature of the base metal is lower than -20°C. At temperatures below 0°C, the steel shall be preheated to a temperature of at least 10C more than that stated in Table 3.
- Preheat shall be applied to all steel to welded so that the steel within 75 mm of the weld is heated to the temperature shown in Table 3.
- Preheat shall be applied in such a manner that moisture from the heating equipment does not penetrate the joint.
- For all welding processes, preheat and interpass temperatures shall be maintained during welding at temperature not less that stated in Table 1.
- Minimum preheat and interpass temperatures based on the thickest part at point of welding, CSA Standard CAN/CSA Grade 350 W G40.21
 - o Less than 19 mm 21°C
 - o 19 mm to 38 mm 66°C
 - o 38 mm to 64 mm 107°C
 - o Over 64 mm 150°C
- Preheat requirements of tack welds shall be as in the above table except where single pass tack welds are used and are to be incorporated and consumed in a weld made by the submerged arc and the gas metal arc processes, preheat is unnecessary.

- When bending plates, the plates shall be so taken from the stock plates that the bend line will be at right angles to the direction of rolling. The radius of the bend measured inside, shall be not less than the thickness of the plate.
 - Weld profiles shall meet the requirements of CSA Standard W59.
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8.8.8 TRANSPORTATION, HANDLING AND STORAGE

- Structural members shall be loaded in such a manner that they can be transported and unloaded at their destination without being excessively stressed, deformed, or otherwise damaged.
 - Material to be stored shall be placed on skids above the ground. It shall be kept clean and properly drained. Long members shall be supported on skids placed near enough to prevent injury from deflection.
 - The straightening of plates and angles or other shapes shall be done by methods that will not produce a fracture or other injury. The metal shall not be heated unless permitted by the Contract Administrator, in which case the heating shall not be to a higher temperature than that producing a "dark cherry red" colour. After heating, the metal shall be cooled as slowly as possible.
 - Following the straightening of a bend or buckle, the surface of the metal shall be carefully inspected for evidence of fracture, and if necessary, replaced or repaired to the satisfaction of the Contract Administrator.
-

8.8.9 WELDING OF GALVANIZED METAL

- All field welding to galvanized metal shall be touched up by the Galvalloy Process in accordance with these Specifications. All Galvalloy repairs shall be made flush with adjacent metal.
-

8.8.10 MEASUREMENT AND PAYMENT

METHOD OF MEASUREMENT

- Supply and Install of Structural Steel shall be measured on a mass basis. The number of units to be paid for shall be the total number of kilograms of structural steel measured from the Contract Drawings, acceptably supplied, and installed in accordance with this Specification and accepted by the Contract Administrator.
 - Supply and Install of Railings shall be measured on a mass basis. The number of units to be paid for shall be the total number of kilograms of Railing steel measured from the Contract Drawings, acceptably supplied, and installed in accordance with this Specification and accepted by the Contract Administrator.
-

BASIS OF PAYMENT

- The supply and installation of Structural Steel members will be paid for at the Contract Unit Price per unit for "Items of Work" of the various bridge components listed below, measured as specified herein, which price shall be payment in full for the supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work

- Alvey – Supply and Fabrication of Structural Steel
 - Alvey – Place Structural Steel
 - Alvey – Bridge Railing

 - Parkhill – Supply and Fabrication of Structural Steel
 - Parkhill – Place Structural Steel
-

- Parkhill – Bridge Railing
- Parkhill – Parapet Railing

8.9 RIPRAP

8.9.1 DESCRIPTION

- The Specification shall cover supply and installation of quarried granite stone riprap, geotextile, excavation as required, transportation of rock, cleaning and all work associated with placement of riprap.

8.9.2 MATERIALS

- The Contractor shall supply quarried granite rock which shall be free from sod, roots, organic material, and debris prior to placement. If the rock delivered to site is dirty, the Contractor shall wash down the riprap stockpile prior to placement of the riprap. The Contractor shall ensure that proper mitigation measures are implemented prior to washing the rock clean.
- Geotextile fabric shall be non-woven and conform to the requirements of CW 3120-R3 Section 2.5.
- The riprap shall be well graded having a full range and even distribution of sizes and shall conform to the following gradation:

Size	Class
450	100%
250	15 - 50%
150	0 – 15%

8.9.3 CONSTRUCTION METHODS

- Rock that contains debris and is dirty, shall be washed prior to transportation to site.
- Place a layer of the geotextile fabric under the riprap and anchor the upstream and downstream ends of rock limits as detailed on the Contract Drawings.
- Place the random rock riprap carefully on the geotextile fabric so that it does not tear.

8.9.4 MEASUREMENT AND PAYMENT

METHOD OF MEASUREMENT

- The store riprap will be measured on a volume basis. Where the unit bid item for “Riprap” is in cubic metres, the volume to be paid for will be the number of cubic metres placed in the completed work as determined by multiplying the actual surface area by the thickness shown on the plans. The riprap footprint and thickness shall be as per the drawings or greater.

BASIS OF PAYMENT

- Stone riprap will be paid for at the unit price for “Riprap”, measured as specified herein, which price will be payment in full for excavating, labour, transportation, geotextile, rock cleaning, required mitigation measures and all costs associated to supply and placement of Riprap as accepted by the Contract Administrator.

8.10 BEARINGS

8.10.1 DESCRIPTION

- This Specification shall cover the supply and installation of the bearings, steel plates and steel anchor bolts for the proposed bridge.
 - The work to be done under this specification shall include the furnishings of all superintendence, overhead, labor, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.
-

8.10.2 MATERIAL

- All materials supplied under this Specification shall be of a type approved by the Contract Administrator and shall be subject to inspection and testing by the Contract Administrator.
 - The contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in the Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.
 - The bridge bearing pads shall be supplied and installed by the Contractor as shown on the Drawings.
 - Bearing pads shall be Goodco (Canam Bridges) Plan Bearings Series ER pads as shown on the Drawings or approved equivalent. Bearing pads shall have a Shore A hardness of 65 Durometer.
 - Steel anchor bolts, embedded plates and angles shall be supplied and installed as shown on the drawings. Steel anchor bolts shall be ASTM F1555 steel. All steel components shall be hot dip galvanized.
-

8.10.3 FABRICATION

- Shop drawings showing details of bearings, completed with laminated and non-laminated bearing pads and steel bearing plates shall be provided to the Contract Administrator for Approval. Submission of shop drawings to the Contract Administrator in no way relieves the Contractor of her/his responsibility for the fabrication quality and accuracy and proper installation of the bearing pads as indicated herein this Specification and on the Drawings.
-

8.10.4 CONSTRUCTION METHODS

- The bearings, complete with steel anchor bolts, base plates, washers, and grouting, as detailed on the drawings.
 - Before placement of the bearings, the Contractor shall satisfy her/himself that the location of substructure units and elevations of bridges seats are in accordance with the plans and specifications. All discrepancies discovered by the Contractor shall be brought immediately to the attention of the Contract Administrator.
 - Workmanship and finish shall be in accordance with plans and specifications and shall conform to the best practices of bridge construction. The parts shall be assembled as shown on the plans and match marks shall be observed. The material shall be handled carefully so that no parts will be bent, broken or otherwise damaged.
-

8.10.5 QUALITY CONTROL

- All workmanship and all materials furnished and supplied under this Specification are subject to the close and systematic inspection by the Contract Administrator. The Contractor shall be wholly

responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract administrator reserves the right to reject any materials or works, which are not in accordance with the requirements of the specification.

8.10.6 MEASUREMENT AND PAYMENT

METHOD OF PAYMENT

- Supply and Install girder bearing pads, shall be measured on a per unit basis. Each unit shall include the individual bearing pad supplied and placed in accordance with this Specification.

BASIS OF PAYMENT

- Supply and install girder bearings shall include, but not limited to hot dip galvanized anchor bolts and nuts, bearing pads, grouting, fabrication, transportation, and installation as shown on the contract drawings. Payment shall be made in full at the contract Unit Price for "Supply and Install Bearings" on a per unit basis supplied and placed in accordance with this Specification and accepted by the Contract Administrator. Costs for submission of shop drawings and warranty shall be included herein this pay item.

8.11 MISCELLANEOUS METAL

8.11.1 DESCRIPTION

- This Specification shall cover supply, fabrication, galvanizing, transportation, handling, and delivery of miscellaneous metal. This Specification shall include, but is not limited to, the supply and installation of the items of work listed herein.
- 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 the satisfactory performance and completion of all work as hereinafter specified.

8.11.2 MATERIALS

- The Contractor shall be responsible for the supply, safe storage and handling of all miscellaneous metal materials as set forth in this Specification.
- All materials supplied under this Specification shall be of a type accepted by the Contract Administrator and shall be subject to inspection and testing by the Contract Administrator.
- Unless otherwise specified, all steel shall conform to the requirements of CSA Standard CAN/CSA-G40.21, Grade 300W.
- All items supplied under this Specification shall be hot-dip galvanized in accordance with CSA Standard G164 to retention of 600 gm/m². All metal surfaces to be galvanized shall be thoroughly cleaned of rust, rust scale, mill scale, dirt and other contaminants by commercial sand, grit or shot blasting and/or pickling prior to galvanizing. Heavy deposits of oil and grease shall be removed with solvents prior to blasting or pickling.
- Field-applied galvanizing, to touch-up damaged hot-dip galvanizing on-site and to galvanize field welds, see Structural Steel section.
- All bolts, nuts, and washers to be hot dip galvanized.

- Structured bolts shall meet the requirements of ASTM F3125 (formerly A325) C/W ASTM A563 Grade DH Heavy hex nuts and ASTM F436 Hardened Steel Washers.
- Manufactures compliance certificates for bolts, nuts and washers are to be submitted for Contract Administrator approval.
- Bolts to be shipped as a unit.
- Bolts to be installed by the turn of nut method.
- Only Canadian or American made bolts are acceptable.
- Non-shrink grout shall be supplied as specified in "Structural Concrete".

8.11.3 CONSTRUCTION METHODS

- It is intended that this Specification cover the following miscellaneous metal elements and all others not specifically noted within this Specification, including all components and related fasteners as shown on the Drawings:

8.11.4 WELDING

- Unless noted otherwise, welding shall follow the Structural Steel specification section. er fabrication

8.11.5 QUALITY CONTROL

- All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified work.
- The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or acceptance that may have been previously given. The Contract Administrator reserves the right to reject any materials or works, which are not in accordance with the requirements of this Specification.
- The Contractor shall allow the Contract Administrator free access to all parts of the work at all times.

8.11.6 QUALIFICATIONS OF CONTRACTOR

- The Contractor shall produce evidence that her/his plant is recently fully approved by the C.W.B. to the requirement of CSA Standard 47.1, Division 3.
- The Contractor shall produce evidence that all welding operators to be employed on the work are currently qualified by the C.W.B. at the time of fabrication and in the processes in which they are to be employed on the work. Such qualification shall have been issued within two years of the commencement of fabrication.
- The Contractor shall also produce evidence relative to each operator, that he has been executing satisfactory welding in the required processes within the six-month period before the award of this contract.

8.11.7 WELDING PROCEDURES

- The Contractor shall submit copies of the welding procedures, which she/he intends to use, for examination and acceptance by the Contract Administrator.
- Such procedures shall be accompanied by documentary proof that they have been qualified previously by the C.W.B. at the plant where the work is to carried out.

8.11.8 QUALITY CONTROL

- All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the work. The Contractor shall be wholly responsible for the control of all operation incidental thereto notwithstanding any inspection or acceptance that may have been previously given.
 - The Contract Administrator reserves the right reject any materials or works, which are not in accordance with the requirements of this Specification.
-

8.11.9 SUBMISSIONS

- At least seven (7) days prior to the scheduled commencement of any fabrication, the qualifications of Contractor, the qualifications of operator, the shop drawings, mill certificates, welding procedures, and welding consumable certificates shall be submitted to the Contract Administrator for her/his acceptance.
 - The shop drawings shall clearly show shapes, weights, dimensions, detail, connection (including proper CSA welding identification), bolt holes, and accessories.
 - Calculated mass of miscellaneous metal for each shop drawing following shop drawing final acceptance shall be submitted.
-

8.11.10 PREPARATION OF MATERIAL

- Steel items to be bent shall be bent by methods that will not injure the metal. The steel shall not be heated unless permission is given by the Contract Administrator. Any damage to the galvanizing surface shall be repaired in accordance with the Structural Steel section.
 - The edges of plates or sections which are to weld together shall be prepared by sawing, shearing, flame-cutting, machining, chipping or arc air gouging to the details shown on the shop drawings. Surfaces and edges to be welded shall be smooth, uniform, and free from thins, tears, cracks, and other defects, which would adversely affect the quality or strength of the weld. Surfaces to be welded shall also be free from loose scale, slag, rust, grease, moisture, or other material that will prevent proper welding. Mill scale that withstands vigorous wire brushing, alight film of drying oil or a thin rust inhibitive coating may remain.
 - Surfaces within 50 mm of any weld location shall be free from any paint or other material that would prevent proper welding or produce objectionable fumes while welding.
 - Edges of material thicker than specified in the following list shall be trimmed if and as required to produce a satisfactory welding edge wherever a weld along the edge is to carry calculated stress:
 - o Sheared edges of material thick than 12 mm
 - o Rolled edges of plates (other than Universal Mill Plates) thicker than 9 mm
 - o Toes of angles thicker than 16 mm
 - o Universal Mill Plates or edges of flanges of wide section thicker than 25 mm.
 - o Edges may be prepared by oxygen cutting, providing that a smooth and regular surface free from cracks and notches is secured, and providing that an accurate profile is secured using mechanical guide. Freehand cutting shall be done only where accepted by the Contract Administrator.
 - Steel may be cut to size by sawing, shearing, or machining.
-

- Minimize the number of butt joint by maximizing the length of plates. Details of all butt joints shall be submitted to the Contract Administrator for her/his review. The fabricator may submit an alternative butt joint design provided that such design has been pre-qualified by A.W.S.
 - Welding of anchor studs shall conform to the requirements of CSA Standard W59.
-

8.11.11 ASSEMBLY

- The Assembly shall follow the requirements stated in the Structural Steel section of this specification.
-

8.11.12 TRANSPORTATION, HANDLING AND STORAGE

- Miscellaneous Steel members shall be loaded in such a manner that they can be transported and unloaded at their destination without being excessively stressed, deformed, or otherwise damaged.
 - Material to be stored shall be placed on skids above the ground. It shall be kept clean and properly drained. Long members shall be supported on skids placed near enough to prevent injury from deflection.
 - The straightening of plates and angles or other shapes shall be done by methods that will not produce a fracture or other injury. The metal shall not be heated unless permitted by the Contract Administrator, in which case the heating shall not be to a higher temperature than that producing a "dark cherry red" colour. After heating, the metal shall be cooled as slowly as possible.
 - Following the straightening of a bend or buckle, the surface of the metal shall be carefully inspected for evidence of fracture, and if necessary, replaced or repaired to the satisfaction of the Contract Administrator.
-

8.12 CHAIN LINK FENCE

8.12.1 DESCRIPTION

- This Specification shall cover supply, fabrication, galvanizing, transportation, handling, and delivery of a chain link fence.
 - 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 the satisfactory performance and completion of all work as hereinafter specified.
-

8.12.2 MATERIALS

- The Contractor shall be responsible for the supply, safe storage and handling of all Chain Link Fence materials as set forth in this Specification.
- All materials supplied under this Specification shall be of a type accepted by the Contract Administrator and shall be subject to inspection and testing by the Contract Administrator.
- All chain link fence materials shall conform to this Specification and the Canadian General Standards Board (CGSB) Specifications CAN/CGSB-138.1, CAN/CGSB-138.2 and CAN/CGSB-138.4. Where any contradictions occur, Specification CW 3550-R2 shall take precedence over CGSB Specifications.

TERMINAL POSTS

- Terminal posts, comprising of end, corner and straining posts shall be standard seamless, continuous weld, Schedule 40 hot dip galvanized steel pipe weighing 11.28 kg per lineal metre.
 - Posts shall be supplied with weatherproof caps. Tubing, conduit, or open seam material will not be accepted.
 - End, corner, and straining posts shall be of 1220 mm from grade, and total length of 2440 minimum.
 - Pipe diameter shall be a minimum of 89mm.
-

LINE POSTS

- Line posts shall be standard seamless, continuous weld, schedule 40 hot dip galvanized steel pipe weighing 5.43 kg per lineal metre. Line posts for fence fabric that is to be 3660 mm and higher shall weigh 8.63 kg per lineal metre. Tubing, conduit, or open seam pipe will not be accepted.
 - Line posts shall be supplied with weatherproof eye top caps to accommodate continuous horizontal top rail and shall be of the lengths and dimensions shown in the following table:
-

TOP AND BOTTOM RAILS

- Top rails, or bottom rails where specified, shall be standard, continuous weld, schedule 40 hot dip galvanized steel pipe weighing 3.38 kg per lineal metre. Top rails shall be 6700 mm in length and have an outside diameter of not less than 43 mm.
-

TOP AND BOTTOM RAIL SLEEVE COUPLINGS

- Top and bottom rail sleeve couplings shall be schedule 40, hot dip galvanized steel pipe, 171 mm long and 45 mm inside diameter to accommodate a 43 mm outside diameter top rail and manufactured specifically as a top/bottom rail sleeve coupling for chain link fence.
-

FABRIC

- Fabric shall be No. 9 gauge steel wire woven into a uniform 50 mm (2") diamond pattern mesh or as specified. Size of mesh shall be determined by measuring the minimum clear distance between the wires forming the parallel sides of the mesh. Permissible variation in size of mesh shall be 3 mm (1/8"). Diameter of wire shall be no less than 3.68 mm (0.145"). The top and bottom selvage shall be knuckled.
 - Fabric shall be zinc coated before weaving by the hot dip process to an average mass per unit area of not less than 490 g/m².
 - Mesh fabric shall not be excessively rough, or have blisters, bruises or flaking.
 - Chain link fabric shall have a minimum tensile strength of 415 MPa.
-

BOTTOM TENSION WIRE

- Bottom tension wire shall be No. 6 gauge single strand galvanized steel wire.
-

TURNBUCKLES

- Where turnbuckles are specified, they shall be drop forged steel and be hot dip galvanized. The average overall length shall be approximately 300 mm, with ends in the closed position. Bolt diameter shall be 10 mm and shall be capable of taking up a minimum of 150 mm slack.
-

BRACES

- Braces shall be schedule 40 hot dip galvanized steel pipe, not less than 43 mm outside diameter and weigh 3.38 kg per lineal metre.
-

FITTINGS AND ACCESSORIES

- Tension bars shall be 5 x 19 mm galvanized flat steel and not less than 50 mm shorter than the height of the fabric with which they are to be used.
 - Tension bands shall be 3 x 19 mm galvanized flat steel c/w 8 x 32 mm galvanized carriage bolts and nuts.
 - Brace bands shall be 3 x 19 mm galvanized flat steel c/w 8 x 32 mm galvanized carriage bolts and nuts to fasten top rail receptacles to terminal posts.
 - Cut ends of tension bars shall be ground smooth to remove all sharp edges and burrs.
 - Fabric clips shall be No. 9 gauge aluminum alloy wire.
 - Weatherproof post tops/caps, receptacles, and fittings shall be of adequate strength and may be of aluminum alloy, malleable steel, or pressed steel. All ferrous metals shall be hot dip galvanized.
-

8.12.3 ASSEMBLY

CHAIN LINK FENCE

- The Contractor shall install chain link fence plumb and level at the approximate location shown on the drawings.
 - Site location adjustments can be made upon acceptance from the Contract administrator.
 - Chain link fence shall be installed without damage and shall be stable upon completion of installation.
 - Survey bars and control monuments must be protected during construction.
-

POST INSTALLATION

- Terminal and line posts, except where otherwise specified, shall be installed to a depth equal to the difference between the proposed fence height and the specified pipe length shown noted above.
 - Use hydraulic equipment to push or pound posts into the existing ground.
 - Concrete piles shall not be used for fence post installation.
 - Posts shall be plumbed and set to give correct alignment. Bending of posts to give correct alignment is not acceptable.
 - Weatherproof post tops/caps shall be securely attached to eliminate removal by hand. Eye top caps shall allow for the insertion of a top rail in a horizontal position.
 - Maximum spacing between centerline of posts shall not exceed 3050 mm.
 - Straining posts shall be installed at all sharp changes in grade and where directed by the Contract Administrator.
-

FABRIC INSTALLATION

- Fabric shall be stretched taut to the correct tension as specified by the manufacturer and to the Contract Administrator's satisfaction. Where posts have been installed in concrete piles, fence fabric shall not be installed until piles have cured for a period of not less than five (5) days. Fabric shall be installed on the outside of the fence unless requirement for installation on the inside of the fence is specified.
 - Clearance between bottom of fabric mesh and ground surface shall be no less than 40 mm or more than 50 mm unless otherwise indicated on the drawing or approved by the Contract Administrator.
 - Fabric clips shall be used to fasten the fabric to the top rail at 450 mm spacing and to line posts at 380 mm maximum spacing. Wires ties on the top rail and bottom rail or tension wire shall have a minimum of two twists around mesh. Tension bars, bands and bolts shall be used to fasten the fabric to terminal posts. Maximum spacing for tension bands and bolts shall be 380 mm. Top of tension bars shall not protrude above the bottom of the top rail.
 - The bottom tension wire shall be stretched taut along the bottom of the fabric and securely attached to all terminal and line posts and attached to the bottom edge of the fabric at 450 mm maximum spacing using hog rings.
-

TURNBUCKLES

- Where turnbuckles are specified for installation, they shall be used to stretch the bottom tension wire taut and be able to take up a minimum of 150 mm slack.
-

BRACES

- Braces, where specified only, shall be placed either horizontally or diagonally from the terminal post to the first adjacent line post. Braces shall be secured to posts in accordance with construction drawing details and/or to the satisfaction of the Contract Administrator.
 - Corner and straining posts shall have braces on both sides.
-

ZINC COATING REPAIRS

- All abraded and damaged galvanized surfaces shall be cleaned and painted. Damaged surface areas shall be thoroughly grinded, or wire brushed and all loose and cracked zinc coating removed, after which the cleaned area shall be painted with two coats of a zinc pigmented paint approved by the Contract Administrator for this purpose.
-

8.12.4 MEASUREMENT AND PAYMENT

METHOD OF PAYMENT

- Chain link fence will be measured on a linear measure basis. The quantity to be paid for will be the actual number of linear metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.
-

BASIS OF PAYMENT

- Chain Link fence will be paid for at the Contract Unit Price per metre for "Chain Link Fence", measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.
-

8.13 GAURDRAIL

8.13.1 DESCRIPTION

- This section specifies requirements for the bridge traffic barrier, guardrail, rail posts, hazard markers, and associated hardware to be installed at the locations shown on the Drawings.
 - The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all WORKS as hereinafter specified.
-

8.13.2 SUBMITTALS

- Submit shop drawings and material specifications at least ten (10) business days prior to fabrication, installation, or use.
 - The Contractor may elect to undertake Work prior to receiving Approval from the Contract Administrator, at his/her own risk.
 - Submit to the Contract Administrator Shop Drawings of proposed fabrications and product information for proposed Item of Work.
-

8.13.3 QUALITY ASSURANCE

- Approval of materials and products used does not constitute acceptance of work completed. Acceptance depends upon satisfactory material test results and installed performance of item.
-

8.13.4 MATERIALS

STEEL POSTS

- Posts shall be in accordance with the Drawing details and shall be hot dip galvanized.
-

ANCHORAGES

- Anchorage assemblies shall be in accordance with the details as shown on the Drawings.
-

TIMBER POSTS

- Posts shall be pressure treated 200 mm x 200 mm SPF No.2 unless noted otherwise on the drawings.
-

TERMINAL SECTIONS

- Standard galvanized sections.
-

FLEX RAIL

- Galvanize to CSA-G164.
 - Railing shall be 2.67 mm thick W-Beam with dimensions as specified on the Drawings. Flare treatments shall be provided unless noted otherwise on the drawings.
-

BOLTS, NUTS AND WASHERS

- As shown on the Drawings unless otherwise specified here.
 - Bolts, nuts, and washers to connect the Flex Rail together at the splice locations and to connect the W-beam to the barrier posts shall be provided by the Flex Rail supplier, or as shown on the Drawings.
 - Bolts shall conform to ASTM F154, Grade 105, nuts shall conform to ASTM A563, and steel washers shall conform to ASTM F436-1 unless otherwise noted.
 - Bolts, nuts, washers - hot dip galvanized to CSA-G164.
-

EDGE SCREED ANGLES AND RETAINER

- As shown and detailed on the Drawings.
 - Hot dip galvanized to CSA-G164.
-

SHIMS

- As shown and detailed on the Drawings.
 - Metal shims, if required shall be galvanized unless noted and detailed otherwise on the Drawings.
-

HAZARD MARKERS

- Hazard Markers shall be Medium Duty Bridge Marker supplied by ATS Traffic Services with three spring set-up, or approved equivalent.
 - Hazard Markers shall come complete with mounting bracket, diamond grade delineating hazard markers fastened to the mounting brackets, and all mounting equipment required to mount the marker on steel or wood posts, as required.
 - Diamond grade delineating hazard marker shall be WA-36R and WA-36L, 300 mm x 900 mm, as per the latest version of the Manual of Uniform Traffic Control Devices (MUTCD).
-

8.13.5 INSPECTION

- All materials supplied under this Contract shall be subject to inspection and testing by the Contract Administrator at no charge to the Owner.
-

POST INSTALLATION

- Install rail posts plumb and as indicated on the Drawings
-

RAIL INSTALLATION

- Erect steel components as shown on the Drawings and as recommended by the manufacturer.
 - Lap joints in the direction of traffic.
-

HAZARD MARKER INSTALLATION

- Install hazard markers on the end barrier post of either the steel bridge railing or the timber approach railing, whichever is further from the bridge.
-

- Hazard markers shall be securely installed using appropriate mounting hardware suitable for the mounting material type and as per the manufacturer's instructions.
 - Hazard markers shall be installed one (1) at each corner of the bridge (4 total) and the appropriate WA-36R and WA-36L delineating sign shall be used depending on the side of the bridge the sign is installed on following the latest version of the Manual of Uniform Traffic Control Devices (MUTCD).
-

8.13.6 MEASUREMENT AND PAYMENT

- Supply and Install of the Guardrail System shall be in accordance with, but not be limited to, the Drawings and this section herein.
 - Supply and Install Guardrail System shall include the supply of all materials, including the posts and flex rail section, asphalt edge screed angle, connection bolts, base plates, stiffener plates, shims, incidental items, transportation costs, coatings, and installation of all material and Work required to provide the railing as shown on the Drawings.
-

METHOD OF MEASUREMENT

- Supply and Install Guardrail System, as defined herein this Specification, shall be measured on a linear metre basis. The number of linear metres to be paid for shall be the total number of linear metres acceptably supplied and installed by the Contractor and confirmed and measured in the field by the Contract Administrator.
-

BASIS OF PAYMENT

- Railing shall be paid for at the Contract Unit Price for "Supply and Install Guardrail System" measured as specified above for all operations herein described and all other items incidental to the Work included in this Specification.
-

8.14 WATERPROOFING MEMBRANE

8.14.1 DESCRIPTION

- This section specifies requirements for hot mix asphaltic waterproofing membrane.
 - The Work includes preparation of surfaces, supply, and placing of hot mix asphaltic waterproofing membrane.
-

8.14.2 PROCEDURES

- Construction procedures, methods, types of equipment used, and sequence of construction shall be subject to the approval of the Contract Administrator.
-

8.14.3 SUBMITTALS – PRODUCT SPECIFICATIONS

- The Contractor shall use products that meet or exceeds the materials specified herein this section.
 - The Contractor may use a product not specified within this section if they receive approval from the Contract Administrator. The Contractor shall submit product specifications with the respective surface preparation for that product ten (10) working days prior to installation for review and approval by the Contract Administrator.
-

8.14.4 MATERIALS TESTING BY THE OWNER

- The Owner may employ a testing agency to do on-site testing as the Work progresses.
 - The Contract Administrator and the Owner's testing agency shall have access, always, to all parts of the operation for testing, for verification of weights, temperatures, proportion, and character of materials.
 - The Owner may take any or all the tests listed in this Specification.
-

8.14.5 MATERIALS

PRIME COAT

- Bemalastic 910 or approved equivalent water proofing shall be used.
-

ASPHALTIC WEATHER PROOFING MEMBRANE

- Hot applied rubberized asphaltic waterproofing membrane shall consist of two (2) layers of Bemalastic 1213, or approved equivalent.
 - Hydrotech Fabric Reinforcement Sheet or Bakor Polyester Fabric Reinforcement Sheet or approved equivalents shall be embedded into the first layer of membrane.
 - 3 mm Vibraflex Waterproofing Protection Board or Bakor Asphalt Protection Board (for waterproofing) shall be placed.
-

8.14.6 INSPECTION

- No priming or placement shall be carried out until the surfaces have been inspected by the Contract Administrator.
 - All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator. There shall be no charge to the Owner for any material taken by the Contract Administrator for testing purposes.
-

8.14.7 SURFACE PREPARATION

The surface shall be prepared by either of the following methods:

- Surfaces in contact with the waterproofing membrane shall be prepared in accordance with the manufacturer's recommendations. At a minimum, the surface shall be cleaned by power brooming and compressed air to provide a surface that is free of deleterious material.
 - An alternative method not listed here that is recommended by the Contractor and is approved by the Material Supplier and the Contract Administrator.
 - The entire concrete surface area onto which the hot poured rubberized asphalt waterproofing is to be applied shall be clean and free from curing compounds, laitance, and scaling. The concrete surface shall be dry, clean, and free from frost, dust, dirt, and all foreign matter. The Contractor shall ensure no materials enter the stream during cleaning operations.
-

8.14.8 INSTALLATION

- The waterproofing membrane and protection board shall be installed following the manufacturer's installation instructions.
-

- The hot poured rubberized asphalt waterproofing membrane shall be a two-layer, fabric-reinforced system. Each layer shall be 2.0 – 3.0 mm in thickness. The intermediate fabric reinforcement shall be placed between the layers.
- The Contractor shall supply and install the protection board to cover the hot poured rubberized asphalt waterproofing membrane.
- The prime coat shall be applied following the directions and at the application rate specified by the manufacturer's recommendations.
- The hot-poured rubberized asphalt waterproofing membrane shall be installed in accordance with the manufacturer's application rate and installation instructions. The membrane shall be applied in two 2.0 – 3.0 mm thick layers. Discontinuities in the waterproofing membrane shall be avoided and joints shall be lapped a minimum of 150 mm.
- The intermediate reinforcing layer shall be installed in accordance with the manufacturer's installation instructions. The first reinforcing layer shall be set into the first layer of waterproofing membrane to achieve a minimum of 50% bleed through.
- The protection boards shall be placed on top of the upper layer of waterproofing membrane and rolled by means of linoleum or lawn type roller while the membrane is still warm to ensure good contact with the membrane.
- The protection board shall be placed with a 25 mm edge overlap, both longitudinally and transversely. The protection board shall be placed such that the longitudinal joints are staggered at least 150 mm.
- Instances where edges of the protection board curl up shall be cemented down using asphalt waterproofing. The Contract Administrator shall inspect the protection boards and any boards that are warped, distorted, or damaged may be rejected by the Contract Administrator. Costs to replace the damaged boards shall be the responsibility of the Contractor and there shall be no change to the contract price

8.14.9 MEASUREMENT AND PAYMENT

- Supply and Install Waterproofing Membrane shall be in accordance with, but not be limited to, the Drawings and this section herein.
- Supply and Install Waterproofing Membrane shall include the supply of all materials, testing, surface preparation and installation of the membrane, acceptable to the Contract Administrator.

METHOD OF MEASUREMENT

- Supply and Install Waterproofing Membrane, as defined herein this Specification, shall be measured on a square metre basis. The number of linear metres to be paid for shall be the total number of linear metres acceptably supplied and installed by the Contractor, confirmed, and measured in the field by the Contract Administrator.

BASIS OF PAYMENT

- Bridge waterproofing shall be paid for at the Contract Unit Price for "Supply and Install Waterproofing Membrane" measured as specified above for all operations herein described and all other items incidental to the Work included in this Specification.

A GEOTECHNICAL INVESTIGATION

