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<u>Drawing No.</u>	<u>Title</u>
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GENERAL

G - 100	COVER SHEET
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STRUCTURAL

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ELECTRICAL

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END OF SECTION

1.0 GENERAL

- .1 The Work covered by this Contract shall include, but shall not be limited to the furnishing of all materials, equipment, tools, machinery, supplies, temporary lighting, water, heating, transportation, labour and superintendence necessary for the construction of the work as herein specified and shown on the Drawings.
- .2 The Contractor shall read and be governed by the Bid Form, Instructions to Bidders, Addenda, Consent of Surety, Bid Security, Agreement, Definitions, Supplementary General Conditions, General Conditions, General Requirements, and complete Specifications and Drawings of this project.
- .3 The complete Work under this Contract shall be governed by the dictates of good practice and shall be complete in all details of materials and methods even if not minutely specified. The Work shall be properly coordinated with the requirements of all work specified in other sections.

1.1 Scope of Work

- .1 The work covered by this Contract shall include mobilization and demobilization, the furnishing of all materials, labour, equipment, tools, supplies, temporary lighting and heating, transportation, quality control, Division 1 requirements, labour and superintendence necessary for the construction of the work as herein specified and shown on the Drawings.
- .2 Work under this Contract covers supply and installation of all materials and construction of the following:

1.2 South Building Face Remediation Including Doors

- .1 Selective demolition of existing south face structure, metal siding, door frames, protective bollards and miscellaneous electrical provisions.
- .2 Supply and installation of new structural components as detailed.
- .3 Supply and installation of new exterior siding provisions as well as minor repairs to adjacent walls and roof.
- .4 Supply and installation of new rolling shutter doors complete with door operators and controls.
- .5 Supply and installation of in slab sensing loops for new doors including saw cutting of slab/asphalt surfaces and associated patch and repair.
- .6 Supply and installation of interior and exterior projective bollards.
- .7 Miscellaneous electrical scope including but not limited to new exterior lighting and receptacles, removal and reinstallation of existing horn assembly as well as power services to and connection of new overhead doors.

1.3 Garbage Chute Remediation

- .1 Selective demolition of existing garbage chute structure.
- .2 Supply and installation of new structural components and detailed.
- .3 Supply and installation of new chute curtain and associated supports.

1.4 Interpretation

- .1 If a Contractor finds discrepancies in or omissions from the Drawings, specifications or other documents or has any doubt as to the meaning or intent of any part thereof, the contractor shall at once inform Departmental Representative, who may send a written instruction or explanation. Every request for an interpretation shall be made in writing.
- .2 Discussions at Bid briefings or other oral discussions shall not become part of the Bid Documents unless confirmed by Amendment.

1.5 Location of Work

- .1 The Work is located in Jasper National Park, 360 km west of the City of Edmonton, Alberta.

1.6 Material Supply

- .1 The Contractor shall supply all new materials necessary for the construction of the work as herein specified or shown on the Drawings.

1.7 Contract Schedule and Completion

- .1 Provide within five working days after Contract award, construction bar chart schedule in weekly increments showing anticipated progress stages, significant milestones, inspections by outside parties and final completion of Work within time period required by Contract and Bid documents.
- .2 The Contractor shall commence the Work and proceed with diligence to perform the Work in accordance with the agreed upon schedule in sufficient time to complete the Work on or before the completion date specified in the contract.
- .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by the Contractor in conjunction with and to approval of Departmental Representative.
- .4 Scheduling shall be in accordance with the General Conditions, Supplementary Conditions and General Requirements.

1.8 Documents Required

- .1 Maintain at job site, one copy each of following:
 - .1 Latest version of Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed shop Drawings.
 - .5 Change orders.
 - .6 Other modifications to Contract.
 - .7 Field test reports.
 - .8 Copy of latest approved Work Schedule.
 - .9 Manufacturers' installation and application instructions.
 - .10 Permits, licenses and land use regulations.
 - .11 Up to date As-Built Drawings.

1.9 Site Conditions

- .1 The Contractor shall thoroughly examine the site of the work before submitting the Bid, to satisfy himself as to the local conditions and nature of work. The Contractor shall not seek nor receive any compensation for failing to thoroughly investigate the site conditions and their effect on the tendered unit rates.
- .2 Prior to commencing actual construction, check field conditions to obtain actual dimensions required to ensure correct execution of the Work, and notify Departmental Representative, in writing, of all matters which could prejudice proper execution of the work.
- .3 Commencement of construction shall constitute acceptance of existing conditions and verification of dimensions.
- .4 No extra charges will be allowed for Work resulting from conditions which would have been evident upon a thorough examination of the site.

1.10 Construction Layout

- .1 All Work is to be laid out by the Contractor. This shall include, but not be limited to, batter boards, sight rails, stakes and marks, and bench marks as required.

1.11 Responsibility for Work

- .1 Departmental Representative will not be responsible for the Contractor's means, methods, techniques, sequences or procedures of construction, or for the supervision of the Contractor's performance of this Contract, or for the Contractor's failure to perform the work in accordance with the Contract. However, if at any time Departmental Representative is of the opinion that the number of workers, pieces of equipment or quality of machinery, tools, plant and equipment or articles is insufficient to meet the schedule, he may so advise the Contractor in writing. The Contractor shall promptly make the necessary changes to ensure that the schedule is adhered to.
- .2 Pursuant to the provisions of the General Conditions of the Contract, while it is intended that the Contractor shall be allowed in general to carry out the Contract in such manner that may appear to be the most desirable, Departmental Representative may with discretion direct the order in which and points at which the work shall be undertaken. This control shall be exercised in the interest of the Departmental Representative and it is intended that an agreement be reached between all parties prior to the commencement of the Contract. A schedule of work shall be drawn up for this purpose by the Contractor.
- .3 Whenever in the Contract the terms "as ordered", "as directed", "as required", "as allowed" or terms of the like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of the like effect or import are used to describe requirement, direction, review or judgement of Departmental Representative as to the work, it is intended that such requirement, direction, review or judgement will be solely to evaluate the work for compliance with the Contract unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be construed to indicate that Departmental Representative shall have authority to supervise or direct performance of the work.

1.12 Mobilization / Demobilization

- .1 Mobilization shall include the necessary work and operation including, but not limited to, the movement of personnel, equipment, supplies and incidentals to the Work, the establishment of facilities necessary to undertake the Work and for expenses incurred for other work and operations which must be performed prior to the commencement of the Work.
- .2 Demobilization shall include the dismantling and removal from the site of all of the Contractor's equipment and materials, clean-up of the site, and transportation of labour from the site.
- .3 There will be no separate payment made for mobilization and demobilization. The cost is to be included in Lump sum.

1.13 Contractor's Use of Site

- .1 Use of site: Contractor to be provided access for execution of work in accordance with General Conditions and Special Provisions, except as follows:
 - .1 The Contractor and stored materials shall not interfere with the Departmental Representative's access to the site for operation, maintenance and repair of existing facilities. Provide temporary access to existing facilities as may be required and move materials as requested by the Departmental Representative.
 - .2 The Contractor shall not operate any of the existing facilities without a representative of the Departmental Representative present.
 - .3 At all times cooperate with the Departmental Representative.
- .2 The Contractor shall be responsible for site security for the duration of the Contract. Where security is reduced by work of Contract, provide temporary means to maintain security.
- .3 Obtain and pay for use of additional storage or work areas as required.

1.14 Project Meetings

- .1 Departmental Representative will arrange and set times for project meetings and will record and distribute minutes.
- .2 The Contractor's site superintendent and representatives of the subcontractors shall attend the meetings at the request of Departmental Representative.

1.15 Permits, Licenses, Certificates and Fees

- .1 Contractor shall pay for all permits, licenses, certificates and all fees required for performance of the Work in accordance with General Conditions and Supplementary Conditions.

1.16 Location of Equipment and Fixtures

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of impending installation and obtain Departmental Representative's approval for actual location.
- .4 Submit field Drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.17 Water Supply

- .1 Supply all water necessary for the work and obtain written permission from the Departmental Representative prior to using any Park Facility.
- .2 The Contractor shall be held responsible for any damage done to the Park Facility or surrounding area.
- .3 Make an Agreement with the Departmental Representative for the payment of water used.

1.18 Contractor Submission Requirements

- .1 A list of the documents and information to be submitted by the Contractor is presented in the table at the end of this Section. Please note that this list does not necessarily include all required submissions.
- .2 Submit all information and documents by the dates indicated, unless otherwise directed by the Parks Canada.

1.19 Haul Roads

- .1 The Contractor shall be responsible for damage and/or spillage on all roads used for hauling materials and equipment to and from the site subject to Departmental Representative being satisfied such damage or spillage was a direct result of the actions of the Contractor or one of the Contractor's agents in the performance of the work required under this Contract.
- .2 Upon notification by Departmental Representative that the remedial work is necessary, immediately clean and/or restore the affected areas designated by Departmental Representative.
- .3 Obtain approval from the Departmental Representative prior to using any road as a haul road.

1.20 Construction Signage and Safety

- .1 The Contractor shall supply and maintain, at their own expense, all barriers, fences, warning signs and other precautions to protect the workers and general public against accident or injury. All excavations or obstructions shall be clearly marked between sunset and sunrise with proper warning flares or lights. Local or Municipal bylaws governing warning flares or lights shall be strictly observed.
- .2 Signage shall be erected indicating an open excavation and to adequately protect the general public against accident or injury. Signs and notices for safety and instruction shall be in both official languages.

- .3 All signs, barricades, and warning devices shall meet local and/or Regional Transportation Advisory Committee (RTAC) requirements and satisfaction of Departmental Representative. The Contractor shall obtain any permits required by the Departmental Representative with respect to this work.
- .4 Upon notification by Departmental Representative, the Contractor shall remove the construction sign to a location designated by Departmental Representative.

1.21 Working Hours, Night Work and Holidays

- .1 The acceptable working hours for the Contractor shall be from 7:00 AM to 19:00 PM, 7 days per week.
- .2 Night work will only be allowed if written permission is given beforehand by the Departmental Representative. When work is carried out at night, the Contractor shall supply, at their own cost, a sufficient number of electric or other approved lights to enable the work to be done in a safe and satisfactory manner.
- .3 The Contractor shall not work on any other day normally observed as a holiday, without the approval of the Departmental Representative.

1.22 Remove and Dispose of Materials

- .1 Materials to be removed and disposed shall be removed, hauled and disposed of at the Contractor's expense.
- .2 All materials in excess of that needed for completion of the project shall be removed from site upon excavation.
- .3 All the necessary approvals and/or permits shall be obtained from the Parks Canada of the disposal site, and any governing authority prior to dumping any material.

1.23 Emergency Situations

- .1 In emergency situations, endangering life or public property, the Departmental Representative shall proceed with repairs and thereupon advise the Contractor of the failure, and resulting costs shall be paid by the Contractor.

1.24 Clearing of Site

- .1 Complete all clearing of bush, levelling, etc., for the proper execution of the work under this Contract.
- .2 All refuse, bush, etc., shall be disposed of in a manner satisfactory to Departmental Representative.
- .3 The Contractor shall become fully aware of the conditions in the work area prior to submitting their Bid.

1.25 Traffic Accommodation

- .1 Prior to construction, provide a Traffic Accommodation strategy and Work Safety Plan indicating all proposed detour routes and schedules. The plan must be approved by the governing authority and Departmental Representative prior to construction.
- .2 Traffic control shall be in accordance with the provisions of the Uniform Traffic Control Devices of Departmental Representative.
- .3 Supply and maintain all barriers, fences, warning signs and other precautions to protect the workers and general public against accident or injury.
- .4 All excavations or obstructions shall be clearly marked between sunset and sunrise with proper warning flares or lights.
- .5 Local or Municipal Bylaws governing warning flares or lights shall be strictly observed.
- .6 Should any of the Contractor's work cause interference with any existing public roads, lanes or pedestrian accesses, the Contractor shall provide and maintain detour roads and shall post such signs, lights, barriers, etc., as may be required for public convenience in accordance with governing local or municipal standards.
- .7 As construction proceeds, clean up all streets and ditches and make them passable and useable.
- .8 Clean up streets after the work in each block is finished.

1.26 Noise and Dust Control

- .1 The Contractor shall be responsible for controlling objectionable dust conditions in areas of construction as a result of traffic, construction equipment, or wind.
- .2 All equipment shall be equipped with suitable muffling systems.
- .3 The Contractor shall be cognizant of and abide by Noise Bylaws which affect any work in the area.

1.27 Existing Fences, Trees and Buildings

- .1 No trees whatsoever shall be cut down without the written permission of Departmental Representative.
- .2 Trees, shrubbery, fences, poles and all other private property and surface structures shall be protected unless their removal is shown on the Drawings or authorized by Departmental Representative.

1.28 Relics and Antiquities

- .1 Give immediate notice to the Departmental Representative if evidence of historical or archaeological finds are encountered during construction, and await the Departmental Representative's written instructions before proceeding with the Work in this area.

1.29 Easements

- .1 This project is located in the National Park. There will be less temporary workspace due to trees on both sides of the fence at certain places. The Contractor shall manage the construction with limited workspace.

1.30 Landscaping, Gravel and Concrete Works Repairs

- .1 All landscaping, gravel and concrete works such as curb and gutter, gravel driveway, asphalt and concrete driveways that are removed during construction shall be repaired to their original condition or better.

1.31 Existing Utilities and Pipelines

- .1 The Contractor shall assume full responsibility for safeguarding all existing and relocated utility installations during the progress of the Work. While the Departmental Representative has made every effort to collect and present details concerning utility installations, no responsibility will be assumed by Departmental Representative for the correctness and completeness of the information, and the Contractor shall have no claim on that account. The existence, location, elevation, and condition of existing underground utilities or pipelines is not guaranteed, and notwithstanding any other provisions in the Contract, the Contractor shall be responsible for determining the location and elevation of all sewer, water and gas mains or lines, electric light, power or telephone conduits, or other structures or utilities or pipelines, by non-destructive means acceptable to the Departmental Representative.
- .2 There will be no separate payment made for all incidental work related to utility or pipeline coordination or temporary protection or protection required during the course of the contract (including warranty period) or repair of existing services damaged in the course of the Works.

1.32 Dewatering and Drainage

- .1 Keep all portions of the Work properly drained during the construction and until completion.
- .2 The Contractor will be held responsible for all damage, directly resultant from their operations, which may be caused by or which may result from water backing up or overflowing through, from or along any part of the work.

- .3 The Contractor shall bear all costs related to the effective dewatering of excavations and all other pumping and drainage necessary for the proper construction of the Works, including keeping the pipes, structures and trenches free of undesirable accumulations of seepage, subsoil water, surface water or rainwater.
- .4 Dispose of all water drained or pumped as above by discharging it to drainage ditches or natural water course approved by Departmental Representative, but in compliance with all Municipal, Provincial and Federal regulations, ordinances, bylaws, etc., and provide documentation indicating that authority has been granted to discharge effluent water into any drainage ditch, brook, creek or river.
- .5 Keep all drainage channels and culverts free of silt, sand, debris and gravel and remove such deposits as required by Departmental Representative or any other Authority Having Jurisdiction.
- .6 Accept responsibility for any actionable damage, inconvenience or interference caused by the dewatering operations to the surrounding properties, houses, other building, roads, curbs, sidewalks, driveways, utilities, services or other improvements which may be affected by a lowering of the water table and bear all costs of repair, replacement, reinstatement or alteration of same.

1.33 Subsurface Investigation Data

- .1 Geotechnical information documents are not available for the project.

1.34 As-Built Drawings

- .1 The Departmental Representative will provide one (1) additional set of construction Drawings for As-Built drawing purposes after Award of Contract.
- .2 Identify each Drawing as "Project As-Built Copy". Maintain Drawings in good condition and make available for inspection on site by Departmental Representative at all times.
- .3 Maintain project As-Built Drawings and record accurately significant deviations from Contract documents caused by site conditions and change orders by Departmental Representative. The Contractor shall keep the "As-Built" Drawings current as the job progresses.
- .4 Mark changes in red.
- .5 Record following information:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by Change Order or Field Instruction.
 - .3 Horizontal and vertical location of all concrete structures and all gravel access roads and turning pads.

.4 Horizontal and vertical locations of all reconstructed berms and structures.

.6 At completion of project and prior to Issuance of Completion Certificate, sign and date prints as Certification of Accuracy and submit As-Built Drawings.

1.35 Final Clean-Up

.1 At the completion of the construction work, all areas on which work has been done shall be left in a neat and presentable condition.

.2 All gutters and drainage ditches which have been blocked as a result of the work shall be repaired or restored to their original condition or better.

.3 The Contractor, at their own expense, shall dispose of all surplus excavated material, trees, brush, rock, boulders and pieces of concrete or masonry, including those less than 0.5 m³ in volume, at a location approved by the Departmental Representative.

1.36 Backfill

.1 Backfilling of trenches or fill areas will not be permitted unless Departmental Representative is onsite. The Contractor will notify Departmental Representative 24 hours in advance of backfilling scheduled for weekends or holidays.

1.37 Surface Restoration

.1 All existing roadways, landscaping and other surface structures shall be restored. No separate payment will be made for any restoration and the costs are to be included in unit prices.

2.0 PRODUCTS

.1 Not applicable.

3.0 EXECUTION

.1 Not applicable.

CONTRACTOR SUBMITTAL SCHEDULE		
Specification Section	Description	Date Required
01 10 00	Copies of Permits/Licenses	Upon Departmental Representative's request
01 33 00	Material and Shop Drawing Schedule	15 days from Notice of Acceptance
01 32 17	Contract Work Schedule	15 days from Notice of Acceptance Revised schedule with each payment application
01 35 30	Safety Meeting Minutes	Upon Departmental Representative's request
01 35 30	Accident Reports	Promptly after incident
01 35 30	WHMIS Data Sheets	Upon delivery of materials to site
01 77 00	Record Drawings (1 set)	At project completion/prior to final inspection.

END OF SECTION

1.0 GENERAL

- .1 Payments will be made on the basis of the unit prices and lump sum prices bid in the Tender. Additions and credit to the Work will be assessed based on the unit prices provided on the Bid Form.
- .2 Each unit or lump sum price stated on the Bid Form shall constitute full compensation as herein specified for each item of Work completed in accordance with the Drawings and Specifications.
- .3 The prices bid for various items of work, unless specifically noted otherwise, shall include the supply of all labour, plant, products, material, and equipment necessary to construct the Work in accordance with the Contract Documents.
- .4 The prices bid for supply and installation shall be full compensation for supplying, hauling, handling, storing, installing, cleaning, testing, and placing in service together with all other work subsidiary and incidental thereto for which separate payment is not provided elsewhere.
- .5 The method of measurement of the quantities for payment and the basis for payment will be in accordance with the following items of this section. All measurement will be done using generally accepted field survey methods.
- .6 Where the Tender shows separate items for supply and installation, the unit prices or lump sum prices bid for supply shall include supplying, delivering, loading, unloading and all allowances for handling, storage, breakage and waste. Payment will be made only for material actually installed in the Work. Progress Payment for supply-only items shall be made only for material and product on the worksite and in the Contractor's care, and shall then become the property of the Owner.
- .7 Other materials on site, whether existing structures, vegetation, topsoil, gravel, sand or other excavated or piled materials, are the property of the Owner or of the owner of the land on which the Work is located. Only those materials specifically noted in the Contract Documents as belonging to the Contractor shall become the Contractor's property.
- .8 Where there are excess excavated materials, unsuitable materials excavated or materials of any kind that are excavated but not used in the Work, such materials are not the property of the Contractor unless authorized in writing by the Consultant or specified to be disposed of by the Contractor.
- .9 With each progress payment claim, the Contractor and any pre-selected Supplier shall jointly certify a claim for payment for pre-ordered material used or incorporated into the Work or delivered to the site of the Work during that claim period.
- .10 Upon complete performance of the Work, the Contractor shall credit the Client for material paid for as supplied on the worksite, but not incorporated in the Work, and remove the surplus material from the worksite.

1.2 Definitions:

- .1 Unit price is price per unit of measurement for materials, equipment, services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 Applications for Progress Payment

- .1 Submit to the Departmental Representative, at least 7 days before the first application for payment, a detailed cost breakdown for all parts of the Work aggregating the total amount of the Contract Price, as directed by the Departmental Representative. After approval by the Departmental Representative, the cost breakdown shall be used as the basis for progress payments.
- .2 Support claims for products delivered to the place of Work, but not yet incorporated into the Work, by such evidence as the Departmental Representative may reasonably be required to establish value and delivery of products.
- .3 Submit, with the application for progress payment, a letter of clearance or certificate from Workers' Compensation Board verifying that all assessments due by the Contractor have been fully paid.
- .4 Submit, with the application for progress payment, a current Statutory Declaration verifying that all Subcontractors, Suppliers, labour and accounts for services, materials, machinery and equipment, and any other indebtedness, which may have been incurred by the Contractor, directly or indirectly, in the performance of the Work have been fully paid by the Contractor except of unpaid holdbacks on such subcontracts and that no lien has been filed against the Contractor, the Project, the premises or any materials supplied to or incorporated into the Work or in respect of anything done under or by virtue of the Contract.
 - .1 A Statutory Declaration shall be submitted for the second and all subsequent payment applications.
 - .2 If only one payment application is made for the Work, the Statutory Declaration is to be submitted with the first payment application.

1.4 Progress Payment

- .1 The Departmental Representative will issue, no later than 10 days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as the Departmental Representative determines to be due. If Departmental Representative amends the application, Departmental Representative will give notification in writing giving reasons for amendment.

1.5 Substantial Performance of Work

- .1 Contractor shall prepare and submit to the Departmental Representative a comprehensive list of items to be completed or corrected and apply for a review by the Departmental Representative to establish Substantial Performance of Work (or Substantial Performance of designated portion of Work) when Work is substantially performed as permitted by lien legislation applicable to the Place of Work. Failure to include items on list does not alter responsibility to complete Contract.
- .2 No later than 10 days after receipt of list and application, the Departmental Representative will review Work to verify validity of application and will notify Contractor if Work (or designated portion of Work) is substantially performed.
- .3 When Work is determined to be Substantially Completed by the Departmental Representative, the Departmental Representative shall issue a certificate of Substantial Performance.
- .4 Immediately following issuance of certificated of Substantial Performance of Work, Contractor shall establish a reasonable date for finishing Work, in consultation with Departmental Representative.

1.6 Payment of Holdback Upon Substantial Performance of Work

- .1 Upon issuance of certificate of Substantial Performance of Work:
 - .1 Submit application for payment of holdback amount.
 - .2 Submit sworn statement that accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of Work and for which Parks Canada might be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.
- .2 After receipt of application for payment and sworn statement, the Departmental Representative will issue certificate for payment of holdback amount.

1.7 Final Payment

- .1 Submit application for final payment when Work is completed.
- .2 The Departmental Representative shall, no later than 10 days after receipt of application for final payment, review Work to verify validity of application. The Departmental Representative will give notification that application is valid or give reasons why it is not valid, no later than 7 days after reviewing Work.
- .3 The Departmental Representative will issue final certificate for payment when application for final payment is found valid.

2.0 PAYMENT CLAUSES

2.1 Mobilization and Demobilization

- .1 Mobilization and demobilization shall include the Contractor's costs of mobilization at the beginning of the project; and the costs of demobilization at the end of the project.
- .2 Included in mobilization are such items as bonding, insurance, permits, moving personnel, materials and equipment to the site, setting up temporary facilities, project signage and all preparation for performing the Work.
- .3 Included in demobilization are preparation and submission of operation and maintenance manuals, removal of all personnel, materials and equipment; and cleanup of the site and the Work.
- .4 The lump sum price bid for this work shall be relative to the costs involved but shall not exceed ten percent of the Tender Price.
- .5 Payment will be made as follows, as approved by the Departmental Representative:
 - .1 50% of the lump sum bid will be included in the first progress payment certificate;
 - .2 50% of the lump sum bid will be included in the final progress payment certificate.

2.2 Schedule

- .1 Payments will be made on the basis of the unit prices and lump sum prices bid in the Tender on the Bid Form.
 - .1 Unit rates will be paid on a unit rate basis following the term in which the work is completed and as approved by the Departmental Representative.
- .2 Lump sum items will be paid 100% following the term in which the work was completed and as approved by the Departmental Representative.

END OF SECTION

1.0 GENERAL

1.1 Departmental Representative to Administer

- .1 Departmental Representative will schedule and administer preconstruction meeting and progress meetings as required.
- .2 Departmental Representative will:
 - .1 Prepare agenda for meetings.
 - .2 Make arrangements for meeting locations.
 - .3 Preside at meetings.
 - .4 Record meeting minutes, identifying significant proceedings and decisions, and noting action by the parties.
 - .5 Reproduce and distribute copies of the minutes to participants and affected parties not in attendance.
- .3 Contractor's superintendent and senior representatives of major Subcontractors, to attend all meetings.
- .4 Representatives of Contractor, Subcontractor and suppliers attending meetings shall be qualified and authorized to act on behalf of the party each represents.

1.2 Preconstruction Meeting

- .1 Within 5 days after award of Contract, Departmental Representative will arrange a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Senior representatives of Departmental Representative and major Subcontractors will be in attendance.
- .3 Agenda to include the following:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work and progress scheduling.
 - .3 Requirements for temporary facilities.
 - .4 Site security.
 - .5 Contemplated changes, change procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .6 Force account work procedures.

- .7 Record drawings.
- .8 Acceptance and warranties.
- .9 Monthly progress claims, administrative procedures, photographs and holdbacks.
- .10 Insurances.
- .11 Safety Program.

1.3 Progress Meetings

- .1 Progress meetings will be held at least once a month, up to and including start-up and commissioning.
- .2 Contractor, major Subcontractors involved in Work, and Departmental Representative are to be in attendance.
- .3 Agenda to include the following:
 - .1 Review and approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revisions to construction schedule.
 - .8 Progress, schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review of pending and proposed changes for effect on construction schedule and on completion date.
 - .12 Safety issues.
 - .13 Environmental Issues (including, but not limited to a summary of locations where temporary erosion and sedimentation control measures are in place and success of measures.
 - .14 Issues.
 - .15 Other business.

2.0 PRODUCTS

.1 Not used.

3.0 EXECUTION

.1 Not used.

END OF SECTION

1.0 GENERAL

1.1 Requirements Included

- .1 Construction schedule.
- .2 Shop drawings and product data.
- .3 Samples.
- .4 As-Built drawings and all pertaining reports.
- .5 Certificates.

1.2 Administrative

- .1 Provide submittals to Departmental Representative for review with reasonable promptness and in an orderly sequence so as to not cause delay in the Work. Departmental Representative shall be provided with a minimum of 14 days to review submittals. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 At Departmental Representative's request, prepare and submit schedule fixing dates for submission and return of shop drawings, product data or samples.
- .3 Work affected by the submittal shall not proceed until review is complete.
- .4 Review submittals prior to submission to the Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with the requirements of the Work and the Contract Documents. Submittals not stamped, signed, dated and identified as to the specific project will be returned without being examined and will be considered rejected.
- .5 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative review of submittals.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .7 Keep one reviewed copy of each submission on Site.
- .8 Contractor shall submit a dust control plan for the transport of materials to and from the construction site. The plan shall be submitted prior to the start of construction.
- .9 If the Departmental Representative deems the dust control measures undertaken to be inadequate, he/she retains the right to instruct the Departmental Representative to undertake appropriate dust control measures. The cost of such measures will be billed to the Contractor.

1.3 Construction Schedule

- .1 Refer to Section 01 10 00 - General Instructions.

1.4 Samples

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples as to origin and intended use in the Work.
- .2 Deliver samples prepaid to Departmental Representative's business address.
- .3 Notify the Departmental Representative in writing, at the time of submission, of deviations in samples from requirements of Contract Documents.
- .4 Adjustments made on samples by the Departmental Representative are not intended to change the Contract Amount. If adjustments affect the value of Work, state such in writing to the Departmental Representative prior to proceeding with the Work.
- .5 Make changes in samples which the Departmental Representative may require, consistent with Contract Documents.

1.5 As-Built Drawings

- .1 Submit record As-Built drawings to Departmental Representative, per Section 01 77 00, upon completion of Work and prior to final inspection.

2.0 PRODUCTS

- .1 Not used.

3.0 EXECUTION

- .1 Not used.

END OF SECTION

1.0 GENERAL

1.1 Reference Standard

- .1 Traffic regulations to be in accordance with Departmental Representative requirements.

1.2 Protection of Public Traffic

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out work or haul materials or equipment.
- .2 When working on travelled way:
 - .1 Place equipment in position to present minimum of interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions will permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .3 Do not close any lanes or any road without approval of Departmental Representative. Before re-routing traffic, erect suitable signs and devices in accordance with a manner acceptable to Departmental Representative. Provide sufficient crushed gravel to ensure a smooth riding surface during work.
- .4 Load trucks in a manner that will prevent spillage and tracking of soil or debris on roadways. Clean up immediately to the satisfaction of the Departmental Representative if spillage or tracking does occur. Clean haul routes as directed by the Departmental Representative. Failure to clean up haul routes may result in the Departmental Representative crews doing the cleaning without notice to the Contractor and the costs will be deducted from moneys due to the Contractor.

1.3 Informational and Warning Devices

- .1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project work which may require road user response. Signs and notices for safety and instruction shall be in both official languages.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions, of manual titled Uniform Traffic Control Devices for Canada.
- .3 Place signs and other devices in locations recommended in said manual.
- .4 Meet with Departmental Representative prior to commencement of work to prepare list of signs and other devices required for project.

- .5 Continually maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Removing or covering signs which do not apply to conditions existing from day-to-day.

1.4 Control of Public Traffic

- .1 Ten (10) days prior to undertaking any construction, the Contractor shall submit in writing, the intended system of routing traffic during construction, to the Departmental Representative. The Contractor's system of routing traffic will be reviewed by the Departmental Representative with the Contractor and any modifications requested, at any time, by the Departmental Representative, shall be immediately implemented.
 - .1 Restricted Activity on Roads
 - .1 Lane closure in Jasper National Park is not permitted without Departmental Representative consent.
 - .2 Prior to closing any lanes, commercial crossings, business or residential vehicular accesses, contractor to provide an alternate access with approval of the Departmental Representative. For all closures Contractor to obtain street closure permits prior to closing any street.
 - .3 Contractor to maintain one lane of traffic in a single direction at all times during underground utility construction. Contractor to use box trench construction method to minimize work zone area influence and to minimize traffic disruption.
 - .4 For sidewalk and concrete construction, curb lanes may be closed and must be fenced off to vehicular traffic, to allow for a safe walking area for pedestrians. At minimum, concrete mini barriers must separate vehicular traffic and pedestrian traffic for public safety.
 - .5 Maintain wheelchair access at all times.
 - .6 Traffic signs shall be erected and maintained to ensure safety of workers and public as required in Section 1.3.
 - .2 The desire for this project is to minimize disruption to traffic (both public and service vehicles) to the greatest extent possible. Lane closures should be limited to those sections being actively worked on and should re-open to public traffic as soon as possible.

- .3 Provide competent flag persons, properly equipped as specified in manual of Uniform Traffic Control Devices for Canada, in following situations:
 - .1 When public traffic is required to pass working vehicles or equipment which may block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workers or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices are not readily available.
 - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

2.0 PRODUCTS

- .1 Not used.

3.0 EXECUTION

- .1 Not used.

END OF SECTION

Jasper Transfer Station

1.0 GENERAL

1.1 Occupational Health and Safety Act

- .1 The Prime Contractor is responsible to ensure that all contractors working on the worksite comply with the Occupational Health & Safety Act and applicable regulations.
- .2 The Contractor shall comply and ensure that all the Subcontractors comply with all applicable legislation. The Contractor shall enforce all the applicable safety rules and regulations to all individuals who will be on the site.
- .3 The following is a list of safety information to assist the Contractor in familiarizing with the Occupational Health & Safety Requirements. The Contractor warrants that the Contractor shall comply with all requirements of the Occupational Health & Safety Act as well as the relevant legislation in conducting work under this contract.

1.2 Supervision:

- .1 The Contractor shall advise the Departmental Representative in writing of the person or persons who will ensure compliance with applicable safety legislation. This list should include the site superintendent plus as many representatives as the Contractor determines are required to ensure appropriate supervision and the subsequent safe performance of all jobs on the site. Provision should be made to include twenty-four (24) hour emergency telephone number(s) on this list.

1.3 Competent Workers:

- .1 The Contractor shall ensure that workers on the site be adequately qualified and sufficiently experienced to perform work in a safe manner. Those workers who do not meet these criteria shall be supervised by someone who is competent. The Contractor shall provide or arrange for the necessary training to ensure sufficient workers on site are competent.

1.4 Audit/Inspections:

- .1 The Contractor shall conduct frequent inspections to ensure compliance with legislation. Any unsafe conditions or work practice observed shall be corrected as soon as possible. In the event of an imminent danger situation, Section 27 of the Occupational Health and Safety Act shall be followed. All reports provided by outside agencies (i.e. Alberta Government Health & Safety, etc.) shall be copied and a copy provided to the Departmental Representative within twenty-four (24) hours following the inspection.

1.5 Reporting Procedures:

- .1 All serious or potentially serious accidents or incidents as specified in the current Designation of Serious Injury and Accident regulation shall be reported as prescribed by Section 13 of the Occupational Health & Safety Act. Following this, the Departmental Representative shall be notified and a copy of the investigation report is to be provided as soon as practicable. Severe action including fines may be imposed by the provision authorities should a Contractor be found guilty of failure to report an accident or having disturbed the scene of an accident prior to an investigation.

1.6 First Aid and Emergency Planning:

- .1 Each Contractor shall provide first aid services, equipment and supplies in accordance with the current First Aid Regulation. The Contractor shall establish an overall emergency plan (routes, equipment, emergency contracts, etc.) and inform all the workers on the worksite of the contents of the plan. If the worksite has an existing emergency plan, the Contractor shall familiarize all the workers under their control of the contents of the plan.

1.7 Codes of Practice:

- .1 The Contractor shall post at all worksites, codes of practice for confined space entry, respiratory protective equipment, designated chemicals, and others as required under the Occupational Health & Safety Legislation. Each code of practice must reflect the specific operation conduct at that particular site.

1.8 Chemical Hazards:

- .1 The Contractor shall ensure that all controlled products present at the worksite are stored, used and handled in accordance with Part 2 of the Chemical Hazards Regulations.

- .1 Material Safety Data Sheets:

- .1 The Contractor shall have all Material Safety Data Sheets accessible to all workers at the worksite for controlled products present at the worksite. The Contractor shall provide copies of the Material Safety Data Sheets to the Departmental Representative upon request.

- .2 Labels:

- .1 The Contractor shall ensure that all controlled products present at the worksite are identified with either supplier or worksite labels.

.3 Education:

- .1 The Contractor shall ensure all workers are instructed in accordance with Sections 17 and 18, Part 1, of the Chemical Hazards Regulation.

1.9 Personal Protective Equipment:

- .1 The Contractor shall ensure that workers use appropriate personal protective equipment and are trained in its use and care in order to control or minimize hazards that cannot be controlled by engineering or administrative practices.

1.10 Safety Meetings:

- .1 A meeting shall be held prior to the commencement of work for the purpose of review and clarification of safety procedures.

1.11 Safety Committees:

- .1 The Contractor may be required to establish worksite committees acceptable to the Departmental Representative for the purpose of discussing safety related issues.

1.12 Worksite Classification/Procedure Development:

- .1 The Contractor shall develop procedures for demolition, hot work, explosives; work over water, ground thawing, pesticide application, radioactive material, lasers, electrical or substance isolation (blanking, lockouts), carcinogenic material, and other hazards as required for the Work. These procedures shall be made available upon request. The Contractor shall ensure that these procedures outline safe work practices that will address health and safety concerns and the workers on the site and exposed or potentially exposed to these hazards shall be familiar with and follow the safe work practices prescribed.

1.13 Maintenance and Repair:

- .1 The Contractor shall ensure that all equipment used on the worksite is maintained in such condition that it will not compromise the health and safety of workers.

1.14 Housekeeping:

- .1 The Contractor shall ensure that the worksite is kept clean and free from hazards that may endanger workers or restrict safe access or egress.

1.15 Illumination:

- .1 The Contractor shall ensure illumination at the worksite is sufficient to enable work to be done safely. Refer to the current CSA standard for guidance.

1.16 Powered Mobile Equipment:

- .1 The Contractor shall ensure that powered mobile equipment meets the requirements of pertinent legislation. Personnel shall not be transported in a vehicle unless adequate seating is provided. Equipment fitted with roll over protective structures shall be equipped with seat belts and the seat belts shall be worn when the equipment is operated. Equipment requiring back-up alarms shall have the alarms maintained in good working order.

1.17 Traffic Hazards:

- .1 The Contractor shall ensure that appropriate measures are taken to protect workers from the hazards created by traffic including the provision and wearing of safety vests where required.

1.18 Hoisting and Rigging:

- .1 The Contractor shall ensure that all aspects of hoisting and rigging comply with applicable legislation. Only competent workers shall operate hoists, act as signaller, or perform rigging. The Contractor shall designate workers who will operate hoisting equipment or act as signaller for hoisting work. Log books for cranes and hoist shall be provided and maintained as required. Approved rigging shall be of sufficient strength, inspected thoroughly at the beginning of each shift and used in a safe manner.

1.19 Movement of Equipment and Material:

- .1 The Contractor shall ensure that loads and materials are secured against unintentional movement that could adversely affect the safety of workers. Chemical substances regulated by the Transportation of Dangerous Goods regulation shall be handled in accordance with that regulation. The Contractor shall ensure workers are aware of the hazards associated with working around moving equipment and that appropriate measures are taken to protect the workers from injury.

1.20 Fall Protection:

- .1 The Contractor shall ensure that fall protection (i.e. guard rail, safety harnesses, fall arresting device) is provided and used when workers would fall greater than 3.0 metres from a temporary work area or 1.2 metres from a permanent work area.
- .2 Openings that create a falling hazard must have a temporary cover with warning signs or guard rails and toes boards installed by the Contractor. Similarly, where open trench work is adjacent to a frequently used public thoroughfare, guard rails shall be erected and maintained.

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1.21 Ladders and Scaffold:

- .1 The Contractor shall ensure that ladders which meet the requirements of applicable legislation are provided when no other safe means of access or egress between levels is present. The Contractor shall ensure that a scaffold will be designed to support four (4) times the load it will carry and that the erection, maintenance, and dismantling is performed by a competent worker. Scaffolds shall be anchored at least every 4.6 metres vertically and 6.4 metres horizontally.
- .2 Scaffold planks shall be at least grade one 51 millimetres x 254 millimetres lumber that is inspected and load tested before installation at which time they should be secured to prevent movements. Free standing or rolling scaffolds shall be erected with a minimum of 3 to 1 height to base ratio.

1.22 Excavations and Trenches:

- .1 The Contractor shall ensure that workers are protected from cave-ins by cutting back the walls or by installing temporary protective structures in trenches and excavations depending upon the nature of soil and the depth. Cut-backs in hard and compact solid (requiring use of rippers and heavy machinery) must be cut-back to not less than 30°. Other soils to not less than 45°. Typical utility involved streets and lanes shall NOT be considered hard and compact in native material unless stipulated by the Departmental Representative. The temporary protective structures shall be installed as outlined in the applicable legislation or as specified in plan designed and certified by a Professional Engineer and made available at the job site. Any additional loads (equipment, buildings, etc.) that may be imposed on the trench or excavations walls shall be taken into account when protecting workers from cave-ins.
- .2 Installation and removal of temporary protective structures shall be done in a safe manner. Workers shall install cross braces while on a ladder starting from the top and working down. Removal shall again be from a ladder starting from the bottom and working upward.

1.23 Underground and Overhead Utilities:

- .1 The Contractor shall ensure that all underground utilities are located and procedures outlined in the Pipeline Act, Electrical Utilities Regulations, and other applicable legislation are followed. The Contractor shall ensure that workers are made aware of the location of overhead utilities, the dangers of contacting these utilities are communicated to all workers and the safe limits of approach as outlined in the legislation are maintained for workers and equipment.

1.24 Hand and Power Tools:

- .1 The Contractor shall ensure that power and hand tools are properly maintained and that they are used in accordance with good industrial practices. Tools that are particularly hazardous, such as explosive actuated fastened tools, shall be operated only by workers who have received specific instruction on the safe use, limitations and maintenance of that tool.

Jasper Transfer Station

1.25 Compressed Gases:

- .1 The Contractor shall ensure that compressed gases are transported, used and stored in accordance with the manufacture's specifications. Cylinders shall have their contents clearly labelled (WHMIS) and the cylinders shall be secured to prevent being dislodged or damaged by equipment or moving materials.

1.26 Smoking:

- .1 The Contractor shall inform their workers of any smoking restrictions that may be in place on the worksite and ensure these restrictions are followed.

1.27 Sanitary Facilities:

- .1 The Contractor shall ensure that sanitary facilities shall be provided in accordance with applicable legislation. The provision of additional washing facilities (i.e. showers) may be required in accordance with the hazards associated with the materials on the worksite.

1.28 Hazardous Wastes:

- .1 The Contractor shall ensure that all hazardous wastes generated at the worksite are removed, transported and disposed of in accordance with applicable legislation. A copy of the necessary documentation (i.e. Hazardous Waste Manifest) must be supplied to the Departmental Representative upon request.

1.29 Fire Protection:

- .1 The Contractor shall ensure that an adequate number of the appropriate types and size of fire extinguishers are provided and maintained in accordance with applicable legislation. The fire extinguishers shall be clearly visible and readily accessible and the workers shall be trained in the use of the fire extinguishers provided.

1.30 Use and Storage of Flammable Substance:

- .1 The Contractor shall ensure that the hazards associated with the use of any flammable substance are clearly evaluated and procedures put in place to ensure the safety of workers, materials and equipment at the worksite. Flammables shall be stored in approved containers and rags contaminated with flammable substance shall be stored in suitable metal containers with adequate covers.

1.31 Site Security/Public Safety:

- .1 The Contractor shall ensure that access or movement at or adjacent to the worksite does not present hazards.

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- .2 This may involve the use of fencing, barricading, lighting, signing, hoarding, locked covers over openings, workers on watch, "authorized entry only" provision, or other means as appropriate. The Contractor shall ensure that authorized personnel have access to the site.
- .3 The branch may request the Contractor to institute a means of identifying authorized workers on the site to assist in site security. Adverse weather conditions may require an increased awareness of public security and safety.

1.32 Key Control:

- .1 .1 The Contractor shall adhere to any key control system established by the Departmental Representative to protect the worksite.

1.33 Worker's Compensations Board:

- .1 The Contractor and the Subcontractors shall have accounts in good standing with the Workers' Compensation Board. Proof of current account status shall be provided upon request.

1.34 Demolition:

- .1 The Contractor shall ensure that before demolition work commences, a meeting will be held on site with the Contractor, the Departmental Representative, and other interested parties to discuss the coordination, scheduling, safety, and all other aspects of the work.

1.35 Asbestos:

- .1 The Contractor shall ensure that when work requires the removal of asbestos material, procedures shall be developed and are site specific. Work to be executed by certified abatement personnel only.

1.36 Manhole and Vault Covers:

- .1 The Contractor shall ensure that when work requires the temporary removal of a manhole or vault lid, the manhole or vault lid is not left open while unattended. The manhole or vault shall be adequately protected and covered if it becomes necessary to leave it unattended without its lid in place.

END OF SECTION

1.0 GENERAL

1.1 Fires

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

1.2 Disposal of Wastes

- .1 Do not bury rubbish and waste materials on site.
- .2 All waste must be stored and handled in compliance with the National Park Garbage Regulations. Waste is to be source separated and recycled whenever possible.
- .3 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .4 Remove from site wastes and materials specified or designated by the Departmental Representative to be disposed of. Arrange for disposal sites.

1.3 Drainage

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- .4 Concrete wash-out must be completely contained and removed from site to a wastewater treatment facility. There will be no run-off of concrete wash-out at site.
- .5 Maintain existing drainage facilities affected by the Work in good operating condition at all times during construction.

1.4 Site Clearing and Plant Protection

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

1.5 Pollution Control

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment to local authority's emission requirements.
- .3 All vehicle and equipment re-fueling will take place at licensed facilities (gas station) or on hardened surfaces (roadways or parking lots).
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .5 Provide dust control during all truck transport activities.
- .6 All equipment will be clean of mud and vegetative debris prior to use on this project. Equipment brought in from outside the Park will not be washed within the Park.
- .7 A spill kit capable of handling 110% of the total fuels on-site will be available at worksite and all staff trained in its use. Parks Canada dispatch (780.852.6155) or ESO (780.883.0794) will be notified immediately of any fuel spills or leaks.
- .8 Noise and air pollution from equipment on-site will be kept to a minimum by shutting off equipment when not in use.
- .9 Address releases of harmful and/or hazardous substances as required by the Environmental Enhancement and Protection Act, Water Act or any other applicable legislation or municipal bylaw.

1.6 Cultural Resource Material

- .1 If cultural resource materials are discovered at any time, they will be left in place and undisturbed. The cultural resource specialist, Mike Dillon (780.852.6164), will be notified immediately.

2.0 PRODUCTS

- .1 Not used.

3.0 EXECUTION

- .1 Not used.

END OF SECTION

1.0 GENERAL

1.1 Requirements Included

- .1 Not used.

1.2 Compliance with Regulations

- .1 Ascertain requirements and regulations of local authorities (gas/power/telephone service providers, Federal authorities, Alberta Environmental Protection, etc.).
- .2 Comply with all such requirements and regulations as applicable to the Work.
- .3 Requirements set out in this Section are for guidance and information and are not necessarily complete.

1.3 Permits

- .1 Obtain all construction permits necessary for the Works.

1.4 Work in Vicinity of Overhead Power Lines

- .1 Request power company to relocate, de-energize or guard any energized conductor where construction equipment may operate within 3.0 m or the stipulated safe operating distance of conductor (whichever is larger).
- .2 Obtain power company approval prior to operating any equipment within 3.0 m or the stipulated safe operating distance of energized conductor (whichever is larger).
- .3 Where practical, avoid storage of metallic pipe sections under high voltage overhead power lines.
- .4 If pipe sections must be stored under power lines, protect personnel from effects of induced currents by grounding pipe sections appropriately.

END OF SECTION

1.0 GENERAL

1.1 Symbols on Drawings

.1 Refer to Drawings for explanation of symbols.

1.2 Abbreviations

.1 Symbol or Abbreviation

A	ampere	6	centreline
AB	anchor bolt	CL	clearance
ABS	acrylonite butadiene styrene (plastics)	cm	centimetre
AC	alternating current	CMP	corrugated metal pipe
Ac	asbestos cement (pipe)	Cr	chrome
AFC	automatic frequency control	CSG	casing
AF	audio frequency	CSK	countersink
A h	ampere hour	CTR	centre
Al	aluminum	Cu	copper
AM	amplitude modulation	cu	cubic
AUX	auxiliary	CULV	culvert
AVG	average	CV	control valve
AWG	American wire gauge	CW	cold water
BBL	barrel	dB	decibel
BLDG	building	DBL	double
BM	bench mark	DC	direct current
BPD	barrels per day	DIA	diameter
BRKR	breaker	DIM	dimension
BSMT	basement	DL	deadload
Btu	British thermal unit	DWG	drawing
BWV	backwater valve	DWV	drain waste vent (plastics)
CB	catch basin	ECCRED	eccentric reducer
cc	cubic centimetre	EHV	extra high voltage
CCRED	concentric reducer	EJCTR	ejector
Cd	Cadmium	ELB	elbow
CDN	Canadian	EMT	electrical metallic tubing
CDT	conduit	EP	epoxy (plastics)
CHC	continuous high chair	EPDM	ethylene propylene dienemonomer (plastics)
CI	cast iron		equal
CIP	cast iron pipe	EQ	
CJ	construction joint	ESP	external static pressure

FBM	board foot (foot, board measure)	kg	kilogram
F/C	flanged by compression	km	kilometre
FDN	foundation	km/h	kilometres per hour
Fe	iron	kN	kilonewtons
FF	flat-face	kPa	kilopascals
FLTR	filter	kV	kilovolt
FM	frequency modulation	kVA	kilovolt ampere
FS	forged steel	kW	kilowatt
FSD	flat side down	kW/h	kilowatt per hour
FSL	full surface level		
FSU	flat side up	L	litre
ft	foot	lb	pound
ft/min	foot per minute	LIN	linear
ft/s	foot per second	LL	live load
		lm	lumen
g	gram	LP	low pressure
g/m ²	grams per square metre	Lpm	litres per minute
GA	gauge	Lps	litres per second
GALV	galvanized	LR	long radius
GRD	electrical ground	lx	illuminance
ha	hectare	m	metre
HC	high chair	mA	milliamperes
HDW	hardware	MAX	maximum
HF	high frequency	m ³ /d	cubic metres per day
HGR	hanger	mg	milligram
HORIZ	horizontal	mg/L	milligrams per litre
hp	horsepower	MH	manhole
HP	high pressure	migd	million imperial gallons per day
hr	hour		
HV	high voltage	MIN	minimum
HW	hot water	MJ	megajoules
HYD	hydrant	mm	millimetre
Hz	hertz	MPa	megapascals
		m/s	metres per second
ID	inside diameter	MTG	mounting
ig	imperial gallons	MW	megawatt
igpm	imperial gallons per minute		
ig/s	imperial gallons per second	N	newton
imp	imperial	NIC	not-in-contract
INV	invert	NPT	National pipe thread
IP	iron pipe	NTS	not-to-scale

2.0 PRODUCTS

.1 Not used.

3.0 EXECUTION

.1 Not used.

END OF SECTION

1.0 GENERAL

1.1 Latest Editions

- .1 All references to specifications, standards, or methods of technical associations refer to the latest adopted revision, including all amendments, in effect on the date of submission of bids, except where a date or issue is specifically noted.

1.2 Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Antifriction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ARI	Air-Conditioning and Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWMAC	Architectural Woodworkers Manufacturers Association of Canada
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
CAN	Canadian National Standard
CBM	Certified Ballast Manufacturers
CBTIC	Clay Brick and Tile Institute of Canada
CEC	Canadian Electrical Code
CEMA	Canadian Electrical Manufacturers Association
CGA	Canadian Gas Association
CGRA	Canadian Good Roads Association
CGSB	Canadian General Standards Board
CISC	Canadian Institute of Steel Construction
CITC	Canadian Institute of Timber Construction
CLA	Canadian Lumbermen Association
CMAA	Crane Manufacturers Association of America
CMHC	Canada Mortgage and Housing Corporation
CPCA	Canadian Painting Contractors Association
CPCI	Canadian Prestressed Concrete Institute
CRCA	Canadian Roofing Contractors Association
CRSI	Concrete Reinforcing Steel Institute
CSA	Canadian Standards Association
CSSBI	Canadian Sheet Steel Building Institute
CUA	Canadian Underwriters Association
CWB	Canadian Welding Bureau
CWC	Canadian Wood Council

CSPI	Corrugated Steel Pipe Institute
DIN	Deutsches Institute Normung
EEL	Edison Electric Institute
EIB	Electrical Inspection Branch
EEMAC	Electrical and Electronic Manufacturers of Canada
FFPC	Federal Fire Prevention Committee
FMEC	Factory Manual Engineering Corporation
FM	Factory Mutual Engineering Corporation
IAO	Insurers' Advisory Organization
IBRM	Institute of Boiler and Radiator Manufacturers
IEC	International Electro technical Commission
IEE	Institution of Electrical Engineers (U.K.)
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IGMAC	Insulated Glass Manufacturers Association of Canada
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
ISO	International Standardization Organization
LEMA	Lighting Equipment Manufacturers Association
LTIC	Laminated Timber Institute of Canada
MMA	Millwork Manufacturers Association
NACE	National Association of Corrosion Engineers
NAAMM	National Association of Architectural Metal Manufacturers
NBC	National Building Code of Canada
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NLGA	National Lumber Grade Authority
NWTI	National Wood Tank Institute of the USA
OECI	Overhead Electrical Crane Institute
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
RLM	RLM Standards Institute
RTAC	Road and Transportation Association of Canada
SAE	Society of Automotive Engineers
SBI	Steel Boilers Institute
SJI	Steel Joist Institute
SSPC	Steel Structures Painting Council
TTMAC	Terrazzo, Tile and Marble Association of Canada
ULC	Underwriters' Laboratories of Canada
USFG	United States Federal Government
WCB	Workers' Compensation Board

1.3 Conformance

- .1 Conform to these standards, in whole or in part as specifically requested in Specifications.
- .2 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves the right to have such products or systems tested to prove or disprove conformance.
- .3 The cost for such testing will be born by Departmental Representative in the event of conformance with Contract Documents or by Contractor in the event of non-conformance.

2.0 PRODUCTS

- .1 Not used.

3.0 EXECUTION

- .1 Not used.

END OF SECTION

1.0 GENERAL

1.1 Related Documents

- .1 Particular requirements for surveying, inspection, and testing to be carried out by local survey firm or testing laboratory designated by the Departmental Representative are specified under various Sections.

1.2 Inspection and Testing of Work

- .1 Work included: From time to time during progress of the Work, the Departmental Representative may require that Quality Assurance Survey or Testing be performed to determine that materials and workmanship provided for the Work meet the specified requirements. This Quality Assurance work is in addition to and does not replace the Contractor's responsibility for Quality Control.
- .2 Related Work Specified Elsewhere: Requirements for testing may be described in various sections of these specifications. Where no testing requirements are described, but the Departmental Representative decides that testing is required, the Departmental Representative may require testing to be performed under current pertinent standards for testing.

1.3 Independent Quality Assurance

- .1 Departmental Representative will appoint, and reimburse Contractor for services of an Independent Land Survey Firm and an Independent Testing Laboratory or Agency to perform whatever Quality Assurance surveying, testing, and inspection is deemed necessary by the Departmental Representative to confirm the compliance of the Work within the Contract Documents.
 - .1 Submit receipts and proof of payment to Departmental Representative for approval.
 - .2 Payment will be made only for tests requested and approved by Departmental Representative, supported by proof of payment as described in Clause 1.3.1.1.
- .2 Departmental Representative will not pay for or reimburse Contractor for any services related to surveying, inspection, or testing of the following:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Additional tests specified in Clause 1.3.3.

- .3 Where tests or inspections by designated testing laboratory reveal work not in accordance with Contract requirements, the Contractor shall pay costs for additional tests or inspections as Departmental Representative may be required to verify acceptability of corrected work.
- .4 Where tests or inspections are called prematurely or the testing laboratory is delayed by the Contractor, the Contractor shall pay all additional costs incurred.

1.4 Laboratories/Agencies

- .1 Independent Survey and Inspection/Testing Agencies will be approved by the Departmental Representative for the purpose of inspecting and/or testing portions of the Work. Costs of such services will be recovered from the Quality Assurance Cash Allowance.
- .2 The cost of transportation (including shipping charges) shall be borne by the Contractor and not recoverable from the engineering testing cash allowance for materials testing.
- .3 The Contractor and Subcontractor mark-up for the engineering Quality Assurance Cash Allowance shall be included in the Contractor's contract price. The Contractor shall not be allowed to recover the costs of any tests or retests, which indicate the result does not exceed the minimum specified.
- .4 The Contractor shall pay the full cost of all testing required for the approval of materials such as pipe, aggregates, and fittings. The cost of such testing will not be recoverable from the Quality Assurance Cash Allowance.

1.5 Contractor Responsibility for Quality Control

- .1 It is the Contractor's responsibility to carry out whatever quality control surveys, inspections, and testing is required to ensure that the Work is in conformance with the Contract Documents and its associated costs.
- .2 The Contractor cannot rely on the surveys, inspection, or testing that will be carried out by the Independent Survey Firm or Independent Testing Agency for quality assurance by the Departmental Representative; the intention of this surveying and testing is for determination by the Departmental Representative of satisfactorily completed work for Progress Payment.
- .3 All costs required to ensure quality control shall be borne by the Contractor.

1.6 Access to Work and Plant

- .1 Allow the Survey and Inspection/ Testing Agencies access to all portions of Work on site and manufacturing and fabrication plants, as may be necessary to carry out their work. Cooperate to provide reasonable facilities for such access.

1.7 Procedures for Inspection and Testing

- .1 If Work is designated for special tests, inspections, or approvals in the Contract Documents, or by the Departmental Representative's instructions or the laws or ordinances of the Place of the Work, give the Independent Testing Agency and Departmental Representative timely notice requesting inspection. Inspection by the Independent Testing Agency will be made promptly. Arrange for inspections by other authorities and give the Departmental Representative timely notice of the date and time.
- .2 Submit necessary samples and/ or materials required for testing, as specifically requested in the Specifications. Submit with reasonable promptness and in an orderly sequence, so as to cause no delay in Work.
- .3 Provide workers and facilities to obtain and handle samples and/or materials on-site. Provide sufficient space to facilitate the storage and curing of test samples.
- .4 If defects are revealed during survey, inspection and/ or testing, the appointed agency will request additional survey, inspection and/ or testing to ascertain full degree of defects. Correct defects and irregularities as advised by the Departmental Representative. Pay costs for retesting, re-surveying, and re-inspection.
- .5 The Contractor shall correct defects and irregularities and pay all costs for all additional testing and surveying.

1.8 Covered Work

- .1 If the Contractor covers or permits to be covered work that has been designated for inspections or approvals before they are made, uncover such work, have the inspections or tests satisfactorily completed, and make good such work.
- .2 The Departmental Representative may order any part of the Work to be examined if such work is suspected to be not in accordance with the Contract Documents. If, upon examination, such work is found not in accordance with the Contract Documents, correct such work and pay for cost of examination and correction. If such work is found in accordance with the Contract Documents, the Departmental Representative shall pay the cost of examination and replacement.

1.9 Rejected Work

- .1 Defective work, whether the result of poor workmanship, use of defective products or damage through carelessness or other acts of omission of the Contractor, and whether incorporated in the work or not, which has been rejected by the Departmental Representative as failing to conform to the Contract Documents shall be removed promptly from the work and replaced or re-executed by the Contractor in accordance with the Contract Documents at the Contractor's expense.

- .2 Other work destroyed or damaged by such removals, replacement or re-execution shall be promptly made good at the Contractor's expense.

1.10 Reports

- .1 Submit four (4) copies of inspection and test reports promptly to the Departmental Representative for all requested Quality Assurance Testing as requested by the Departmental Representative.

1.11 Tests and Designs

- .1 Furnish to the Departmental Representative test results and mix designs as specifically requested in the Specifications.
- .2 The cost of test results and mix design shall be borne by the Contractor.

2.0 PRODUCTS

- .1 Not used.

3.0 EXECUTION

- .1 Not used.

END OF SECTION

1.0 GENERAL

1.1 Section Includes

- .1 Temporary utilities.
- .2 Construction facilities.
- .3 Temporary controls.

1.2 Access

- .1 Prior to closing lanes, commercial crossings, business or residential vehicular accesses, Contractor to provide alternate access. Contractor to obtain street closure permits prior to closing any street.
- .2 Maintain existing roads used for project site access for the duration of the Contract and make good any damage resulting from Contractor's use of these roads.
- .3 Clean roadways used by Contractor's equipment.
- .4 Do not obstruct hydrants, valve or control pit covers, valve boxes, curb stop boxes, fire or police call boxes, and all other utility controls, warning systems, and appurtenances.
- .5 Prior to final inspection, obtain and submit to Departmental Representative written signed releases from owners of all roads used for Site access, verifying that roads have been adequately restored and left in a satisfactory condition.
- .6 Trim loads of trucks hauling excavated material, cement, sand, stone, gravel, debris or other loose material before leaving the site, and ensure that the bodies of such vehicles are tight so that no spillage of loads occurs.

1.3 Installation/Removal

- .1 Provide temporary utilities in order to execute the work expeditiously.
- .2 Make necessary applications to Authorities having jurisdiction, obtain required permits, and pay all fees and related charges.
- .3 Remove from site all such work after use.
- .4 Restore site to clean, sanitary condition.

1.4 Storage Sheds

- .1 Provide adequate weathertight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.
- .2 Maintain storage sheds in a neat, clean condition.

- .3 All storage sheds to be located within designated work zone within fenced area.

1.5 Sanitary Facilities

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 Disinfect facilities frequently.
- .4 Remove contaminated soil and material and replace with fresh, clean material.
- .5 Dispose of sanitary wastes, in accordance with the applicable regulations, and subject to approval of Departmental Representative.
- .6 Provide all sanitary supplies required for use by the Contractor's work force and staff of Departmental Representative.
- .7 Prohibit the committing of nuisance. Promptly discharge any employee violating such provision.
- .8 All sanitary facilities to be located within designated work zone within fenced area.

1.6 Site Enclosures

- .1 Hoarding
 - .1 Provide barricades and covered walkways required by governing authorities for public rights-of-way.
 - .2 Provide secure, rigid guard railings and barricades around deep excavations.
 - .3 All work areas shall be completely fenced off at all times using temporary fencing. Fencing shall be rigidly supported, steel grade with a minimum height of 1.8 m. The Contractor shall maintain the fencing throughout the project duration.

1.7 Power

- .1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
- .2 Install temporary facilities for power, such as pole lines and underground cables, to approval of local power supply authority.
- .3 Locate temporary power at designated location, or at an acceptable location subject to approval of Departmental Representative.

1.8 Water Supply

- .1 Arrange for connection with appropriate utility company, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.
- .2 Locate temporary water supply at a location acceptable to Departmental Representative.

1.9 Maintenance and Public Utilities

- .1 Arrange work to avoid interruption of utilities serving the public. Pay for damage.
- .2 Where interruption of public utilities is unavoidable, obtain prior approval for interruption from responsible authority.
- .3 As required by utility authority, establish and pay for temporary relocation of utility during construction.

1.10 Materials to be Salvaged

- .1 Remove, clean, deliver, unload and neatly stockpile at the Departmental Representative yard materials which are specified or designated by the Departmental Representative to be salvaged.
- .2 Repair or replace at Contractor's expense salvaged materials damaged during removal, unloading or in transit.

1.11 Equipment, Tool and Materials Storage

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Any equipment, tools, and materials must be stockpiled or situated within fenced work zone.

1.12 Security

- .1 Provide and pay for responsible security personnel to guard the site and contents of the site after working hours and during holidays.

1.13 Construction Cleaning

- .1 Maintain the work in tidy condition, free from the accumulation of waste products and debris, other than that caused by the Departmental Representative or other contractors.
- .2 Remove waste material and debris from the site and deposit in waste container at the end of each working day.

- .3 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.
- .4 Promptly clean up any spillage that occurs on site roads, access roads or public roads, or other areas where construction vehicles are travelling.
- .5 If Contractor is negligent in maintaining cleanliness of roads, Departmental Representative will arrange for cleaning to be done at Contractor's expense.
- .6 Contractor shall not dump waste products, either personal or construction related, into trenches and backfill.
- .7 Contractor to supply, maintain and empty garbage bins along construction site.
- .8 Contractor is encouraged to enforce that recyclable materials be separated and disposed of properly.

1.14 Open Excavations

- .1 All open excavations to be fenced off and/ or covered with steel plates.
- .2 Open excavations impeding on modified traffic flow must be backfilled immediately after utility repair or covered with a steel plate capable of supporting traffic loads, to ensure traffic flow is reinstated.

1.15 Site Signs and Notices

- .1 Safety and Instruction Signs and Notices:
 - .1 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN3-Z321-77.
- .2 Maintenance and Disposal of Site Signs:
 - .1 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

2.0 PRODUCTS

- .1 Not used.

3.0 EXECUTIONS

- .1 Not used.

END OF SECTION

1.0 GENERAL

1.1 Requirements Included

- .1 Location, protection, removal, and replacement of existing structures and utility works.
- .2 Existing structures and utility works being all existing pipes, ducts, ditches, or other works forming a part of sewerage, drainage, water, telephone, electrical, gas, or other utility systems as well as sidewalks, curbs, poles, fences, buildings, and other man-made things that may be encountered during construction.

2.0 COORDINATION

2.1 Coordination

- .1 Coordinate the protection of all utilities.

3.0 WORKMANSHIP

3.1 Location of Structures and Utility Works

- .1 Locate existing surface and underground structures that may affect the work or may be damaged during construction.
- .2 The existence, location and elevation of utilities and structures are not guaranteed. Determine the existence, location and elevation of all sewer, water, and gas mains, services or lines, electric light, power, cable T.V. or telephone conduits, or other such structures or utilities. Notify the appropriate company, department or persons on intention to carry out operations in the vicinity of any structure or utility, at least one week in advance of any such operations being carried out.

In the case of sanitary, storm sewer and water lines:

Parks Canada

In the case of roads and transportation:

Parks Canada

In the case of telephone conduits or lines:

Telus Communications

In the case of electric power conduits or overhead power lines:

ATCO Electric or Fortis

In the case of gas mains or lines:

ATCO Gas

In the case of Cable TV lines:

Shaw Cable

In particular, the Contractor is cautioned that all opening and closing of existing water main valves are to be carried by Parks Canada.

- .3 Provide the Departmental Representative with letters from the appropriate authority of the utility or utilities involved stating that the Contractor has made satisfactory arrangements with the utility organization for the location, protection and inspection of the utility involved.
- .4 On request from the Departmental Representative, excavate and uncover underground structures and utilities for the purpose of establishing line or grade for proposed installation of piping or other works.

3.2 Protection of Structures and Utilities

- .1 Protect from damage. In the event of damage resulting from the construction operation, repair to a condition which is at least the equivalent of that which existed prior to construction.

3.3 Emergency Situations

- .1 In emergency situations resulting from the construction operation, where life or property are endangered, immediately take whatever action is possible to eliminate the danger and notify the appropriate authorities of the situation.

3.4 Access Maintained

- .1 Maintain access for existing roadways, hydrants, valve or control pit covers, valve boxes, curb stop boxes, fire or police call boxes, and all other utility control, warning systems, and appurtenances thereof.

3.5 Support of Structures and Utility Works

- .1 Protect existing structures and utilities against damage from settlement by means of supports or compaction of backfill as approved by the Departmental Representative. Where necessary, supports shall remain in place following backfill of excavations.
- .2 Compact backfill which is placed under or adjacent to existing structures and utilities which have been undermined during excavation in a manner which will prevent damage of the structure or utility from settlement. Backfill with approved crushed granular material less than 50 mm in diameter.

3.6 Drainage Facilities

- .1 Keep clear existing culverts, enclosed drains, flumes and ditches, and other drainage structures affected by the work. When it is necessary to temporarily remove an existing drainage structure, provide suitable temporary ditches or other approved means of handling the drainage during construction.
- .2 Replace culverts and drain pipes at the time of backfilling to line and grade as directed by the Departmental Representative.

END OF SECTION

1.0 GENERAL

1.1 Requirements Included

- .1 Product quality, availability, storage, handling, protection, transportation.
- .2 Manufacturer's instructions.
- .3 Workmanship, co-ordination, protection of work in progress.
- .4 Quantities.
- .5 Ownership.

1.2 Products and Materials

- .1 Quality
 - .1 Products, materials, equipment and articles (referred to as Products throughout the specifications) incorporated in the Work shall be new, not damaged or defective, and of the best quality (compatible with specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
- .2 Availability
 - .1 Immediately upon signing Contract, review Product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of Products are foreseeable, notify the Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
 - .2 In the event of failure to notify the Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Departmental Representative reserves the right to substitute more readily available products of similar character, at no increase in Contract Amount.
- .3 Storage, Handling and Protection
 - .1 Handle and store Products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
 - .2 Store packaged or bundled Products in original and undamaged condition with manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in the Work.
 - .3 Store products subject to damage from weather in weatherproof enclosures.

- .4 Remove and replace damaged Products at own expense and to the satisfaction of the Departmental Representative.
- .5 Contractor to identify location for stockpiles. Stockpiles must be either located offsite in designated areas approved by Departmental Representative or stockpiled on site in a manner such that stockpile is fenced off from public traffic and while maintaining traffic flow under modified traffic restrictions as detailed in this contract.
- .4 Transportation
 - .1 Pay costs of transportation of Products required in the performance of Work.

1.3 Manufacturer's Instructions

- .1 Unless otherwise indicated in the specifications, install or erect Products in accordance with manufacturer's instructions.
- .2 Notify the Departmental Representative, in writing, of conflicts between the specifications and manufacturer's instructions, so that the Departmental Representative may establish the course of action.
- .3 Improperly installed or erected Products, shall be removed and re-installed at no increase in Contract Amount.

1.4 Workmanship

- .1 General
 - .1 Execute work by workers experienced and skilled in the respective duties for which they are employed. Notify Departmental Representative immediately if required Work is such as to make it impractical to produce required results.
 - .2 Do not employ any unfit person or anyone unskilled in their required duties. The Departmental Representative reserves the right to require the dismissal from the site, workers deemed incompetent, careless, insubordinate or otherwise objectionable.
 - .3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with the Departmental Representative, whose decision is final.
- .2 Co-ordination
 - .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
 - .2 Be responsible for co-ordination and placement of openings, sleeves and accessories.

.3 Protection of Work in Progress

- .1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Departmental Representative, at no increase in Contract Amount.

1.5 Ownership

- .1 All materials provided by the Contractor for execution of the work will vest in and become the property of the Departmental Representative upon delivery to the Site, but will remain in the custody and at the risk of the Contractor until Final Completion.

2.0 PRODUCTS

- .1 Not used.

3.0 EXECUTION

- .1 Not used.

END OF SECTION

1.0 GENERAL

1.1 Section Includes

- .1 Cleaning.
- .2 Project record documents.
- .3 Spare parts and maintenance materials.

1.2 Related Sections

- .1 General Conditions and Special Provisions.
- .2 Individual Specifications Sections: Specific requirements for operation and maintenance data.

1.3 Progressive Cleaning

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Departmental Representative or other Contractors.
- .2 Make arrangements with and obtain permits from authorities having jurisdiction for off-site disposal of waste and debris.
- .3 Remove waste material and debris from the site at the end of each working day.
- .4 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.4 Final Cleaning

- .1 In accordance with the General Conditions and Special Provisions.
- .2 At the completion of the construction work, all areas on which work has been done shall be left in a neat and presentable condition.
- .3 All gutters and drainage ditches which have been blocked as a result of the work shall be repaired or restored to their original condition or better.
- .4 Dispose of all surplus excavated material, trees, brush, rock, boulders and pieces of concrete or masonry.
- .5 Rake clean surfaces of grounds.

1.5 As-Built Documents - Actual Site Conditions

- .1 Departmental Representative will provide one set of prints for As-Built drawing purposes.

- .2 Maintain project As-Built drawings current as work progresses and record neatly and accurately deviations from Contract Documents.
- .3 Record the following information:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by Change Order or Field Order.
- .4 Identify each set of drawings as "Project As-Built Drawings" and date and sign each set.
- .5 Record changes in red. Mark on one set of prints and at completion of project and prior to interim inspection, neatly transfer notations to second set and submit both sets to Departmental Representative.

1.6 Spare Parts and Maintenance Materials

- .1 Spare parts and maintenance materials provided shall be new, not damaged or defective, and of the same quality and manufacture as Products provided in the Work. If requested, furnish evidence as to type, source and quality of Products provided.
- .2 Defective Products will be rejected, regardless of previous inspections. Replace products at own expense.
- .3 Store spare parts and maintenance materials in a manner to prevent damage, or deterioration.
- .4 Provide spare parts, special tools, maintenance and extra materials in quantities specified in individual specification sections.
- .5 Provide items of same manufacture and quality as items in the work.

1.7 Inspection

- .1 Refer to the General Instructions for contractual requirements.
- .2 Accumulate all necessary data from sub trades and suppliers and present same in the specified format for the approval by the Departmental Representative.
- .3 Once the items of this section are completed and the Contractor has verified that the requirements of the Contract have been performed give five days' notice to the Departmental Representative, in writing, of satisfactory completion of the work and request an Interim Inspection.
- .4 The Interim Inspection will be performed by the Departmental Representative. A list of deficiencies and defects will be tabulated. If in the opinion of the Departmental Representative, the list indicates the project is excessively incomplete, an Interim Certificate of Completion will not be issued. Corrections shall be done expeditiously by the Contractor.

- .5 Once the Interim Certificate of Completion is issued and all deficiencies and defects have been corrected; request a Final Completion inspection, giving the Departmental Representative five days' notice.
- .6 The Final Completion Inspection will be performed by the Departmental Representative. If the deficiencies and defects from the Interim inspection are completely corrected, a Final Certificate of Completion will be issued.
- .7 If the Contractor requests either an Interim or Final Completion Inspection when an Interim or Final Completion Certificate cannot be issued, the Contractor will pay expenses for additional visits by the Departmental Representative to re-perform the inspection.

2.0 PRODUCTS

- .1 Not used.

3.0 EXECUTION

- .1 Not used.

END OF SECTION

1.0 GENERAL

1.1 References

- .1 Canadian Standards Association (CSA International).
- .1 CSA S350-M1980(R1998), Code of Practice for Safety in Demolition of Structures.

1.2 Submittals

- .1 Submit shop drawings in accordance with Sections 01 33 00 Submittal Procedures.
- .2 Before proceeding with demolition of south elevation provide plans showing proposed methods to support remaining structure
- .3 Provide name and address of waste facilities.

1.3 Waste Disposal

- .1 Dispose of all demolition material in accordance with all applicable environmental and OH&S regulations.

2.0 PRODUCTS

- .1 Not Used

3.0 EXECUTION

3.1 Preparation

- .1 Inspect building with Departmental Representative and Owner and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

- .1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.
- .2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 Protection

- .1 Prevent movement, settlement, or damage to adjacent structures and equipment to remain in place. Provide bracing and shoring required.
- .2 Keep noise, dust, and inconvenience to occupants to minimum.
- .3 Protect building systems, services and equipment.
- .4 Provide temporary covers, railings, supports and other protection as required.
- .5 Do Work in accordance with Section 01 35 29 - Health and Safety Requirements.

3.3 Salvage

- .1 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .2 Remove items to be reused, store as directed by Departmental Representative.

3.4 Site Removals

- .1 Remove items as indicated.

3.5 Demolition

- .1 Remove parts of existing roofing to permit new construction.
- .2 Trim edges of partially demolished building elements to tolerances as defined by drawings to suit tie in details.

3.6 Disposal

- .1 Dispose of removed materials in accordance with authority having jurisdiction.

END OF SECTION

1.0 GENERAL

1.1 Work Included

- .1 Forms for all concrete
- .2 Wood and/or steel forms for all cast-in-place concrete.
- .3 Shoring, bracing, and anchorage.
- .4 Supply and installation of concrete accessories.
- .5 Set anchor rods, anchors, sleeves, dowels, frames and other items supplied by other trades.
- .6 Clean erected formwork prior to concrete placement.
- .7 Remove forms and supporting falsework.

1.2 Related Work

- .1 Section 03 20 00 – Concrete Reinforcement.
- .2 Section 03 30 00 – Cast-In-Place Concrete.

1.3 References

- .1 ACI 347, Guide to Formwork for Concrete.
- .2 Alberta Building Code 20
- .3 Alberta Occupational Health and Safety Code 200
- .4 CSA-A23.1-/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .5 CAN/CSA-S269.3-M92 (R20), Concrete Formwork.

1.4 Design Standards

- .1 Design and detail formwork in accordance with CSA-A23.1, CAN/CSA-S269.3, ACI 347, and applicable construction safety regulations.
- .2 Where there is a conflict between the above-noted codes and standards, the most stringent requirements shall apply. The Departmental Representative shall decide which requirement is the most stringent.
- .3 Use load combinations in accordance with the Alberta Building Code 20.

- .4 Design formwork, falsework, and reshoring to carry all dead loads, lateral loads, concrete loads, and construction live loads, until these loads can be supported by the structure.
- .5 All design shall be done by a Professional Structural Engineer, registered in the Province of Alberta.

1.5 Quality Assurance

- .1 Construct and erect formwork and falsework in accordance with CSA-A23.1, CAN/CSA-S269.3, ACI 347, and applicable construction safety regulations.
- .2 Provide a system of quality control and quality assurance to ensure that the minimum standards specified herein are attained.

1.6 Shop Drawings

- .1 Submit shop drawings for formwork, falsework, and reshoring well in advance of the work in accordance with Division 01.
- .2 Shop drawings for formwork and falsework shall clearly indicate the following:
 - .1 Design loads and load combinations;
 - .2 Proposed construction methods and field adjustment of forms;
 - .3 Specifications for formwork materials and overall formwork scheme;
 - .4 Density of plastic concrete;
 - .5 Method of placing concrete;
 - .6 Concrete slump, concrete admixtures, and concrete temperature;
 - .7 Compressive strength of concrete at formwork removal and application of construction loads.
- .3 Shop drawing review by the Departmental Representative is solely to ascertain conformance to the general design concept.
- .4 Responsibility for approval of detail design inherent in shop drawings rests with the Contractor and review by the Departmental Representative shall not imply such approval.
- .5 Review shall not relieve the Contractor of his responsibility for errors or omissions in shop drawings or for proper completion of the Work in accordance with the Contract Documents.

2.0 PRODUCTS

2.1 Materials

- .1 For Exposed Surfaces: square-edged, smooth surfaced panels true in plane, free of holes, surface markings or defects.
- .2 For Unexposed Surfaces: square-edged plywood or other material suitable to retain concrete without leakage or distortion.
- .3 Wood Materials:
 - .1 Sheathing: CSA-O151-09 or CSA-O325-07, solid one side select sheathing - tight face grade. Sound, undamaged sheets with clean true edges.
 - .2 Lumber: conforming to CSA-O141-05.
 - .3 Nails, Spikes and Staples: galvanized or phosphatized.

2.2 Prefabricated Forms

- .1 Steel Type: minimum 1.6 mm steel thickness; well matched, tight fitting and adequately stiffened to support the weight of concrete without deflection detrimental to structural tolerance and appearance of finished concrete surface.

2.3 Accessories

- .1 Form Ties: Removable or snap-off metal type with metal form spacers, adjustable length; minimum working strength of 13 kN. When assembled, free of defects that will leave metal closer than 40 mm from concrete surface. Cones shall be approximately 20 mm diameter and not larger than 40 mm. Use plastic cone snap type or screw type on exposed surface. Wire ties are not permitted.
- .2 Form Release Agent: colourless mineral oil which will not stain concrete or impair natural bonding or colour characteristics of coating intended for use on concrete. Form release agent shall be non-toxic.
- .3 Sealing Tape: reinforced, self-adhesive polyvinyl-chloride.

3.0 EXECUTION

3.1 Examination

- .1 Before starting this Work, examine work done by others which affects this Work.
- .2 Rectify all conditions which would prejudice proper completion of this Work.
- .3 Commencement of Work implies acceptance of existing conditions.

3.2 Erection

- .1 Verify lines, levels and centers before proceeding with formwork. Ensure dimensions agree with the Drawings.
- .2 Construct formwork and falsework to meet design and regulatory requirements and to produce finished concrete conforming to surfaces, shapes, lines and dimensions indicated on the Drawings. Ensure visible lines of the curbs, walls and walks follow a smooth profile both vertically and horizontally.
- .3 Do not weld formwork to steel superstructure.
- .4 Align joints and make watertight to prevent leakage of cement paste and disfiguration of concrete. Keep form joints to a minimum. Where joints are shown on Drawings, Contractor shall ensure that joint layout matches drawings. Tape form joints as necessary.
- .5 Do not use earth surfaces to form concrete without written approval of Departmental Representative unless shown on Drawings.
- .6 Check and re-adjust formwork to required lines and levels during placing of concrete.
- .7 If form sheathing is to be re-used, remove nails and clean surfaces in contact with concrete before re-using.

3.3 Tolerances

- .1 Construct formwork, falsework and all supporting or bracing members to provide concrete with dimensions, lines and levels within tolerances specified in CSA-A23.1.
- .2 If tolerances are exceeded, remove, replace or modify placed concrete as directed by the Departmental Representative at no cost to the Owner.

3.4 Construction Joints

- .1 Locate joints not indicated on the Drawings so as to least impair the strength of the structure. Obtain the Departmental Representative's approval before proceeding.
- .2 Construct joints in accordance with CSA-A23.1 and details shown on drawings.
- .3 Roughen surface of hardened concrete and thoroughly clean of any foreign matter and laitance. Wet surface with water and ensure forms are tight against face of hardened concrete. Epoxy bonding agent to be used where shown on Drawings or as indicated by the Departmental Representative.

3.5 Inserts / Embedded Items / Openings

- .1 Accurately locate and set in place items which are to be cast directly into concrete.
- .2 Do not set anchor bolts, sleeves and inserts into placed concrete.

3.6 Quality Control

- .1 Inspect and check complete formwork, and bracing to ensure that the work is in accordance with formwork design and that supports, fastenings, wedges, ties and parts are secure.
- .2 For all exposed concrete surfaces, do not patch formwork.

3.7 Cleaning

- .1 Clean forms as erection proceeds to remove foreign matter. Remove cuttings, shavings and debris from within the forms. Flush completely with water to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- .2 During cold weather, remove ice and snow from within the forms. Do not use de-icing salts. Do not use water to clean out completed forms unless formwork and concrete construction proceed within a heated enclosure. Use compressed air or other means to remove foreign matter.

3.8 Preparation

- .1 Apply form release agent in accordance with the manufacturer's recommendations prior to placing reinforcing steel, anchoring devices and embedded parts. Any embedded item to be cast in concrete, on which form release agent has been applied, shall be thoroughly cleaned prior to placing concrete.

3.9 Form Removal

- .1 Loosen forms carefully. Do not apply tools to exposed concrete surfaces.

END OF SECTION

1.0 GENERAL

1.1 Work Included

- .1 Reinforcing steel bars and welded steel wire fabric for cast-in-place concrete, complete with tie wire.
- .2 Support chairs, bolsters, bar supports, and spacers for reinforcing.
- .3 All labour, materials, and equipment to supply and place the reinforcing steel shown on the Drawings.

1.2 Related Work

- .1 Section 03 10 00 – Concrete Formwork and Falsework.
- .2 Section 03 30 00 – Cast-In-Place Concrete.

1.3 References

- .1 ACI Detailing Manual – 2004.
- .2 CAN/CSA-A23.1-14/A23.2-14, "Concrete Materials and Methods of Concrete Construction".
- .3 CAN/CSA-A23.3-14, "Design of Concrete Structures".
- .4 CAN/CSA-G30.18-09 (R2007), "Billet-Steel Bars for Concrete Reinforcement".
- .5 CAN/CSA-W47.1-09, "Certification of Companies for Fusion Welding of Steel".
- .6 CAN/CSA-W186-M1990, "Welding of Reinforcing Bars in Reinforced Concrete Construction".
- .7 Reinforcing Steel Institute of Canada, "Reinforcing Steel – Manual of Standard Practice, Fourth Canadian Edition 2004".

1.4 Quality Assurance

- .1 Perform concrete reinforcing work in accordance with CSA-A23.1.
- .2 Provide a system of quality control and quality assurance to ensure that the minimum standards specified herein are attained.
- .3 Perform welding in accordance with CSA-W186.

1.1 Inspection and Testing

- .1 If requested by Departmental Representative, submit certified copies of mill test report of reinforcement supplied, indicating physical and chemical analysis.

1.5 Shop Drawings

- .1 Submit bar lists and placing drawings in accordance with Division 1.
- .2 Placing drawings and details shall conform to the ACI Detailing Manual and RSIC Manual of Standard Practice.
- .3 Clearly indicate bar sizes, spacing, locations and quantities of reinforcing steel, mesh, chairs, spacers, and hangers.
- .4 Show minimum clearances between reinforcing bars and the minimum concrete protection for reinforcement.
- .5 Locate bars relative to building grid lines which can be identified on the formwork.
- .6 Specify the location and embedment of dowels.
- .7 Design and detail lap lengths, bar development lengths, and splice lengths to CSA-A23.1 and CSA-A23.3, unless noted otherwise on the drawings.
- .8 Fabrication shall commence only after shop drawings have been reviewed by the Departmental Representative, provided that the drawings require no resubmission.

1.6 Delivery and Storage

- .1 Deliver, handle and store reinforcement in a manner to prevent damage and contamination.
- .2 Deliver bars in bundles, clearly identified in relation to placing drawings.

1.7 Substitutions

- .1 Different size bars will be permitted only upon written approval of the Departmental Representative.

1.8 Construction Review

- .1 Notice for inspection must be given to the Departmental Representative 48 hours prior to actual concrete placing. Failure to give adequate notice may cause the Departmental Representative to classify the work as defective.
- .2 Concrete shall not be cast until the reinforcement and its placement has been inspected by the Contractor's quality control representative.
- .3 Correct defects and irregularities to the satisfaction of the Departmental Representative, at no cost to the Owner.
- .4 The Departmental Representative's general review is undertaken to inform the Owner of the Contractor's performance, and in no way shall augment the

Contractor's quality control procedure, or relieve the Contractor of contractual responsibility.

2.0 PRODUCTS

2.1 Reinforcing Materials

- .1 Reinforcing Steel: 400 MPa yield grade; deformed billet steel bars conforming to CSA-G30.18; plain finish.
- .2 Weldable Reinforcing Steel: weldable low alloy deformed steel bars, conforming to CSA G30.18, Grade 400W.
- .3 Tie Wire: minimum 1.6 mm annealed type, or patented system approved by Departmental Representative.
- .4 Chairs, Bolsters, Bar Supports, and Spacers: adequately sized for strength and support of reinforcing steel during construction.
- .5 Concrete Bricks: acceptable for support of bottom layer of bars in slabs on fill. Broken concrete blocks and wood supports not acceptable.

3.0 EXECUTION:

3.1 Examination

- .1 Before starting this work, examine work done by others which affects this work.
- .2 Notify the Departmental Representative of any conditions which would prejudice proper completion of this work.
- .3 Commencement of work implies acceptance of existing conditions.

3.2 Fabrication

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1 and Drawings.
- .2 Locate reinforcing splices not indicated on Drawings at points of minimum stress.
- .3 Fabricate within the following tolerances:
 - .1 Sheared length: ± 25 mm.
 - .2 Depth of truss bars: plus 0, minus 10 mm.
 - .3 Stirrups, ties and spirals: ± 10 mm.
 - .4 Other bends: ± 25 mm.
- .4 Weld reinforcing bars in accordance with CSA W186.

- .5 All bending shall be done cold with a suitable machine accurately producing all lengths, depths and radii shown on the bending details.
- .6 Bars shall not be bent or straightened in a manner that will injure the material and any bars with kinks or bends not shown on the Drawings shall not be used.
- .7 After initial fabrication, reinforcing steel shall not be re-bent or straightened unless so indicated on the Drawings.
- .8 Heating of reinforcing steel will not be permitted.
- .9 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

3.3 Installation

- .1 Place reinforcing steel in accordance with CSA-A23.1 and reviewed placing drawings.
- .2 When specifically requested, obtain Departmental Representative's approval of reinforcing steel and position before placing concrete.
- .3 Reinforcement shall be free from loose rust, scale, grease, clay, or other coatings which will destroy or reduce concrete bond.
- .4 Concrete cover shall be as specified on the Drawings, or if not specified, in accordance with CSA-A23.1.
- .5 Reinforcement shall be adequately secured in position by approved chairs, support bars, and spacers.
- .6 Reinforcement shall be tied with wire ties at bar intersections to ensure that displacement outside the allowable tolerances will not occur. Tack welding of bars is not permitted.
- .7 Necessary splices shall be lapped not less than 24 bar diameters unless noted otherwise, and be in accordance with CSA-A23.3.
- .8 Revise, reseal, and correct improperly positioned reinforcing prior to placing concrete to the satisfaction of the Departmental Representative.
- .9 Provide horizontal "L" shaped corner bars of same cross-sectional area and spacing as horizontal bars around wall and grade beam corners, unless shown otherwise on Drawings.
- .10 Provide 10M support bars in hooks and corners of beam stirrups unless shown otherwise on the Drawings.
- .11 Where toppings are placed on waterproof membranes or vapour barriers, prevent reinforcement or tie wire from contacting these items.

- .12 Do not drive or force reinforcement into fresh concrete.

Item	Tolerances Plus or Minus
Slabs	5 mm
Other Structural Members	10 mm
Rebar Bends and Ends	50 mm

- .13 Prior to closing forms and placing concrete, obtain Departmental Representative's acceptance of completed installation of reinforcement. Review in-place and instructions resulting from such review will take precedence over previous instructions or reviews.

3.4 Field Bending

- .1 Do not field bend reinforcement except where indicated or authorized in writing by the Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

3.5 Welding Reinforcing Steel

- .1 Welding of reinforcing steel to plates or to other reinforcing steel shall be in accordance with CSA-W186.
- .2 The organization undertaking to weld under this section shall be certified by the Canadian Welding Bureau in accordance with CSA-W47.1.

3.6 Cleaning

- .1 Ensure concrete reinforcing is clean and free from oil and deleterious matter.
- .2 Remove all loose scale, loose rust and other deleterious matter from surfaces of reinforcing.

3.7 Field Touch-Up

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

END OF SECTION

1.0 GENERAL

1.1 Work Included

- .1 All cast-in-place concrete shown on Drawings.
- .2 Repairing concrete imperfections.
- .3 Finishing formed concrete surfaces.

1.2 Related Work

- .1 Section 03 10 00 - Concrete Formwork and Falsework.
- .2 Section 03 20 00 - Concrete Reinforcement.
- .3 Section 05 12 00 - Structural Steel.

1.3 References

- .1 ASTM C260-15, "Standard Specification for Air-Entraining Admixtures for Concrete".
- .2 ASTM C494-15, "Standard Specification for Chemical Admixtures for Concrete".
- .3 ASTM C1017-13, "Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete".
- .4 CSA-A23.1-14, "Concrete Materials and Methods of Concrete Construction".
- .5 CSA-A23.2-14, "Methods of Test and Standard Practices for Concrete".
- .6 CSA-A3001-13, "Cementitious Materials for Use in Concrete".

1.4 Quality Assurance

- .1 Cast-in-place concrete to conform to CSA-A23.1.
- .2 Testing shall conform to CSA-A23.2.
- .3 These standards shall be available in the Contractor's site office for the use of the Contractor, Subtrades, and Departmental Representative.
- .4 Provide a system of quality control and quality assurance to ensure that the minimum standards specified herein are attained.
- .5 Obtain acceptance of resultant concrete surface finish prior to placing or finishing subsequent concrete.

1.5 Submittals for Review

- .1 Submit concrete mix proportions in accordance with Division 1 and Table 5 in CSA-A23.1 Alternate 1.
- .2 At the request of the Departmental Representative, submit a letter, signed and sealed by a Professional Engineer registered in the Province of Alberta, stating that all concrete supplied meets the project specifications and requirements of CSA-A23.1.
- .3 Submit proposed source of aggregates, including results of petrographic examination indicating petrographic number (PN) and ironstone content for each coarse aggregate proposed for use, which will include evidence that aggregates are not susceptible to alkali-aggregate reactions. Petrographic analysis shall be performed by an experienced qualified petrographer of a CSA certified laboratory. The analysis of the aggregates shall be current and fully represent the material to be used in production. Sampling and testing shall have been done no more than ninety (90) days prior to concrete production. Refer to 2.1.5 for ironstone and coal/lignite limits

1.6 Inspection and Testing

- .1 Notify Departmental Representative at least 24 hours before complete formwork and concrete reinforcement will be ready for inspection.
- .2 Allow ample time for inspection and corrective work, if required, before scheduling concrete placement.
- .3 Concrete sampling, inspection and testing is to be performed by an Inspection and Testing Firm appointed and paid by the Owner.
- .4 Provide free access to all portions of work and cooperate with appointed firm.
- .5 Submit proposed mix design of each class of concrete to Departmental Representative for review prior to commencement of work.
- .6 Tests of cement and aggregates may be performed to ensure conformance with requirements stated herein.
- .7 Notify Inspection and Testing Firm before placing concrete, in ample time to permit scheduling.
- .8 One (1) set of concrete test cylinders will be taken for every 50 to 100 m³ or less of each class of concrete placed each day.
- .9 A set of test cylinders will consist of:

- .1 Three (3) cylinders, unless noted otherwise. One (1) cylinder will be tested at 7 days, and two (2) cylinders will be tested at 28 days.
- .2 Four (4) cylinders for concrete with CSA exposure class S-1, S-2, S-3, or concrete defined as HVSCM-1. One (1) cylinder will be tested at 7 days, one cylinder will be tested at 28 days, and two cylinders will be tested at 56 days.
- .3 One (1) additional test cylinder will be taken during cold weather concreting, and be cured on job site under the same conditions as concrete it represents. The field cylinders will be tested at 28 days.
- .10 One slump test and one air content test will be taken for each set of test cylinders taken.
- .11 Additional slump tests may be taken as necessary to verify quality of concrete.
- .12 Concrete for the test cylinders, slump and air tests will be taken from the discharge point closest to the point of final deposit in the form in order to best represent the in situ conditions. These samples will not be taken from the first or last portions of concrete discharged from the delivery truck.
- .13 Testing of concrete will be performed in accordance with CAN/CSA-A23.2. Test results will be issued to Contractor, Departmental Representative and Owner.
- .14 Pay costs for retesting required due to defective materials or workmanship.
- .15 Contractor may arrange and pay for additional tests for use as evidence to expedite construction.

2.0 PRODUCTS

2.1 Concrete Materials

- .1 Portland cement: to CSA-A3000, Type GU.
- .2 Supplementary cementing materials (SCM): to CSA-A23.1, Type F, CI, or CH flyash. A maximum of 25% flyash shall be permitted for concrete with exposure class Class C-1 and C-2 when exposed to freezing and thawing.
- .3 Water: to CSA-A23.1.
- .4 Aggregates: to CSA-A23.1. Coarse aggregates to be normal density. Ironstone content shall not exceed one percent (1.0%) for coarse aggregate and one point five percent (1.5%) for fine aggregate. Coal and lignite content shall not exceed 0.1% for coarse aggregate and 0.5% for fine aggregate.
- .5 Air entraining admixture: to ASTM C260. Notwithstanding tabulated concrete properties in Section 2.2 below, air may be deleted for interior slab work.

- .6 Chemical admixtures: to ASTM C494/C494M. Admixtures containing chlorides are not permitted.
- .7 Bonding agent: 100% Acrylic high strength.
- .8 Superplasticizers: to ASTM C1017/1017M.
- .9 Ensure that no aggregates are used which may undergo volume change due to alkali reactivity, moisture retention or other causes. Confirm suitability of aggregate with a petrographic analysis as directed by Departmental Representative.

2.2 Concrete Mixes

- .1 Pay all costs for mix design. Submit design of a proven mix to Inspection and Testing Firm and Departmental Representative for review.
- .2 Do not change concrete mix without prior approval of Departmental Representative. Should change in material source be proposed, submit new mix designs to be reviewed by Departmental Representative.
- .3 Use accelerating admixtures in cold weather only when approved by Departmental Representative. If approved, the use of admixtures will not relax cold weather placement requirements. Do not use calcium chloride.
- .4 Use set-retarding admixtures during hot weather only when approved by Departmental Representative.
- .5 All admixtures are subject to the approval of the Departmental Representative. List all proposed admixtures in mix design submission. Do not change or add admixtures to approved design mixes without Departmental Representative's approval.
- .6 Concrete delivered to Site must be accompanied by a delivery slip in accordance with CAN/CSA-A23.1.
- .7 Provide concrete mixed in accordance with requirements of CSA-A23.1 to give the following properties:

Location	CSA Exposure Class	Cement Type	Minimum Compressive Strength (MPa)	Max w/c Ratio	Max Aggregate (mm)	Air Content (%)
Curbs and Slabs	F-2	GU	30 @ 28 Days	0.55	20	4-7

3.0 EXECUTION

3.1 Examination

- .1 Before starting this work, examine work done by others which affects this work.
- .2 Notify the Departmental Representative of any conditions which would prejudice proper completion of this work.
- .3 Commencement of work implies acceptance of existing conditions.

3.2 Placing Concrete

- .1 Place concrete in accordance with requirements of CSA-A23.1 and as indicated on drawings.
- .2 Immediately before concrete is placed, all forms shall be carefully inspected to ensure that they are properly placed, sufficiently rigid and tight, and that all reinforcing steel is in the correct position and secured against movement during the placing operation. All forms shall be thoroughly cleaned and all debris, snow, ice or other foreign material removed. Chemicals shall not be used to remove ice or hardened concrete from the forms. All forms shall be thoroughly soaked with water except in freezing weather.
- .3 Handling equipment shall be kept free from hardened concrete or foreign material, and cleaned at frequent intervals.
- .4 Notify Departmental Representative and Inspection and Testing Firm minimum 24 hours prior to commencement of concrete operations.
- .5 Ensure all anchors, seats, plates and other items to be cast into concrete are securely placed, and will not interfere with concrete placement.
- .6 Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent the separation or loss of the ingredients. Concrete shall be deposited in the forms as nearly as practicable in its final position to avoid rehandling or flowing. Vibrators shall not be used to move concrete. Under no circumstances shall the concrete which has partially hardened by deposited in the forms.
- .7 When concrete is started, it shall be carried on as a continuous operation until the placing of the section is completed. When shown on the Drawings, concrete shall be placed in the sections indicated and according to the sequence given.
- .8 Maintain accurate records of cast-in-place concrete items. Record date, location of pour, quantity, air temperature and test samples taken.
- .9 Ensure reinforcement, inserts, embedded parts, formed expansion and control joints and heating pipes are not disturbed during concrete placement.

- .10 Prepare set concrete by removing all laitance and loose materials and applying bonding agent. Apply bonding agent in accordance with manufacturer's recommendations.
- .11 Place concrete continuously between present construction and control joints.
- .12 Vibrate concrete using the appropriate size equipment as placing proceeds in strict accordance with CSA-A23.1. Check frequency and amplitude of vibrations prior to use. Provide additional standby vibrators in the event of equipment failure.
- .13 Where bonding a topping to previously placed substrate concrete is required, ensure that the substrate concrete surface is rough, clean and free of oil, grease, laitance and loose material such as dust and debris. Thoroughly clean the substrate and place the bonding agent to substrate immediately prior to placing the topping in accordance with the manufacturer's recommendations.
- .14 Where placing operations would involve dropping the concrete more than 1.5 meters, it shall be placed through "canvas elephant trunks" or galvanized iron chutes. Concrete levels shall not be raised at a rate greater than that for which proper vibration may be affected.
- .15 The concrete surfaces shall be protected from rain until the final set occurs.
- .16 A minimum of 72 hours shall elapse between adjacent pours separated by construction joints or expansion joints.
- .17 Do not place concrete in the interior of a building if carbon dioxide producing equipment has been in operation in the building during the 12 hours preceding the pour. This equipment shall not be used during placing or for 24 hours after placing. During placing and curing concrete, surfaces shall be protected by formwork or an impermeable membrane from direct exposure to carbon dioxide, combustion gases or drying from heaters.
- .18 Honeycombing or embedded debris in concrete is not acceptable.
- .19 Remove and replace defective concrete in accordance with Clause 3.12 of this Section.

3.3 Construction Joints

- .1 Joints not indicated on the Drawings shall be located so as to least impair the strength of the structure. The location of these joints shall be subject to the prior approval of the Departmental Representative. Joints shall be in accordance with CSA-A23.1, or as indicated on Drawings or direct by the Departmental Representative.
- .2 Construction joints shall be completed as follows:

- .1 Reinforcement continuous through the joint.
- .2 Roughen surface to minimum 5 mm amplitude by sandblasting and/or high pressure water blasting.
- .3 The surface of hardened concrete shall be roughened and thoroughly cleaned of foreign matter and laitance, and shall be thoroughly wetted with water but not saturated and the forms re-tightened against the face of the hardened concrete before depositing additional concrete. Epoxy bonding agents may be required as directed by the Departmental Representative.

3.4 Cold and Hot Weather Concreting

- .1 Conform to requirements of CSA-A23.1.
- .2 Refer to Division 1 for temporary enclosure and heating requirements.
- .3 Protect slabs being finished during drying conditions above 25°C and/or during high winds with moisture retention film.

3.5 Concrete Protection for Reinforcement

- .1 Ensure reinforcement is placed to provide minimum concrete cover in accordance with CSA-A23.1 or as shown on Drawings.

3.6 Install Items Specified Under Other Sections

- .1 Install hangers, sleeves, anchors, etc. specified under other Sections.
- .2 Pour concrete after other trades have satisfactorily installed their materials.
- .3 Do not eliminate or displace reinforcement to accommodate hardware. If hangers, inserts, anchors, etc. cannot be located as specified obtain approval of all modifications from Departmental Representative before placing concrete.

3.7 Curing and Protection

- .1 Cure and protect freshly placed concrete in accordance with CSA-A23.1 and this specification.
- .2 Cure concrete and concrete toppings by maintaining concrete surfaces continuously moist at a minimum temperature of 10°C for the minimum length of time as specified in CSA A23.1.
- .3 Cure concrete slab and concrete toppings by one of the following methods:
 - .1 Ponding or continuous sprinkling.
 - .2 Absorptive fabric covered with polyethylene and kept continuously moist.

- .4 During hot weather provide additional initial curing for concrete slabs in accordance with recommendations of ACI 305R.
 - .1 Keep surface moist by fogging until bleeding has stopped if rate of evaporation exceeds rate of bleeding.
 - .2 Apply evaporation retardant if rapid drying ambient conditions exist.
- .5 Curing compounds may be used on columns, non-watertight walls and roof slabs except as noted. Contractor to submit proposed application procedure for review.
 - .1 Apply compound immediately after removal of forms.
 - .2 Apply compound with roller, brush, or airless sprayer in accordance with manufacturer's instructions.
 - .3 Submit proof of compound compatibility with subsequent coatings and membranes.
 - .4 Submit procedure for removing curing compound where subsequent coating or membranes are not compatible with curing compound.
- .6 Curing compounds may not be used for floor slabs, toppings, architectural concrete or surfaces to receive bonded toppings.

3.8 Frost Protection

- .1 After concrete curing process is completed, provide continuous protection for slabs and foundations on ground to prevent subgrade below from freezing during cold weather. Provide heated enclosures, insulation, etc., as required.
- .2 All concrete poured shall be hoarded and heated to protect the work during freezing conditions. The cost of this shall be included in the Contractor's tender cost.

3.9 Formed Concrete

- .1 Inspect concrete surfaces immediately upon removal of forms.
- .2 Treat imperfections in formed surfaces in accordance with CSA-A23.1 and to Departmental Representative's approval.
- .3 Modify or replace concrete not conforming to qualities, lines, details and elevations specified herein or indicated on Drawings.

3.10 Finishing Formed Surfaces

- .1 Finish all exposed formed concrete surfaces with sack rubbed finish conforming to CSA-A23.1.

- .2 Fill all surface voids wider than 0.5mm and deeper than 1.0mm for all exposed wall surfaces. Surface voids shall be filled with patching mortar in accordance with the manufacturer's instructions.
- .3 Inspect concrete surfaces immediately upon removal of all formwork.
- .4 Patch imperfections when concrete is green.
- .5 Remove all exposed metal form ties, nails and wires, break off fins and remove all loose concrete.
- .6 Thoroughly wet all form tie pockets and patch with patching mortar followed by proper curing.
- .7 Chip away honeycombed and other defective surfaces to depth of not less than 25mm with the edges perpendicular to the surface. Thoroughly wet and patch with patching mortar followed by proper curing.

3.11 Finishing Walks, Curbs, Ramps, Steps

- .1 Finish edges of curbs, walks and pads to smooth radius.
- .2 On walks, tool control joints across at spacing shown on Drawings.
- .3 Broom finish surface of overhead door pads, man door aprons, steps, walks, curbs and ramps.
- .4 Apply curing and sealing compound to manufacturer's directions.

3.12 Defective Concrete

- .1 Concrete not meeting the requirements of the Specifications and Drawings shall be considered defective concrete.
- .2 Concrete not conforming to the lines, detail and grade specified herein or as shown on the Drawings shall be modified or replaced at the Contractor's expense and to the satisfaction of the Departmental Representative. Finished lines, dimensions and surfaces shall be correct and true within tolerances specified herein and in the Formwork Section of these Specifications.
- .3 Concrete not properly placed resulting in excessive honeycombing, and all honeycombing and other defects in critical areas of stress shall be repaired or replaced at the Contractor's expense and to the satisfaction of the Departmental Representative.
- .4 To conform to the strength requirements, the average of all tests shall exceed the specified strength. When five or more tests of the same class of concrete are available, the average of any five consecutive tests shall be equal to, or greater than the specified strength, and no strength test shall fall more than 3.5 MPa below the specified strength. If any of the criteria of the above clause are not

met, the Departmental Representative shall have the right to require one or more of the following:

- .1 Changes in mix proportions for the remainder of the work.
- .2 Cores drilled and tested from the areas in question as directed by the Departmental Representative and in accordance with CSA-A23.2. The test results shall be indicative of the strength of the in-place concrete.
- .3 Load testing of the structural elements. The changes in the mix proportions and the testing shall be at the Contractor's expense.
- .5 Concrete failing to meet the strength requirements of this specification shall be strengthened or replaced at the Contractor's expense and the satisfaction of the Departmental Representative.

3.13 Patching

- .1 Allow Departmental Representative to inspect concrete surfaces immediately upon removal of all formwork.
- .2 Patch imperfections when concrete is green.
- .3 Remove all exposed metal form ties, nails and wires, break off fins and remove all loose concrete.
- .4 Thoroughly wet all form tie pockets and patch with patching mortar followed by proper curing.
- .5 Chip away honeycombed and other defective surfaces to depth of not less than 25mm with the edges perpendicular to the surface. Thoroughly wet and patch with patching mortar followed by proper curing.

3.14 Clean-Up

- .1 At completion of work, remove from site all debris, excess materials and equipment.

END OF SECTION

1.0 GENERAL

1.1 Work Included

- .1 Structural framing including columns, beams, hollow sections and channels.
- .2 Architecturally exposed structural steel (AESS) members.
- .3 Support channels and angles attached to structural framing.
- .4 Baseplates, bearing plates, anchor rods, and vertical and horizontal bracing.
- .5 Welds, bolts, washers, nuts, shims, and connecting material.
- .6 Prime paint and/or galvanize structural steel members and appurtenances.
- .7 Field touch up of primed or galvanized surfaces including field welding.
- .8 Temporary erection bracing during construction.

1.2 Related Work

- .1 Section 03 30 00 – Cast in Place Concrete.

1.3 References

- .1 ASTM A123/A123M-15, Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A325M 2014, Standard Specification for Structural Bolts, Steel, and Heat Treated 830 MPa Minimum Tensile Strength (Metric).
- .3 ASTM A490M REV A 2014, Specification for High-Strength Steel Bolts.
- .4 ASTM A572/A572M 2015, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
- .5 ASTM A992/A992M 2011 R2015, Standard Specification for Structural Steel Shapes.
- .6 CISC/CPMA 1-73a, A Quick-Drying One-Coat Paint for Use on Structural Steel.
- .7 CISC/CPMA 2-75, A Quick-Drying Primer for Use on Structural Steel.
- .8 CISC Code of Standard Practice for AESS definitions of Categories.
- .9 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .10 CSA-S16-14, Limit States Design of Steel Structures.

- .11 CSA-S136-12, North American Specification for the Design of Cold Formed Steel Structural Members.
- .12 CSA-W47.1-09 (R2014), Certification of Companies for Fusion Welding of Steel.
- .13 CSA-W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
- .14 CSA-W55.3-08, Certification of Companies for Resistance Welding of Steel and Aluminum
- .15 CSA-W59-13, Welded Steel Construction (Metal Arc Welding).
- .16 SSPC-SP 1, Solvent Cleaning
- .17 SSPC-SP 3, Power Tool Cleaning
- .18 SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning.
- .19 SSPC-SP 7 /NACE No. 4, Brush Off Blast Cleaning.
- .20 SSPC-SP 8, Pickling.
- .21 SSPC-SP 10/NACE No.2, Near-White Blast Cleaning.

1.4 Design Standards, Code Requirements

- .1 Conform to requirements of CSA-S16-14, CSA-S136-12, the Canadian Institute of Steel Construction (CISC) "Code of Standard Practice for Buildings", and the Provincial Construction Safety Act.
- .2 Use loads, load combinations, and stress levels shown on Drawings and in accordance with the Alberta Building Code 2014.
- .3 Architecturally exposed structural steel (AESS) members to conform to the CISC Code of Standard Practice, according to the Category as specified by the Architect.
- .4 Shear connections:
 - .1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.
 - .2 Select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam, when shears are not indicated.

- .5 Submit sketches and design calculations stamped and signed by a qualified Professional Engineer registered in the Province of Alberta for non-standard connections.
- .6 All shop drawings containing connection details to be stamped and signed by a qualified Professional Engineer registered in the Province of Alberta.
- .7 Perform all welding in accordance with requirements of CSA-W59.

1.5 Qualifications

- .1 All work is to be performed by a firm certified by the Canadian Welding Bureau to the requirements of CSA W47.1 in Division 1 or Division 2.1.
- .2 All welders employed for erection are to possess valid "S" Classification Class "O" certificates issued by the Canadian Welding Bureau.

1.6 Inspection & Testing

- .1 Shop and field inspection and testing may be performed by an Inspection and Testing Firm appointed and paid for by the Owner.
- .2 Provide free access to all portions of work in the shop and in the field and cooperate with appointed firm.
- .3 Pay all additional costs for inspection and re-inspection due to defective workmanship or materials.
- .4 If requested by the Departmental Representative, submit four (4) copies of mill test reports, properly correlated to materials actually used.
- .5 Radiographic and magnetic particle inspection of welds may be performed by the Inspection and Testing Firm, in accordance with CSA W59 and ASTM E109, for all full penetration welds and, all column splices.
- .6 All welds are to be visually inspected.
- .7 Welds are to be considered defective if they fail to meet quality requirements of CSA W59.
- .8 High strength bolted connections are to be inspected and tested in accordance with Clause 23.9 of CSA-S16.

1.7 Shop Drawings and Submittals

- .1 Provide a fabrication and erection schedule to the Departmental Representative prior to commencement of shop fabrication and field erection, in ample time to allow proper scheduling of inspection and testing.
- .2 Submit details of typical connections and special connections for review prior to preparation of shop drawings.

- .3 All shop drawings containing connection details to be stamped and signed by a qualified Professional Engineer registered in the Province of Alberta.
- .4 Submit shop drawings for review in accordance with Division 1.
- .5 Clearly indicate profiles, sizes, spacing and locations of structural members, connections, attachments, reinforcing, anchorage, framed openings, size and type of fasteners, cambers and loads, accessories, column anchor bolt locations, and setting details.
- .6 Include erection drawings, elevations, and details.
- .7 Indicate welded connections using welding symbols in compliance with CISC Welding Standards. Clearly indicate net weld lengths.
- .8 Shop drawing review by the Departmental Representative is solely to ascertain conformance to the general design concept.
- .9 Responsibility for approval of detail design inherent in shop drawings rests with the Contractor and review by the Departmental Representative shall not imply such approval.
- .10 Review shall not relieve the Contractor of his responsibility for errors or omissions in shop drawings or for proper completion of the Work in accordance with the Contract Documents.
- .11 Responsibility for verification and correlation of field dimensions, fabrication processes, and techniques of construction, installation and coordination of all parts of the Work rests with the Contractor.

2.0 PRODUCTS

2.1 Materials

- .1 All materials are to be new.
- .2 Beam End Plates, Ledger Angles, and Miscellaneous Steel: to CSA-G40.21, Grade 300W with minimum yield strength of 300 MPa.
- .3 Base and Cap Plates: to CSA-G40.21, Type 300W with minimum yield strength of 300 MPa.
- .4 Structural steel wide flange sections (W shapes): conforming to CSA-G40.21, Grade 350W with minimum yield strength of 350 MPa, or conforming to ASTM A992 or A572, Grade 50 with minimum yield strength of 345 MPa.
- .5 Structural Channels (C shapes): conforming to CSA-G40.21, Grade 300W with minimum yield strength of 300 MPa.

- .6 Hollow Structural Sections: conforming to CAN/CSA G40.21, Grade 350W Class 'C' with minimum yield strength of 350 MPa. Hollow structural sections conforming to ASTM A500 Grade C will not be acceptable unless approved by the Departmental Representative.
- .7 Bolts, Nuts and Washers: conforming to ASTM A325M; finished to match members to which they attach.
- .8 Anchor Rods: fabricated from material conforming to CSA-G40.21, Grade 300W with minimum yield strength of 300 MPa; nuts and washers to be of equal or greater strength than rods.
- .9 Welding Materials: conforming to CSA-W59.
- .10 Primer: primer to CISC/CPMA 1-73b or CISC/CPMA 2-75. Color to be selected by Architect from standard color chart.
- .11 Galvanizing: conforming to ASTM A123.
- .12 Touch-up galvanizing with minimum 2 coats of zinc rich primer.

2.2 Fabrication

- .1 Fabricate structural steel members in accordance with CSA-S16 and CSA-S136.
- .2 Verify all drawing dimensions prior to commencing fabrication.
- .3 Provide openings and punched holes 10 – 30 mm in diameter in structural members for other building components. Reinforce openings with steel plates sized and welded in place, to restore members to original design strength. Locate holes so as to cause no appreciable reduction in strength of members.
- .4 Provide connections for loads indicated on the Drawings as a minimum.
- .5 Provide for field connections to be bolted except where field welded connections are shown on the Drawings. Bolted connections shall be bearing type connections with the thread excluded from the planes of shear.
- .6 Provide CISC double angle header connections wherever possible.
- .7 Provide top and bottom flange angle clips for all spandrel beams.
- .8 Accurately cut and mill column ends and bearing plates to assure full contact of bearing surfaces prior to welding.
- .9 Close and weatherproof all gaps, butt joints, and connections exposed to exterior of building. Grind all exposed welds flush with surface of welded members.
- .10 Weld shear studs in place with stem perpendicular to member, in full fusion weld.

- .11 Design and detail connections for structural steel so that corrosion potential is minimized. Cap and seal weld all exposed ends of HSS sections.
- .12 Weld reinforcing bars to structural steel where approved by the Departmental Representative or as shown on Drawings in accordance with CSA-W186.

2.3 Shop Painting

- .1 Clean all members, remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surfaces according to SSPC-SP3 "Power Tool Cleaning", unless noted otherwise.
- .2 Clean surfaces according to SSPC-SP10 "Near-White Blast Cleaning" for all steel that will be galvanized. All steel outside of the building envelope and in the washbays located between Grids B and D (inclusive) to be galvanized, unless noted otherwise. Refer to Drawings for extent of galvanized steel.
- .3 Clean surfaces prior to painting according to SSPC-SP6 "Commercial Blast Cleaning" for all architecturally exposed steel. Refer to Drawings for extent of architecturally exposed steel.
- .4 Apply one coat of prime paint in the shop to all steel surfaces, except:
 - .1 Surfaces to be encased in concrete.
 - .2 Surfaces to receive field installed stud shear connectors.
 - .3 Surfaces and edges to be field welded.
 - .4 Faying surfaces of friction-type connections.
 - .5 Surfaces to receive sprayed fireproofing.
 - .6 Surfaces to be galvanized.
- .5 Apply paint under cover, on dry surfaces only and when surface and air temperatures are above 5°C.
- .6 Maintain dry condition and 5°C minimum temperature until paint is thoroughly dry.
- .7 Patch paint bolts, nuts, sharp edges, and corners one coat before full prime coat is applied.
- .8 Apply paint by brush, spray, or dipping to a dry film thickness of 0.05 mm minimum.
- .9 Clean surfaces prior to galvanizing according to SSPC-SP8 "Pickling" unless noted otherwise.

3.0 EXECUTION

3.1 Examination

- .1 Before starting erection, take field measurements and examine other work that may affect this work.
- .2 Notify the Departmental Representative of any conditions which would prejudice proper installation of this work.
- .3 Commencement of this work implies acceptance of existing conditions.

3.2 Damaged Members

- .1 Repair or replace members damaged during transit or erection, before securing in position.
- .2 Before starting erection, check all AESS members upon delivery for twist, kinks, gouges or other imperfections which may result in the rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel.

3.3 Erection

- .1 Erect structural steel in accordance with CSA-S16 and Drawings.
- .2 Field connections are to be bolted or welded, or as shown on Drawings.
- .3 Do not field weld wet surfaces or during rain unless under cover.
- .4 Do not weld at temperature below 5°C except with express permission of the Departmental Representative.
- .5 Conform to requirements of CSA-W59 for minimum preheat and interpass temperatures.
- .6 Make adequate provision for all erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of necessary permanent bracing.
- .7 Provide connections for temporary shoring, bracing and supports only where noted on the approved shop erection drawings. Temporary connections shall be made at locations not exposed to view in the final structure or as approved by the Architect.
- .8 Set column bases and other vertical members to design elevations on levelling nuts or steel shims. Do not use wood shims.
- .9 Use only light drifting to draw parts together. Enlarge holes for bolted connections with reamers or twist drill only. Do not burn to form holes, enlarge holes or match unfair holes.

- .10 Erection error is not to exceed requirements of CSA-S16.
- .11 Obtain Departmental Representative 's written permission prior to field cutting or altering structural members.

3.4 Cleaning and Touch ups

- .1 After erection field prime welds, nuts, bolts, washers, and touch up abrasions and damage to shop primed surfaces.
- .2 Touch-up galvanizing with minimum 2 coats of zinc rich primer.

END OF SECTION

1.0 GENERAL

1.1 Section Includes

- .1 Requirements for the installation of preformed metal cladding/siding.

1.2 References

- .1 American National Standards Institute (ANSI).
 - .1 ANSI B18.6.3, Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM D2369, Test Method for Volatile Content of Coatings.
 - .2 ASTM D2832, Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.
 - .3 ASTM F1667, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

1.3 Design Requirements

- .1 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects.
- .2 Design expansion joints to accommodate movement in cladding and between cladding and structure to prevent permanent distortion or damage to the cladding.

1.4 Submittals

- .1 Product data: submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures. Indicate arrangement of cladding system, including dimensions, location of joints, profiles of outer skin, types and locations of supports, fasteners, flashing, closures and all metal components related to the cladding installation.
- .3 Samples:
 - .1 Submit duplicate 400 x 400 mm samples of cladding material, of colour and profile specified for review by the Parks Canada Representative, prior to fabrication.

- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 Quality Assurance

- .1 Manufacturer of wall system, and installer shall demonstrate at least five years experience in projects similar in scope.
- .2 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Maintenance Data

- .1 Provide maintenance data for cleaning and maintenance of panel finishes for incorporation into manual specified in Section 01 77 00 Closeout Procedures.

1.7 Product Delivery, Handling and Storage

- .1 Store components and materials in accordance with panel manufacturer's recommendations and protect from elements.
- .2 Protect prefabricated steel during fabrication, transportation, site storage and erection, in accordance with CSSBI Standards.

1.8 Warranty

- .1 Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty covering failure of factory-applied exterior finish within the warranty period. Warranty period for finish: 20 years after the date of Substantial Completion.

1.9 Waste Management and Disposal

- .1 Separate waste materials for reuse and/or recycling.
- .2 Divert used metal cut-offs from landfill by disposal removed for disposal at the nearest metal recycling facility.
- .3 Divert unused caulking, sealants, and adhesive materials from landfill through disposal at hazardous material depot.

2.0 PRODUCTS

2.1 Cladding Components

- .1 Cladding:
 - .1 Colour: colour selected by Parks Canada Representative.

- .2 Gloss: low.
- .3 Profile: 338 mm, 35 mm deep, preformed interlocking joints, fastener holes pre-punched.
- .4 Pattern: pattern surface.
- .5 Thickness: 0.61 mm base metal thickness.
- .1 Fascia and exposed trim:
 - .2 Colour: colour selected by Parks Canada Representative.
 - .3 Gloss: low
 - .4 Profile: manufacturer's standard as indicated.
 - .5 Pattern: pattern surface.
 - .6 Thickness: 0.61 mm base metal thickness.

2.2 Accessories

- .1 Flashing: Material to match cladding in exposed locations, galvanized material in concealed locations. Custom fabricated to suit architectural details, as required. Use preformed corner pieces only. Double back exposed edges.
- .2 Closures: Metal closures to suit profiles selected, to manufacturer's recommendations.
- .3 Sealants:
 - .1 Concealed: Tape or compound, non-skinning, non-drying, butyl rubber.
 - .2 Exposed: One part silicone.
- .4 Nails: ASTM F1667. Screws: ANSI B18.6.3. Machine Screws, and Metallic Drive Screws.

3.0 EXECUTION

3.1 Examination

- .1 Examine work of other Sections upon which work of this Section depends.
- .2 Report all discrepancies to Parks Canada Representative before beginning work on the roof system.

3.2 Manufacturer's Instructions

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.3 Installation

- .1 Install cladding in accordance with CGSB 93.5, and manufacturer's written instructions
- .2 Install continuous starter strips, inside and outside corners, edgings, soffit, drip, cap, sill and window/door opening flashings as indicated.
- .3 Install outside corners, fillers and closure strips with carefully formed and profiled work.
- .4 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.
- .5 Attach components in manner not restricting thermal movement.
- .6 Caulk junctions with adjoining work with sealant.

3.4 Cleaning

- .1 Clean exposed panel surfaces in accordance with manufacturer's instructions.
- .2 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Parks Canada Representative and only where appearance after touch-up is acceptable to Parks Canada Representative.
- .3 Replace damaged panels and components that, in opinion of the Parks Canada Representative, cannot be satisfactorily repaired.

END OF SECTION

1.0 GENERAL

1.1 Related Sections

- | | | |
|----|--------------------------------|------------------|
| .1 | Submittal Procedures | Section 01 33 00 |
| .2 | Structural Steel for Buildings | Section 05 12 00 |
| .3 | Automatic Entrances | Section 08 42 29 |

1.2 References

- .1 Not Used.

1.3 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Indicate assembly details, material, thickness, hardware attachments and accessories.

2.0 PRODUCTS

2.1 Materials

- .1 Door:
- .1 Flexible polyvinyl chloride reinforced fabric, colour as selected by Client.
- .2 Vision panels: 600 x 600mm clear polyvinyl chloride.
- .3 Automatically self re-inserting.
- .2 Side Guides:
- .1 Structural channels 84 x 51 x 3mm galvanized steel.
- .2 Inner Side Guide: in polyethylene; outer section 22 x 40 mm, son springs. Include galvanized side guide covers.
- .3 Drum:
- .1 Steel, 102 x 2mm, shafts in steel.
- .4 Motor:
- .1 Without brake
- .2 4 poles

- .3 Controlled by variable speed drive
- .4 Power: 2 HP
- .5 Protection degree NEMA 4.
- .5 Gearbox:
 - .1 Size 63
- .6 Operating Speed:
 - .1 1220mm per second
- .7 Detectors:
 - .1 Infrared photocell inside side guide mounted 305mm above floor.
 - .2 Bottom edge detector.
- .8 Acceptable Product:
 - .1 Dynaco Power M2, Dynaco Power M3 or approved alternate.

3.0 EXECUTION

3.1 Installation

- .1 Install doors, hardware, airseals and vision panels in accordance with manufacturers' written instructions.
- .2 Adjust operable parts for correct function.

END OF SECTION

1.0 GENERAL

1.1 Products Supplied But Not Installed Under This Section

.1 Not used.

1.2 Products Installed But Not Supplied Under This Section

.1 Installation by this section:

.1 Supply of Flexible Traffic Doors Section 08 38 16:

1.3 Related Requirements

.1 Flexible Traffic Doors Section 08 38 16

1.4 References

.1 ASTM International

.1 ASTM D 2000-12, Standard Classification System for Rubber Products in Automotive Applications.

.2 ASTM D 2287-12, Standard Specification for Non Rigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.

.3 ASTM E 330-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.4 ASTM E 331-09, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

.5 ASTM E 547-09, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.

.2 CSA International

.1 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 Administrative Requirements

.4 Pre-Installation Meetings:

.1 Convene pre-installation meeting 1 week prior to beginning work of this Section and on-site installation, Parks Canada Representative in accordance with Section 01 31 19 - Project Meetings to:

- .1 Verify project requirements.
- .2 Review installation and substrate conditions.
- .3 Co-ordination with other building sub trades.
- .4 Review manufacturer's written installation instructions and warranty requirements.
- .5 Arrange for site visit with Parks Canada Representative prior to start of Work to examine existing site conditions adjacent to demolition Work.

1.5 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for [doors, hardware, and accessories] and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by Professional Engineer registered or licensed in Province of Alberta, Canada.
 - .2 Indicate layout, dimensions, elevations, detail sections of members and sill conditions, materials, finishes, recesses, hardware including mounting heights, anchors and reinforcements, provisions for expansion and contraction, types of sealants, details of other pertinent components of the work, and adjacent construction to which work of this section is attached.
 - .3 Identify installation tolerances required, assembly conditions, routing of service lines, locations of operating components, controls and boxes.
 - .4 Indicate door signs.
- .4 Manufacturers Reports:
 - .1 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.6 Closeout Submittals

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit project record documents that accurately record locations of concealed or remote equipment, services, and conduit.

- .3 Operation and Maintenance Data: submit operation and maintenance data for door system for incorporation into manual.
- .4 Parts List:
 - .1 Submit manufacturer's parts lists; include servicing frequencies, instructions for adjustment and operation applicable to each type of component or hardware, and name, address and telephone number of nearest authorized service representative.
- .5 Maintenance Contract:
 - .1 Supply complete service and maintenance of operating equipment for 1 year from date of substantial performance of the work.

1.7 Maintenance Material Submittals

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Supply wrenches and tools required for maintenance of equipment.

1.8 Quality Assurance

- .1 Regulatory Requirements:
 - .1 Conform to applicable code for automatic release of control drive unit to permit manual operation of emergency exit doors.
- .2 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.9 Delivery, Storage and Handling

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

- .4 Cover exposed metal surfaces with pressure sensitive heavy protection paper or strippable plastic coating.
 - .1 Use materials of type which will not leave residue or become bonded when exposed to sun.
 - .2 Use padded blankets or approved protective wrapping for decorative metal work and similarly finished exposed elements.

1.10 Warranty

- .1 Contractor hereby warrants that automatic doors will function as specified by manufacturer, for 36 months.
- .2 Warranty: include coverage of repair or replacement of components or entire units which fail in materials workmanship. Failures include but are not necessarily limited to, structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation of operators speed control and hardware, deterioration of metals, metal finishes, and other materials beyond normal weathering.

2.0 PRODUCTS

2.1 Performance Requirements:

- .1 Automatic door equipment to accommodate medium frequency vehicular traffic of 8 cycles per hour, and weight of doors.
- .2 Operator Equipment: CSA approved.
- .3 Design fabric roll up door systems to operate, hold open and close under design wind and suction loads, as calculated in accordance with Alberta Building Code.
- .4 Design framing members to withstand their own weight, loads imposed by motion of operable elements, and design wind and suction loads, as calculated in accordance with applicable code and applicable municipal regulations, to maximum allowable deflection of 1/175 of span. Design for thermal movement of door and screen framing system caused by ambient temperature range of 70 degrees C without causing buckling, failure of seals, undue stress on fasteners or other detrimental effects, and to prevent transmission of stress to operators.
- .5 Design for dimensional distortion of components during operation.
- .6 Supply manual operation for opening and closing of doors during electrical power failure and when power is manually switched off.
- .7 Include fully adjustable operators for opening and closing speeds, hold open time and cancellation on activation of fire alarm and smoke detection system.
- .8 Supply framing members and finished metal sheets with uniform appearance and colour.

.9 Eliminate possibility of water accumulating and freezing in door power units.

.10 Design equipment to operate at ambient temperatures between 40 degrees C and 30degrees C.

2.2 Automatic Door System

.1 Automatic Door Equipment: electro-mechanically operated with in slab detection loops or manual switch control devices.

2.3 Materials

.1 VOC limit 250g/L maximum to SCAQMD Rule 1113.

.2 Galvanizing Touch-Up: zinc-rich, organic, ready mixed primer to CAN/CSA G164.

.3 Isolation Coating: zinc chromate primer to CGSB 1.132M] [acid and alkali resistant bituminous paint] [epoxy solution].

.4 Weather stripping:

.1 Sill Gasket: resilient seal type, surface mounted on door, replaceable.

.5 Sealants and Gaskets:

.1 Types recommended by manufacturer to remain permanently elastic, non-shrinking and non-migrating, and required for fabrication and assembly of door framing.

2.4 Automatic Operators

.1 Concealed in floor operator for accommodating door action.

.2 Fully adjustable without removal of doors. Supply adjustable speed control for checking opening and closing cycles and length of time door remains open.

.3 Supply connections for power and control wiring.

.4 Supply for manual operation when power is off.

.5 Equip operators with current characteristics to suit building's electrical service.

2.5 Operator Power Units

.1 Operation: [power open] [spring hold] [power close] [spring close] [power rotation] operation. [Include power boost spring close and hold feature with switch on operator].

.2 Electro-Mechanical Type W, self-contained, [chain] [gear] [belt] [linear] driven.

2.6 Door Operator Control Systems

- .1 Supply controls with detection patterns and sensitivity, for both operation and safety, of sizes and quantities required to suit project
- .2 Motion Detecting Control System.
- .3 Presence Sensor: In slab detection loop.

3.0 EXECUTION

3.1 Examination

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for automatic entrances installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Parks Canada Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 Installation

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Install doors, frames in accordance with shop drawings and manufacturer's instructions.
- .3 Co-ordinate installation of components with related and adjacent work. [Attach and seal air vapour barrier materials to perimeter framing.] [Attach and seal damp proofing flashings to perimeter framing.]
- .4 Set work plumb, square, level, free from warp, twist and superimposed loads.
- .5 Securely anchor work in required position. Do not restrict thermal movement.
- .6 Apply isolation coating to separate aluminum and primed or galvanized steel surfaces at points of contact with cementitious materials.
- .7 Install door operator system in accordance with manufacturer's instructions, including control wiring.
- .8 Set tracks, header assemblies, operating brackets, rails and guides level and true to location, with adequate anchorage for permanent support.

3.3 Adjusting

- .1 After repeated operation of completed installation equivalent to three days of use by normal traffic (100 to 300 cycles), readjust door operators and controls for optimum, smooth operating condition and safety . Lubricate hardware, operating equipment and other moving parts.

3.4 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Remove traces of primer, caulking; clean doors and frames.
 - .3 Clean aluminum surfaces promptly after installation. Exercise care to avoid damage to coatings.
 - .4 Remove protective material from prefinished aluminum surfaces.
 - .5 Wash exposed surfaces with mild solution of detergent and warm water, using soft, clean wiping cloths. Remove dirt from corners. Wipe surfaces clean.
 - .6 Remove excess sealant by moderate use of solvent, of type acceptable to sealant manufacturer.
 - .7 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5 Demonstration

- .1 Demonstrate operation, operating components, adjustment features, and lubrication requirements to Owner.

3.6 Protection

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by aluminum door and frame installation.

END OF SECTION

1.0 GENERAL

1.1 References

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1 Canadian Electrical Code, Part 1
- .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)

1.2 General Requirements

- .1 This specification and any addenda hereto form part of the contract documents and shall be read in conjunction with them. Work to include the furnishing of all labour and materials unless specified otherwise to complete and put into operating condition all electrical systems as indicated on the drawings and specified herein.
- .2 Intent of drawings and specifications is to include all labour, products and services necessary for complete work, tested and ready for operation.
- .3 Symbols used to represent various electrical devices often occupy more space on drawing than actual device does when installed. In such instances, locations of devices shall not be scaled out from electrical symbols. Install devices with primary regard for usage of wall space, convenience of operation and grouping of devices.
- .4 These specifications and the drawings and specifications of all other divisions shall be considered as an integral part of the accompanying drawings. Any item or subject omitted from either the specifications or the drawings but which is mentioned or reasonably specified in and by the others, shall be considered as properly and sufficiently specified and shall be provided.
- .5 Provide all minor items and work not shown or specified but which are reasonably necessary to complete the Work.
- .6 Responsibility to determine which Division provides various products and work rests with the Contractor. Additional compensation will not be considered because of differences in interpretation of specifications.
- .7 Execute all work in competent manner and to present acceptable appearance when completed.
- .8 Employ competent supervisor and sufficient number of licensed tradesmen to complete Work in required time.
- .9 Contractor shall examine carefully structural, architectural and mechanical drawings and work of other trades and satisfy himself that the work under this contract can be satisfactorily carried out without changes to the building as

shown on the plans. Should any difficulty arise showing conflict with, or requiring additional work beyond the work of these drawings, bring this matter to the attention of the engineer before submitting tender.

- .10 Drawings and specifications are complementary each to the other and what is called for by one to be binding as if called for by both.
- .11 Should any discrepancy appear between drawings and specifications which leaves electrical trade in doubt as to true intent and meaning, obtain ruling before submitting tender. If this is not done, it will be assumed that the most expensive alternate has been figured.
- .12 Operating voltages shall be according to CAN3-C235.
- .13 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .14 Language operating requirements: provide identification nameplates and labels for control items in English.

1.3 Setting-Out of the Work

- .1 Electrical trade to be responsible for correcting all work completed contrary to intent of drawings and specifications and bear all cost for same. Where intent of drawings and specifications is not clear, obtain clarification before proceeding with work.
- .2 Electrical trade to give work his personal supervision, lay out his own work, do all necessary levelling and measuring or employ a competent engineer to do so. Figures, full size and detail drawings to take precedence over scale measurements.
- .3 Where any equipment supplied by electrical trade must be built in with work of other contractors, this contractor to be responsible for supplying of equipment to be built in or measurements to allow necessary openings to be left so as not to hold up work.
- .4 Electrical trade to be responsible for any damage caused owner or any other trade by improper location or carrying out of his work.
- .5 In setting out of his work, Electrical trade to make reference to architectural, structural, and mechanical drawings. Consult with respective trades in setting out locations for conduit runs, lighting fixtures, panel assemblies, etc., so that conflicts are avoided and symmetrical spacing is maintained.

- .6 Where receptacles are mounted above counters, benches, splashbacks, etc., location and mounting heights of devices to be coordinated with the built-in units; refer to architectural details. Where receptacles occur in outside walls where heating units occur, receptacle height to be adjusted to coordinate with the heating units.
- .7 Contractor to coordinate any interruptions to adjoining spaces to avoid any inconveniences to occupants. If necessary, contractor to do any required connections on off hours.
- .8 Switch mounting heights to be coordinated with architectural details and to be adjusted, if required, to coordinate with panelling, dados, masonry course lines, etc.
- .9 Where outlets occur in exterior walls, electrical trade to ensure that there is insulation behind the outlet boxes to prevent condensation through the boxes.
- .10 Maintain separation between electrical wiring system and building piping, ductwork, etc. so that wiring system is isolated (except at approved connections to such systems) to prevent galvanic corrosion.
- .11 In particular, contact between dissimilar metals, such as copper and aluminium, in damp or wet locations is not permitted.
- .12 Do not support wiring from pipes, ductwork, ceiling hangars etc.
- .13 All conduit and cable entries through outside walls of buildings, through partition walls separating electrical rooms from other areas, through fire separations, and through floors or roofs above grade to be sealed to prevent passage of moisture, dust, gasses, flame, or to maintain pressurization.

1.4 Examination of the Site

- .1 Prior to submitting tender, electrical trade to carefully examine the site and ascertain all conditions which may affect his trade. No extras will be allowed for work resulting from conditions that would have been evident upon a thorough examination of site.

1.5 Mechanical Equipment and Starters

- .1 Unless specified otherwise, electrical trade to supply and install all conduit and wire, fittings and connections for all mechanical equipment. Motor protection switches complete with overload relays, etc. to be supplied and installed by electrical trade. Electrical trade to confirm with mechanical trade size, characteristics and locations of all mechanical equipment before installation of conduit, outlets, heaters, etc.
- .2 Wire and leave in operation all electrically operated equipment supplied under all contracts related to this project. All control wiring for control circuits applicable to equipment regardless of voltage shall be provided by division 16. Control circuits

may vary with different manufacturers of equipment. Verify all control circuits with suppliers of equipment and make any corrections that may be required.

- .3 Supply all pushbuttons, relays, starters, etc., necessary for operation of equipment. Check all starters, relay coils and thermal elements to ensure that they provide necessary protection for motors.

1.6 Cutting and Patching

- .1 General trade will be responsible for all cutting and patching required for electrical installation. Structural members must not be cut without consent of the engineer.
- .2 Where work by electrical trade damages work of other trades, electrical trade to repair and make good such damage to satisfaction of trade concerned and the engineer.

1.7 Cleanup

- .1 Electrical trade and his sub-trades to at all times during construction, keep site free of all debris, boxes, packing, etc., resulting from work of this trade.
- .2 Upon completion of work, electrical installation to be left in a clean and finished condition to satisfaction of the engineer.

1.8 Submittals

- .1 Shop Drawings:
 - .1 Submit drawings stamped by the submitting subcontractor and the prime contractor.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
 - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .5 Submit required number of copies of drawings to authority having jurisdiction and/or inspection authorities to obtain electrical construction permit.

- .6 If changes are required, notify Departmental Representative of these changes before they are made.
- .2 Quality Control:
 - .1 Provide CSA certified equipment and material.
 - .2 Submit test results of installed electrical systems and instrumentation.
 - .3 Permits and fees: in accordance with General Conditions of Contract.
 - .4 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
- .3 Manufacturer's Field Reports
 - .1 Submit to the Departmental Representative's manufacturer's written report, within three (3) days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.9 Standards of Material and Workmanship

- .1 All materials to be new and of the quality specified and conform to the standards of CSA. Where equipment or materials are specified by technical description only, they shall be of the best commercial quality obtainable for the purpose.
- .2 All work to be executed in a neat and workmanlike manner by qualified tradesmen. Electrical trade to keep a competent foreman and necessary assistants on the job during the progress of the work.
- .3 Products and materials referred to in specifications by trade names, manufacturer's name and catalogue reference are those which shall be used as basis for Tender.
- .4 Design has been based on use of specified product.

1.10 Quality Assurance

- .1 Regulatory Requirements:
 - .1 Comply with Safety Codes Act and rules and regulations made pursuant thereto, including Canadian Electrical Code.
 - .2 Unless otherwise indicated, all references in the Contract Documents to "Canadian Electrical Code" or "CEC" refers to the edition of the Canadian Electrical Code, Part I, CSA C22.1 - latest edition and the variations made thereto by local provincial regulation, which are in force on the date of bid closing for the Contract.

- .3 Should any instance occur in this Specification or on the Drawings in which the materials or construction methods called for are less than the minimum requirements of the above codes, the requirements of the codes to take precedence, and the Contractor is to supply the materials and perform the Work as though called for to the minimum code standards.
 - .4 All electrical products to be tested, certified, and labelled in accordance with a certification program accredited by the Standards Council of Canada. Where a product is not so labelled, provide written approval by the authority having jurisdiction.
 - .5 Aforementioned minimum standards are not to detract from the quality of materials or methods of installation shown where these exceed said standards.
 - .6 Submit to authority having jurisdiction and utility company, necessary number of Drawings and Specifications for examination and approval prior to commencement of electrical Work. Pay associated fees.
 - .7 Notify the Departmental Representative of changes required by Electrical Inspection Authority prior to making changes. Make reasonable changes and alterations required by the Inspection Authority at no extra cost to the Owner.
- .2 Qualifications: Electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of Provincial Act respecting manpower vocational training and qualification.
- .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.

1.11 Delivery, Storage and Handling

- .1 Material Delivery Schedule: provide Departmental Representative with schedule within two (2) weeks after award of Contract.

1.12 System Start-up

- .1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

1.13 Operating Instructions

- .1 Include to the existing Operation and Maintenance Manual the following but not limited to:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start-up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
 - .6 List of spare parts of all electrical equipment complete with names and addresses of sales, service representatives and suppliers.
 - .7 Copy of data cable test data
 - .8 Copy of final inspection certificate.
 - .9 Copy of all warranty certificates.
 - .10 Set of final Vendor Drawings.
- .2 Print or engrave operating instructions and frame under glass or on approved laminated plastic.
- .3 Post instructions where directed.
- .4 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
- .5 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.14 RECORD PLANS

- .1 The engineer will furnish to the electrical trade one set of prints to be used for As-built markups and record purposes. All revisions made on site during construction to be accurately recorded.
- .2 Contractor shall maintain and submit the as-built markups drawings to Engineer at the end of construction; such plans shall clearly signed and dated and complete with the Contractor stamp.

1.15 Co-ordination with Mechanical

- .1 Provide electrical connections for the ancillary devices specified in the Mechanical section of the work (i.e. thermostats, dampers, etc.).

2.0 PRODUCTS

2.1 Materials and Equipment

- .1 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from authority having jurisdiction inspection before delivery to Work Site and submit such approval as described in PART 1 - SUBMITTALS.
- .2 Factory assembled control panels and component assemblies.

2.2 Electric Motors, Equipment and Controls

- .1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.

2.3 Warning Signs

- .1 Warning Signs: in accordance with requirements of authority having jurisdiction and the Owner's Representative.
- .2 Porcelain enamel or plastic decal signs, minimum size 175 x 250 mm.

2.4 Wiring Terminations

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.5 Equipment Identification

- .1 Identify electrical equipment with nameplates as follows:

- .2 Nameplates – to be used on cabinets, panels, motor control centres and larger junction boxes - plastic lamacoid, 3 mm thick plastic engraving sheet, matt black finish face, white core, lettering accurately aligned and engraved into core mechanically attached with self-tapping screws.

- .1 Sizes as follows:

Nameplate Sizes:			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .7 Terminal cabinets and pull boxes: indicate system and voltage.

2.6 Wiring Identification

- .1 Identify wiring with permanent indelible identifying markings, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.7 Conduit and Cable Identification

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

System up to 250 V	Prime Yellow	Auxiliary
Telephone	Blue	
Other Communication Systems	Blue	Green
Fire Alarm	Red	
Other Security Systems	Red	Yellow

2.8 Finishes

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
- .2 Paint outdoor electrical equipment "Equipment Green".
- .3 Paint indoor switchgear and distribution enclosures light gray to: EEMAC 2Y-1.

2.9 Mounting Heights

- .1 Unless conflict exists, use the following as mounting heights from finished floors to centre of device.

Receptacles in Garage	1000 mm
Receptacles on Exterior	1000 mm
Receptacles above Workbench	1200 mm
Light Switches	1200mm
Panels (to top of cover)	2000 mm
Emergency Lighting	2200 mm
Thermostats	1400mm

2.10 Conduit / Raceways / Wiring / Cable

- .1 PVC Conduits used for incoming service connection and building ground connections only. All building wiring to be type NMD-90 installed concealed within wood frame of building.
- .2 Where surface mounted conduits are required, install parallel to structural lines and provide concentric bends in parallel conduit runs.
- .3 Conduits to be installed free from dents and bruises and have ends plugged to prevent entrance of dirt or moisture.
- .4 All conduits, except where otherwise noted, to be sized in accordance with Canadian Electrical Code.
- .5 Unless noted otherwise, all wiring to be 98% conductivity copper, 300 Volt, 90 degree type NMD-90 cable. Minimum conductor size to be #12 AWG.

- .6 Type AC-90 cable may be used for lighting fixture drops in hung ceilings and for servicing of devices in partition walls provided wiring is run concealed. Length of individual AC-90 cable runs shall not exceed 3.0 m. AC-90 cable runs are not permitted for exposed runs.
- .7 Use of NMD-90 wiring is permitted where allowed by code for concealed wiring in wood construction.

2.11 Outlet / Junction/ Pull Boxes

- .1 Boxes: hot dipped galvanized, conforming to CSA requirements.
- .2 Boxes for ceiling: No. 54151 box, otherwise No. 52171 or No. 72171 box as per Code requirements.
- .3 Indoor recessed device box: No. 1104
- .4 Surface Mount weatherproof device box: WFS2
- .5 All outlets to be flush mounted where possible.
- .6 Supply and install pull boxes as required to suit job conditions. Pull boxes to conform to Canadian Electrical Code requirements and be finished in enamel over corrosion resistant primer with screw on or hinged cover.

2.12 Devices

- .1 Standard receptacles to be specification grade Hubbell CR5352W or equal, 15 - 20 Amp, 125 Volt, CSA 5 - 20.
- .2 GFI receptacles to be specification grade Hubbell GF20WL or equal, 15-20 Amp, 125 Volt, CSA 5-20.
- .3 Line voltage switches to be specification grade Hubbell CSB120W or equal, 20 Amp, 125 Volt. Provide three way switches where noted.
- .4 Dimmers to be solid state slide type, specification grade Lutron N Series or equal. Select dimmer type to match load controlled (incandescent / fluorescent / LED as well as line or low voltage).
- .5 All devices to be white.
- .6 All cover plates for internal devices to be stainless steel.
- .7 All exterior devices to have PVC weatherproof gasketed covers.
- .8 Identify circuit number on all device cover plates using plastic tape labels.

2.13 Power Distribution

- .1 Three phase power panels to be surface / flush mounted as indicated 120 / 208 Volt, 3 phase, 4 wire, 225 A copper bussing, 10 kA IC rating, with bolt in place breakers. Provide integral main breaker where noted.
- .2 Single phase power panels to be surface / flush mounted as indicated 120 / 240 Volt, 1 phase, 3 wire, 225 A copper bussing, 10 kA IC rating, with bolt in place breakers. Provide integral main breaker where noted.
- .3 Branch breakers: single and two pole, amperage as indicated or required, of same manufacture as the panel, rated 120 / 240 Volt, 10 kA IC rating, bolt in place. GFI breakers where indicated or required.

2.14 Lighting

- .1 Provide all luminaires complete with laps as indicated in the Contract Documents.
- .2 Install all luminaires in standard manner for type of luminaire and in accordance with manufacturer's instructions.
- .3 Support all luminaires from structural members.
- .4 Supply luminaires with lamps as indicated.
- .5 All exterior luminaires are to be Night Sky Compliant.

3.0 EXECUTION

3.1 Installation

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead systems in accordance with CSA C22.3 No.1 except where specified otherwise.
- .3 Do underground systems in accordance with CSA C22.3 No.7 except where specified otherwise.

3.2 Nameplates and Labels

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 Conduit and Cable Installation

- .1 Generally project is plywood on wood stud construction: electrical work to consist of concealed electrical wiring installed in the building walls and ceiling. Type NMD-90 cable to be used.

- .2 Install fittings flush fitted or plastered over, close to building structure so furring can be kept to minimum.

3.4 Location of Outlets

- .1 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

3.5 Mounting Heights

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

3.6 Field Quality Control

- .1 All portions of electrical work to be tested and checked for satisfactory operation.
- .2 Before energizing any portion of electrical system, perform megger tests on all feeders and branch circuits. Results of such tests to conform to requirements of Canadian Electrical Code and be to satisfaction of authorized inspection agency and the engineer.
- .3 Load Balance:
 - .1 Upon completion and immediately prior to final inspection and takeover, check load balance on all feeders and at distribution centres, panels, etc. Tests to be carried out by turning on all possible loads and checking load current balance. If load unbalance exceeds 15 %, reconnect circuits to balance load.
- .4 Provide upon completion of Work, create and conduct load balance report as directed in PART 1 - SUBMITTALS: phase and neutral currents on panel boards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .5 Conduct following tests:
 - .1 Power distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
- .6 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.

- .7 Systems: fire alarm system, communications.
- .8 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Check resistance to ground before energizing.
 - .3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .9 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
- .10 Provide manufacturer's field services consisting of product use recommendations and periodic Work Site visits for inspection of product installation in accordance with manufacturer's instructions.
- .11 Schedule Work Site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.7 Cleaning

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION