END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Entire Specification - All areas of common work.

1.2 DEFINITIONS

.1 Contractor: Firm or representative retained to conduct the Works as per this Specification.

.2 Departmental Representative: Person designated in the Contract, to act as the Owners Representative for the purposes of the Contract,

.3 Site: Property on which the Works will be conducted.

.4 Works: Scope of work as detailed and described in this Specification

1.3 WORK COVERED BY CONTRACT DOCUMENTS

.1 Title and description of Work: Aircraft Fuelling System Modifications, including the removal and replacement of the existing aviation fuel storage and dispensing system at the RCMP Hangar Site located at Prince Albert Airport (Glass Field), north of Prince Albert, Saskatchewan.

.2 The work comprises all activities associated with: decommissioning and removal of the existing aboveground storage tank (AST); decommissioning and removal of the existing underground storage tank (UST); removal of the existing fuel handing and transfer system, and all associated contents and appurtenances, including the disposal of non-impacted and petroleum hydrocarbon (PHC) impacted soil within and adjacent to the UST excavation; supply and installation of a new AST and dispensing system; and installation of a new overland spill containment area.

.3 The site will be restored to pre-deconstruction conditions or better.

.4 Mobilization and demobilization consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to and from the project.

.5 Work includes:

- .1 Adherence to all federal, provincial and municipal Laws, Regulations, Codes, Guidelines at a minimum.
- .2 Permit Applications, including:
  - .1 Obtain all Municipal, Provincial and Federal permits, as required to complete the Work.
- .3 Management of Site Safety, including:
  - .1 Develop Site Specific Safety Plan.
  - .2 Coordinate and lead Pre-Job Safety Meeting and Daily On-Site Safety Meetings.
  - .3 Develop Spill Prevention and Spill Response Plans.

.4 Develop Emergency Response Plan.

.4 Site Preparation Activities, including:

.1 Areas of work should be identified prior to beginning work with the Departmental Representative and all work should remain within the established work boundaries.

.2 Erect and maintain temporary perimeter fencing around the UST work area.

.3 Relocate existing fencing separating the air and ground side operations to facilitate access to the work area.

.4 Maintain and protect all existing buildings, foundations, concrete pads, and existing monitoring wells to remain within the proposed work areas.

.5 Maintain and protect all overhead and underground utilities within the proposed work areas.

.5 Decommissioning of five (5) existing environmental monitoring wells located within the work area.

.6 Removal of the existing AST (2,400 L), UST (50,000 L) and fuel dispensing system, including:

.1 Work to be completed by a Certified Technician from the Province of SK. Certification must be submitted with bid.

.2 Removal and disposal of all product and sludge contained within the existing AST and UST to a licensed disposal facility. Waste manifests required to be submitted to the Departmental Representative.

.3 Removal of the AST, UST, concrete anchor(s) and all associated vent, fill and transfer piping, including all electrical and remote monitoring equipment.

.4 Destruction of the AST and UST, and appropriate disposal of the tanks and all related infrastructure. Destruction certificates, pictures and waste manifests required to be submitted to the Departmental Representative.

.5 Remove and dispose off-site to a licensed facility all water from within the UST excavation and/or liquid waste from within the AST and/or UST. Estimated quantity of wastewater requiring disposal is 10,000 litres and estimated time for on-site vacuum truck is 20 hours, including travel. Waste manifests required to be submitted to Departmental Representative.

.6 Provide equipment to facilitate soil sampling by the Departmental Representative of the resulting UST excavation for environmental sampling and compaction purposes.

.7 Supply, installation and commissioning of a new 45,000 litre aboveground aviation fuel storage tank (AST) and dispensing system, including:

.1 Structural foundation and concrete pad.

.2 AST and associated dispensing system.

.3 Electrical services and remote monitoring equipment to support system operation.

.4 Impact protection.

.8 Construction of an overland Spill Containment Area, including:

.1 Concrete spill pad to contain spills from the new AST and fuel handling areas.

.2 Regrade Taxiway Bravo (B), including removal of approximately 220 square metres of existing asphalt, reshaping of approximately 220 square metres of subgrade and placement of approximately 400 square metres of new asphalt pavement to promote positive drainage away from the Spill Containment Area.

.9 Implementation of safety work zones, site Health and Safety Plan and Emergency Response Plan.

.10 Excavation and off-site disposal of non-contaminated and petroleum hydrocarbon (PHC) contaminated soil from UST excavation to permitted facility.

.1 Provision and installation of materials and equipment necessary to remove the soil to the lines and dimensions shown on the Drawings, including temporary shoring, as required in order to protect adjacent structures, including the hangar building, storage shed, aircraft ramp, taxiway and associated infrastructure.

.2 The Departmental Representative will be responsible for the collection of all representative soil sample(s) from the excavation for a standard Saskatchewan Landfill Analytical Requirements analysis and any parameters as required by the approved waste disposal facility that the Contractor will use.

.3 Due to the short duration of the field work, the Contractor must obtain interim waste soil acceptance from the proposed waste disposal facility based upon the historic analytical testing completed as soon as the work is awarded.

.4 Laboratory results will be provided by the Departmental Representative to the Contractor upon bid award in order to facilitate final waste soil disposal acceptance with the proposed waste disposal facility.

.5 Excavate, store on-site as required, load, transport and dispose off-site 900 tonnes of non-contaminated soil and 450 tonnes of PHC contaminated soil.

.6 Store excavated soil in temporary storage cells. Locate cells as directed by the Departmental Representative in writing.

.7 Cover soil stockpiles with tarps and underlay contaminated soil stockpile with flexible membrane to minimize or prevent leaching losses.

.8 Ensure no contact between non-contaminated excavated soil and drainage and/or contaminated water and/or contaminated soil.

.9 Manage excavation water during soil remediation work (see 1.3.5.5.5 above).

.10 Backfilling the remedial excavation with approximately 1350 tonnes of Type 2 material and 50 tonnes of Type 4 material to be approved by Departmental Representative in writing, including excavation of the borrow, transport to the work area, placement and compaction.

.11 Provision of a photographic record, original waste manifests, destruction certificates and report of all waste materials removed from the site for disposal.

.12 Obtaining all required permits and approvals for waste disposal.

.11 Site Restoration, including:

.1 Supply, placement and spreading of 800 square metres of weed-free topsoil over affected areas, including seeding.

.12 Commissioning and pressure testing of the new AST system after the Owner has registered the system with EC, and a registration number has been provided and installed on the tank.

.6 Work by Others: Soil sampling by Departmental Representative.

1.4 CONTRACT METHOD

.1 Construct Work under combined lump sum and unit price contract.

1.5 SITE LOCATION AND INFORMATION

.1 The RCMP Hangar is located at 190 Veterans Way in the northeast part of the City of Prince Albert, Saskatchewan. The UTM (WGS84, Zone 13) coordinates for the center of the property are E454335, N5896396.

.2 The site is comprised of a 45.70 by 97.50 m rectangular shaped lot covering an area of 4,457 m^2. The site is currently occupied by a 980 m^2 single-storey slab-on-grade building situated in the center of the property.

.3 The Property is surrounded by the City of Prince Albert Airport property to the north, east and south, including the main terminal building, runway, taxiways, airport garage and undeveloped grassed areas. Several commercial businesses are located west of the Property, including a newspaper publishing business, an airplane maintenance building and an aviation business.

.4 The local topography at the site is relatively flat and is situated at an elevation of approximately 429 m above sea level. The nearest surface water body to the Property is the North Saskatchewan River, located 430 m to the southwest.

.5 The Property consists of the building footprint, which is situated in the center of the site, an asphalt parking area to the south, an asphalt access road on the west side of the hangar, and a concrete apron and asphalt tarmac to the north. The remaining areas to the west, south and east are landscaped with grass.

.6 The Phase III Environmental Site Assessment (ESA) report prepared by EGE Engineering Ltd. (EGE), dated February 2012 is presented in Appendix A of the Specification.

.7 The Geotechnical Investigation report prepared by P. Machibroda Engineering Ltd. (PMEL), dated November 2015 is presented in Appendix B of the Specification.

.8 Based on the soil logs and soil descriptions provided in the Phase III ESA and Geotechnical Investigation report, the soils in the vicinity of the proposed work areas consist of silt and sand underlain by plastic clay and silt. Groundwater levels reported for September 2015 ranged from 2.9 to 3.5 m below grade,

.9 Environmental test holes are referenced in the 2012 Phase III ESA by EGE and 2015 Geotechnical Investigation by PMEL. The environmental and geotechnical investigation reports by their nature cannot reveal all conditions. Environmental and geotechnical data is provided for information only and is based on conditions at the time of investigation and at the test hole locations shown and may not be indicative of the entire site or the present conditions.

.10 The Departmental Representative has applied for a Nav Canada Land Use Proposal for the specified work activities. All restrictions and requirements stipulated within the Land Use Approval shall apply to the Contractor. Copies of the Land Use Proposal and Nav Canada approval will be made available upon award of contract.

.11 The Saskatchewan Ministry of Environment has approved an application to construct the new storage facility at the RCMP Prince Albert Hangar site. A copy of the approval letter is provided in Appendix C. The Contractor will be required to submit an updated Application to Construct, obtain the necessary authorizations and assume all responsibilities related to finalizing the application.

.12 The Departmental Representative has submitted a Corrective Action Plan (CAP) to the Saskatchewan Ministry of Environment. A copy of the submitted CAP is provided in Appendix D, along with a copy of the approval letter. All restrictions and requirements stipulated within the approval shall apply to the Contractor.

.13 The Departmental Representative has submitted an application to decommission the existing UST to the Saskatchewan Ministry of Environment. A copy of the application is provided in Appendix E, along with a copy of the approval letter. All restrictions and requirements stipulated within the approval shall apply to the Contractor.

1.6 SITE EXAMINATION

.1 Contractor shall compare plans and specifications with existing conditions, to fully satisfy themselves as to all data and matters required for the completion of the contract.

.2 Failure of Contractor to acquaint them self fully with all available information concerning conditions affecting the work shall not relieve the Contactor of the responsibility for estimating the difficulties and costs of satisfactorily performing the work.

.3 Commencement of mobilization shall constitute acceptance of existing conditions, and verification of dimensions.

.4 Claims for additional costs will not be entertained with respect to conditions which would reasonably have been ascertained by an inspection of the site prior to mobilization.

1.7 WORK BY OTHERS

.1 Co-operate with other Contractors in carrying out their respective works.

.2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.8 COORDINATION

.1 Perform coordination of progress schedules, submittals, use of site, temporary facilities, and construction Work with progress of Work of other contractors.

1.9 CONSTRUCTION ORGANIZATION AND START UP

.1 Within 7 days after award, attend a meeting to discuss and resolve administrative procedures and responsibilities, as per Section 01 31 19 - Project Meetings.

.2 Departmental Representative, Owner, Contractor, major Subcontractors, field inspectors and supervisors to be in attendance, at a minimum at all meetings.

.3 Meeting agenda, as per 1.3.1 of Section 01 31 19 - Project Meetings.

.4 During construction, coordinate use of site and facilities through Departmental Representative.

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

1.10 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.11 WORK SEQUENCE

.1 Construct Work in stages to accommodate overall project schedule.

1.12 CONTRACTOR USE OF PREMISES

.1 The Contractors use of the site shall be restricted to the identified work areas. There shall be no access to site buildings unless directed in writing by the RCMP.

.2 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.3 The Contractor shall not unreasonably encumber site with materials or equipment or move stored products or equipment which interferes with RCMP mandate and/or operations at the Site.

.4 Use of site shall comply with the environmental protection requirements of Section 01 35 43 - Environmental Procedures and the Environmental Protection Plan.

.5 The Contractor shall keep the roads clean of impacted soil and tracked mud from the excavations, and passable at all times. Contractor shall remove litter on a daily basis as directed by the Departmental Representative. If litter created by the Contactor's activities is not cleaned to the satisfaction of the Departmental Representative and upon notification, the Contractor refuses to improve road conditions, the Departmental Representative shall direct that this work be performed by others and the cost of the Work shall be borne by the Contractor. The Departmental Representative assumes no responsibility for any inconvenience or costs incurred due to road passage interruptions.

.6 Contractor will provide sanitary facilities for use by Contractor's personnel. Keep facilities clean.

.7 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.8 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed in writing by Departmental Representative.

.9 At completion of construction operations, condition of existing work shall be equal to or better than that which existed before new work started.

1.13 DEPARTMENTAL REPRESENTATIVE

.1 PWGSC will be represented at the site by the Departmental Representative.

1.14 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.15 EXISTING SERVICES

.1 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings in writing. Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.2 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power, communications, water and external heating services. Adhere to approved schedule and provide minimum 24 hour notice to affected parties.

.3 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.4 Record locations of maintained, re-routed and abandoned service lines and provide information in writing to the Departmental Representative

1.16 WASTE DISPOSAL QUANTITIES

.1 Contractor to provide summary of all wastes disposed including quantities, disposal locations, and original scale tickets, as applicable. Waste quantities to be reconciled daily in writing with the Department Representative, including the provision of original waste manifests.

1.17 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy of each document as follows:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Reviewed Shop Drawings.

.5 List of Outstanding Shop Drawings.

.6 Change Orders.

.7 Other Modifications to Contract.

.8 Field Test Reports.

.9 Copy of Approved Work Schedule.

.10 Health and Safety Plan and Other Safety Related Documents including Spill Prevention Plan and Spill Response Plan.

.11 Other documents as specified.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" the work areas in accordance with relevant Municipal, Provincial and Federal regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

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

.3 Contractor to provide sanitary facilities and will be responsible for upkeep of these facilities.

1.3 EXISTING SERVICES

.1 Maintain existing roads for personnel and vehicular traffic.

1.4 SPECIAL REQUIREMENTS

.1 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.

.2 Ensure that Contractor personnel employed on site are familiar with and obey all site specific safety, fire, traffic and security requirements, where applicable.

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

.4 Erect and maintain a temporary minimum 1.8 m high chain link fence perimeter around the UST work area throughout the duration of the work.

.5 Relocate existing fencing separating the air and ground side operations, as noted on the contract drawings and as directed by the Departmental Representative.

.6 Coordinate all air side work with the City of Prince Albert Airport Manager.

.7 Where work is to be carried out on the adjacent leased properties, coordinate work with the property tenants, including access to and egress from their property.

.8 Contractor to outline site specific traffic control measures to be followed on site as part of their site layout plan.

1.5 BUILDING SMOKING ENVIRONMENT

.1 No smoking is permitted on site.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Departmental Representative will schedule and administer pre-construction meeting upon Award.

.2 Departmental Representative to schedule and administer project meetings throughout the progress of the Work as needed.

.3 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

.4 Departmental Representative and Contractor to meet daily once work on site commences to discuss:

.1 Field observations, problems and conflicts.

.2 Problems which impede construction schedule.

.3 Corrective measures and procedures to regain projected schedule.

.4 Revision to construction schedule.

.5 Progress schedule during succeeding work period.

.6 Review proposed changes for affect on construction schedule and on completion date.

.7 Departmental Representative will take minutes and distribute weekly to Owner and Contractor.

1.2 PRECONSTRUCTION MEETING

.1 Within 7 days after award of Contract, attend a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Owner, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Departmental Representative to establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.

.3 Understanding of the Work, including requirement for RCMP security.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.5 Change order process and procedure, approvals required, and administrative requirements.

.6 Health and safety requirements in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.7 Environmental protection requirements in accordance with Section 01 35 43 - Environmental Procedures.

.8 Close out procedures and submittals in accordance with Sections 01 77 00 - Closeout Procedures and 01 78 00 - Closeout Submittals.

.9 Other business.

1.3 PROGRESS MEETINGS

.1 During course of Work and as required, Departmental Representative to schedule progress meetings as required.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.3 Departmental Representative to notify parties minimum 48 hours prior to meetings.

.4 Agenda to include the following:

.1 Review of Work progress since previous meeting.

.2 Field observations, problems, conflicts.

.3 Problems which impede construction schedule.

.4 Corrective measures and procedures to regain projected schedule.

.5 Revision to construction schedule.

.6 Progress schedule, during succeeding work period.

.7 Review submittal schedules: expedite as required.

.8 Review proposed changes for affect on construction schedule and on completion date.

.9 Other business.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

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

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

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

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

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Duration is usually expressed as work days or work weeks.

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

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

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

1.2 REQUIREMENTS

.1 Ensure Project Schedule is practical and remains within specified duration.

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

.3 Schedule activity durations to a maximum of approximately 10 working days to allow for progress reporting.

.4 Ensure that it is understood that time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of the essence of this contract.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit to Departmental Representative within 5 working days of Award, Schedule as Bar (GANTT) Chart for planning, monitoring and reporting of project progress. Schedule to be discussed at pre-construction meeting.

1.4 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.

.1 Participate in Preconstruction Meeting within seven working days of award date.

.2 Complete preparatory Work including landfill acceptance, permitting, and health and safety within two weeks of award date.

1.5 PROJECT SCHEDULE

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

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

.1 Award.

.2 Permits including record of licensed waste management facility, acceptance of waste, and impacted soil from Site.

.3 All submittals as specified in Section 01 33 00 - Submittal Procedures including but not limited to Health and Safety Plan, Environmental Protection Plan including Spill Response and Spill Prevention Plan, Emergency Response Plan, and site layout drawings.

.4 Completion of utility locates.

.5 Mobilization.

.6 Temporary relocation of security fencing.

.7 Construction of emergency spill containment pad

.8 Excavation.

.9 Decommissioning and removal of existing AST and UST.

.10 Decommissioning of groundwater wells.

.11 Disposal of non-impacted/impacted soil at licensed waste management facility.

.12 Backfill and compaction.

.13 Construction of new structural concrete pad.

.14 Installation and commissioning of new AST.

.15 Final grading and surface restoration, including replacement of paved surfaces.

.16 Topsoil placement and seeding.

.17 Interim inspection.

.18 Deficiency corrections.

.19 Demobilization.

.20 Commissioning.

.21 Deficiency corrections.

.22 Final inspection.

.3 Departmental Representative will review Project Schedule and return revised schedule within three working days.

.4 Revise schedule and resubmit within three working days.

.5 Accepted revised schedule will be used as baseline for updates.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on regular basis reflecting activity changes and completions, as well as activities in progress and submit to Departmental Representative for review.

1.7 PROJECT MEETINGS

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

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed below for review.

Table 1: Breakdown of Required Project Submittals and Submission Dates

Submittal Required	Submission Date
• Project Schedule - as per Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.	• Five days following Contract Award.
• Health and Safety Plan (including Spill Response and Spill Prevention Plan, Emergency Response Plan and Training Certificates) - as per Section 01 35 29.06 - Health and Safety Requirements.	• Five days following Contract Award.
• Environmental Protection Plan (including Non-hazardous Waste Disposal Plan, Erosion Control Plan and Sediment Control Plan) - as per Section 01 35 43 - Environmental Procedures.	• Five days following Contract Award.
• Proposed waste disposal facilities - as per Section 02 61 00.01 - Soil Remediation	• Five days following Contract Award.
• Site Layout Drawings - as per Section 01 35 13.43 - Special Project Procedures for Contaminated Sites.	• Ten days prior to mobilization to site.
• Description of hazardous materials and notification of filing - as per Section 02 41 13 - Selective Demolition.	• As required, seven days prior to the start of construction.
• Source and samples of proposed backfill (Sub-base, Base, Asphalt Mix, Type 2, Type 4 and topsoil) - as per Section 31 23 33.01 - Excavating, Trenching and Backfilling, and Section 32 12 17 - Asphalt Paving - Short Form.	• Five days prior to the start of construction.
• Engineered design drawings for shoring - as per Section 31 23 33.01 - Excavating, Trenching and Backfilling.	• Five days prior to the start of construction.
• Drawings, diagrams and/or details showing sequencing of demolition - as per Section 02 41 13 - Selective Demolition	• Five days prior to the start of construction.
• Utility locate clearance sheets - as per Section 31 23 33.01 - Excavating, Trenching and Backfilling.	• Five days prior to the start of construction.

• WHMIS MSDS - as per Section 02 81 01 - Hazardous Materials.	• Prior to the start of construction.
• Shop Drawings, Product Data and Samples - as per Section 01 33 00 - Submittal Procedures, and as outlined within the various sections of Division 02 - Existing Conditions, Division 03 - Concrete, Division 05 - Metals, Division 09 - Finishes, Division 23 - Heating, Ventilation and Air Conditioning (HVAC) , Division 26 - Electrical, Division 31 - Earthwork, Division 32 - Exterior Improvements and Division 33 - Utilities.	• As required prior to the start of construction and/or during construction.
• Site Health and Safety Inspection Reports - as per Section 01 35 29.06 - Health and Safety Requirements.	• Daily during construction.
• Incident and Accident Repots - as per Section 01 35 29.06 - Health and Safety Requirements.	• As required during construction.
• Written spill report - as per Section 02 81 01 - Hazardous Materials.	• Within 24 hours of incident.
• Originals of certified weigh bills, bills of lading, waste manifests and/or waste disposal receipts from authorized disposal sites and recycling facilities - as per Section 01 74 21 - Construction/Demolition Waste Management and Disposal, Section 02 61 00.01 Soil Remediation and Section 02 41 13 - Selective Demolition.	• Weekly during construction.
• Tank serial numbers and other pertinent details on tank ID tags, copy of vapour removal test results and photos and affidavit of destruction - as per Section 02 65 00 - Aboveground and Underground Storage Tank Removal and Section 02 41 13 - Selective Demolition.	• Following tank decommissioning.
• Completed Environment Canada (EC) Storage Tank System Identification Form - as per Section 02 65 00 - Aboveground and Underground Storage Tank Removal.	• Following tank decommissioning.
• Third party test results of proposed backfill - as per Section 31 23 33.01 - Excavating, Trenching and Backfilling.	• Prior to delivery and start of backfilling.
• CSA certified equipment and material, test results of installed electrical systems and instrumentation, and permits and fees - as per Section 26 05 00 - Common Work Results - for Electrical.	• As required, during and upon completion of electrical Work.

• Manufacturer's field reports - as per Section 26 05 00 - Common Work Results - for Electrical.	• Within three days of review, verifying compliance of Work and electrical system and instrumentation testing.
• Samples of paints that do not appear on MPI Approved Products List - as per Section 09 97 19 - Painting Exterior Metal Surfaces.	• As required, ten days prior to the start of painting.
• Name of Contractors commissioning agent, draft commissioning documentation and preliminary commissioning schedule - as per Section 01 91 13 - General Commissioning Requirements.	• Four weeks following Contract Award and a minimum of 14 days prior to commissioning.
• Design as-built drawings and information requirements identified in Schedule 2 of the STR - as per Section 01 91 13 - General Commissioning Requirements.	• Within 14 days of commencement of commissioning.
• Start-up documentation. - as per Section 01 91 13 - General Commissioning Requirements.	• Within 14 days of commencement of commissioning.
• Written maintenance program for fuel system - as per Section 01 91 13 - General Commissioning Requirements.	• Within 14 days of commencement of commissioning.
• Completed and approved commissioning documentation and standalone written records of all testing - as per Section 01 91 13 - General Commissioning Requirements.	• Within 5 days of commencement of commissioning.
• Complete list of equipment and listed data for proposed instruments and equipment - as per Section 01 91 13 - General Commissioning Requirements.	• Prior to the start of commissioning.
• Copies of Federal, Provincial and/or Municipal permits, applications and/or approvals, Waste Summary Report and digital photos of the Work - as per Section 01 78 00 - Closeout Submittals.	• Within one week following completion of the work.
• Four hard and electronic copies of the Operation and Maintenance Manual - as per Section 01 73 03 - Execution Requirements.	• Within two weeks following completion of the work.

.2 Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit as detailed in specification is not considered reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.3 Do not proceed with Work affected by submittal until review is complete and written confirmation to proceed with Work has been provided by Departmental Representative.

.4 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.5 Where items and/or information are not produced in SI Metric units, converted values are acceptable.

.6 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with the requirements of the Specifications. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.7 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Specifications stating reasons for deviations. Await written Departmental Representative approval to proceed.

.8 Verify field measurements and affected adjacent Work is co-ordinated.

.9 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representatives review of submittals.

.10 Contractor's responsibility for deviations in submission from requirements of Specifications is not relieved by Departmental Representative review.

.11 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit for review shop drawings and product data as requested in respective specification Sections. Label with origin, date and intended use.

.2 Deliver shop drawings and product data prepaid to Departmental Representative’s business address.

.3 Notify Departmental Representative in writing, at time of submission, of deviations from requirements of Specifications.

.4 Departmental Representative will review Contractor's shop drawings and/or product data and provide comments to Contractor within 3 days after receipt of such. Contractor to revise submittals where required and resubmit to Departmental Representative 3 days after receipt of comments from Departmental Representative.

1.3 SAMPLES

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

.2 Deliver samples prepaid to Departmental Representative’s business address.

.3 Notify Departmental Representative in writing, at time of submission, of deviations in samples from requirements of Specifications.

.4 Departmental Representative will provide results of any sample testing to Contractor within 4 days after receipt of such. Contractor to re-submit samples where required to Departmental Representative 3 days after receipt of results from Departmental Representative.

1.4 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copy of colour digital photography in jpg format, standard resolution with progress statement as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Frequency of photographic documentation: daily or as directed by Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Transportation Association of Canada Manual of Uniform Traffic Control Devices (MUTCD) for Streets and Highways (Latest Edition).

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 Do not close any lanes of road without written approval of the Owner and/or the Departmental Representative. Before re-routing traffic, erect suitable signs and devices in accordance with instructions contained in Part D of MUTCD.

.3 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, unless other means of road access exist that meets approval of Departmental Representative:

1.3 INFORMATIONAL AND WARNING DEVICES

.1 Provide and maintain signs, flashing warning lights, and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of the MUTCD.

.3 Place signs and other devices in locations recommended in the MUTCD.

.4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes revise list to written approval of Departmental Representative.

.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.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 All references to be most recent issued.

.2 Canada Labour Code Part 11- Occupational Health and Safety (R.S. 1985, c.L-2).

.3 CCME, Canadian Environmental Quality Guidelines, http://st-ts.ccme.ca/.

.4 PN1398, Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in soil – User Guidance

.5 Canadian Environmental Protection Act. (CEPA), 1999, c.33.

.6 Canadian Environmental Assessment Act (CEAA), (2012).

.7 Canada Labour Code (1985, c. L-2) – Canadian Occupational Health and Safety Regulations (SOR/86-304).

.8 Transportation of Dangerous Goods Regulation, *SOR/2001-286, Canada Gazette Part II, August 2001*.

.9 Saskatchewan Guidelines for Treatment and Disposal of Petroleum Contaminated Soils at Municipal Waste Disposal Grounds, December 1995.

.10 Saskatchewan Environmental Code (2015).

.11 National Fire Code (2015)

.12 The Occupational Health and Safety Regulations, 1996 (SK)

1.2 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submittals for Progress Meetings: make submittals at least 24 hours prior to scheduled progress meetings as follows:

- .1 Update progress schedule detailing activities. Include review of progress with respect to previously established dates for starting and stopping various stages of Work, major problems and action taken, injury reports, equipment breakdown, and material removal.
- .2 Copies of transport manifests, trip tickets, and disposal receipts for waste materials removed from work area.
- .3 Weekly copies of site entry and work area logbooks with information on worker and visitor access.
- .4 Other information as required by Departmental Representative or relevant to agenda for upcoming progress meeting.

.3 Site Layout: within 10 days prior to mobilization to site, submit site layout drawings showing existing conditions and facilities, construction facilities and temporary controls provided by Contractor including following:

- .1 Means of ingress, egress and temporary traffic control facilities.

.2 Equipment and material staging areas.

.3 Soil stockpile areas as per direction and written approval from the Departmental Representative.

.4 Grading, including contours, required to construct temporary facilities.

1.3 REGULATORY REQUIREMENTS

.1 Provide erosion and sediment control in accordance with regulations.

.2 Comply with Federal, Provincial, Municipal and local laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.

.3 Work to meet or exceed minimum requirements established by Federal, Provincial, Municipal and local laws and regulations which are applicable.

1.4 SOIL STOCKPILING FACILITIES

.1 Provide, maintain, and operate storage/stockpiling facilities as required at locations approved by the Departmental Representative.

.2 Install liner approved by Departmental Representative below any proposed contaminated stockpile locations to prevent contact between contaminated stockpile material and ground.

.3 Cover stockpiled material with tarps until material is removed for disposal off site.

1.5 VEHICULAR ACCESS AND PARKING

.1 Maintenance and Use:

.1 Prevent contamination of access roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated as determined by Departmental Representative; transport and place into designated area approved by Departmental Representative; transport and dispose of in permitted off-site disposal facility.

.2 If roads are not maintained and kept clean, then clean access roads as directed by Departmental Representative at no extra cost.

.3 Departmental Representative may collect soil samples for chemical analyses from traveling surfaces of constructed and existing access routes prior to, during, and upon completion of Work. Excavate and dispose of clean soil contaminated by Contractor's activities at no additional cost.

1.6 DUST AND PARTICULATE CONTROL

.1 Execute Work by methods to minimize raising dust from construction operations.

.2 As minimum, use appropriate covers on trucks hauling fine or dusty material. Use watertight vehicles to haul wet materials.

.3 Prevent dust from spreading to adjacent property sites.

.4 Departmental Representative will stop work at any time when Contractor's control of dust and particulate is inadequate for wind conditions present at site.

.5 If Contractor's dust and particulate control is not sufficient for controlling dust and particulates into atmosphere, the Departmental Representative will stop work. Contractor must discuss procedures with Departmental Representative that Contractor proposes to resolve problem. Make necessary changes to operations and get written approval to proceed from Departmental Representative prior to resuming excavation, handling, processing, or other work that may cause release of dusts or particulates.

1.7 POLLUTION CONTROL

.1 Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious toxic substances and pollutants produced by construction operations as outlined in Spill Response Plan.

.2 Be prepared to implement spill response plan through the intercept, clean up, and disposal of spills and/or releases that may occur whether on land and/or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible on site.

.3 Immediately report spills and releases potentially causing damage to environment to:

.1 Authority having jurisdiction and/or interest in spill and/or release including but not limited to: fire department, conservation authority, water supply authorities, drainage authority and/or road authority.

.2 Departmental Representative.

.4 Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release.

.5 Provide spill response materials as detailed in the spill response plan and including, containers, adsorbent, shovels, and personal protective equipment. Make spill response materials available at all times in which hazardous materials or wastes are being handled or transported. Location of storage of spill response materials to be approved by Departmental Representative. Spill response materials: compatible with type of material being handled.

1.8 EQUIPMENT DECONTAMINATION

.1 Equipment Decontamination to be carried out in area designated by Departmental Representative.

.2 Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.

.3 At minimum, mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water.

.4 Collect all scraped and/or brushed material for off-site disposal at designated permitted facility as approved by the Departmental Representative.

.5 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.

1.9 WATER CONTROL

.1 Maintain excavations free of water.

.2 Protect site from puddling or running water. Grade site to drain away from hangar building and operating areas. Provide water barriers as necessary to protect site from soil erosion.

.3 Prevent surface water runoff from leaving work areas.

.4 Do not discharge surface water runoff or groundwater which may have come in contact with potentially contaminated material, off site.

.5 Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover all stockpiled materials with an impermeable liner during periods of work stoppage including at end of each working day and as directed by Departmental Representative.

.6 Direct surface waters that have not contacted potentially contaminated materials to existing surface drainage systems.

.7 Control surface drainage such that runoff from un-stabilized areas is intercepted and diverted to suitable outlet.

.8 Dispose of any collected water in manner not injurious to public health or safety, to property, or to any part of Work completed or under construction.

1.10 EROSION AND SEDIMENT CONTROL

.1 Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas, from stockpiles, staging areas, and other work areas.

.2 Provide and maintain temporary measures to prevent erosion and migration of silt, mud, sediment, and other debris off site or to other areas of site where damage might result, or that might otherwise be required by Laws and Regulations. Make sediment control measures available during construction.

.3 Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures as directed by the Departmental Representative.

.4 If soil and debris from site accumulate in low areas, or other areas where Departmental Representative has not approved, remove accumulation, deposit in area approved by Departmental Representative and restore area to original condition at no extra cost.

1.11 PROGRESS CLEANING

.1 Maintain cleanliness of Work and surrounding site to comply with Federal, Provincial, Municipal and local fire and safety laws, ordinances, codes, and regulations.

.2 Co-ordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.

1.12 FINAL DECONTAMINATION

.1 Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.

.2 Perform decontamination as specified to satisfaction of Departmental Representative. Departmental Representative will direct Contractor to perform additional decontamination if required.

1.13 REMOVAL AND DISPOSAL

.1 Remove surplus materials and temporary facilities from site.

.2 Dispose of non-contaminated waste materials, litter, debris, and rubbish off site.

.3 Do not burn or bury rubbish and waste materials on site.

.4 Do not discharge wastes into streams or waterways.

.5 Dispose of following materials at appropriate permitted off-site facilities identified by Contractor and approved by Departmental Representative:

.1 Non-contaminated litter and rubbish.

.2 Liquid waste from existing AST and UST decommissioning.

.3 Water encountered during remedial excavations.

.6 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

1.14 RECORD KEEPING

.1 Maintain adequate records to support information provided to Departmental Representative.

.2 Provide original bills of ladings including tank destruction certificate and waste manifests to Departmental Representative within 24 hours.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Province of Saskatchewan.

.1 The Workers Compensation Act RSM 1987 - Updated 2013.

1.2 SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan for review by Departmental Representative and PWGSC within 5 days after date of Award and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 On-site contingency and Emergency Response Plan.

.4 Site control measures employed at site including site map, site Work zones, site communications, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.

.5 Emergency response requirements addressing: pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local, provincial, or federal agencies.

.6 Procedures dealing with heat and/or cold stress.

.7 Spill containment program if waste material is generated, excavated, stored, or managed on site.

.8 First Aid Kit and location.

.9 Spill Response Plan.

.10 Spill Prevention Plan.

.11 First Aid Certificates as required by Saskatchewan Occupational Health and Safety regulations.

.3 Submit electronic copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.

.4 Submit copies of reports or directions issued by Federal and Provincial Health and Safety Inspectors. Submit verbal report immediately followed by a written report within 24 hours to the Departmental Representative.

.5 Submit copies of incident and accident reports. Submit verbal report immediately followed by a written report within 24 hours to the Departmental Representative.

.6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.7 Departmental Representative will review Contractor's site-specific Health and Safety Plan including on-site contingency and Emergency Response Plan, Spill Prevention and Spill Response Plan and provide comments to Contractor within 3 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative 3 days after receipt of comments from Departmental Representative.

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

.9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 SAFETY ASSESSMENT

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

1.4 MEETINGS

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

1.5 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Petroleum hydrocarbon (PHC) impacted soils. Impacted soils defined as soils with PHC concentrations exceeding Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) and Canada Wide Standards (CWS) for PHCs in soil for commercial land use.

.2 PHC concentrations in soils have the potential to be ingested or inhaled if dust is mobilized by wind, and can be carried long distances. Dust may come from excavation activities or during transport of materials for disposal off site.

.3 Possible hot weather and wet conditions.

1.6 GENERAL REQUIREMENTS

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

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

.3 Ensure Health and Safety guidelines provide for safe and minimal risk for site personnel and minimize impact of activities involving contact with hazardous materials or hazardous wastes on general public and surrounding environment.

1.7 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.8 COMPLIANCE REQUIREMENTS

.1 Comply with Saskatchewan Ministry of Advanced Education, Employment and Labour *The Occupational Health and Safety Regulations* (1996, including amendments up to 2012).

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.9 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and immediately advise Departmental Representative verbally and in writing.

1.10 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have site-related working experience specific to activities associated with PHC impacted soil.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.11 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

1.12 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified within 24 hours of such notice.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected or at any time.

1.13 BLASTING

.1 Blasting or other use of explosives is not permitted.

1.14 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.15 PERSONNEL HEALTH, SAFETY, AND HYGIENE

.1 Training: ensure personnel entering site are trained in accordance with specified personnel training requirements.

.2 Levels of Protection: establish levels of protection for each Work area based on planned activity and location of activity.

.3 Personal Protective Equipment:

.1 Furnish site personnel with appropriate PPE. Ensure that safety equipment and protective clothing is kept clean and maintained. Include requirements in Health and Safety Plan.

.4 Heat Stress/Cold Stress: implement heat stress, cold stress monitoring program as applicable and include in site-specific Health and Safety Plan.

.5 Emergency and First-Aid Equipment:

.1 Locate and maintain emergency and first-aid equipment in appropriate location onsite including first-aid kit to accommodate number of site personnel; portable emergency eye wash; two 9 kg ABC type dry chemical fire extinguishers.

.2 As minimum, provide on-site at all times when Work activities are in progress 1 first-aid technician holding at a minimum a Standard First Aid and CPR Level C certification recognized in Canada, as per Canada Labour Code and Saskatchewan Occupational Health and Safety regulations. Provide proof of certification within 5 days of Award.

.6 Safety Meetings: conduct mandatory daily safety meetings for all personnel on site, Departmental Representative, and additionally as required by special or Work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on as-needed basis.

1.16 SITE CONTROL

.1 Meet specified requirements as indicated in Section 01 14 00 - Work Restrictions, Section 01 35 43 - Environmental Procedures, Section 01 52 00 - Construction Facilities, Section 01 74 11 - Cleaning and Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Restrict access to site to those involved in the remediation Work.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.2 REFERENCES AND CODES

.1 Perform Works in accordance all applicable codes and standards including all amendments and other codes of Federal, Provincial, Municipal or local application, provided that in case of conflict or discrepancy more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

.3 Meet or exceed the governing codes, standards and guidelines, and regulations applicable to Work and issued under the authority of the Government of Canada and Saskatchewan as follows, latest edition, but not limited to:

.1 National Building Code of Canada, 2015.

.2 National Fire Code of Canada, 2015.

.3 Canada Labour Code Part 11- Occupational Health and Safety (R.S. 1985, c.L-2).

.4 CCME, Canadian Environmental Quality Guidelines, http://st-ts.ccme.ca/.

.5 PN1398, Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in soil – User Guidance

.6 Canadian Environmental Protection Act. (CEPA), 1999, c.33.

.7 Canadian Environmental Assessment Act (CEAA), (2012).

.8 Canada Labour Code (1985, c. L-2) – Canadian Occupational Health and Safety Regulations (SOR/86-304).

.9 Transportation of Dangerous Goods Regulation, *SOR/2001-286, Canada Gazette Part II, August 2001*.

.10 Saskatchewan Guidelines for Treatment and Disposal of Petroleum Contaminated Soils at Municipal Waste Disposal Grounds, December 1995.

.11 Saskatchewan Environmental Code, June 2015.

1.3 WHMIS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada.

1.4 REGULATORY REQUIREMENTS

.1 Perform work in accordance with the Canadian Environmental Protection Act.

.2 Provide erosion and sediment control in accordance to regulations of authorities having jurisdiction.

.3 Comply with Federal, Provincial, Municipal and local laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.

.4 Work to meet or exceed minimum requirements established by Federal, Provincial, Municipal and local laws and regulations which are applicable.

.1 Contractor: responsibility for complying with amendments as they become effective.

.5 In event that compliance exceeds scope of work of conflicts with specific requirements of contract notify Departmental Representative immediately.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit Environmental Protection Plan for review by Departmental Representative within 5 days of Contract award and in accordance with Section 01 33 00 - Submittal Procedures.

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

.3 Address topics at level of detail commensurate with environmental issue and required construction tasks, and as outlined in the Corrective Action Plan (see Appendix D).

.4 Include in Environmental Protection Plan:

.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

.3 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided, including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, and Federal, Provincial and Municipal laws.

.4 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.5 Spill Control Plan including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.6 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.7 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.8 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.9 Waste Water Management Plan identifying methods and procedures for management and /or discharge of waste waters which are directly derived from construction activities, such as, clean-up water and dewatering of ground water.

1.6 FIRES

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

1.7 DRAINAGE

.1 Control disposal and/or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.8 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants from damage within the area of the Work, where applicable.

.2 Minimize over stripping of topsoil and vegetation.

.3 Restrict tree removal and clearing activities to areas indicated by Departmental Representative.

.4 Imported fill materials must be free of seeds of any invasive plant species.

1.9 POLLUTION CONTROL

.1 Maintain erosion and sedimentation control features installed in this specification and in accordance with Section 01 57 13 - Erosion and Sediment Control.

.2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.

.3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

.4 Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious toxic substances and pollutants produced by construction operations.

.5 Be prepared to intercept, clean up, and dispose of spills or releases that may occur whether on land or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible on site.

.6 Immediately report spills and releases potentially causing damage to environment to:

.1 Authority having jurisdiction and/or interest in spill and/or release including: the fire department, conservation authority, water supply authorities, drainage authority and/or road authority, as applicable.

.2 Owner of pollutant, if known.

.3 Person having control over pollutant, if known.

.4 Departmental Representative.

.7 Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release, if safe to do so.

.8 Provide spill response materials as detailed in the accepted spill response plan including at a minimum, containers, adsorbent, shovels, and personal protective equipment. Make spill response materials available at all times in which hazardous materials or wastes are being handled or transported. Spill response materials: compatible with type of material being handled and as detailed in Emergency Response Plan.

1.10 EQUIPMENT DECONTAMINATION

.1 Perform equipment decontamination at Work site.

.2 At minimum, perform following steps during equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water. Perform assessment as directed by Departmental Representative to determine effectiveness of decontamination.

.3 Each piece of equipment may be inspected by Departmental Representative after decontamination and prior to removal from site and/or travel on clean areas. Departmental Representative will have right to require additional decontamination to be completed if deemed necessary.

.4 Collect decontamination sediments which accumulate on equipment decontamination area.

.5 Furnish and equip personnel engaged in equipment decontamination with appropriate personal protective equipment.

1.11 NOTIFICATION

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

.2 Contractor: after receipt of such notice, inform Departmental Representative within 24 hours of proposed corrective action and take such action for approval by Departmental Representative.

.1 Take action only after receipt of written approval by Departmental Representative.

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

1.12 WILDLIFE

.1 Do not approach, feed or harass the wildlife.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 CLEANING

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

.1 Leave Work area clean at end of each day.

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

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

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Contractor will provide all refuse and recycling bins required to complete Work.

.2 Remove recycling and refuse containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)

.2 Canadian Standards Association (CSA International)

.3 US EPA 832/R-92-005 - Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 INSTALLATION AND REMOVAL

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

.2 Indicate use of supplemental or other staging area.

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

.4 Remove from site all such work after use.

1.3 SITE STORAGE/LOADING

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

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

1.4 CONSTRUCTION PARKING

.1 Parking will be permitted on site as directed by the Departmental Representative. Construction parking shall not interfere with RCMP mandate on the site.

.2 Provide and maintain adequate access to project site.

1.5 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

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

1.6 SANITARY FACILITIES

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

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

1.7 CONSTRUCTION SIGNAGE

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

.2 Signs and notices for safety and instruction in both official languages with Graphic symbols to CAN/CSA-Z321.

.3 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.

1.8 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

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

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.

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

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

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

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

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

1.9 CLEAN-UP

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

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

.3 Clean-up in accordance with Section 01 74 11 - Cleaning.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 EROSION AND SEDIMENTATION CONTROL

.1 Provide erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff that complies with US EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent and in accordance with Section 01 57 13 - Erosion and Sediment Control.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.

.3 Remove any temporary erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

.1 Temporarily re-align existing Airside Fence to the lines and dimensions shown on the Drawings.

.2 Install one lockable vehicle gate for equipment and material access to the work site.

.3 Airside fence and gate to be of the same quality and function as existing.

.4 Secure temporary Airside access gate at all times.

.5 Provide temporary construction fencing around the work site during execution of Work.

.6 Temporary construction fence to be maintained a minimum distance of 15 m away from the adjacent taxiway.

.7 Reinstate Airside fence to original alignment following completion of Work.

.8 Remove from site all temporary works after use.

1.2 ACCESS TO SITE

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

1.3 FIRE ROUTES

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

.2 The existing access road extending along on the west side of the property is used by the tenant and property Owner for emergency vehicle access to the airfield and shall not be used by the Contractor without prior written authorization from the Departmental Representative.

1.4 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

.2 Be responsible for damage incurred at no additional cost.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 US EPA 832/R-92-005 - Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices, September 1992.

1.2 DEFINITIONS

.1 Erosion: Deterioration, displacement, or transportation of land surface by wind or water, intensified by land-clearing practices related to construction activates.

.2 Rain or Rain Storm: An event defined causing the pooling of water on road or other impervious surfaces.

.3 Sediment: Particulate matter transported and deposited as a layer of solid particles within a body of water.

1.3 SUBMITTALS

.1 Provide requested information specified in Section 01 33 00 - Submittal Procedures.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 GENERAL REQUIREMENTS

.1 Prevent cleared topsoil, excavated earth stockpiles and regraded areas from being eroded by rain.

.2 Limit operation of vehicles on site to paved surfaces or temporary gravel surfaces in order to avoid disturbing the soil.

3.2 MUNICIPAL STORM WATER

.1 Each Day: Inspect erosion and sediment control measures, to ensure proper functions are not damaged.

END OF SECTION

Part 1 General

1.1 MANUAL

.1 An organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation, warranties and maintenance of individual products or systems.

1.2 GENERAL INSTRUCTIONS

.1 Assemble, coordinate, bind, and index required data into Operation and Maintenance Manual.

.2 Submit four (4) hardcopies and four (4) electronic copies attached to each hard copy of the complete operation and maintenance manual to the Departmental Representative within 2 weeks of project completion.

.3 Material: label each section with tabs protected with celluloid covers fastened to hard paper dividing sheets.

.4 Type lists and notes.

.5 Drawings, diagrams, and manufacturer's literature must be legible.

1.3 BINDERS

.1 Binders: vinyl, hard covered, 3 "D" ring, loose leaf, sized for 215 x 280 mm paper, with spine pocket.

.2 Identify contents of each binder on spine.

1.4 CONTENTS

.1 Cover sheet containing:

- .1 Date submitted.
- .2 Project title, location, and project number.
- .3 Names and addresses of Contractor and all subcontractors.

.2 Table of Contents of all binders.

.3 List of maintenance materials provided.

.4 List of special tools provided.

.5 List of spare parts provided.

.6 Warranties, guarantees.

.7 Copies of approvals and certificates.

1.5 PRODUCT DATA

.1 Provide the following data:

- .1 List of equipment including service depot.
- .2 Nameplate information including equipment number, make, size, capacity, model number, and serial number.
- .3 Parts list.

.4 Installation details.

.5 Operating instructions.

.6 Maintenance instructions for equipment.

.7 Maintenance instructions for finishes.

.2 Shop drawings:

.1 One complete set of reviewed final shop drawings and product data.

.3 Warranties:

.1 One complete set of manufacturer warranties.

Part 2 Products

2.1 NOT USED

2.1.1 Not used.

Part 3 Execution

3.1 NOT USED

3.1.1 Not used.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

.1 Maintain work in tidy condition, free from accumulation of waste products and debris.

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

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

.4 Provide on-site refuse and recycling containers for collection of waste materials and debris.

.5 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.6 Dispose of waste materials and debris off site.

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

.8 Provide adequate ventilation during use of volatile or noxious substances.

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

1.2 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work including fencing.

.2 Remove waste products and debris other than that caused by others, and leave Work area clean.

.3 Prior to inspection by Departmental Representative and as per Section 01 77 00 - Closeout Procedures, remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris other than that caused by Owner or other Contractors.

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

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

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions:

.1 Approved/Authorized recycling facility: waste recycler approved by applicable Provincial authority or other users of material for recycling approved by the Departmental Representative.

.2 Inert Fill: inert waste - exclusively asphalt and concrete.

.3 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

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

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

.2 Reference Standards:

.1 Canadian Construction Association (CCA)

.1 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prepare and submit on weekly basis, throughout project and/or at intervals agreed to in writing by Departmental Representative the following:

.1 Original receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials recycled or disposed of. Contractor invoices will not be paid until original receipts have been submitted and verified by Departmental Representative.

1.3 USE OF SITE AND FACILITIES

.1 Contractor and subcontractor personnel will require RCMP initiated security screening to complete Work in premises and on site.

.2 Execute Work with minimal interference and disturbance to normal use of premises.

.3 Provide temporary security measures approved by Departmental Representative, where required.

1.4 WASTE PROCESSING SITES

.1 Contractor is responsible to do research and locate waste diversion resources and service providers. Waste materials are to be transported off site to approved and/or authorized recycling facilities. Contractor to provide proof of disposal for all materials removed from site.

1.5 STORAGE, HANDLING AND PROTECTION

.1 Store materials to be disposed of off-site at locations as directed by Departmental Representative.

.2 Separate non-salvageable materials for transport and delivery to licensed disposal facility.

.3 Protect structural components not removed from movement or damage.

.4 Protect surface drainage from damage and blockage.

.5 Handle materials in accordance with requirements for acceptance by designated processing facilities.

1.6 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste into waterways, storm, or sanitary sewers.

.3 Keep records of waste including: waste type; tonnage generated for off-site disposal; tonnage recycled; and waste destination.

.4 Provide original waste manifest to Departmental Representative.

.5 Remove materials off-site as Work progresses.

1.7 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 APPLICATION

.1 Handle waste materials in accordance with all applicable regulations and codes.

3.2 CLEANING

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

.1 Leave Work area clean at end of each day.

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

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Departmental Representative inspection within 24 hours of project completion.

.2 Departmental Representative Inspection:

.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents, including submittal of all original waste manifests and tank destruction certificate.

.2 Defects: corrected and deficiencies completed.

.3 Certificates required by authorities having jurisdiction: submitted.

.4 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.

.2 When Work incomplete according to Owner and Departmental Representative, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

.6 Final Payment:

.1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.2 When Work deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

1.2 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove all surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide evidence, if requested by Departmental Representative, for type, source and quality of products supplied.

1.2 FORMAT

.1 Organize data as a neat record of Work, available for inspection by Departmental Representative.

1.3 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Provide copies of Federal, Provincial and/or Municipal permits, applications and/or approvals within one week of project completion to Departmental Representative.

.2 Provide waste summary report, including wastes hauled, disposal location and hauler. Include all original weigh scale tickets, waste manifests and original certificate of destruction within one week of project completion to Departmental Representative.

1.4 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Provide digital photos for site records within one week of project completion to Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 General requirements relating to commissioning of project's components and systems, specifying general requirements to performance verification (PV) of components, equipment, sub-systems, systems, and integrated systems.

.2 Related Requirements

.1 All other sections.

.3 Acronyms:

.1 AFD - Alternate Forms of Delivery, service provider.

.2 OMM - Operation and Maintenance Manual.

.3 Cx - Commissioning.

.4 EMCS - Energy Monitoring and Control Systems.

.5 OM - Operation and Maintenance.

.6 PI - Product Information.

.7 PV - Performance Verification.

.8 TAB - Testing, Adjusting and Balancing.

1.2 GENERAL

.1 Commissioning (Cx) is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:

.1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.

.2 Ensure appropriate documentation is compiled into the Operations and Maintenance manual (OMM).

.3 Effectively train Operation and Maintenance (OM) staff.

.2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.

.1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency.

.2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

.3 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

.4 Cx to be carried out in compliance with all applicable Federal and Provincial regulations and codes. In accordance with SOR/2008-197, Storage Tank Systems for Petroleum

Products and Allied Petroleum Products Regulations (STR), submit the following information to the Departmental Representative a minimum of 14 days prior to Cx:

.1 Design as-built drawings, bearing the stamp and signature of a professional engineer licensed to practice in the Province of Saskatchewan and show:

.1 the outline of the tank;

.2 the centreline of all piping;

.3 the centreline of all underground electrical power and monitor sensor conduits;

.4 the building foundation outlines;

.5 the property lines; and

.6 the secondary containment systems.

.2 Information requirements identified in Schedule 2 of the STR.

.5 Cx will require fuel in the new tank. Fuel delivery will be coordinated by the Owner. Fuel cannot be delivered into the tank until it is labeled with an Environment Canada (EC) tank ID number, an emergency response plan is completed and the Saskatchewan Ministry of Environment has granted approval to operate. A spill response kit must also be on site before fuel is delivered. The Owner is responsible for registering the tank system with EC, informing the Departmental Representative of completed registration, preparing the emergency response plan and providing the spill response kit. Contractor is to ensure that the new tank is labelled with the EC ID number before first filling. It is the Contractor's responsibility to schedule commissioning to coincide with the EC Tank ID labelling.

1.3 COMMISSIONING OVERVIEW

.1 Cx Plan to be provided to Departmental Representative a minimum of 14 days prior to Cx.

.2 Cx to be a line item of Contractor's cost breakdown.

.3 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.4 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.

.5 Departmental Representative will review Contractor Cx work for the following:

.1 Completed Cx documentation has been received, reviewed for suitability and approved by the Departmental Representative.

.2 Equipment, components and systems have been commissioned and all deficiencies have been addressed.

.3 OM training and manual have been completed.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the non-functional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.

.2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor.

1.5 PRE-CX REVIEW

.1 Before Construction and to be discussed at contract award meeting:

.1 Review contract documents, confirm by writing to Departmental Representative.

.1 Adequacy of provisions for Cx.

.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction:

.1 Co-ordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:

.1 Have completed Cx Plan up-to-date and submitted to Departmental Representative 14 days before Cx.

.2 Ensure installation of related components, equipment, sub-systems, and system is complete.

.3 Fully understand Cx requirements and procedures.

.4 Understand completely design criteria and intent and special features.

.5 Submit complete start-up documentation to Departmental Representative.

.6 Have Cx schedules up-to-date.

.7 Ensure systems have been cleaned thoroughly.

.8 Ensure that tank system has EC registration number attached and emergency response plan on site with spill response kit.

.4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

.1 Report conflicts between requirements of this section and other sections to Departmental Representative before Cx start-up and obtain clarification.

.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit no later than 4 weeks after award of Contract and 14 days prior to Cx:

.1 Name of Contractor's Cx agent.

.2 Draft Cx documentation.

.3 Preliminary Cx schedule.

1.8 COMMISSIONING DOCUMENTATION

.1 Provide completed and approved Cx documentation to Departmental Representative 5 days prior to Cx.

1.9 COMMISSIONING SCHEDULE

.1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar Chart.

.2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:

.1 Approval of Cx reports.

.2 Verification of reported results.

.3 Repairs, retesting, re-commissioning, re-verification.

.4 Training.

1.10 STARTING AND TESTING

.1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

.2 Undertake precision leak detection testing of tank and piping in accordance with Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197).

.3 Submit standalone written records documenting procedures and results of all testing 5 days prior to Cx. Owner to supply fuel and tank must be registered with EC prior to testing.

1.11 WITNESSING OF STARTING AND TESTING

.1 Provide 14 days notice to Departmental Representative prior to commencement.

.2 Departmental Representative to witness of start-up and testing.

.3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.12 PROCEDURES

.1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.

.2 Correct deficiencies and obtain approval from Departmental Representative.

.3 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:

.1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.

.2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.

.3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.

.1 Rejected equipment to be removed from site and replaced with new.

.2 Subject new equipment/systems to specified start-up procedures.

1.13 START-UP DOCUMENTATION

.1 Assemble start-up documentation and submit to Departmental Representative for approval 14 days before commencement of commissioning.

.2 Start-up documentation to include:

.1 EC Tank Number must be visible prior to fuelling the tank.

.2 Emergency Response Plan from Owner

.3 Factory and on-site test certificates for specified equipment.

.4 Pre-start-up inspection reports.

.5 Signed installation/start-up check lists.

.6 Start-up reports,

.7 Step-by-step description of complete start-up procedures, to permit Departmental Representative and/or Owner to repeat start-up at any time.

1.14 MAINTENANCE OF EQUIPMENT AND SYSTEMS

.1 With assistance of manufacturer develop written maintenance program and submit to Departmental Representative for approval within 14 days of completion of Cx. Include approved documentation in OMM.

1.15 TEST RESULTS

.1 If start-up, testing and/or PV produce results not acceptable to Departmental representative, then repair, replace or repeat specified starting and/or PV procedures until results are accepted by Departmental Representative in writing.

.2 Provide manpower and materials, assume costs for re-commissioning. Repeat part 1.15.1 above.

1.16 START OF COMMISSIONING

.1 Notify Departmental Representative at least 14 days prior to start of Cx.

.2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed including EC tank registration by Owner. Contractor to apply EC registration to tank when Departmental Representative informs Contractor in writing.

1.17 INSTRUMENTS / EQUIPMENT

.1 Submit to Departmental Representative for review and approval:

.1 Complete list of instruments proposed to be used.

.2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.

.2 Provide the following equipment as required:

.1 Equipment as required to complete work.

1.18 COMMISSIONING PERFORMANCE VERIFICATION

.1 Carry out Cx:

.1 Under accepted simulated operating conditions, over entire operating range, in all modes.

.2 On independent systems and interacting systems.

.2 Cx procedures to be repeatable and reported results are to be verifiable.

.3 Follow equipment manufacturer's operating instructions.

1.19 WITNESSING COMMISSIONING

.1 Departmental Representative to witness activities and verify results.

1.20 AUTHORITIES HAVING JURISDICTION

.1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

.2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

.3 Provide four (4) hardcopies and four (4) electronic copies attached to each hard copy to Departmental Representative within 5 days of test and with Cx report.

1.21 EXTRAPOLATION OF RESULTS

.1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.22 SUNDRY CHECKS AND ADJUSTMENTS

.1 Make adjustments and changes which become apparent as Cx proceeds.

.2 Perform static and operational checks as applicable and as required.

1.23 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during start-up and Cx to written approval of Departmental Representative.

.2 Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative.

1.24 COMPLETION OF COMMISSIONING

.1 Upon completion of Cx leave systems in normal operating mode.

.2 Except for warranty and seasonal verification activities specified in Cx specifications, Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative.

1.25 ACTIVITIES UPON COMPLETION OF COMMISSIONING

.1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item to Departmental Representative.

1.26 TRAINING

.1 Provide system operation and maintenance training to a representative of the Owner at Owner’s convenience.

1.27 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

.1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract in the manual.

1.28 OWNER'S PERFORMANCE TESTING

.1 Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment.

.1 Include removal of the existing fuel dispensing equipment, and all associated appurtenances, cabinet, remote monitoring equipment and supporting concrete curb in lump sum price for decommissioning of the aboveground storage tank (AST) and underground storage tank (UST) systems as per Section 02 65 00 – Aboveground and Underground Storage Tank Removal, including removal of the existing AST and UST.

.2 Measure well decommissioning on a per well basis. Based on the limit of the remedial excavation and proposed Work, five environmental monitoring wells will be decommissioned, as noted on the Contract Drawings.

1.2 REFERENCES

.1 Reference Standards: comply with applicable standards and regulations in effect at the time the work is performed:

.1 Canadian Council of Ministers of the Environment (CCME)

.2 Canadian Environmental Assessment Act (CEAA)

.3 Canadian Environmental Protection Act (CEPA) and Regulations

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

.6 The Occupational Health and Safety Regulation (SK) 1996.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Site Meetings.

.1 The Departmental Representative will convene a pre-demolition meeting one week prior to beginning work of this Section in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart to:

.1 Verify project requirements.

.2 Review site conditions.

.3 Co-ordinate with on-site personal.

.2 Departmental Representative will take minutes and distribute to Owner and Contractor

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

.1 Submit to Departmental Representative for review, five days prior to the start of construction, all drawings, diagrams and/or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.

.3 Hazardous Materials:

.1 Provide description of Hazardous Materials and Notification of Filing with authorities having jurisdiction within 7 days of beginning of Work as required. Copy to be provided to Departmental Representative.

.4 Certificates:

.1 Submit originals of certified weigh bills, bills of lading, receipts from authorized disposal sites and recycling facilities, and certificate of tank destruction, for all material removed from site on weekly basis and upon request of Departmental Representative. Payment of invoices will require receipt of all original documentation.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with CEPA, CEAA, TDGA, and all applicable Federal, Provincial and Municipal Acts and Regulations.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Store and manage hazardous materials in accordance with Section 01 35 43 - Environmental Procedures.

.2 Storage and Protection.

.1 Protect in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling

.2 Contractor to provide a written record of existing items designated to remain. Departmental Representative to review and approve in writing. Contractor to protect existing items designated to remain. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative and/or Owner.

1.7 SITE CONDITIONS

.1 Site Environmental Requirements.

.1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife or contribute to excess air and noise pollution. Details to be provided in reviewed Environmental Protection Plan.

.3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout the project.

.4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances. Methods to be provided in Environmental Protection Plan. Departmental Representative may stop work if non-compliant. Contractor to make repairs to approval of Departmental Representative at no cost to Departmental Representative and/or Owner.

Part 2 Products

2.1 EQUIPMENT

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

Part 3 Execution

3.1 PREPARATION

.1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal/recycling and items to remain.

.2 Locate and protect both public and private utilities before starting Work.

.3 Preserve active utilities traversing site in operating condition.

.4 Provide utility locate information to Departmental Representative within 5 days before starting Work.

3.2 REMOVAL OF HAZARDOUS WASTES

.1 Remove contaminated and/or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to a permitted facility to minimize danger at site and/or during disposal.

3.3 REMOVAL OPERATIONS

.1 Remove items as indicated on the Contract Drawings.

.2 Do not disturb items designated to remain in place, as identified on the Contract Drawings.

.3 Removal of pavements, curbs and gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method to be approved by Departmental Representative in writing.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.4 Prevent contamination with base course aggregates when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving,

.5 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.

.6 Decommission monitoring wells (5) in accordance with applicable Federal and Provincial guidelines.

.7 Disposal of Material:

.1 Dispose of waste materials at authorized permitted facilities.

.2 Aboveground and Underground Storage Tanks: remove and dispose of in accordance with CCME PN1326 and Section 02 65 00 - Aboveground and Underground Storage Tank Removal.

.8 Backfill:

.1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.4 STOCKPILING

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

.2 Stockpile locations to be approved by Departmental Representative.

3.5 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project and/or interferes with the mandate of the Owner.

.2 Dispose of materials in accordance with all applicable Acts and Regulations.

.1 Disposal Facilities: approved in writing by Departmental Representative.

.2 Written authorization from Departmental Representative is required to deviate from approved disposal facilities.

3.6 RESTORATION

.1 Restore areas and existing works outside areas of excavation to conditions that existed prior to beginning of Work and match condition of adjacent, undisturbed areas.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.7 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 debris, trim surfaces and leave work site clean, upon completion of Work

.3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

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

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.8 PROTECTION

.1 Repair damage to adjacent materials or property caused by selective site demolition.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment.

.1 Removal of existing asphalt pavement will be measured in square metres of surface actually removed regardless of depth removed or number of operations required.

.2 Payment under this item will include operations involved in removing, hauling, stockpiling and disposal of designated pavement, and cleaning of remaining pavement surface.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert unused asphalt materials from landfill to local facility approved in writing by Departmental Representative.

Part 2 Products

2.1 EQUIPMENT

.1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

Part 3 Execution

3.1 PREPARATION

.1 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.

3.2 PROTECTION

.1 Protect existing pavement not designated for removal from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 REMOVAL

.1 Remove existing asphalt pavement to lines and grades as indicated.

.2 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.

.3 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.4 Provide for suppression of dust generated by removal process.

3.4 STOCKPILING OF MATERIAL

.1 Existing asphalt base material can be salvaged for use as new support base material at the Contractor's discretion.

.2 Dispose of removed asphalt pavement by removing from site. Do not stock-pile materials.

.3 Removed asphalt pavement which is to be recycled in hot mix asphalt concrete under this contract may be stockpiled at designated asphalt plant site.

3.5 FINISH TOLERANCES

.1 Finished surfaces in areas where asphalt pavement has been removed to be within +/-5 mm of grade specified but not uniformly high or low.

3.6 SWEEPING

.1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section.

.1 Include soil remediation costs in items of Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.2 REFERENCES

.1 Applicable environmental and health and safety laws and regulations for Canada, Province of Saskatchewan and Municipal by-laws (latest edition).

.2 CCME (Canadian Council of Ministers of the Environment) Contaminated Sites, Contaminated Soil and Groundwater, and Remediation of Contaminated Sites most current publications including Environmental Quality Guidelines and Canada Wide Standards.

.3 National Fire Code (2015).

.4 Corrective Action Plan, EGE 2016 (see Appendix D).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Closeout Submittals:

.1 Provide Closeout Submittals in accordance with Section 01 77 00 - Closeout Procedures and Section 01 78 00 - Closeout Submittals as follows:

.1 Provide written proof (original weigh scale tickets) that all contaminated soil from the site has been sent to waste disposal facility authorized by the Province of Saskatchewan.

.2 Provide original written proof that waste has been sent to waste disposal facility authorized by the Province of Saskatchewan.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Identify members of project team including project manager. Define experience, and qualifications.

.2 Regulatory Requirements:

.1 Perform work in accordance with:

.1 Acts, Regulations, Laws, guidelines, codes of practice, directives and policies of government authorities pertaining to: environment; noise; water supply; waste water; air quality; health and safety; transportation; contaminated sites; and, waste management (latest edition).

.2 WHMIS.

.3 Canadian Environmental Assessment Act.

.4 Canadian Environmental Protection Act.

.5 Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197).

.6 Transportation of Dangerous Goods Act.

.7 National Building Code of Canada.

.8 National Fire Code of Canada.

.9 The Fisheries Act.

.10 Migratory Birds Convention Act.

.11 Migratory Birds Regulations.

.12 Canada Occupational Health and Safety Regulations (SOR/86-304).

.13 The Occupational Health and Safety Regulations (Saskatchewan).

.14 Saskatchewan Environmental Code.

.3 Field Samples:

.1 Due to the short duration of the field work, the Contractor should obtain interim waste soil acceptance from the proposed waste disposal facility based upon the historic and anticipated soil impacts associated with the UST.

.2 Field samples of waste soil and water will be collected for laboratory analyses by the Departmental Representative. Within 5 days of award, notify Departmental Representative of proposed disposal facilities so that appropriate analytical requirements can be determined.

.3 Laboratory results will be provided by the Departmental Representative (upon receipt) to the Contractor in order to facilitate final waste soil disposal acceptance with the proposed waste disposal facility.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Contaminated Soil:

.1 Transport and dispose of non-contaminated and contaminated soil according to current Federal requirements and Saskatchewan regulations and Municipal By-laws such as road restrictions.

.2 Segregate the non-contaminated and contaminated soil as directed by the Departmental Representative. Ensure no contact between non-contaminated excavated soil and drainage or contaminated water or contaminated soil.

1.6 SITE CONDITIONS

.1 Existing Conditions:

.1 Review 2012 Phase III ESA report by EGE, as provided in Appendix A.

.2 Review 2015 Geotechnical Investigation report by PMEL, as provided in Appendix B.

.3 Failure to acquaint fully with all available information concerning conditions affecting the work shall not relieve the Contactor of the responsibility for estimating the difficulties and costs of satisfactorily performing the work.

.4 Claims for additional costs will not be entertained with respect to conditions which would reasonably have been ascertained by an inspection of the site prior to tender closing time.

1.7 MAINTENANCE

.1 Access Roads:

.1 Maintain on-site Access Roads in accordance with Section 01 52 00 – Construction Facilities and as follows:

.1 Maintain and clean roads for duration of Work.

.2 Repair damage incurred from use of roads, points of ingress and egress. Departmental Representative to inspect repair. If not acceptable, then re-repair at no extra cost to Departmental Representative and/or Owner.

.3 Provide photographic documentation of roads used by construction vehicles before, during and after Work.

Part 2 Products

2.1 MATERIALS

.1 Fill:

.1 Characterized and compactible to meet decontamination objectives.

.2 Hazardous Waste:

.1 Disposed in accordance with TDGA and Saskatchewan Acts and regulations.

2.2 EQUIPMENT

.1 Leave equipment and machinery running only while in use.

.2 Trucks (at a minimum) shall be:

.1 Cleaned between loads of contaminated soil and clean fill.

.2 Cleaned at end of work day.

.3 Covered with tarpaulins during transportation (truck bodies).

.4 Watertight truck bodies for transporting contaminated soil.

Part 3 Execution

3.1 PREPARATION

.1 Protection:

.1 Keep excavation sites water free throughout work and manage recovered water according to Provincial and/or Municipal regulations.

.2 Protect excavation from precipitation as practical.

.3 Provide temporary structures to divert flow of surface waters from excavation.

.4 Provide safety measures to ensure worker and public safety.

.5 At end of each day's work, leave Work Site in safe and stable condition, and to not be a hazard to people and/or wildlife.

3.2 APPLICATION

.1 Soil Management:

.1 Do not dilute contaminated soil with less contaminated soil.

.2 Groundwater Management:

.1 Vacuum truck is an acceptable means of excavation dewatering.

3.3 RESTORATION

.1 Confirmatory sampling to be completed by Departmental Representative and backfilling shall not proceed until results indicate that contaminant concentrations within the base of the excavation are in compliance with applicable federal standards and Departmental Representative has informed Contractor in writing to proceed with backfilling.

.2 Backfill excavation in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.4 EQUIPMENT DECONTAMINATION

.1 Decontaminate equipment used in excavation process and remove from site at end of remedial activities.

.2 Collect, load, transport and dispose all waste from decontamination area to permitted facility.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 Removal of Aboveground Storage Tank (AST) and Underground Storage Tank (UST) systems will be a lump sum payment, including: decommissioning of all system infrastructure, including but not necessarily limited to:

.1 decommissioning of aboveground and underground storage tanks and associated supply, fill and vent pipes;

.2 tank purging and destruction;

.3 decommissioning of the aviation fuelling cabinet, hose reel, associated appurtenances and concrete curb

.4 removal of underground electrical and communication cables, piping and conduits; and

.5 removal of concrete tank tie-downs and any anchors.

.2 Unit of Measure for the services of a vacuum truck, if necessary, for excavation dewatering and the removal of any residual hydrocarbon product from the tanks will be hourly.

.3 Disposal of excavation water and residual hydrocarbon product from the tanks and piping using the services of a vacuum truck to be measured in litres. Measurement to include removal, transport and disposal to approved waste receiving facility.

1.2 REFERENCES

.1 All references to be most recent issued.

.2 Canadian Council of Ministers of the Environment (CCME)

.1 CCME PN 1326-2003, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products.

.2 CCME PN 1299-[2006], Canadian Environmental Quality Guidelines.

.1 Chapter 7-2006, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health.

.3 Saskatchewan Ministry of Environment (SK MoE)

.1 Risk-Based Corrective Actions for Petroleum Hydrocarbon Impacted Sites (RBCA) (SK MoE 2009)

.2 Saskatchewan Environmental Code (2015).

.4 Canadian Federal Legislation

.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

.2 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canada Labour Code (R.S. 1985, c. L-2).

.1 Part II (September 2000) - Occupational Health and Safety.

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.5 Underwriters' Laboratories of Canada (ULC)

.1 ULC-S603-2000, Standard for Steel Underground Tanks for Flammable and Combustible Liquids.

1.3 SUBMITTALS

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

.2 Provide the following information for each storage tank system:

.1 Tank serial numbers and other pertinent details as provided on tank identification tags.

.3 Provide Departmental Representative with copy of vapour removal test results.

.4 Forward photos and affidavit of destruction of aboveground and underground storage tanks to the Departmental Representative.

.5 Provide Departmental Representative with completed Environmental Canada (EC) Storage Tank System Identification Form (attached as an Appendix to these specifications), including all pertinent information for the permanent removal of the aboveground and underground storage tanks. One form for each system.

.6 Required submittals to be provided to Departmental Representative within 48 hours of completion of tank decommissioning.

1.4 QUALITY ASSURANCE

.1 Contractor personnel must be licensed/certified by the Province of Saskatchewan, the authority having jurisdiction for removal of storage tanks.

.1 License/certificate, title and number must accompany bid.

.2 Regulatory Requirements: ensure Work is performed in compliance with CEPA, TDGA and all applicable Federal and Provincial regulations (latest editions).

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert metal materials where practical from landfill to metal recycling facility approved by Departmental Representative.

.3 Segregate and deliver non-salvageable and/or non-recyclable materials, including waste liquid, sludge, non-impacted soil and PHC impacted soil to provincially licensed/permitted waste facility. Provide original manifest documents to Departmental Representative. Originals will be required for payment of Contractor invoices.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 PREPARATION SAFETY AND SECURITY

.1 Conform to or exceed Federal, Provincial and Municipal codes, by-laws, and codes and regulations of utility authorities having jurisdiction.

.2 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Protection:

.1 Meet safety requirements of Occupational Safety and Health, Canada Labour Code Part II and Regulations for Construction Projects, and applicable Saskatchewan Occupational Safety and Health requirements.

.2 Disconnect or remove all sources of ignition from vicinity of tanks.

.3 Provide temporary protection for safe movement of personnel and vehicle traffic.

.4 Cut, braze or weld metal only in monitored areas established to be free of ignitable vapour concentrations.

.5 Ground and bond metal equipment, including tanks and transfer pipes, before operating equipment and/or transferring flammable materials.

.6 Use non-sparking tools and intrinsically safe electrical equipment.

.7 Smoking is not permitted on site.

3.2 DRUMS

.1 Storage of Liquid Waste: 200 L steel drums meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.

.2 Storage of Solid Waste: 200 L steel drums meeting Transportation and Dangerous Goods Act, closable lids, complete with labels for marking contents and date filled.

.3 Drums to be stored on an environmental pallet or liner.

3.3 WATER CONTROL

.1 Maintain excavations free of water.

.2 Protect site from puddling or running water.

.3 Prevent surface water runoff from leaving work areas.

.4 Do not discharge decontaminated water or surface water runoff and/or groundwater which may have come in contact with potentially contaminated material, off site or to municipal sewers.

.5 Prevent precipitation from infiltrating and/or from directly running off stockpiled waste materials. Cover stockpiled waste materials with tarps during periods of work stoppage including at end of each working day and as directed by Departmental Representative.

.6 Direct surface waters that have not contacted potentially contaminated materials to the existing surface drainage systems. Use silt fences, as required, to minimize any silt load in the surface water.

.7 Control surface drainage including ensuring that gutters are kept open, water is not directed across or over pavements or sidewalks except through approved pipes or properly constructed troughs, and runoff from un-stabilized areas is intercepted and diverted to suitable outlet.

.8 Dispose of water in manner not injurious to public health or safety, to property or to any part of Work completed or under construction.

.9 Provide, operate, and maintain necessary equipment appropriately sized to keep excavations, staging pads, and other work areas free from water.

.10 Have on site sufficient pumping equipment, machinery, and storage tanks in good working condition for ordinary emergencies, including power outage.

.11 Departmental Representative will review all water control measures.

3.4 DEWATERING

.1 Dewater various parts of Work including, without limitation, excavations, structures, foundations, and work areas.

.2 Employ construction methods and precautions that ensure Work, including excavations, are stable, free from disturbance, and dry.

.3 Dewatering Methods: Vacuum trucks are an acceptable means of excavation dewatering.

3.5 DRAINING

.1 Drain and flush piping into tanks.

.2 Pump out liquid from tanks.

.1 Use explosion proof, air driven or hand pump.

.3 Remove sludge from tank bottoms.

.1 Dispose of product and sludge in accordance with local, Municipal, and Provincial regulations using waste disposal carrier licensed by authority having jurisdiction (Saskatchewan).

3.6 EXCAVATION TRENCHING AND BACKFILL

.1 Do work in accordance with Section 31 23 33.01 - Excavation, Trenching and Backfilling.

.2 Contractor to provide constant supervision during excavation and backfilling.

.3 Excavation:

.1 Excavate until top of UST tank and connections and openings are exposed.

.2 Disconnect piping:

.1 Remove fill tube.

.2 Disconnect fill gauge, product and vent lines.

.3 Cap or plug open ends of lines that are not to be used further.

.4 Remove piping from ground.

.3 Temporarily plug tank openings.

.4 Continue excavation until tank is completely exposed.

.5 Temporarily stockpile soil on a liner on site, in vicinity of tank, until waste classification can be established by Departmental Representative in writing prior to final disposal.

.4 Prevent movement, settlement and/or damage of adjacent structures, services, walks, paving, landscaping, adjacent grades. Provide bracing and/or shoring as per Section 31 23 33.01 - Excavating, Trenching and Backfilling for Departmental Representative review.

3.7 TANK REMOVAL

.1 Permanently remove tanks in accordance with SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations, CCME Code of Practice PN 1326 and/or applicable provincial standards and regulations, and place in designated location as approved by Departmental Representative.

.2 Block tanks to prevent movement.

3.8 VAPOUR REMOVAL

.1 Purging:

.1 Purge vapours in accordance with applicable Federal and Provincial guidelines.

.2 Purge vapours to less than 10% of lower explosive limit (LEL).

.3 Verify with combustible gas metre.

.4 Purge vapours prior to removal of UST from ground and again prior to removing UST and AST from site.

.5 Provide Departmental Representative with written copy of all test results.

.2 Inverting:

.1 Displace oxygen to levels below necessary to sustain combustion.

.2 Verify with combustible gas metre.

.3 Dry Ice Method:

.1 Add 1.85 gm of solid carbon dioxide (dry ice) for each 100 litre capacity.

.2 Crush and distribute ice evenly over greatest area to secure rapid evaporation. Avoid skin contact.

.3 Verify dry ice has vaporized.

.4 Air Method:

.1 Ventilate tanks with air using small gas exhauster operated with compressed air or other suitable means.

.2 Air to enter opening at one end and to exit opening at other end to quickly remove vapour.

.3 Test interior of tanks to determine when tanks are free of vapour.

3.9 CAPPING

.1 Plug or Cap holes after tanks have been freed of vapours and before tanks are moved from site.

.1 Leave vents open.

.2 Plug corrosion leak holes using screwed (boiler) plugs.

.3 Leave 3 mm vent hole in one plug to prevent tanks from being subjected to excessive pressure differential caused by extreme temperature change.

3.10 SECURING AND REMOVAL FROM SITE

.1 Check vapour levels prior to transport:

.1 Remove vapour if required.

.2 Dispose of tanks in accordance with most stringent of local, Provincial and/or Federal regulations.

.3 Truck removal:

.1 Secure tanks on truck for transport to disposal site.

.2 Cut suitable openings in tank sides to render tanks unusable.

.3 Ensure minimum 3 mm vent hole located at uppermost point on tanks.

.4 Provide pictures of tanks and destruction certificates to Departmental Representative.

3.11 SITE REMEDIATION

.1 Repair/replace finish grade to match surrounding area after approval by Departmental Representative to proceed.

.2 In event of required site remediation as directed by Departmental Representative, refer to Section 02 61 00.01 - Soil Remediation.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment

.1 No measurement of payment will be made for this section.

.1 Include on-site storage, handling and management of hazardous materials costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 Definitions:

.1 Dangerous Goods: product, substance or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: product, substance or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.

.2 Reference Standards (latest edition):

.1 Canadian Environmental Protection Act,1999 (CEPA 1999)

.1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).

.2 Department of Justice Canada (Jus)

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

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

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 National Research Council Canada Institute for Research in Construction (NRC-IRC)

.1 National Fire Code of Canada - 2015.

1.3 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 hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental

Procedures to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations and applicable Provincial regulations.

.3 Storage and Handling Requirements:

.1 Co-ordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.

.2 Store and handle hazardous materials and wastes in accordance with applicable Federal and Provincial laws, regulations, codes and guidelines.

.3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.4 Keep no more than 250 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.

.1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.

.2 Storage of quantities of flammable and combustible liquids exceeding 250 litres for work purposes requires the written approval of the Departmental Representative.

.5 Transfer of flammable and combustible liquids is prohibited within buildings.

.6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.

.7 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.

.8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

.9 No smoking allowed on site.

.10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids and 5 litres for liquids:

.1 Store hazardous materials and wastes in closed and sealed containers.

.2 Label containers of hazardous materials and wastes in accordance with WHMIS.

.3 Store hazardous materials and wastes in containers compatible with that material or waste.

.4 Segregate incompatible materials and wastes.

.5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.

.6 Store hazardous materials and wastes in secure storage area with controlled access.

.7 Maintain clear egress from storage area.

.8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.

.9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment as detailed in the Environmental Protection Plan and reviewed by the Departmental Representative.

.10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.11 When hazardous waste is generated on site:

- .1 Co-ordinate transportation and disposal with Departmental Representative.
- .2 Comply with applicable Federal, Provincial and Municipal laws and regulations for generators of hazardous waste.
- .3 Use licensed carrier authorized by Provincial authorities to accept subject material.
- .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.
- .5 Label containers with legible, visible safety marks as prescribed by federal and Provincial regulations.
- .6 Only trained personnel handle, offer for transport, or transport dangerous goods. Certificates of training to be provided on request of Departmental Representative.
- .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
- .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
- .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate Provincial authority. Take reasonable measures to control release. Spill Response Plan in Environmental Protection Plan to be followed.

.12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.13 Report spills or accidents immediately to Departmental Representative and authority having jurisdiction. Submit a written spill report to Departmental Representative within 24 hours of incident.

Part 2 Products

2.1 MATERIALS

.1 Description:

.1 Bring on site only the quantities of hazardous material required to perform Work.

.2 Maintain MSDS in proximity to where materials are being used where the environmental protection plan is stored. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 Execution

3.1 CLEANING

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

.1 Leave Work area clean at end of each day.

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

.3 Waste Management: separate waste materials for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Dispose of hazardous waste materials in accordance with applicable Federal and Provincial acts, regulations and guidelines.

.2 Burning, diluting or mixing hazardous wastes for purpose of disposal is prohibited.

.3 Disposal of hazardous materials in waterways, storm or sanitary sewers or in municipal solid waste landfills is prohibited.

.4 Dispose of hazardous wastes in timely fashion in accordance with applicable Provincial regulations.

.5 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include cast-in-place concrete costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM):

.1 ASTM D1751, Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-19.24, Multicomponent, Chemical-Curing Sealing Compound.

.3 National Research Council Canada (NRC):

.1 National Building Code Canada 2010 NBCC2010.

.4 Canadian Standards Association (CSA):

.1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.

.2 CAN/CSA-A23.2, Methods of Test for Concrete.

.3 CAN/CSA-A3000-A5, Portland Cement.

.4 CAN/CSA-G30.5, Welded Steel Wire Fabric for Concrete Reinforcement.

.5 CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement.

1.3 SUBMITTALS

.1 Shop Drawings:

.1 Submit placing drawings prepared in accordance with plans to clearly show size, shape, location and all necessary details of reinforcing.

.2 Submit drawings showing formwork and falsework design to: CAN/CSA-A23.1.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Ensure emptied containers are sealed and stored safely.

.5 Use trigger operated spray nozzles for water hoses.

.6 Designate cleaning area for tools to limit water use and runoff.

Part 2 Products

2.1 MATERIALS

.1 Portland cement with 40% fly ash replacement: to CAN/CSA-A3000-A5, Type 10.

.2 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.

.3 Welded steel wire fabric: to CAN/CSA-30.5.

.4 Pre-moulded joint filler:

.1 Bituminous impregnated fibreboard: to ASTM D1751.

.5 Joint sealer/filler: grey to CAN/CGSB-19.24, Type 1, Class B.

.6 Sealer: proprietary poly-siloxane resin blend.

.7 Other concrete materials: to CAN/CSA-A23.1.

2.2 MIXES

.1 Proportion concrete in accordance with CAN/CSA-A23.1 to meet the following requirements:

.1 Exposure Class: S-1

.2 56 day compressive strength: 35 MPa

.3 Maximum water/concrete ratio: 0.4

.4 Nominal aggregate size: 20 mm

.5 Maximum slump: 120 mm

.2 Minimum compressive strength at 28 days: 30 MPa as specified by Departmental Representative.

.3 Class of exposure: To CAN/CSA-A23.1, Table 11.

.4 Nominal maximum size of coarse aggregate: to CAN/CSA-A23.1.

.5 Slump: to CAN/CSA-A23.1.

.6 Air content: concrete to contain purposely entrained air in accordance with CAN/CSA-A23.1, Table 10.

.7 Admixtures: to CAN/CSA-A23.1.

.8 Polypropylene fibres: add 1 kg/m^3, in small quantities at plant, with minimum 7 minutes mixing time.

Part 3 Execution

3.1 CONSTRUCTION

.1 All workmanship, component design, and materials to be to NBCC2010 as a minimum. Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.

.2 Check all dimensions, elevations, and details prior to construction.

.3 Sandblast, clean, and roughen all existing concrete to a full amplitude of 5 mm prior to pouring new. Apply epoxy bonding agent prior to pour.

.4 Hook reinforcing bars at opposite face at discontinuous ends. Provide class “B” lap splices throughout. Tie and secure reinforcing in place prior to placing concrete. Support reinforcing using plastic chairs to maintain minimum of 50 mm concrete cover.

.5 Vibrate fresh concrete adequately to produce sound concrete without honeycomb.

.6 Provide 20 mm chamfer at all exposed concrete edges.

3.2 INSERTS

.1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in. Sleeves and openings greater than 100 mm x 100 mm not indicated, must be approved by Departmental Representative in writing.

.2 The quantity, size, and thread projection of anchor bolts, nuts, and washers for attachment and leveling of tank to suit tank manufacturer’s specifications.

3.3 FINISHES

.1 Formed surfaces exposed to view: sack rubbed finish in accordance with CAN/CSA-A23.1.

.2 Equipment pads: provide smooth trowelled surface.

.3 Pavements, walks, curbs and exposed site concrete:

.1 Screed to plane surfaces and use aluminum floats.

.2 Provide round edges and joint spacings using standard tools.

.3 Trowel smooth to provide lightly brushed non-slip finish.

3.4 CONTROL JOINTS

.1 Cut control joints in slabs on grade at locations indicated, in accordance with CAN/CSA-A23.1 and install specified joint sealer/filler.

3.5 EXPANSION AND ISOLATION JOINTS

.1 Install pre-moulded joint filler in expansion and isolation joints full depth of slab flush with finished surface.

3.6 CURING

.1 Cure and protect concrete in accordance with CAN/CSA-A23.1:

.1 Do not use curing compounds where bond is required by subsequent topping or coating.

3.7 SEALING

.1 Following curing, apply poly-siloxane resin blend sealer at 4 m^2/L.

3.8 SITE TOLERANCES

.1 Concrete floor slab finishing tolerance in accordance with CAN/CSA-A23.1.

.2 Honeycomb or embedded debris in concrete is not acceptable. Remove and replace defective concrete as directed by Departmental Representative.

3.9 FIELD QUALITY CONTROL

.1 Concrete testing: to CAN/CSA-A23.2 by testing laboratory designated and paid for by Contractor. Accelerated test methods will apply.

.2 Make and test four cylinders for each concrete placement. Test one at 7 days and three at 28 days.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include concrete reinforcing costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 SOURCE QUALITY CONTROL

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.

.2 Upon request, inform Departmental Representative in writing of proposed source of material to be supplied.

1.3 SHOP DRAWINGS

.1 Not Required.

1.4 SUBSTITUTES

.1 Substitute different size bars only if permitted in writing by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.

.2 Reinforcing steel: weldable low alloy steel deformed bars to CAN/CSA G30.18.

.3 Cold-drawn annealed steel wire ties: to CSA G30.3.

.4 Deformed steel wire for concrete reinforcement: to CSA G30.14.

.5 Welded steel wire fabric: to CSA G30.5. Provide in flat sheets only.

.6 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.

.7 Mechanical splices: subject to approval of Departmental Representative.

.8 Plain round bars: to CAN/CSA-G40.21.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada, unless indicated otherwise.

.2 Obtain Departmental Representative’s written approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.

.4 Ship bundles of bar reinforcement clearly identified in accordance with bar bending details and lists.

Part 3 Execution

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized in writing by 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.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.

.2 Prior to placing concrete, obtain Departmental Representative’s written approval of reinforcing material and placement.

.3 Ensure cover to reinforcement is maintained during concrete pour.

3.3 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

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include metal fabrication costs in lump sum price for new aboveground storage tank (AST) Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

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

.1 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

.3 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-1.40, Anti-corrosive Structural Steel Alkyd Primer.

.2 CAN/CGSB-1.181, Ready-Mixed, Organic Zinc-Rich Coating.

.3 Canadian Standards Association (CSA International):

.1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel.

.2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CAN/CSA-S16.1, Limit States Design of Steel Structures.

.4 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.5 CSA W59, Welded Steel Construction (Metal Arc Welding) (Imperial Version).

.4 The Environment Canada - Environmental Choice Program:

.1 Certification Criteria Document – UL 27681/CCD-047a, Architectural, Surface Coatings.

.2 UL 2760/CCD-048, Surface Coatings - Recycled Water-borne.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit WHMIS Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials. Indicate VOC's:

.1 For finishes, coatings, primers and paints.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories at a minimum.

1.4 QUALITY ASSURANCE

.1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Protection:

.1 Cover exposed steel surfaces with heavy protection paper or plastic film, before shipping to job site.

.2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper and plastic packaging material for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.

.2 Steel pipe: to ASTM A53/A53M standard weight, black finish.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A307.

.6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

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

.3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 600g/m^2 to CAN/CSA-G164.

.2 Shop coat primer: to CAN/CGSB-1.40.

.3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.4 ISOLATION COATING

.1 Isolate aluminum from following components, by means of bituminous paint:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry.

.3 Wood.

2.5 SHOP PAINTING

.1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.

.3 Clean surfaces to be field welded; do not paint.

Part 3 Execution

3.1 ERECTION

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

.2 Fabricate protective pipe bollards as detailed on drawings.

.3 Locate bollards to provide protection of fuel storage tank fuel dispensing cabinet. Coordinate location with tank arrangement and dimensions.

.4 Coordinate bollard installation with slab preparation to ensure compaction is maintained and reinforcing bar is not adversely impacted.

.5 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.6 Provide anchorage as detailed on the drawings such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles. Coordinate quantity, size, and thread length with fuel storage tank installation requirements.

.7 Exposed fastening devices to match finish and be compatible with material through which they pass.

.8 Provide components for building by other sections in accordance with shop drawings and schedule.

.9 Make field connections with bolts to CAN/CSA-S16.1, or weld.

.10 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

.11 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer. Departmental Representative to inspect for completion.

.12 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include painting of exterior metal surfaces costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

.2 Lump sum costs to include cleaning and preparation of structural steel and components, shop painting, field painting, supply of paint, application of paint and all incidental work.

1.2 REFERENCES

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

.1 ASTM D610, Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces.

.2 ASTM D2369, Test Method for Volatile Content of Coatings.

.3 ASTM D2832, Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.

.4 ASTM D5326, MPI-9 Test Method for Color Development in Tinted Latex Paints.

.2 Master Painters' Institute (MPI), Exterior Structural Steel and Metal Fabrications:

.1 EXT 5.1, Alkyd.

.2 EXT 5.1G, Zinc Rich/Aliphatic Polyurethane.

.3 EXT 5.4, Aluminum.

.3 Environmental Choice Program (ECP):

.1 CCD-048, Recycled Water-borne Surface Coatings.

.2 CCD-047a, Paints - Surface Coatings.

.4 Federal Standard (FS):

.1 FS-595B, Paint Colours.

.5 Steel Structures Painting Council (SSPC):

.1 SSPC-SP-1, Solvent Cleaning.

.2 SSPC-SP-2, Hand Tool Cleaning.

.3 SSPC-SP-3, Power Tool Cleaning.

.4 SSPC-SP-6/NACE No. 3, Commercial Blast Cleaning.

.5 SSPC-SP-7/NACE No 4, Brush-off Blast Cleaning.

.6 SSPC-Vis-1, Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs) Editorial Changes September 1, 2000 (Steel Structures Painting Manual, Chapter 2 - Surface Preparation Specs.).

.7 SSPC-SP-10/NACE No. 2, Near White Blast Cleaning.

.8 SSPC-PA, Measurement of Dry Coat Thickness with Magnetic Gauges.

.9 SSPC Good Painting Practices, Volume 1, 4th Edition.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit WHMIS Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials. Indicate VOC's for paint.

.2 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.3 Paints that do not appear on MPI Approved Products List must be approved by Departmental Representative before use on project. When it is proposed to use non-qualified paint, submit one 2 L sample of paint to Departmental Representative at least 2 weeks prior to commencement of painting for analysis and acceptance. Mark samples with name of project, its location, paint manufacturer's name and address, name of paint, MPI standard number and manufacturers paint code number.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert unused coating materials from landfill through disposal at a special wastes depot.

Part 2 Products

2.1 MATERIALS

.1 Paint:

.1 Primer: MPI EXT 5.1C, primer, marine for steel.

.1 Primer for second coat: tinted sufficiently off finish colour of first coat to show where second coat is applied.

.2 Tinting material: compatible with primer and not detrimental to its service life.

.2 Enamel: MPI EXT 5.1G, enamel, alkyd, marine, exterior; first coat grey, colour No. 501-205; second and third coat yellow. Colours to match FS-595B. If majority of paint application is to be by brushing, use paint to MPI EXT 5.1D:

.1 Table.

.2 Aluminum paint: to MPI EXT 5.4, paint, aluminum, marine.

.3 Sand for sandblasting: to SSPC (Steel Structures Painting Council).

Part 3 Execution

3.1 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.

3.2 SITE EXAMINATION

.1 Precaution should be taken when removing loose and rusted existing paint from metal surfaces.

3.3 PREPARATION

.1 New metal surfaces:

.1 Clean surfaces of new metal to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and foreign substances in accordance with the following:

.1 Commercial blast cleaning: SSPC-SP-6 (Steel Structures Painting Council).

.2 Solvent cleaning: SSPC-SP-1.

.3 Hand tool cleaning: SSPC-SP-2.

.4 Power tool cleaning: SSPC-SP-3.

.5 Brush-off blast cleaning: SSPC-SP-7.

.6 Near White Blast Cleaning: SSPC-SP10/NACE No. 2.

.2 Compressed air to be free of water and oil before reaching nozzle.

.3 Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, by blowing with clean dry compressed air, or by vacuum cleaning.

.4 Do not apply paint until prepared surfaces have been accepted by Departmental Representative in writing.

.5 Prior to commencing paint application, the degree of cleanliness of surfaces to be in accordance with SSPC-Vis1.

.6 Protection of surfaces:

.1 Protect surfaces not to be painted and if damaged, clean and restore such surfaces as directed by Departmental Representative.

.2 Apply primer, paint, or pre-treatment after surface has been cleaned and before deterioration of surface occurs.

.3 Clean surfaces again if rusting occurs after completion of surface preparation.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.

.5 Protect cleaned and freshly painted surfaces from dust to approval of Departmental Representative.

.7 Mixing paint:

.1 Do not dilute or thin paint for brush application; use as received from manufacturer.

.2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.

.3 Do not mix or keep paint in suspension by means of air bubbling through paint.

.4 Thin paint for spraying according to manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

.8 Number of paint coats:

.1 New metal surfaces:

.1 Shop: one primer coats to minimum dry film thickness of 35 microns.

.2 Field: Two alkyd enamel coats to minimum dry film thickness of 25 microns per coat.

3.4 APPLICATION

.1 Apply paint by spraying, brushing, or combination of both. Use sheepskins or daubers when no other method is practical in places of difficult access.

.2 Use dipping or roller coating method of application when specifically authorized by Departmental Representative in writing.

.3 Caulk open seams at contact surfaces of built up members with material approved by Departmental Representative, before second undercoat of primer is applied.

.4 Where surface to be painted is not under cover, do not apply paint when:

.1 Air temperature is below 5 degrees C or when temperature is expected to drop to 0 degrees C before paint has dried.

.2 Temperature of surface is over 50 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Fog or mist occur at site; it is raining or snowing; there is danger of rain or snow; relative humidity is above 85%.

.4 Surface to be painted is wet, damp or frosted.

.5 Previous coat is not dry.

.5 Provide cover when paint must be applied in damp or cold weather. Protect, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified in 3.2.4. Protect until paint is dry or until weather conditions are suitable.

.6 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.7 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.8 Brush application:

.1 Work paint into cracks, crevices and corners and paint surfaces not accessible to brushes by spray, daubers or sheepskins.

.2 Brush out runs and sags.

.3 Remove runs, sags and brush marks from finished work and repaint.

.9 Spray application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.

.3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.4 Apply paint in uniform layer, with overlapping at edges of spray pattern.

.5 Brush out immediately runs and sags.

.6 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.

.7 Remove runs, sags and brush marks from finished work and repaint.

.10 Shop painting:

.1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.

.2 Spray paint contact surfaces of field assembled, bolted, friction type joints with primer coat only. Do not brush primer after spraying.

.3 Do not paint metal surfaces which are to be embedded in concrete.

.4 Paint metal surfaces to be in contact with wood with either full paint coats specified or three shop coats of specified primer.

.5 Remove weld spatter before painting.

.6 Protect machine finished or similar surfaces that are not to be painted but that do require protection, with coating of rust inhibitive petroleum, molybdenum disulphide, or other coating approved by Departmental Representative.

.7 Copy previous erection and weight marks on areas that have been shop painted.

.11 Field painting:

.1 Paint steel structures as soon as practical after erection.

.2 Touch up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.

.3 Field paint surfaces (other than joint contact surfaces) which are accessible before erection but which are not to be accessible after erection.

.4 Do not apply final coat of paint until concrete work is completed, except as directed by Departmental Representative. If concreting or other operations damage paint, clean and repaint damaged area at no extra cost. Remove concrete spatter and droppings before paint is applied.

.5 Where painting does not meet with requirements of specifications, and when so directed by Departmental Representative remove defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications at no extra cost.

.12 Handling painted metal:

.1 Do not handle painted metal until paint has dried, except for necessary handling for painting or stacking for drying.

.2 Scrape off and touch up paint which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

3.5 FIELD QUALITY CONTROL

.1 Upon completion of the painting procedures test for dry film reading and evaluate the results as per SSPC PA 2.

3.6 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment.

.1 No measurement of payment will be made for this section.

.1 Include fuel system piping costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 All work covered by this section shall be carried out in accordance with, but not limited to the following standards, which shall be deemed to be and form part of this specification:

.1 American National Standards Institute:

.1 B31.3 – “Chemical Plant and Petroleum Refinery Piping”.

.2 B2.1 – “Pipe Threads”.

.3 B16.50 – “Steel Pipe Flanges and Flanged Fittings”.

.4 B16.90 – “Steel Butt-weld Fittings.

.5 B16.11 – Forged Steel Fittings Socket Welding and Threaded.

.6 B16.21 – “Non-Metallic Gaskets for Pipe Flanges”.

.7 B18.20 – “Square and Hex Nuts and Bolts”.

.8 B16.25 – “Butt Welding Ends”.

.2 Boiler and Pressure Vessel Regulations of the Province of Saskatchewan.

.3 American Society of Mechanical Engineers: ASME Boiler and Pressure Vessel Code.

.4 Applicable Municipal and Regional Codes.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

Part 2 Products

2.1 MATERIALS

.1 Steel Pipe – Class 150:

.1 Steel pipe, valves and fittings shall meet the following requirements:

.1 40 mm and down - Steel, seamless, Schedule 80, API 5L, Gr.B threaded or socket ends.

.2 50 mm - Steel, seamless, XS, API 5L Gr.B plain or B.W. ends.

.2 Stainless Steel Pipe - 304L, Schedule 40.

.3 Petroleum Tubing/Fittings:

.1 Tubing: Type 316 stainless steel, ASTM A-269, seamless, full annealed, max. RB80, 12mm O.D. x 1.3 mm wall thickness.

.2 Tube Fittings: 316 SS compression type.

.3 Shut-Off Valves: 316 SS compression type.

.4 Fusible link valve – 12 mm.

.5 Flexible Metal Hoses: 316SS tube with SS overbraid, 12mm nominal hose I.D., 900 mm minimum length.

.4 Fittings

.1 40 mm and down – ANSI Class 3000 CWP, steel, A-105 forged, threaded or socket.

.2 50 mm – B.W., carbon steel, std. Wt., A-234 Gr.WPB.

Part 3 Execution

3.1 INSTALLATION - GENERAL

.1 All work to meet local, Provincial, and Federal Acts, codes, and regulations, installed and tested to the satisfaction of governing fire authority and Departmental Representative. Fuel system installation work is to be done by a Petroleum Installer certified by the Province of Saskatchewan. Certificates to be provided with bid. PWGSC requires the ITA Certified Petroleum Installer to provide a signed record that they completed the installed works as per CEPA Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations, CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products, and the National Fire Code.

.2 Fabrication of all piping shall be as per CSA B139-09, ANSI B31.3 and ASME Boiler and Pressure Vessel Codes as applicable.

.3 Piping to be installed fitted and tested only by a petroleum pipe fitter of journeyman status. Journeyman certificates to be provided with bid.

.4 All piping must be flushed and tested.

.5 The use of close nipples is not permitted.

.6 The use of street elbows or 45 degree elbows for swing joints is not permitted.

.7 The Contractor shall follow the drawings in all matters concerning the location and placement of all pipe, valves, fittings and supports, and no changes are to be made from the drawings without prior written permission from the Departmental Representative.

.8 Pipes shall be adequately supported to prevent abnormal stress from being imposed on equipment. Inaccuracies in pipe fabrication causing stress to be imposed on the equipment will not be permitted. The Departmental Representative reserves the right to have flanged joints unbolted at the equipment flanges to determine if there is any misalignment. Unsatisfactory workmanship shall be corrected by re-adjustment of pipe supports, anchor points, or re-fabrication.

.9 All pipe and fittings must be swabbed clean (i.e. wire with a rag) prior to their assembly.

.10 After a pipe or fitting has been swabbed, plug the end with a rag or other device.

.11 Pipes shall be accurately cut to length so as to permit normal thread engagement between male and female threads.

.12 Threads shall be tapered and smooth, cut with the correct taper, lead, thread angle and diameter and shall conform to NPT (A.S.A.-B2-1-1945).

.13 After completion of installation, all scale, dirt, welding electrodes, slag, rags and other foreign materials shall be removed from the lines.

.14 Each joint shall be cleaned to remove dirt, loose mill scale or foreign substances before placing pipe in alignment for welding.

.15 Pipe not yet in use or in material stock pile on site shall be plugged with a rag or similar device to prevent foreign material from entering the pipe.

.16 All practical precautions shall be taken to prevent the introduction of foreign material into instruments, valves, meters, loaders, pumps and any other equipment.

3.2 ABOVEGROUND PIPE INSTALLATION

.1 Pipelines must be located aboveground, in parallel banks, plumb and true to provide a neat, orderly arrangement.

.2 Pipeline runs located as shown on plot plan and piping plan. Spaced centre to centre:

.1 40 mm and smaller - 150 mm C.C.

.2 50 mm – 200 mm C.C.

.3 Pipe Supports:

.1 Pipe supports/hangers shall be provided to support lines from 20 mm to 75 mm diameter every 2400 mm minimum and 100 mm to 300 mm diameter every 6500 mm or as shown on drawings.

.2 If variations to .1 above are indicated on the drawings, the drawings shall govern.

3.3 INSPECTION AND TESTING

.1 The Contractor's work shall be available for inspection at any time by the Departmental Representative. All work shall be in accordance with and inspected and tested to meet the requirements of the standards specified.

.2 Contractor shall test valves for shut off and operation, and check packing for leakage.

.3 Defects disclosed in the work shall be made good or the work replaced without additional cost to the Owner.

.4 Test Procedures:

.1 The Contractor's work shall be available for inspection at any time by the Owner. All work shall be in accordance with and inspected and tested to meet the requirements of the standards specified.

.2 Contractor shall test valves for shut-off and operation, and check packing for leakage.

.3 Defects disclosed in the work shall be made good or the work replaced without additional cost to the Owner.

.5 Repairs to piping systems shall be made with new material. No caulking or screwed joints, cracks, or holes will be acceptable. Where it becomes necessary to replace pieces of pipe, such replacements shall be the same lengths as the defective pieces.

3.4 PAINTING

.1 All aboveground pipelines including all vent lines and pipe supports are to be painted to meet CPPI Colour-Symbol System.

.2 Painting and coating shall be performed after inspection and testing of the pipe.

.3 Gasoline pipe, Vent pipe and Supports in White.

.4 Surface preparation: Sandblast to SSPC-SP6 Commercial Blast Cleaning or cleaned to SSPC-SP11 Power Tool Cleaning to Bare Metal.

.5 Prime Coat: One coat (3 mils dry thickness).

.6 Final Coat: One coat (3 mils dry thickness).

.7 Contractor to touch up any paint damaged during installation.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include common work for electrical costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International) latest edition:

.1 CSA C22.1-2015, Canadian Electrical Code, Part 1 23rd Edition), Safety Standard for Electrical Installations.

.2 CAN/CSA-C22.3 No. 1, Overhead Systems.

.3 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC):

.1 EEMAC 2Y-1, Light Gray Colour for Indoor Switch Gear.

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS):

.1 Material Safety Data Sheets (MSDS).

1.3 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 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.

.2 Equipment to be surge protected where applicable.

.3 Language operating requirements: provide identification nameplates and labels for control items in English.

1.4 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures:

.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.

.2 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - Field Quality Control.

1.5 QUALITY ASSURANCE

.1 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license and their or apprentices in accordance with authorities having jurisdiction.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 SYSTEM STARTUP

.1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.

.2 Arrange and pay for services of manufacturer's factory service representative 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 will aspects of its care and operation.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

.1 Material and equipment] to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - Submittals.

.2 Factory assemble 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 Departmental Representative.

2.4 WIRING TERMINATIONS

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

2.5 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates and labels as follows:

.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet matt white finish face, black core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.

.2 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

.2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.

.3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.

.4 Allow for minimum of 25 letters per nameplate and label.

.5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY No #, as directed by Departmental Representative.

.7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.8 Terminal cabinets and pull boxes: indicate system and voltage.

.9 Transformers: indicate capacity, primary and secondary voltages.

2.6 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, 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:

	Prime	Auxiliary
up to 250 V	Yellow	

	Prime	Auxiliary
up to 600 V	Yellow	Green
Other Communication Systems	Green	Blue
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:

.1 Paint outdoor electrical equipment "equipment green" finish.

.2 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

Part 3 Execution

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

.3 Use existing three pole 30 ampere fuel dispensing breaker in essential panelboard to feed new fuel tank.

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 Install conduit and sleeves prior to pouring of concrete:

.1 Sleeves through concrete: schedule 40 plastic, sized for free passage of conduit, and protruding 50 mm.

.2 Install cables, conduits and fittings to be embedded neatly and close to building structure so furring can be kept to minimum.

.3 Route new conduit in harmony with existing.

.4 Salvage of existing fuel dispensing feeder inside the Hanger Building is acceptable.

3.4 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.

.2 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 Install electrical equipment at following heights unless indicated otherwise:

- .1 Local switches: 1400 mm.
- .2 Wall receptacles:
  - .1 General: 400 mm.

.4 Panelboards: as required by Code or as indicated.

.5 Mounting heights to comply with barrier free requirements as per CSA B 651, latest edition.

3.6 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.7 FIELD QUALITY CONTROL

.1 Load Balance:

- .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
- .3 Provide upon completion of work, load balance report as directed in PART 1 - Submittals: phase and neutral currents on panelboards, 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.

.2 Conduct following tests:

- .1 Power and distribution system including phasing, voltage, grounding and load balancing.
- .2 Circuits originating from branch distribution panels.
- .3 Lighting and its control.
- .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
- .5 Systems.
- .6 Insulation resistance testing:
  - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
  - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing.

.3 Carry out tests in presence of Departmental Representative.

.4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.5 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.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.8 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

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include wire and box connector’s costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International), latest edition:

.1 CAN/CSA-C22.2No.18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.

.2 CSA C22.2No.65-, Wire Connectors.

.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC):

.1 EEMAC 1Y-2, 1961 Bushing Stud Connectors (1200 Ampere Maximum Rating).

.3 National Electrical Manufacturers Association (NEMA).

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper and corrugated cardboard packaging material for recycling.

.4 Divert unused wiring materials from landfill to metal recycling facility.

Part 2 Products

2.1 MATERIALS

.1 Pressure type wire connectors to: CSA C22.2No.65, with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CSA C22.2No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:

.1 Connector body and stud clamp for stranded copper conductors.

.2 Clamp for stranded copper conductors.

.3 Bolts for copper conductors bar.

.4 Clamps or connectors for armoured cable and flexible conduit as required to: CAN/CSA-C22.2.

Part 3 Execution

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

.1 Apply coat of zinc joint compound on conductors prior to installation of connectors.

.2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2No.65.

.3 Install fixture type connectors and tighten. Replace insulating cap.

.4 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include wires and cables costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 CSA C22.2 No .0.3, Test Methods for Electrical Wires and Cables.

.2 CAN/CSA-C22.2 No. 131, Type TECK 90 Cable.

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Collect and separate plastic, paper packaging and corrugated cardboard packaging for recycling.

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

Part 2 Products

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked thermosetting polyethylene material rated RWU90.

.3 Copper conductors: size as indicated, with thermoplastic insulation type TWU or TWH rated at 600 V.

2.2 TECK CABLE

.1 Cable: to CAN/CSA-C22.2 No. 131.

.2 Conductors:

.1 Grounding conductor: copper.

.2 Circuit conductors: copper, size as indicated.

.3 Insulation:

.1 Cross-linked polyethylene XLPE.

.2 Chemically cross-linked thermosetting polyethylene rated 600 V.

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: interlocking aluminum.

.6 Overall covering: thermoplastic polyvinyl chloride material.

.7 Fastenings:

.1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.

.2 Channel type supports for two or more cables at 1200 mm centers.

.3 Threaded rods: 6 mm dia. to support suspended channels.

.8 Connectors:

.1 Watertight, explosion-proof approved for TECK cable.

2.3 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.

.2 Type: AC90.

.3 Armour: interlocking type fabricated from aluminum strip.

.4 Type: ACWU90 - PVC jacket over thermoplastic armour meeting requirements of Vertical Tray Fire Test of CSA C22.2 No. 0.3 with maximum flame travel of 1.2 m.

2.4 CONTROL CABLES

.1 Type LVT: 2 soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of thermoplastic jacket, and armour of closely wound aluminum wire.

.2 Low energy 300 V control cable: stranded annealed copper conductors sized as indicated, with PVC insulation type TW -40 deg C polyethylene insulation with shielding of tape coated with paramagnetic material over each conductor and overall covering of PVC jackets.

Part 3 Execution

3.1 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

3.2 INSTALLATION OF TECK CABLE 0 -1000 V

.1 Install cables:

.1 Group cables wherever possible on channels.

.2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0 - 1000 V).

3.3 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible.

.2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors (0 - 1000 V).

3.4 INSTALLATION OF CONTROL CABLES

.1 Install control cables in conduit.

.2 Ground control cable shield.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include connectors and terminations costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International), latest edition:

.1 CSA C22.2 No.41, Grounding and Bonding Equipment.

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper and corrugated cardboard packaging material for recycling.

.4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.

Part 2 Products

2.1 CONNECTORS AND TERMINATIONS

.1 Copper short barrel compression connectors to CSA C22.2No. 41 as required sized for conductors.

Part 3 Execution

3.1 INSTALLATION

.1 Install stress cones, terminations, and splices in accordance with manufacturer's instructions.

.2 Bond and ground as required to CSA C22.2No.41.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include grounding secondary costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE), latest edition:

.1 ANSI/IEEE 837, Qualifying Permanent Connections Used in Substation Grounding.

.2 Canadian Standards Association, (CSA International).

.3 CAN/CSA Z32, Electrical Safety and Essential Electrical Systems in Health Care Facilities.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper and corrugated cardboard packaging material for recycling.

.4 Divert unused metal materials from landfill to metal recycling facility.

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

Part 2 Products

2.1 EQUIPMENT

.1 Clamps for grounding of conductor: size as required to electrically conductive electrode approved for direct burial.

.2 Rod electrodes: copper clad steel 19 mm diameter by 3 m long.

.3 Plate electrodes: galvanized steel, surface area 0.2 m^2, 1.6 mm thick.

.4 Grounding conductors: bare stranded copper, tinned, soft annealed, size as required.

.5 Insulated grounding conductors: green.

.6 Ground bus: copper, complete with insulated supports, fastenings, connectors.

.7 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.

.2 Protective type clamps.

.3 Bolted type conductor connectors.

.4 Thermit welded type conductor connectors.

.5 Bonding jumpers, straps.

.6 Pressure wire connectors.

Part 3 Execution

3.1 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Make buried connections, and connections to conductive electrodes, using permanent mechanical connectors or inspect-able wrought copper compression connectors to ANSI/IEEE 837.

.5 Use mechanical connectors for grounding connections to equipment provided with lugs.

.6 Soldered joints not permitted.

.7 Install bonding wire for flexible conduit, connected at both one ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.8 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.

.9 Install separate ground conductor to outdoor lighting standards.

.10 Connect fuel tank steel to ground by welding copper to steel.

.11 Bond single conductor, metallic armoured cables to cabinet at supply end, and provide non-metallic entry plate at load end.

3.2 ELECTRODES

.1 Install concrete encased electrodes in tank slab footings, with terminal connected to grounding network.

.2 Install rod or plate electrodes and make grounding connections.

.3 Bond separate, multiple electrodes together.

.4 Use size 2/0 AWG copper conductors for connections to electrodes.

3.3 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to fuel dispensing equipment, frames of motors, control panels, tank steel work, and outdoor lighting.

3.4 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include hangers and supports for electrical systems costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper and corrugated cardboard for recycling.

.4 Divert unused metal materials from landfill to metal recycling facility.

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

Part 2 Products

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted.

Part 3 Execution

3.1 INSTALLATION

.1 Secure equipment to surfaces with lead anchors or nylon shields.

.2 Secure equipment to poured concrete with expandable inserts.

.3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

.4 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.5 Fasten exposed conduit or cables to building construction or support system using straps:

.1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.

.2 Two-hole steel straps for conduits and cables larger than 50 mm.

.3 Beam clamps to secure conduit to exposed steel work.

.6 Suspended support systems:

.1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.

.2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

.7 For surface mounting of two or more conduits use channels at 1200 m on centre spacing.

.8 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.9 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.10 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.11 Do not use supports or equipment installed for other trades for conduit or cable support.

.12 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include splitters, junction, pull boxes and cabinets costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data for cabinets in accordance with Section 01 33 00 - Submittal Procedures.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Collect and separate plastic, paper packaging and corrugated cardboard packaging for recycling.

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

Part 2 Products

2.1 SPLITTERS

.1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.

.3 At least three spare terminals on each set of lugs in splitters less than 400 A.

2.2 JUNCTION AND PULL BOXES

.1 Welded steel construction with screw-on flat covers for surface mounting.

.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

2.3 CABINETS

.1 Type E: sheet steel, hinged door and return flange overlapping sides, handle, lock and catch, for surface mounting.

Part 3 Execution

3.1 SPLITTER INSTALLATION

.1 Install splitters and mount plumb, true and square to the building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor.

.3 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.

3.3 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Install size 2 identification labels indicating system name voltage and phase.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 No measurement of payment will be made for this section:

.1 Include outlet boxes, conduit boxes and fittings costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 CSA C22.1-2015, Canadian Electrical Code, Part 1, 23rd edition.

.2 CAN/ULC C22.2 No 18.1-13 Metallic outlet boxes.

.3 Canada Geen Building Council (CaGBC);

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Collect and separate plastic, paper packaging and corrugated cardboard packaging for recycling.

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 SHEET STEEL OUTLET BOXES

.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

2.3 CONCRETE BOXES

.1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

2.4 CONDUIT BOXES

.1 Cast FS feraloy boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.5 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 Execution

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment.

.1 No measurement of payment will be made for this section.

.1 Include conduit, conduit fastenings and conduit fittings costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware.

.2 CSA C22.2 No. 45, Rigid Metal Conduit.

.3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

.4 CSA C22.2 No. 83, Electrical Metallic Tubing.

.5 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.

.6 CAN/CSA C22.2 No. 227.3, Flexible Nonmetallic Tubing.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

.4 Collect and separate plastic, paper packaging and corrugated cardboard packaging for recycling.

Part 2 Products

2.1 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel threaded.

.2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.

.3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

.4 Rigid pvc conduit: to CSA C22.2 No. 211.2.

.5 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal.

.6 Flexible pvc conduit: to CAN/CSA-C22.2 No. 227.3.

2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1200 mm oc.

.4 Threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Factory "ells" where 90E bends are required for 25 mm and larger conduits.

.3 Watertight connectors and couplings for EMT. Set-screws are not acceptable.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

.1 Polypropylene.

Part 3 Execution

3.1 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Surface mount conduits.

.3 Use epoxy coated conduit underground.

.4 Use electrical metallic tubing (EMT) except in cast concrete above 2.4 m not subject to mechanical injury.

.5 Use rigid pvc conduit underground.

.6 Use liquid tight flexible metal conduit for[connection to motors or vibrating equipment in damp, wet or corrosive locations.

.7 Use explosion proof flexible connection for connection to explosion proof motors.

.8 Install conduit sealing fittings in hazardous areas. Fill with compound.

.9 Minimum conduit size for lighting and power circuits: 19 mm.

.10 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.11 Mechanically bend steel conduit over 19 mm dia.

.12 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.13 Install fish cord in empty conduits.

.14 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

.15 Dry conduits out before installing wire.

3.2 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on surface channels.

.5 Do not pass conduits through structural members except as indicated.

3.3 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Locate to suit reinforcing steel. Install in centre one third of slab.

.2 Protect conduits from damage where they stub out of concrete.

.3 Install sleeves where conduits pass through slab or wall.

.4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed. Use cold mastic between sleeve and conduit.

.5 Do not place conduits is slabs in which slab thickness is less than 4 times conduit diameter.

.6 Encase conduits completely in concrete with minimum 25 mm concrete cover.

.7 Organize conduits in slab to minimize cross-overs.

3.4 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

.1 Run conduits 25 mm and larger below slab and encased in 75 mm concrete envelope. Provide 50 mm of sand over concrete envelope below floor slab.

3.5 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

.2 Waterproof joints (pvc excepted) with heavy coat of bituminous paint.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment.

.1 No measurement of payment will be made for this section.

.1 Include electrical cabinets and enclosures costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 The Munsell System of Colour Notation.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper and corrugated cardboard packaging material for recycling.

.4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

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

Part 2 Products

2.1 MATERIALS

.1 Enclosure constructed with 2.7 mm thick minimum steel, with weather and corrosion resistant finish, Munsell Notation 7.5GY3.5/1.5, size as indicated.

.2 Entire enclosure capable of withstanding maximum impact force of 86 MN/m^2 area without rupture of material.

.3 Removable enclosure panels with formed edges, galvanized steel external fasteners removable only from inside enclosure.

.4 Enclosure equipped with hot dipped galvanized mounting rails 1 m adjustable horizontally and vertically to enable mounting of equipment at any location within housing.

.1 Rails: 14 mm holes and 50 x 14 mm slots on 100 mm centres for horizontal adjustment.

.2 Holes in side panel flanges in 60 mm increments for vertical adjustment.

.5 Cover: tamperproof, bolt-on, domed to shed water.

.6 Door: minimum 1 m wide, hinged, 3 point latching, with padlocking means.

.7 Ventilation panel constructed to allow air circulation yet preventing entry of foreign objects, wild life, vermin.

.8 Enclosure construction such as to allow any configuration of single or ganged enclosures.

.9 Enclosure capable of being shipped in knocked-down condition.

Part 3 Execution

3.1 INSTALLATION

.1 Assemble enclosure in accordance with manufacturer's instructions and mount on concrete pad.

.2 Mount equipment in enclosure.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment.

.1 No measurement of payment will be made for this section.

.1 Include wiring devices costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-C22.2 No.42, General Use Receptacles, Attachment Plugs and Similar Devices.

.2 CSA-C22.2 No.42.1, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).

.3 CSA-C22.2 No.55, Special Use Switches.

.4 CSA-C22.2 No.111, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper and corrugated cardboard] packaging material for recycling.

.4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.

Part 2 Products

2.1 SWITCHES

.1 15 A, 120 V, single pole, CSA-C22.2 No.55 and CSA-C22.2 No.111.

.2 Manually-operated general purpose ac switches with following features:

.1 Terminal holes approved for No. 10 AWG wire.

.2 Silver alloy contacts.

.3 Urea or melamine moulding for parts subject to carbon tracking.

.4 Suitable for back and side wiring.

.5 Ivory toggle.

.3 Switches of one manufacturer throughout project.

2.2 RECEPTACLES

.1 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, to: CSA-C22.2 No.42 with following features:

.1 Ivory urea moulded housing.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Break-off links for use as split receptacles.

.4 Eight back wired entrances, four side wiring screws.

.5 Triple wipe contacts and rivetted grounding contacts.

.2 Receptacles of one manufacturer throughout project.

2.3 COVER PLATES

.1 Cover plates for wiring devices to: CSA-C22.2 No.42.1.

.2 Cover plates from one manufacturer throughout project.

.3 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.

.4 Stainless steel, vertically brushed, 1 mm thick cover plates cover plates, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.

.5 Cast cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

.6 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

.7 Weatherproof spring-loaded cover plates complete with gaskets for single receptacles or switches.

Part 3 Execution

3.1 INSTALLATION

.1 Switches:

.1 Install single throw switches with handle in "UP" position when switch closed.

.2 Install switches in gang type outlet box when more than one switch is required in one location.

.3 Mount toggle switches at height [in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Receptacles:

.1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.

.2 Mount receptacles at height in accordance with Section 26 05 00 - Common Work Results - Electrical.

.3 Cover plates:

.1 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.

.2 Install suitable common cover plates where wiring devices are grouped.

.3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment.

.1 No measurement of payment will be made for this section.

.1 Include disconnect switches - fused and non-fused costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).

.1 CAN/CSA C22.2 No.4, Enclosed Switches.

.2 CSA C22.2 No.39, Fuseholder Assemblies.

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

1.4 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper and corrugated cardboard packaging material for recycling.

.4 Separate for recycling metal waste.

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

Part 2 Products

2.1 DISCONNECT SWITCHES

.1 Fusible, non-fusible, horsepower rated disconnect switch in CSA Enclosure, to CAN/CSA C22.2 No.4.

.2 Provision for padlocking in on-off off switch position by three locks.

.3 Mechanically interlocked door to prevent opening when handle in ON position.

.4 Fuseholders: to CSA C22.2 No.39 relocatable suitable without adaptors, for type and size of fuse indicated.

.5 Quick-make, quick-break action.

.6 ON-OFF switch position indication on switch enclosure cover.

2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Indicate name of load controlled on size 4 nameplate.

Part 3 Execution

3.1 INSTALLATION

.1 Install disconnect switches complete with fuses if applicable.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 Measure excavation of surplus soil with soil quality meeting applicable Canadian Council of Ministers of the Environment (CCME) Tier 2 Commercial Environmental Quality Guidelines in tonnes. Measurement to include excavation, placement in temporary stockpiles, loading into trucks, and transport to approved permitted waste receiving facility. Measurement to be based on weigh scale tickets.

.2 Measure excavation and disposal of soil with soil quality not meeting applicable CCME Tier 2 Commercial Environmental Quality Guidelines in tonnes. Measurement to include excavation, placement in temporary stockpiles, loading into trucks, and transport to approved permitted waste receiving facility. Measurement to be based on weigh scale tickets.

.3 Unit of Measure for the services of a vacuum truck, if necessary, for excavation dewatering and the removal of any residual hydrocarbon product from tank will be hourly. Measurement to include mobilization/ demobilization, removal and transport to approved waste receiving facility.

.4 Disposal of excavation water and residual hydrocarbon product from tank and piping using the services of a vacuum truck to be measured in litres.

.5 Backfilling using Type 2 imported fill within the remedial excavation will be measured in tonnes. Measurement to be based on weigh scale tickets.

.6 Measure compaction testing and proctor analyses of Type 2 backfill as part of lump sum.

.7 Backfilling using Type 4 imported fill beneath the concrete slab will be measured in tonnes. Measurement to be based on weigh scale tickets.

.8 Measure compaction testing and proctor analyses of Type 4 backfill as part of lump sum.

.9 Measurement for backfilling using Base and Sub-base imported fill below the asphalt pavement to be included in unit cost for placement of asphalt pavement as per Section 32 12 17 - Asphalt Paving - Short Form.

.10 Measure compaction testing and proctor analyses of Base and Sub-base backfill as part of lump sum.

.11 Supply, placement and spreading of topsoil will be measured on a square metre basis.

.12 Seeding and fertilizer to be included in square metre cost of supply, placement and spreading of topsoil.

.13 Measurement for decommissioning environmental monitoring wells to be measured as per Section 02 41 13 - Selective Site Demolition.

.14 Professional geotechnical services required for assessing shoring, bracing and sloping of excavation to be included as part of lump sum payment as per Section

02 65 00 - Aboveground and Underground Storage Tank Removal and will not be measured separately.

.15 Installation and removal of temporary hoarding and/or bracing required to protect adjacent structures will be included within the lump sum price for removal of the existing UST as per Section 02 65 00 - Aboveground and Underground Storage Tank Removal.

1.2 REFERENCES

.1 Codes and standards referenced in this section refer to the latest edition thereof.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-63-2002, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m).

.5 ASTM D1557-02e1,Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN-m/m).

.6 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.4 Canadian Standard Association (CSA)

.1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.

.5 Canadian Council of Ministers of the Environment (CCME)

.1 Canadian Environmental Quality Guidelines (2012).

.2 Canada Wide Standard for Petroleum Hydrocarbons in Soil (2008).

.6 Environmental Protection Agency (EPA)

.1 US EPA 832/R-92-005 - Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices, September 1992.

.7 Phase III Environmental Site Assessment, EGE 2012 (see Appendix A).

.8 Geotechnical Investigation Report, PMEL 2015 (see Appendix B).

.9 Corrective Action Plan (CAP), EGE 2016 (see Appendix D).

1.3 REGULATIONS

.1 Shore and brace excavations, protect slopes and banks and perform all work in accordance with Federal, Provincial and Municipal Laws, regulations and by-laws whichever is more stringent.

1.4 DEFINITIONS

.1 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.2 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.3 Unsuitable materials:

.1 Weak, chemically unstable, frozen and/or compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and C136: Sieve sizes to CAN/CGSB-8.1.

.2 Table:

Sieve Designation	% Passing
2.00 mm	[100]
0.10 mm	[45 - 100]
0.02 mm	[10 - 80]
0.005 mm	[0 - 45]

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.4 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Pre-construction Submittals:

.1 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field and abandoned services within 5 days before starting work.

.3 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Inform Departmental Representative 5 days prior to start of Work of proposed source of fill materials and provide representative samples to a third party testing agency for proctor analysis.

.3 Provide third party test results demonstrating the proposed fill material meets the specifications to Departmental Representative, including the results of the proctor testing, prior to delivery and start of backfilling.

.4 Submit 2 kg sample of proposed fill materials (granular and topsoil) at Contractor expense to Departmental Representative, in tightly closed container to prevent contamination and exposure to elements, for environmental testing 5 days prior to start of Work.

1.6 QUALITY ASSURANCE

.1 Do not use soil material until written report of soil test results are reviewed and approved in writing by Departmental Representative.

.2 Engage services of qualified professional Engineer who is registered and/or licensed in Province of Saskatchewan, Canada in which Work is to be carried out to design and inspect shoring, sloping and bracing and underpinning required for Work. Design drawings to be submitted stamped, dated and signed 5 days prior to beginning the work. Reviewed design drawings to be provided to Contractor within 3 days following receipt. Drawings requiring re-submittal to be provided within 2 days of receipt of reviewed drawings.

.3 Health and Safety Requirements:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements as a minimum.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.8 EXISTING CONDITIONS

.1 Examine 2012 Phase III ESA report by EGE provided in Appendix A and 2015 Geotechnical Investigation report by PMEL provided in Appendix B.

.2 Buried services:

.1 Before commencing work establish location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of active buried services that interfere with execution of work: pay costs of relocating services.

.3 Prior to beginning excavation Work, notify Departmental Representative and establish in writing, location and state of use of buried utilities and structures.

.4 Maintain and protect from damage, water, electric, telephone and other utilities and structures to remain.

.5 Remove obsolete buried services within 2 m of foundations. Cap cut-offs.

.6 Record location of maintained and abandoned underground lines and provide written record to Departmental Representative within 5 days of completion of the work.

.3 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage as directed by Departmental Representative while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

.3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

1.9 PROTECTION

.1 Keep excavations clean, free of standing water, and loose soil.

.2 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

Part 2 Products

2.1 MATERIALS

.1 Unshrinkable fill: proportioned and mixed to provide:

.1 Maximum compressive strength of 0.4 MPa at 28 days.

.2 Maximum Portland cement content of 25 kg/m^3.

.3 Minimum strength of 0.07 MPa at 24 h.

.4 Concrete aggregates: to CAN/CSA-A23.1.

.5 Portland cement: Type 10.

.6 Slump: 160 to 200 mm.

.2 Type 2 fill: approved by the Departmental Representative and meeting the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

.3 Gradation to meet the following:

Sieve Designation	% Passing
	Type 2
75 mm	[100]
50 mm	-
37.5 mm	-
25 mm	-
19 mm	-
12.5 mm	-
9.5 mm	-
4.75 mm	[22-85]
2.00 mm	-
0.425 mm	[5-30]
0.180 mm	-
0.075 mm	[0-10]

.3 Type 4 fill: approved by the Departmental Representative and meeting the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

.3 Gradation to meet the following:

Sieve Designation	% Passing
	Type 4
18 mm	[100]
12.5 mm	[75-100]
5.0 mm	[70-75]
2.00 mm	[32-52]
0.900 mm	[20-35]
0.400mm	[15-25]
0.160 mm	[8-15]
0.071 mm	[6-11]

Part 3 Execution

3.1 EROSION AND SEDIMENTATION CONTROL

.1 Provide erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff that complies with US EPA 832/R-92-005 and/or requirements of authorities having jurisdiction, whichever is more stringent, and in accordance with Section 01 57 13 - Erosion and Sediment Control.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.

.3 Remove any temporary erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated and place in designated area as approved by Departmental Representative.

3.3 PREPARATION/PROTECTION

.1 Keep excavations clean, free of standing water and loose soil.

.2 Protect natural and man-made features required to remain undisturbed.

.3 Protect buried services that are required to remain undisturbed.

.4 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping and adjacent grades. Provide bracing and/or shoring as required.

.5 At end of each day's work, leave Work Site in safe and stable condition, and to not be a hazard to wildlife, people and Owner’s operations on site.

3.4 STOCKPILING

.1 Stockpile clean fill materials in areas designated by Departmental Representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Protect open excavations against flooding and damage due to surface run-off.

.3 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in a manner not detrimental to public and private property or portion of Work completed or under construction.

3.6 EXCAVATION

.1 Advise Departmental Representative at least 7 working days in advance of excavation operations.

.2 Excavate to lines, grades, elevations and dimensions as directed by Departmental Representative.

.3 Protect all monitoring wells not identified to be decommissioned. Contractor will be responsible for cost of repair and/or replacement of any damaged wells to the satisfaction of the Departmental Representative.

.4 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering existing in place topsoil.

.5 Stockpile excavated materials at locations approved by the Departmental Representative, until environmental test results are received.

.6 Restrict vehicle operations directly adjacent to open trenches.

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.9 Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of pipe bedding material on solid and undisturbed ground. Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.

.10 Excavate for slabs and paving to subgrade levels. In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.

.11 Notify Departmental Representative when bottom of excavation is reached.

.12 Obtain Departmental Representative written approval of completed excavation.

.13 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

.14 Correct unauthorized over-excavation at Contractor's expense with Type 2 fill compacted to not less than 95% of corrected Standard Proctor maximum dry density.

.15 The Contractor is to recognize within the contract that soil sampling will be undertaken by the Departmental Representative throughout the duration of the project, sometimes with the assistance of the Contractor. The Contractor is required to assist the Departmental Representative in obtaining samples by use of their equipment where the Departmental Representative deems it unsafe to enter the excavation. The Contractor is to further recognize that excavation and backfill work may need to wait due to environmental sampling requirements; however, waiting will be kept to a minimum and work will be coordinated by the Departmental Representative in discussion with the Contractor.

.16 The Contractor is to recognize the inherent delays involved in projects of this nature and to facilitate the receipt of laboratory analytical results. A minimum turnaround time of 96 hours (4 days) is to be provided to the Departmental Representative for receipt of laboratory analytical results, where required.

3.7 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

- .1 Departmental Representative has completed environmental sampling, and has received laboratory analytical results with written confirmation to Contractor.
- .2 Inspection, testing, approval, and recording location of underground utilities.
- .3 Removal of shoring and bracing (as required); backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice and water.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.

.5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer. Add water as required to achieve specified density. Compaction testing is to be completed by Contractor's third party testing agency.

.6 Compaction: compact each layer of material to following densities for material to ASTM D 698:

- .1 Asphalt Pavement:
  - .1 Type 2 fill to underside of base courses: 98%.
  - .2 Sub-base and Base: 100%.
- .2 Concrete Pad:
  - .1 Type 2 fill to within 1.0 m of underside of pad: 95%.

.2 Type 2 fill from 1.0 m to within 0.3 m of underside of pad: 98%.

.3 Type 4 fill from 0.3 m to underside of pad: 100%.

.3 Surrounding Remedial Excavation:

.1 Type 2 fill to within 1.0 m of finished grade: 95%.

.2 Type 2 fill from 1.0 m to finished grade: 98%.

.7 Backfilling around installations:

.1 Place bedding and surround material as specified by Departmental Representative and Contractor's Geotechnical Engineer's report.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Where temporary unbalanced earth pressures are liable to develop on walls or other structures, erect bracing or shoring to counteract unbalance, and leave in place until no longer required, as specified by the Contractor's Geotechnical Engineer.

.4 All works to be reviewed in writing by Contractor's Geotechnical Engineer, with written notification provided to the Departmental Representative.

3.8 GRADING

.1 Grade so that areas of work match surrounding slope and grade and provide positive drainage away from area.

.2 The surface of finished pavement shall be within required profile and cross-section ± 3 mm. No depressions or bumps shall exceed 5 mm beneath a 3 metre straight edge.

3.9 RESTORATION

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Departmental Representative.

.2 Place topsoil and seed across disturbed areas, as follows:

.1 Topsoil for seeded areas: weed-free mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.

.1 A locally sourced topsoil with soil texture of clay or silty clay and colour of gray based on The Canadian System of Soil Classification.

.2 Topsoil not to contain any weeds or weed seeds.

.3 Topsoil is not to contain petroleum hydrocarbons (BTEX, PHC Fractions F1 to F4) at concentrations in excess of the Canadian Council of Ministers of the Environment (CCME) *Canadian Environmental Quality Guidelines* (2007) and Canada Wide Standards, Tier I guidelines for Residential land use, fine-grained soils.

.4 Topsoil is not to contain metals (including mercury) at concentrations in excess of the CCME EQG, Tier 1 guidelines for Commercial land use, fine-grained soils.

.5 Finished surface free from:

.1 Debris and stones over 50 mm diameter.

.2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

.6 Consistence: friable when moist.

.2 Place topsoil after Departmental Representative has provided written acceptance of subgrade.

.3 Spread topsoil in uniform layer not exceeding 100 mm, as directed by Departmental Representative.

.4 For grass seed, use Canada "Certified" seed, "Canada No. 1 Lawn Grass Mixture".

.5 Seed Placement

.1 Use manually operated drop seeder (Cyclone type or equivalent).

.2 Sow seed uniformly at rate of 250 kg/hectare (0.025 kg/m^2) grass mixture as specified.

.3 Blend applications 150 mm into adjacent grass areas to form uniform surfaces.

.4 Sow half of required amount of seed in one direction and remainder at right angles.

.5 Incorporate seed by light raking in cross directions.

.6 Consolidate seeded areas with manually operated, water ballast, landscaping type, smooth steel drum roller.

.3 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.4 Protect newly graded and seeded areas from traffic and erosion and maintain free of trash or debris.

.5 Owner will be responsible for watering following final inspection.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment.

.1 Reshaping of the roadway subgrade, including re-compaction will be measured in square metres based on the surface area reshaped.

1.2 REFERENCES

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

.1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

1.3 DEFINITIONS

.1 Reshaping subgrade: scarifying, pulverizing, blading, reshaping and re-compacting existing subgrade surface.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 SCARIFYING AND RESHAPING

.1 Scarify subgrade to full width as directed Departmental Representative and to minimum depth of 150 mm.

.2 Pulverize and break down scarified material .

.3 Blade and trim pulverized material to elevation and cross section dimensions.

.4 Where deficiency of material exists, add and blend additional subgrade material as directed by Departmental Representative.

3.2 COMPACTING

.1 Compact to density not less than 100% corrected maximum dry density in accordance with ASTM D698.

.2 Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade surface.

.3 Apply water as necessary during compaction to obtain specified density.

.4 If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected in accordance with ASTM D698.

3.3 SITE TOLERANCES

.1 Reshaped and compacted surface to be within plus or minus 10 mm of elevation as indicated.

3.4 PROTECTION

.1 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until Departmental Representative acceptance.

3.5 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 Measure placement of asphalt pavement in square metres. Measurement to include asphalt, all base and sub-base material, and all associated works.

1.2 REFERENCES

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

.1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.4 ASTM D1559, Standard Test Methods for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

.5 ASTM D2950, Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.

.6 ASTM D3203, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

.7 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-1.5, Low Flash Petroleum Spirits Thinner (Reaffirmation of December 1991).

.2 CAN/CGSB-1.74, Alkyd Traffic Paint.

.3 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.4 CAN/CGSB-16.2,-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.3 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit to Departmental Representative, samples of material a minimum of 5 working days before beginning Work.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove and dispose of all packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Divert unused aggregate materials from landfill to facility for reuse as approved by Departmental Representative.

.5 Divert unused asphalt from landfill to facility capable of recycling materials as approved by Departmental Representative.

1.5 MIX DESIGN

.1 Contractor to submit mix design to Departmental Representative for review and approval 5 days prior to the start of construction.

.2 Design of mix: by Marshall method to requirements below:

.1 Compaction blows on each face to test specimens: 75.

.2 Mix physical requirements are presented in Table 1.

.3 Measure physical requirements as follows:

.1 Marshall load and flow value: to ASTM D 1559.

.2 Air voids: to ASTM D 3203.

.3 Voids in mineral aggregate: to Asphalt Institute, MS-2, Chapter 4.

.3 When change in material source proposed, new job-mix formula to be reviewed and approved by Departmental Representative.

.4 Minimum asphalt content shall be 5.6%.

Part 2 Products

2.1 MATERIALS

.1 Sub-base Material:

.1 Sub-base aggregate shall be composed of sound, hard, and durable particles of sand, gravel, and rock free from injurious quantities of soft or flaky particles, shale, loam, clay balls, and organic or other deleterious materials.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117 and to meet the following:

Sieve Designation	**Percent By Weight Passing Canadian Metric Sieve Series (MHI Type 8)**
50.0 mm	100.0
2.0 mm	0 - 80.0
400 µm	0 - 45.0
160 µm	0 - 20.0
71 µm	0 - 6.0
Plasticity Index 0 - 6.0	

.2 A tolerance of 3 % in the percent by weight passing the maximum size sieve shall be permitted providing 100 % of the oversize passes the 63.0 mm sieve.

.3 Granular Base Material:

.1 Base aggregate shall be composed of sound, hard and durable particles of sand, gravel and rock free from injurious and quantities of elongated soft or flaky particles, shale, loam, clay balls and organic or other deleterious materials.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C11.7.

.3 Granular base course gradation to meet the following:

Sieve Designation	**Percent By Weight Passing Canadian Metric Sieve Series (MHI Type 33)**
18.0 mm	100.0
12.5 mm	75.0 - 100.0
5.0 mm	50.0 - 75.0
2.0 mm	32.0 - 52.0
900 µm	20.0 - 35.0
400 µm	15.0 - 25.0
160 µm	8.0 - 15.0
71 µm	6.0 - 11.0
Plasticity Index	0 - 6.0
Fractured Face %	50.0 Minimum
Light Weight Pieces %	5.0 Maximum

.4 The percentage passing the designated sieve sized for any representative sample, when plotted on a semi-log grading chart, shall show a free flowing concave curve without sharp breaks, within the limits specified.

.5 Liquid limit: to ASTM D4318, maximum 25.

.6 Plasticity index: to ASTM D4318.

.7 Crushed particles at least 50 % of particles by mass of the material retained on the 5.00 mm sieve to have at least one (1) freshly fractured face.

.4 Asphalt Prime

.1 Asphalt prime to CAN/CGSB 16.2 grade MC-30, or SS-1.

.5 Aggregates material to the following requirements:

.1 Gradations to be within limits specified when tested to ASTM C 136. Sieve sizes to CAN/CGSB-8.1.

Mix Characteristics	
Asphalt Type	150-200 A
Marshall Blows	50 blows
16.0 mm 12.5 mm 9.0 mm 5.0 mm 2.0 mm 900 µm 400 µm 160 µm 71 µm	100.0 * 78.0-98.0 66.0-90.0 46.0-72.0 23.0-51.0 15.0-37.0 10.0-27.0 3.0-14.0 2.0-9.0
Air Voids, %	3.0-5.0
Air Voids (Field), %	4.0-9.0
Deleterious Material, Maximum **	2.0
Film Thickness, Minimum µm	7.5
Flow, mm	1.5-3.5
Fracture, Minimum % two faces***	70.0
Lightweight Aggregate, Maximum %	1.0
Retained Stability, Minimum %	70.0
Sand Equivalent, Minimum	45
Stability, Minimum N	5500
Voids Filled, %	65.0-78.0
Voids in Mineral Aggregate (V.M.A.)	14.0-16.0

* A tolerance of 3% in the percent by weight retained on the maximum size sieve will be permitted providing 100% of the oversize passes the 18.0 mm sieve.
** Deleterious material includes all other injurious material other than lightweight pieces.
*** The Fractured Face percentage will be calculated on the aggregate after combining all virgin aggregates and additives.

.6 From a sieve analysis of the aggregate, including adding mineral filler as required, the percentage passing the designated sieves, when plotted on a semi-log grading chart, shall give a smooth flowing curve, without sharp breaks, within the limits given above. Select subgrade.

.7 Prime coat: to CAN/CG5B-16.2,Grade 55-1 or MC-30..

.8 Tack coat: to CAN/CG5B-16.2, Grade 55-1.

.9 Asphalt concrete: shall be uniform in character, free of water, and shall not foam when heated to 175°C. It shall meet the following specifications:

	Test Method	Specifications 150-200	
		MIN	MAX
Penetration, 25°C, 100 g, 5 sec	D5	(see table below)	
Viscosity @ 60°C, mPa.S	D2171		
Flash point (Cleveland Open Cup), °C	D92	205	-
Thin film Oven Test Weight Loss, max %	D1754	-	1
Penetration @ 25°C of residue, % of orig	D5	50	-
Ductility - @ 25°C	D113	100	-
Solubility in Trichloroethylene, min %	D2042	99.5	

The limits of the viscosity and penetration shall be as follows:

		LIMITS			
150-200	Viscosity	155	78	50	92
	Penetration	150	150	200	200

Part 3 Execution

3.1 FOUNDATIONS

.1 Foundations for taxiways comprise:

.1 300 mm compacted thickness of granular subbase.

.2 150 mm compacted thickness of granular base.

3.2 PAVEMENT THICKNESS

.1 Pavements for taxiways:

.1 Base course: 50 mm.

.2 Wear course: 50 mm.

3.3 PAVEMENT ELEVATIONS

.1 Asphalt elevations to be set to match existing pavement structures and adjacent landscaping. Asphalt cap area to be established in the field based on existing elevations.

3.4 PAVEMENT CONSTRUCTION

.1 Base Preparation:

- .1 Place granular base after sub base surface is inspected and approved by Departmental Representative.
- .2 Place granular base mix to avoid mixing with sub-base course.
- .3 Construct granular base course to depth and grade in areas indicated.
- .4 Ensure no frozen material is placed.
- .5 Place material only on clean unfrozen surface, free from snow and ice.
- .6 Place granular base mix using methods which do not lead to segregation or degradation.
- .7 Place granular base mix to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 If excess moisture originating from external causes including but not limited to precipitation and/or Contractor’s operation is present in the subgrade and/or sub-base course and/or base course prior to the acceptance of the completed surfacing structure, the Contractor shall dry the subgrade and/or sub-base course and/or base course to the optimum moisture content and compact the subgrade to not less than the specified density or the optimum density in accordance with the requirements for Moisture-Density Proctor.
- .10 Remove and replace base course which has become segregated or contaminated during spreading.

.2 Compaction:

- .1 Compaction equipment to be capable of obtaining required base course densities.
- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density.
- .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .6 Base mix shall not be compacted if the atmospheric temperature is less than 2ºC.
- .7 The section of base course shall be considered acceptable if it has no surface defects and is true to grade and cross-section and if:
  - .1 The average density meets or exceeds 100 % maximum dry density in accordance with ASTM D698.
  - .2 All individual test results are greater than 98 % of maximum density.

.3 The moisture content is less than or equal to the optimum moisture content.

.8 If the density for any section of the roadway are outside the acceptance limits outlined in Section 3.2.2.7 the section shall be rejected as unacceptable work and the following shall apply:

.1 The Contractor shall have the opportunity to remedy existing base course by re-rolling or by any other method suggested by the Contractor and approved by the Departmental Representative. The Contractor may request that the section of the roadway be retested during or after the completion of the remedial attempts.

.2 The section shall be tested a total of three (3) times free of cost to the Contractor. The Contractor shall pay the cost of any additional testing.

.3 If the base course in the section remains outside the acceptance limits after the remedial attempts, the Contractor shall remove and replace all the base course in that section.

.9 Any section with surface defects shall be rejected as unacceptable work.

.10 Surface defects shall be repaired in a manner acceptable to the Departmental Representative.

.3 Asphalt:

.1 Obtain approval of tack coat or base and primer from Departmental Representative 10 days before placing asphalt mix.

.2 Place asphalt mix only when base or previous course is dry and air temperature is above 2ºC.

.3 Place asphalt concrete in compacted layers not exceeding 50 mm in one lift.

.4 Minimum 110ºC mix temperature required when spreading.

.5 Maximum 155ºC mix temperature permitted at any time.

.6 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.

.7 Compaction:

.1 For asphalt concrete on newly constructed granular base. The Specified Density shall be not less than 98% of density obtained with Marshall specimens prepared in accordance with ASTM D 1559 from samples of mix being used. Roll until roller marks are eliminated.

.2 For all other asphalt concrete paving compact asphalt concrete to density not less than 98% or to a Target Density to be established based on a rolling pattern strip undertaken at the beginning of the work.

.8 The Target Density shall be determined based on a rolling pattern strip. The rolling pattern strip shall comply with the following:

.1 The rolling pattern strip shall have a length of a least 250 m and shall be of the same thickness as the lift it represents.

.2 The material used shall conform to the requirements of the asphalt concrete stated in the contract or as specified by Departmental Representative.

.3 The Departmental Representative and/or the Contractor at any time may order the construction of a new rolling pattern strip if there are reasons indicated that the paving operation, the mix design or lift thickness have been altered.

.4 Compaction shall continue until the Specified Marshall Density is achieved or until no appreciable increase in density can be achieved.

.5 The rolling pattern strip, if accepted, shall remain in place and shall become part of the completed work.

.6 If the Specified Marshall Density is not achieved, then the value of the density achieved with the rolling pattern test strip will be used as the Target Density. Job Mix Formula Densities will continue to be taken, and should change occur in Field Density, lift thickness, or the lane being paved, the Departmental Representative may direct that the Target Marshall Density control procedure be re-established.

.9 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.

.10 Moisten roller wheels with water to prevent pick up of material.

.11 Compact mix with hot tampers or other equipment approved by Departmental Representative, in areas inaccessible to roller.

.12 Finished surface with no irregularities greater than 5 mm in 3 m.

.13 Final surface shall be free from segregation, waves, hairline cracks and other obvious defects. Repair areas on the final lift showing deficiencies as directed by the Departmental Representative. The repair may include, but not limited to slurry seals, overlays, or removal and replacement at the Contractor’s expense.

.14 Complete compaction to the specified density before the asphalt mixture has dropped in temperature to 65°C.

3.5 PLANT REQUIREMENTS

.1 Plant Requirements:

.2 Design, co-ordinate and operate the plant so as to produce a mixture which meets the requirements of these specifications. Equip the machine with screens and bins. Proportioning may be done by weight or volume and must be accurate. Protect the asphalt storage tanks from open flame and equip with an easily read thermometer.

.3 Control temperatures in accordance with the following limits:

Grade of Asphalt	Maximum Temperature of Dry Aggregate	Asphalt Storage Temperature	Bituminous Mix at the Pugmill
150 - 200 (A)	160°C	120-175°C	135-155°C

.4 The bituminous aggregate, immediately before entering the pugmill, shall not contain more than one-half percent moisture by weight.

.5 The amount of asphaltic binder in the mix shall not vary by more than 3/10 of one percent from the mix design and the average asphaltic binder shall not be consistently high or low.

.6 Paving:

.1 Obtain approval of tack coat or base and primer from Departmental Representative before placing asphalt mix.

.2 Place asphalt mix only when base or previous course is dry and air temperature is above 2ºC.

.3 Place asphalt concrete in compacted layers not exceeding 50 mm in one lift.

.4 Minimum 110ºC mix temperature required when spreading.

.5 Maximum 155ºC mix temperature permitted at any time.

.6 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.

.7 Compaction:

.1 For asphalt concrete on newly constructed granular base. The Specified Density shall be not less than 98% of density obtained with Marshall specimens prepared in accordance with ASTM D 1559 from samples of mix being used. Roll until roller marks are eliminated.

.2 For all other asphalt concrete paving compact asphalt concrete to density not less than 98% or to a Target Density to be established based on a rolling pattern strip undertaken at the beginning of the work.

.8 The Target Density shall be determined based on a rolling pattern strip. The rolling pattern strip shall comply with the following:

.1 The rolling pattern strip shall have a length of a least 250 m and shall be of the same thickness as the lift it represents.

.2 The material used shall conform to the requirements of the asphalt concrete stated in the contract or as specified by the Departmental Representative.

.3 The Departmental Representative at any time may order the construction of a new rolling pattern strip if there are reasons to indicate that the paving operation, the mix design or lift thickness have been altered.

.4 Compaction shall continue until the Specified Marshall Density is achieved or until no appreciable increase in density can be achieved.

.5 The rolling pattern strip, if accepted, shall remain in place and shall become part of the completed work.

.6 If the Specified Marshall Density is not achieved, then the value of the density achieved with the rolling pattern test strip will be used as the Target Density. Job Mix Formula Densities will continue to be taken, and should change occur in Field Density, lift thickness, or the lane being paved, the Departmental Representative may direct that the Target Marshall Density control procedure be re-established.

.9 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.

.10 Moisten roller wheels with water to prevent pick up of material.

.11 Compact mix with hot tampers or other equipment approved by Departmental Representative, in areas inaccessible to roller.

.12 Finished surface with no irregularities greater than 5 mm in 3 m.

.13 Final surface shall be free from segregation, waves, hairline cracks and other obvious defects. Repair areas on the final lift showing deficiencies as directed by the Departmental Representative. The repair may include, but not limited to slurry seals, overlays, or removal and replacement at the Contractor's expense.

.14 Complete compaction to the specified density before the asphalt mixture has dropped in temperature to 65°C.

.15 Install temporary ramps at the end of each work day to allow airplane use of the taxiway.

.7 Testing:

.1 Departmental Representative will arrange for inspection and testing of asphalt pavement by designated testing laboratory. Cost will be paid for by the Owner.

.2 One complete Marshall stability analysis at the start of the project and one every 3000 m^2 of mat placed thereafter. Analysis to include; aggregate gradation, Marshall stability, Bulk Specific gravity, air voids, V.M.A., Flow index and asphalt content.

.3 One bulk sample for aggregate gradation and asphalt content from each days operation.

.4 One core sample shall be taken by the Contractor from the finished structure for each 1500 m^2 of pavement surface. Cores shall be tested for thickness, field density and asphalt content. Location of core samples shall be as directed by the Departmental Representative.

.5 Areas found, during normal quality control testing by the Departmental Representative, to be less than the specified thickness shall be subject to further investigation. This investigation shall be carried out on either side of test locations indicating thin pavement and shall cover the entire area between adjacent test locations which indicate adequate pavement depth.

.6 The above area shall be tested on the basis of one thickness test per 500 m^2 of pavement. Test locations shall be as directed by the Departmental Representative.

.7 Field density tests shall be taken in accordance with ASTM D2950, Standard Test Method for Bituminous Concrete in Place by Nuclear Methods.

.1 One field density test shall be taken for each 500 m^2 of pavement surface.

.2 Test locations shall be as directed by the Departmental Representative.

.8 Thickness Tolerance:

.1 Finished base course surface to be within 10 mm of elevations as indicated but not uniformly high or low.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 Supply, installation and commissioning of new Aboveground Storage Tank (AST) fueling system to be measured on a lump sum basis and shall include all associated structural, electrical and mechanical works.

1.2 REFERENCES

.1 All references latest edition.

.2 American National Standards Institute (ANSI):

.1 ANSI/NFPA-329, Handling Underground Releases of Flammable and Combustible Liquids.

.2 ANSI/API 650, Welded Steel Tanks for Oil Storage.

.3 American Petroleum Institute (API):

.1 API RP 651, Cathodic Protection of Aboveground Petroleum Storage Tanks.

.2 API STD 653, Tank Inspection, Repair, Alteration, and Reconstruction.

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

.1 ASTM C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

.5 Canadian Council of Ministers of the Environment (CCME):

.1 CCME-PN1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.

.6 Department of Justice Canada (Jus):

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.7 Canadian Standards Association (CSA)/CSA International:

.1 CAN/CSA-B139, Installation Code for Oil Burning Equipment.

.8 Canadian Environmental Protection Act (CEPA):

.1 Storage Tank Systems for Petroleum Products and Allied Products Regulations SOR/2008-197

.9 The Master Painters Institute (MPI):

.1 Architectural Painting Specification Manual - September 2012.

.10 National Research Council/Institute for Research in Construction:

.1 NRCC 38727, National Fire Code of Canada (NFC) - 2015.

.11 Transport Canada (TC):

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.12 Underwriters' Laboratories of Canada (ULC):

.1 ULC/ORD-C58.9, Secondary Containment Liners for Underground and Aboveground Tanks.

.2 ULC/ORD-C58.12, Leak Detection Devices (Volumetric Type) for Underground Storage Tanks.

.3 ULC/ORD-C58.14, Leak Detection Devices (Nonvolumetric Type) for Underground Storage Tanks.

.4 ULC/ORD-C58.15, Overfill Protection Devices for Underground Tanks.

.5 ULC/ORD-C107.4, Ducted Flexible Underground Piping Systems for Flammable and Combustible Liquids.

.6 ULC/ORD-C107.7, Glass-Fibre Reinforced Plastic Pipe and Fittings.

.7 ULC/ORD-C107.19, Secondary Containment of Underground Piping.

.8 ULC/ORD-C142.23, Aboveground Waste Oil Tanks.

.9 ULC-S601, Aboveground Horizontal Shop Fabricated Steel Tanks.

.10 CAN/ULC-S602, Aboveground Steel Tanks for Fuel Oil and Lubricating Oil.

.11 CAN/ULC-S603.1, Galvanic Corrosion Protection Systems for Steel Underground Tanks.

.12 ULC-S630, Aboveground Vertical Shop Fabricated Steel Tanks.

.13 ULC-S652, Tank Assemblies for Collection of Used Oil.

1.3 SUBMITTALS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate details of construction appurtenances installation leakage detection system.

.3 Shop drawings to detail and indicate following as applicable to project requirements. Submit manufacturer’s product data to supplement shop drawings:

.1 Size, materials and locations of ladders, ladder cages, catwalks and lifting lugs.

.2 Tanks capacity.

.3 Size and location of fittings.

.4 Environmental compliance package accessories.

.5 Decals, type size and location.

.6 Accessories: provide details and manufacturers product data.

.7 Size, material and location of manholes.

.8 Size, materials and locations of railings, stairs, ladders and walkways.

.9 Finishes.

.10 Electronic accessories: provide details and manufacturers product data.

.11 Insulation types, locations and RSI values.

.12 Identification, name, address and phone numbers of corrosion expert where applicable. Grading drawings to be stamped by licensed corrosion expert.

.13 Piping, values and fittings: type, materials, sizes, piping connection details, valve shut-off type and location, cathodic protection system complete with stamp of corrosion expert indicating that design complies with standards, Federal and Provincial regulations.

.14 Spill containment: conduct product transfer area risk assessment and provide description of method[s] and show sizes, materials and locations for collecting spills at connection point between storage tank system and delivery truck, rail car, or vessel.

.15 Anchors: description, material, size and locations.

.16 Concrete: type, composition and strength.

.17 Size and location of tank piers.

.18 Level gauging: type and locations, include:

.1 Reporting systems, types of reports and report frequency.

.2 Maximum number of tanks to be monitored.

.3 Number of probes required and sizes.

.4 Provide details and manufacturer's product data.

.19 Ancillary devices: provide details and manufacturer's product data.

.20 Leak detection system, type and locations, and alarm system.

.21 Grounding and bonding: provide details of design, type, materials and locations.

.22 Corrosion protection: provide details of design, type, materials and locations.

.23 Field-erected AST overfill-protection systems: provide details of design, type, materials and locations.

.24 Containment system for spills, overfills and storm runoff water: provide details, materials used, and locations. Meet NFC as a minimum.

.4 Contractor to submit an updated Application for Approval to Construct to the Saskatchewan Ministry of Environment. The Owner has submitted an application and has obtained approval on the condition that a qualified contractor completes the work. Obtain the necessary authorizations and assume all responsibilities related to finalizing the application.

.5 Provide maintenance data for tank appurtenances and leakage detection system for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging for recycling.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.6 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.7 Ensure emptied containers are sealed and stored safely.

.8 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

.9 Divert unused concrete materials from landfill to local facility as approved by Departmental Representative.

.10 Dispose of unused paint and/or coating material to a licensed hazardous material collections site as approved by Departmental Representative.

.11 Do not dispose of unused paint and/or toxic material into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.12 Fold up metal banding, flatten and place in designated area for recycling. Do not leave on site.

Part 2 Products

2.1 TANKS: CONVENTIONAL STEEL

.1 One (1) tank of 45000 L capacity, dimensions as indicated double wall, self containing.

.2 Horizontal tanks: ULC-S601

.3 Connections: 50 mm minimum. Sizes: as indicated.

.4 Manholes: as indicated.

.5 Tank must be grounded to prevent electrostatic potential.

.6 Railings, stairs, ladders and walkways: as indicated.

.7 Finishes:

.1 Exterior of tank: SSPC-SP6 blast finish, 2 coats exterior enamel.

.2 Interior of tank: SSPC-SP6 blast finish, epoxy lining.

2.2 ANCHORAGE

.1 As indicated and in accordance with Section 05 50 00 - Metal Fabrications.

2.3 LIGHTING

.1 LED lighting to be provided at either end of the AST and must illuminate both the tank and filling area.

.2 Install at a height of between 5.5 to 6.0 m above the concrete slab.

.3 Each light to have a minimum of 22,000 lumens.

.4 Top of the tank, access stairs and fuel dispensing cabinet to be within the pattern of light created.

.5 Lighting to be dark sky friendly and IDA approved.

2.4 CONCRETE

.1 In accordance with Section 03 05 10 - Cast-in-Place - Short Form.

.2 Pad elevation to match fueling ramp.

.3 Coordinate size and location of each tank pier with structural to minimize grouting.

2.5 PIPING, VALVES AND FITTINGS

.1 Fibreglass-reinforced plastic pipe and fittings used for primary pipe in underground service designed, constructed and certified to ULC/ORD-C107.7.

.2 Flexible pipe and fittings used for primary pipe in underground service designed, constructed and certified to ULC/ORD-C107.4.

.3 Mechanical joints on buried primary piping are not permitted.

.4 Piping located below product level equipped with either manual or automatic shut-off at storage tank.

.5 Provide means for collecting spills at connection point between storage tank system and delivery truck.

.6 Underground piping: none.

.7 Fuel dispensing valve to have automatic shut-off.

2.6 LEVEL GAUGING

.1 Tank gauging stick: to manufacturer's standard.

.2 Tank level gauging and indicator.

.1 Remote or direct reading device with Ø50 mm size dial minimum.

.2 Gauge and gauge openings: protected against liquid overflow and possible liquid and vapour release.

.3 Remote electronic solid state combination tank level sensor and leak detector: console containing visual LED display algorithms to automatically compute required operations. System to be programmable for:

.1 Inventory reporting with following features.

.1 Litres of fuel remaining.

.2 Temperature of fuel.

.3 Millimeters of water in bottom of tank.

.4 Millimeters of fuel in tank.

.2 Fuel delivery report.

.3 Single tank installation leak detection.

.4 Visual and audible alarm for:

.1 Overfill 90%.

.2 Low product.

.3 High product.

.4 Leaks.

.5 Probe diagnostics.

.6 Leak tests.

.7 Probes and sensors: factory calibrated and pre-set, to suit diameter of tank.

.8 Ancillary devices:

.1 Interface capability with for monitoring and inventory reconciliation.

.2 Security key lock system to select normal operation, setup to enter or change system and tank parameters or operation, or diagnostics to check systems hardware and software.

2.7 LEAKAGE DETECTION SYSTEM

.1 To ANSI/NFPA-329.

.2 Leak detector: cable system.

.1 Monitoring instrument:

.1 Surge protected.

.2 Temperature compensated solid state circuitry to continuously monitor leak detection circuits for open circuit or alarm condition. Alarm condition is to be indicated by visual indicator light and audible alarm and operation of isolated relay to allow interface with other equipment.

.3 Supply voltage: 120 Vac.

.4 Module: complete with power-on lamp, alarm lamp, test switch and reset switch.

.2 Leak detection cable: twisted pair of 20 AWG woven conductors insulated with hydrocarbon degradable dielectric with loose interlocking aluminum alloy armour.

.3 Control cable: twisted pair of 20 AWG woven conductors with 300 V insulation and PVC jacket.

2.8 GROUNDING AND BONDING

.1 To Section 26 05 00 - Common Work Results - Electrical.

2.9 CORROSION PROTECTION

.1 Steel storage tank systems.

.1 Cathodic protection installed to API RP 651.

2.10 OVERFILL AND SPILL CONTAINMENT

.1 Field erected AST overfill protection systems.

.1 Truck delivery.

.1 Visual and audible alarm system for detecting fluid level that will activate and alert personnel in enough time to terminate product flow to storage tank and prevent overfill.

.2 Shop-fabricated AST overfill protection.

.1 Automatic valve closure on product supply line, or automatic pump shut-off to terminate petroleum product flow upon detection of high levels in the storage tank.

.2 Overfill protection device compatible with intended method of filling designed, built and certified to ULC/ORD-C58.15 with positive shut-off action.

.3 Audible and visual alarm located at the tank fill location to alert personnel during transfer operation to promptly stop flow when detected levels are too high.

.4 Storage tanks with capacity of 50,000 L or less.

.1 Level gauge located on storage tank for frequent monitoring throughout transfer operation permitting personnel to promptly shut down flow, or communicate immediately with person controlling delivery for shut down.

2.11 PRODUCT TRANSFER

.1 ASTs with normal vent and separate emergency vent.

.1 Liquid- and vapour-tight connection on fill pipes for flammable products.

.2 Coupling at end of storage tank suction tube for connection to remove stored fuel.

2.12 TANK BOTTOM WATER

.1 Segregated from rainwater.

.2 Disposed of in accordance with applicable provincial and/or municipal regulations, guidelines and policies.

2.13 SPILLS, OVERFILLS AND STORM RUNOFF WATER

.1 Contained, treated and disposed of in accordance with applicable provincial regulations, guidelines and policies.

2.14 FUEL DISPENSING CABINET – LOCKABLE

.1 Drop down front door, main entrance door.

.2 Cabinet must be lockable to prevent intentional damage and access to equipment inside. Provide three sets of keys to owner.

.3 Cabinet to be constructed of 304 stainless steel, weatherproof, protect and contain electrical connections and disconnects.

.4 Piping in cabinet to be 304 stainless steel.

.5 Equipment

.1 2 stage filtration with pressure differential gauge.

.2 Hose and hose reel – 30 m API bull 1529 Type C, F, CT,

.3 Fuel filling pump.

.4 Equipment to be factory pre-wired.

.6 Protective bollards as indicated and in accordance with Section 05 50 00 - Metal Fabrications

.7 Operating instructions conspicuously posted.

.8 All manufacturer provided signage to bilingual throughout.

2.15 EMERGENCY SHUT OFF

.1 Install emergency shut off at temporary location approved in writing by the Departmental Representative.

.2 Emergency fuel shut off to be located outside of spill area and conveniently accessible to each fueling position.

.3 Must work in power outage.

.4 Clearly marked with letters at least 2 inches high with method of operation indicated in both English and French.

.5 Reset by authorized personnel only.

.6 Emergency shut off and labelling to be relocated after hangar door modification by others. Splice and extend existing cable/conduit.

.7 Permanent location of emergency shut off to be confirmed on-site with Owner. Clearly mark location of permanent emergency shut off, including directions at fuel dispensing box with letters at least 2 inches high and arrow at least 2 inches by 6 inches.

2.16 REMOTE FUELING MONITORING STATION

.1 Status monitoring and dispensing recorder to be turned over to electrical trade for installation inside building.

Part 3 Execution

3.1 INSTALLATION

.1 Install tank in accordance with CAN/CSA-B139 and National Fire Code of Canada and manufacturer's recommendations and CCME PN 1326.

.2 Position tank using lifting lugs and hooks, and where necessary use spreader bars. Do not use chains in contact with tank walls.

.3 Coordinate concrete pad and tank mounting provisions with concrete slab placement.

.4 Coordinate protection bollard locations with fuel dispensing cabinet.

.5 Install tank using installers certified in the Province of Saskatchewan.

.6 Provide copy of Saskatchewan Ministry of Environment Certificate to Operate to Departmental Representative at completion of work.

3.2 FIELD QUALITY CONTROL

.1 Test tank for leaks to requirements of VFC Section 4.4 and in presence of authority having jurisdiction.

.2 Leak detection test of this system after tank has been constructed, deficiencies addressed, tank registered with EC, ERP on site, fuel delivered and tank commissioned is required.

3.3 TOUCH-UP

.1 Where coating is damaged, touch-up with original coating material, as directed by Departmental Representative.

3.4 LEVEL GAUGE SYSTEM

.1 Provide leak and vapour proof caulking at connections.

.2 Shield capillary and tubing connections in heavy duty 50 mm polyethylene pipe.

.3 Calibrate system.

3.5 LEAK DETECTION SYSTEM

.1 Install in accordance with manufacturer's recommendations.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment.

.1 No measurement of payment will be made for this section:

.1 Include direct buried underground cable ducts costs in lump sum price for new AST Installation as per Section 33 56 13 - Aboveground Fuel Storage Tanks.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International):

.1 CSA C22.2 No. 211.1, Rigid Types EBI and DB2/ES2 PVC Conduit.

.2 CSA C22.2 No. 211.3, Reinforced Thermosetting Resin Conduit (RTRC) and Fittings (Bi-national standard, with UL 1684).

1.3 SUBMITTALS

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

.2 Product Data, Certificates and Instructions:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

Part 2 Products

2.1 PVC DUCTS AND FITTINGS

.1 Rigid PVC duct: to CSA C22.2 No. 211.1, Type DB2/ES2, with fabricated fittings, for direct burial, Trade size 5 or 6. Nominal length: 3 m plus or minus 12 mm.

.2 Rigid PVC split ducts.

.3 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make complete installation.

.4 Rigid PVC 90 degrees and 45 degrees bends.

.5 Rigid PVC 5 degrees angle couplings.

.6 Expansion joints as required.

2.2 SOLVENT WELD COMPOUND

.1 Solvent cement for PVC duct joints.

2.3 FIBREGLASS DUCTS

.1 Fibreglass reinforced thermoset duct: to CSA C22.2 No. 211.3, Trade size 5 or 6, watertight type.

.2 Couplings, reducers, plugs, caps, adaptors, and supports to make complete installation.

.3 Expansion joints as required.

2.4 PLASTIC POLYETHYLENE PIPE

.1 Rigid plastic polyethylene pipe with approved couplings and fittings required to make complete installation.

2.5 CABLE PULLING EQUIPMENT

.1 6 mm stranded nylon pull rope tensile strength 5 kN.

2.6 MARKERS

.1 Concrete type cable markers: as indicated, with words: "Cable", "Joint" or "Conduit" impressed in top surface, with arrows to indicate change in direction of duct runs.

.2 Cedar post type markers: 89 x 89mm square, 1.5 m long, pressure treated with clear, copper napthenate or 5% pentachlorophenol solution, water repellent preservative, with nameplate fastened near post top, on side facing duct:

.1 Nameplate: aluminum anodized 89 x 125 mm, 1.5mm thick mounted on cedar post with mylar label 0.125 mm thick with words "Cable" "Joint" or "Conduit" with arrows to indicate change in direction.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install duct in accordance with manufacturer's instructions.

.2 Clean inside of ducts before laying.

.3 Ensure full, even support every 1.5 m throughout duct length.

.4 Slope ducts with 1 to 400 minimum slope.

.5 During construction, cap ends of ducts to prevent entrance of foreign materials.

.6 Pull through each duct steel mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter.

.1 Pull stiff bristle brush through each duct immediately before pulling-in cables.

.7 In each duct install pull rope continuous throughout each duct run with 3m spare rope at each end.

.8 Install markers as required.

END OF SECTION