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PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The work consists of the installation of various new shallow underground utilities within the Tunnel Mountain Campground Operations Area; this includes the installation of new conduit and surface components to support the future replacement of the electrical distribution system servicing 10 buildings, site lighting and vehicle plug-ins, relocating portions of the communications networks within the project work area, and replacement of portions of the gas system to support the other works to take place. These works will require trenching to install the new underground conduits and gas lines and other included infrastructure, demolition of portions of the existing overhead distribution system and necessary restorations to the staff operations site at Tunnel Mountain Campground, Banff National Park, Alberta. Work covered by the contract includes, but is not limited to the total performance of the work (labour, select materials, and equipment).

- .2 The scope of work includes:

Electrical Distribution System
 1. Operate and maintain temporary above ground electrical services which are to be installed by others, as required to allow demolitions and construction to take place while maintaining necessary services to buildings according to the contract. Temporary services are to be left in place upon completion of this contract unless otherwise directed in writing by Parks Canada.
 2. Install Parks Canada supplied conduit, pull boxes and junction boxes as per drawings and Appendix A to support future conductor installation to all buildings, streetlights, panels and vehicle plug-inschargers.
 3. Supply/install one new central distribution panel (CDP) base, including concrete base, grounding. Install Parks Canada supplied CDP onto concrete base, connect to Fortis transformer/grounding and prepare for energization, and install Parks Canada supplied protective bollards.
 4. Supply/install vehicle parking plug-in wooden posts and rails, including installation of Parks Canada supplied conduit and junction boxes to support future electrical component installations. To include supplying all wood materials required to complete scope.
 5. Supply/install three (3) street light concrete bases, and install Parks Canada supplied steel light poles.
 6. Abandon/demolish select existing Parks Canada owned above and below ground electrical distribution lines and poles upon completion by Parks Canada of installation and commissioning of new temporary electrical services.
 7. Parks Canada will be responsible to installing temporary electrical services as outlined in Drawing ED1.0. The supply and installation of temporary electrical services is considered outside the scope of this contract, unless where the Contractor

is required to interfere with the temporary distribution system put into place by Parks Canada.

Fortis Alberta (Fortis) Service

1. Install conduit c/w pull rope between existing overhead Fortis service and proposed new pad mounted transformer base.
2. Install Parks Canada supplied Fortis transformer pad and protective bollards and supply/install grounding grid.
3. Coordinate with Fortis inspection of all supporting Fortis installations included in contract and for Fortis to install new transformer and conductors.
4. All work pertaining to Fortis installations must be completed by Fortis approved contractor.

Telus Service

1. Install Parks Canada supplied conduit and pull boxes c/w pull rope between existing Telus pedestal and Office 1 according to drawings.
2. Maintain temporary above ground Telus services installed by others as required to allow demolitions and construction to take place while maintaining necessary services to buildings according to the contract. Temporary services are to be left in place until Telus decommissions those lines after the completion of the new permanent service installation.
3. Coordinate with Telus for installation by Telus of the new permanent phone line, and abandonment of existing Telus services, including temporary services.
4. Complete building connection demolition as identified in Appendix A.
5. Complete and coordinate all Telus related scope to maintain services according to the contract.
6. Parks Canada has contracted Telus separately to install the temporary and permanent new phone lines. This work is considered outside the scope of this contract.

Parks Canada Communication Network

1. Abandon/demolish existing communication system conduits and pull boxes on site.
2. Install Parks Canada supplied conduit and pull boxes to various buildings throughout the project area according to drawings.
3. Maintain temporary above ground communication services installed by others as required to allow demolitions and construction to take place while maintaining necessary services to buildings according to the contract. Temporary services are to be left in place until Parks Canada, or their designated contractor, decommissions them in coordination with the commissioning of the permanent new services.

4. Coordinate and work closely with Parks Canada to intercept and relocate the existing fibre optic cable service south of Offices 1 & 2 to bring into the newly installed communication conduit/pull box. Parks Canada's communications contractor will be responsible for handling, reconnecting and recommissioning the fibre optic cable once the Contractor has rerouted the existing conduit into the newly installed pull box.
5. Parks Canada has contracted a separate communication company to complete the installation of temporary over ground lines prior to the Contractor mobilizing as well as the installation of permanent new lines upon the Contractor's completion of the new communication conduit installations. That work is considered outside the scope of this contract.

Natural Gas System

1. Abandon/demolish existing natural gas system between Staff House 3/4 and all garages.
2. Install Parks Canada supplied gas service lines between Staff House 3/4 and all four garages, including all terminations and commissioning of system.

Other

1. Locate and verify all existing underground utilities and coordinate all trenching to prevent damage to utilities to remain in place as well as to limit service disruptions to allowances noted in contract.
2. Hydro-vac and expose existing sanitary lines in six (6) additional locations determined by Parks Canada to allow for survey by Parks Canada Representative, and backfill by Contractor.
3. Surface regrading around Garages A and B and restoration of affected area.
4. Restoration of all affected roadway and vegetated areas to original condition or better according to contract.
5. All trenching and backfill required to support underground utility installations noted above. Shared trenches are to be used wherever possible to minimize disturbance footprint.
6. Upon completion of work, provide the Departmental Representative with detailed redline drawings.
7. Commissioning of all completed systems included in the contract, and training of Parks Canada staff prior to hand over.
8. All necessary snow removal within areas under the control of the Contractor, including active work/staging areas and areas which have not yet been suitably restored to be returned to Parks Canada. Parks Canada will continue to provide their normal snow clearing to allow site access and will be responsible for clearing any

areas which have been returned in completed condition to Parks Canada by the Contractor.

9. Act as prime contractor for all activities taking place on site in support of the project.
- .3 The drawings and the specification sections more completely describe the full scope of work and material requirements.
- .4 Construct Work under a Unit Price Contract.
- .5 See 01 27 00 Measurement and Payments for materials to be supplied by Parks Canada; all other materials required are to be supplied by the Contractor.

1.2 WORK BY OTHERS

- .1 Co-operate with other contractors in carrying out their respective works and carry out instructions from Departmental Representative.
- .2 Co-ordinate work with that of other contractors. The Contractor is entirely responsible for coordinating directly with the respective utility providers to complete the items identified in the contract documents as required to be completed by those providers or their assigned contractors. Parks Canada has already put in place contracts directly with those utility providers to complete their respective scopes, however the Contractor will be required to coordinate communicate with those providers going through the duration of the project.
- .3 Parks Canada will not be responsible for any project delays caused by Fortis or Telus. The Contractor is responsible to appropriately coordinate with those utility providers to meet the outlined contract schedule.
- .4 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.
- .5 The Contractor is to act as prime contractor for all work to be completed on site in support of this contract scope; this will include those supporting tasks to be completed by Telus, and Fortis, Parks Canada staff and Parks Canada's communication contractor.

1.3 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 Departmental Representative occupancy according to Canadian Environmental Assessment Act (CEAA).
 - .2 Departmental Representative usage.
 - .3 Park & campground access by public and government agencies.
 - .4 Ongoing Parks Canada campground operations and Parks Canada staff residing within the affected buildings.
 - .5 Work by other contractors.
- .2 Co-ordinate use of premises under direction of the Departmental Representative.

- .3 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .4 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by the Departmental Representative.
- .5 At completion of operations condition of existing work: to make good any work disturbed during construction to that of its original state.
- .6 Follow all site access restrictions noted under Work Restrictions section of specifications.
- .7 The Contractor shall be permitted to set up a hydro-vac dumping facility in Peyto Lagoon located approximately 4km away from the project site, pending approval by Parks Canada of a dumping and clean up plan to be submitted by the contractor.

1.4 DEPARTMENTAL REPRESENTATIVE OCCUPANCY

- .1 The Departmental Representative will have access to the premises during entire construction period for execution of normal operations.
- .2 Co-operate with the Departmental Representative in scheduling operations to minimize conflict with the institution and to facilitate the Departmental Representative's usage.
- .3 Construct Work to accommodate the client's continued use of premises during construction.
- .4 Co-ordinate Progress Schedule and co-ordinate with the Departmental Representative during construction.
- .5 Maintain fire access/control to the work site at all times.
- .6 Maintain park and public access to campground at all times.
- .7 The project area will be occupied by the client during all phases of construction. The Contractor must maintain client access according to Work Restrictions section of specifications.

1.5 ALTERATIONS, ADDITIONS OR REPAIRS

- .1 Execute work with least possible interference or disturbance to campground operations, occupants, staff and normal use of premises. Arrange with the Departmental Representative to facilitate execution of work.
- .2 Execute work according to CEAA and National Parks Act.

1.6 EXISTING SERVICES

- .1 Notify the Departmental Representative and utility companies of intended interruption of services and obtain required permission. The Contractor is to provide:

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- Written notice to the Departmental Representative five business days in advance of any service disruptions.
 - Verbal confirmation to the Departmental Representative 24 hours in advance of any service disruption that it is still to go ahead as previously communicated in writing
- .2 Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to campground operations, occupants, staff and normal use of premises.
 - .3 Contractor shall inform Departmental Representative 24 – 48 hours, depending on building, in advance of requiring access to any buildings.
 - .4 Contractor is to receive approval from Departmental Representative prior to any shutdowns.
 - .5 Where work involves underground services, the Contractor must inform and obtain approval from the Departmental Representative before any excavation may commence.
 - .6 Provide alternative safe routes for personnel and vehicular traffic through construction area.
 - .7 Provide flagging, barricades and traffic controls at all times during work.
 - .8 Maintain continuous pedestrian and vehicle access to the site as noted in the Work Restrictions section of the specifications.
 - .9 Establish location and extent of service lines in area of work before starting Work. Notify the Departmental Representative of findings.
 - .10 Submit schedule to and obtain approval from the Departmental Representative for any shut-down or closure of active service or facility including power and communications services or roadways. Adhere to approved schedule and provide notice to affected parties.
 - .11 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic where required. Normal traffic includes buses and large trailers
 - .12 Where unknown services are encountered, immediately advise the Departmental Representative and confirm findings in writing.
 - .13 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
 - .14 Record locations of maintained, re-routed and abandoned service lines.
 - .15 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.7 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy 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.
- .11 Minutes of Safety Meetings
- .12 Performance Bond
- .13 Peyto Lagoon Hydro-vac Management Plan
- .14 Other documents as specified.

1.8 WORK SEQUENCE

- .1 Work will be permitted to start once all necessary submittals have been approved by Parks Canada. There is no earliest start date for activities on site.
- .2 Project completion milestones are as follows:
 - .1 All work is required to be completed prior to August 25th, 2022.
 - The contract provides the Contractor with the flexibility to schedule all work activities to take place anytime prior to the final completion date, with no intermediate milestone completion dates. The contract does however have limitations on the allowable duration of work by area once work in each area has started.
 - Trenching in the areas in front of Garages A, B and C and in adjacent areas to allow vehicle access must be completed within a period of five continuous days to restore Parks Canada vehicle access into those buildings upon completion.
 - Trenching in the area in front of Garage D and to the south must be completed within a period of three continuous days to restore Parks Canada vehicle access into Garage D upon completion. This period can be combined with or completed separately from the work in front of Garages A, B and C.
 - In addition to the building access disruption limitations noted above, roadway structure rehabilitation affecting access to all garages must be completed within a period of three continuous days. Those three days shall take place no sooner than 48 hours after initial vehicle access has been restored after the initial trenching period to allow Parks Canada interim access to those buildings. Alternatively, this work can take place within the original trenching period.
 - Existing vegetated areas, defined as any area outside of the existing gravel driveway areas, which are disturbed as part of the work, must be restored as per the contract requirements no later than 14 days after disturbance is first initiated to the specific area of question. This is required to minimize vegetation damage.

- Clean up and de-mobilization from Peyto Lagoon hydro-vac dumping site must also be completed prior to project completion date.

END OF SECTION

PART 1 GENERAL

1.1 SITE ACCESS AND EGRESS

- .1 Construction may commence immediately upon approval of all pre-mobilization submittals and approval from the Departmental Representative. The area may be closed to public access, but must remain accessible to all Parks Canada staff and delivery vehicles supporting Parks Canada's operations throughout the duration of the project.
- .2 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.
- .3 Access to the site is to be by use of existing gravel and paved roadways only. Equipment is only to be in vegetated areas when working in those specific areas.
- .4 The Contractor is required to construct and maintain temporary "access to" and "egress from" work areas and all areas affected by construction activities, and campground, including all buildings, parking lot areas, and operations material storage areas.
- .5 The Contractor must provide sufficient snow clearing and sanding within their Work Area to support Parks Canada staff access to all buildings.
- .6 Should the Contractor choose to use Peyto Lagoon for hydro-vac dumping, they will be responsible for keeping the access gate locked at all times.

1.2 CONTRACTOR BUILDING ACCESS

- .1 General Note on Contractor Building Access:
 - .1 Due to Covid-19, the contractor shall minimize their time spent inside each of the buildings only to the times necessary to complete the scope of this project. The contractor will not be permitted to use Parks Canada's washroom facilities located within the work area.
 - .2 Only one employee of the contractor's will be permitted inside any building at a single time. Exceptions will be permitted only when required to allow work to be completed safely, however Parks Canada is to be notified of this when the contractor is requesting building access.
 - .3 Contractors entering buildings must at a minimum follow the stricter of the Province of Alberta or Parks Canada's Covid-19 protocols in addition to those outlined in their own Covid-19 safe work protocol; Parks Canada's protocols will be reviewed with the contractor during the start up meeting and are subject to change.
 - .4 The contractor will not be given blanket access to buildings or provided with building keys for the duration of the project. Instead, the contractor will be required to obtain building keys each morning from the Office 1 building, and return them each evening.
- .2 Office 1, Office 2, Theater Building, Garage A, Garage B, Garage C, Garage D

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- .1 Only if necessary to support the project, the contractor may be permitted access into those buildings between 9am – 5pm, 7 days a week with prior written approval from Parks Canada only.
 - .2 The contractor must provide Parks Canada with 24 hours written notice prior to requiring access into those buildings.
 - .3 Additional access outside these hours may be coordinated in advance to support the communication system scope to meet the service disruption requirements.
- .3 Staff House 3/4, Staff House 5/6, Staff House 7/8
- .1 Only if necessary to support the project, the contractor may be permitted access into the Staff Houses between 9am – 5pm, Monday to Friday with prior written approval from Parks Canada only.
 - .2 The contractor must provide Parks Canada with 48 hours written notice prior to requiring access into any of the Staff House buildings.

1.3 USE OF SITE AND FACILITIES

- .1 The Work Sites specified in the Contract shall only be used for the purposes of the Work.
- .2 The Work Site will be specified by Parks Canada and shall only be used for the purposes of the Work. The Work Site will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents
- .3 The Contractor will not be permitted to set up a camp in the National Parks. PCA regulations prohibit anyone working within the Park from using public campground facilities.
- .4 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with the Departmental Representative to facilitate work as stated. Maintain operations area access to Parks Canada staff at all times.
- .5 Maintain existing services to all buildings according to Section 01 51 00.00 Temporary Utilities and provide for personnel and vehicle access according to Sub-section 1.5 Maintaining Parks Canada Site Access.
- .6 Office/tool trailer may also be set up within the approved project staging area but must not cause environmental or vegetation issues. See Section 01 35 43 – Environmental Procedures
- .7 Where security is reduced by work provide temporary means to maintain security.
- .8 The Contractor will provide onsite sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .9 Contractor shall provide and secure its own waste bins and shall dispose of domestic waste on a daily basis. Contractor shall not use existing public waste bins inside the campground. All construction waste to be placed in Contractor supplied bins on site.
- .10 Closures: protect work temporarily until permanent enclosures are completed.
- .11 Pets shall not be brought to or maintained at the construction site.

- .12 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at their expense.
- .13 The contractor will be permitted to use the existing gravel parking lot area north of Office 1 for their staging area. This area is approximately 200m² and includes some of the trenching and infrastructure installations included in this project. Parks Canada may consider alternative staging areas upon request from the contractor if a strong case can be made for why it is beneficial to the project.
- .14 The contractor shall coordinate their material deliveries and construction staging so that all construction staging can be accommodated within this area. No materials, stockpiles, or equipment is to be stored outside of this area when not in immediate use.
- .15 The Contractor will not be permitted to plug any equipment into the existing or temporary electrical systems on site. The Contractor will be responsible for providing a generator for any equipment or trailers required to be plugged in.
- .16 No equipment is to be left idling within 15m of buildings occupied by Parks Canada staff.

1.4 WORKING TIMES

- .1 Work in BNP is permitted between the following hours during the 2022 season:

| Month | Start | Finish |
|-----------|---------|---------|
| January | 9:00 am | 4:30 pm |
| February | 8:30 am | 5:00 pm |
| March | 8:30 am | 6:00 pm |
| April | 7:30 am | 8:00 pm |
| May | 7:30 am | 8:30 pm |
| June | 7:30 am | 9:00 pm |
| July | 7:30 am | 9:00 pm |
| August | 7:30 am | 8:00 pm |
| September | 8:00 am | 7:00 pm |
| October | 9:00 am | 5:30 pm |
| November | 9:00 am | 4:00 pm |
| December | 9:00 am | 4:00 pm |

- .2 In addition to the above allowable working hours, equipment is not to be operated outside the hours of 9:00 am – 8:00 pm, or the hours shown above, whichever is more restrictive.
- .3 Work outside which does not include motorized equipment may be considered and approved by Parks Canada for outside these hours on a case by case basis. This will only be considered to further minimize service and access disruptions to Parks Canada operations beyond what is otherwise noted as required in the specifications.
- .4 The Contractor will not be permitted to work during the period of any holiday long weekend, unless prior written approval is granted by the Departmental Representative:
 - .1 Easter Weekend (2022)
 - .2 Statutory and Civic Holidays (2022)

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- .1 Easter Weekend: From 12:00 Thursday April 14, 2022, to 07:00 Tuesday April 19, 2022.
 - .2 Victoria Day Weekend: From 12:00 Friday May 20, 2022 to 07:00 Tuesday, May 24, 2022.
 - .3 Canada Day Weekend: From 12:00 Thursday June 30, 2022 to 07:00 Monday July 4, 2022.
 - .4 Heritage Day Weekend: 12:00 Friday July 29, 2022 to 07:00 Tuesday August 2, 2022.
 - .5 Labour Day Weekend: 12:00 Friday September 2, 2022 to 07:00 Tuesday September 6, 2022.
- .5 Variance of the Working Times and any others are provided on the strict condition of satisfactory performance in all requirements as determined at the Departmental Representative's discretion and may be revoked at any time for any reason. It is provided on the presumption that no additional costs or any delay will be attributed to Parks Canada in relation to conducting Works in accordance with the Variance and if that is not the case, the Contractor shall not commence work under the Variance. No claims for additional costs, delays, schedule impacts, loss of productivity or other extra Works resulting from a Variance will be entertained.

1.5 MAINTAINING PARKS CANADA SITE ACCESS

- .1 The entirety of the project area is within Parks Canada's campground and day use area operations head quarters, making the site busy with Parks Canada staff and vehicles during all hours of the day, seven days a week. The site will be in full operation mode during the project.
- .2 Parks Canada's operations will continue throughout the duration of this project; the contractor must plan their work accordingly to minimize disruption to Parks Canada's operations and meet the site access requirements noted below.
- .3 The contractor is required to provide the Departmental Representative with five business days written notice prior to starting work which will impact Parks Canada's existing level of access to any buildings. The contractor shall also verbally confirm the intended impact timeline with the Departmental Representative 24 hours prior to the work beginning.
- .4 Parks Canada Staff Pedestrian Access
 - .1 The contractor must maintain Parks Canada staff access by foot throughout the site and to each of the 10 buildings within the project area at all times throughout the duration of the project.
 - .2 The contractor will be responsible for ensuring the access paths around the site and to each building are secure from construction activities so that Parks Canada staff can move throughout the site without additional risk introduced to them by the construction activities. The contractor is to fence off or flag with stakes/pylons and rope any areas Parks Canada staff are stay out of or away from, to provide a continuous physical barrier to prevent accidental access.
 - .3 The designated access pathways to each building shall not introduce any new surface obstacles which do not currently exist. No new stairs, steep approaches or excessively narrow pathways are to be introduced which would introduce new

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- access hazards or prevent Parks Canada from accessing the building with wheeled devices such as dollies.
- .4 Designated access pathways are to be firm ground and gravel covered unless otherwise approved by Parks Canada in writing.
- .5 In any areas where the designated access pathway will be within the working radius of equipment or where the active work area is not clearly and continuously delineated from open access areas, the contractor shall provide a flagging person/spotter while work is taking place or trenches are open.
- .5 Parks Canada Vehicle Access
- .1 At no time shall any Parks Canada fleet or staff personal vehicles be prevented from leaving the site using the existing or new roadways on site. The contractor will be responsible for providing a minimum 24-hour notification to Parks Canada to have any vehicles removed from an area which will have access cut off from the main access driveway to Trailer Court.
- .2 The contractor is to maintain all existing parking stalls and vehicle travel lanes with the exception of the permitted laydown area for Parks Canada's use except for when work is actively taking place which impacts those parking stalls or driving lanes, either by directly taking place in that area, or by preventing vehicle access to it.
- .3 The vehicle parking lot east of the garage buildings is to be maintained in its current capacity for Parks Canada vehicles at all times throughout the project, except for when trenching for the parking lot streetlight is underway. At that time, any lost parking spaces must be offset elsewhere within the project area.
- .4 Vehicle access is to be maintained to the large doors of Garage A, Garage B, Garage C and Garage D at all times, with the exception of when trenching is actively taking place directly in front of that specific building. Allowable vehicle access disruptions to those buildings are as follows:
1. Garage A, Garage B, Garage C - Vehicle access to Garages A, B and C may be disrupted one time for up to five continuous days to each building to allow for trenching and an additional one time for up to three continuous days to allow for final rehabilitation of the roadway.
 2. Garage D - Vehicle access to Garage D may be disrupted one time for up to three continuous days to allow for trenching and an additional one time for up to three continuous days to allow for final rehabilitation of the roadway.

1.6 EXISTING SERVICES

- .1 See Section 01 51 00 – Temporary Utilities for electrical, communication and gas system permitted service disruptions and requirements for maintaining services throughout construction.
- .2 Water and sanitary services are to be maintained throughout construction.
- .3 Notify the Departmental Representative and utility companies of intended interruption of services and obtain required permission.

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- .4 Where Work involves breaking into or connecting to existing services, give the Departmental Representative five business days written notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal hours of occupants.
 - .5 Provide for personnel and vehicular traffic. Provide detours, flagging, barricades and traffic controls before beginning work.
 - .6 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.7 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 18 - Construction Progress Schedules - Bar (GANTT) Chart.
- .2 All contractors involved in the project must maintain in good standing a business licence to operate in Banff National Park through the duration of the project.
- .3 All work supporting the Fortis installations included in the contract documents may only be completed by a Fortis approved contractor.
- .4 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic, security regulations, the National Parks Act and Canadian Environmental Assessment Act.
- .5 Keep within limits of work and avenues of ingress and egress.
- .6 The contractor is required to coordinate pick up of all Parks Canada supplied materials from Parks Canada's Banff compound between 8:00 – 16:00 Monday to Friday and will require 24 hours prior written notice.
- .7 Deliver materials during normal working hours unless otherwise approved by the Departmental Representative.
- .8 Trenches adjacent to the roadway must be safe for public transportation and not affect the support or structure of adjacent roadways at any time.
- .9 Trenches must be barricaded and blocked off at the end of each working day and/or whenever not being attended to by the contractor.
- .10 Trenches which are tarped, resulting in the appearance of a nearly continuous flat surface must also be fenced off when not supervised to mitigate the risk of pedestrians, vehicles or wildlife falling into the open trench.
- .11 No more than 75 metres of trench may be left open at the end of any working day when the Contractor will be working the next day. No more than 30 metres of trench may be left open at the end of any working day when the Contractor will not be working the next day. There is no limit to length of open trench at any given time during the work day.
- .12 Disturbed vegetated areas must be restored as per the contract requirements within 14 days of work beginning in the subjected area. (ie. trenches must be backfilled and topsoil replaced

within 14 days of topsoil being stripped). Exceptions may be made for trenches less than 3 metres in length being left open for tie-ins or crossings.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

- .1 Payments shall be made on the basis of the lump sum prices and the unit prices bid in the Unit Price Schedules in the Tender Form.
- .2 The prices bid for various items of work, unless specifically noted otherwise, shall include the supply of all labour, material, plant and equipment required to construct the work in accordance with the drawings and specifications.
- .3 The method of measurement of the quantities for payment and the basis for payment will be in accordance with the following items of this section. All measurement for the determination of payment will be done by the Departmental Representative. For items which require survey for quantity verification, the Contractor shall submit all supporting survey data in electronic format to the Departmental Representative for review a minimum of five business days prior to claiming those items for payment.
- .4 The prices bid for supply and installation of materials shall be full compensation for supplying, delivering, loading, unloading, handling, storage, breakage, waste, hauling, installing, cleaning, testing and placing in service the work together with all work subsidiary and incidentals thereto for which separate payment is not provided elsewhere. Payment shall be only for materials actually installed unless otherwise approved in writing in advance by Departmental Representative.
- .5 All existing materials on-site whether structures, vegetation, topsoil, gravel, sand or other excavated, or piled materials are the property of the Owner on which the work is located. Only those materials specifically noted in the specifications or on the drawings as belonging to the Contractor shall become the Contractor's property.
- .6 Where there are excess excavated materials, unsuitable materials or materials of any kind that are not used in the work, such materials are not the property of the Contractor unless authorized in writing by the Departmental Representative or specified to be disposed of by the Contractor outside of the Park.
- .7 The sum of the payments in the Unit Price Schedules of the Tender Form shall constitute full payment for the complete works as described in these documents. Extra payment will only be made for items adding to the scope of the works, as described in these documents and/or shown on the drawings and as evident from inspection of the site of the works.

PART 2 NON-PAYMENT ITEMS

2.1 DESCRIPTION

- .1 Supply of all equipment, labour, materials, plant, and services required to complete the Work for which no specific payment item has been assigned in the Unit Price Schedules of the Tender Form shall be considered incidental to the Works.
- .2 There shall be no separate payment for incidental work. Payment for incidental work shall be considered to be included in the total tendered price of the Unit Price Schedules of the Tender Form.

- .3 All work shown on the plans and drawings, or referred to in the General Conditions, the Supplementary General Conditions, or the General Specifications shall be considered as part of the complete work unless specifically deleted.

2.2 MATERIALS TO BE SUPPLIED BY PARKS CANADA

- .1 The following items are to be supplied to the contractor for the purpose of completing the project work. The contractor must supply all materials and additional quantities required to complete the project which are not allowed for in the table below.

| Item | Description | Units | Quantity |
|---------------------------------------|---|-------|----------|
| 1 - 103mm Conduit and Fittings | | | |
| 1.1 | - 103mm DB2 | Ft. | 1700 |
| 1.2 | - 103mm PVC | Ft. | 20 |
| 1.3 | - 103mm DB2 (90° elbow, 36" radius) | Ea. | 30 |
| 1.4 | - 103mm PVC (90° elbow, 36" radius) | Ea. | 5 |
| 1.5 | - 103mm DB2 (45° elbow, 36" radius) | Ea. | 5 |
| 1.6 | - 103mm DB2 (22° elbow, 36" radius) | Ea. | 5 |
| 1.7 | - 103mm DB2 (5° Coupling) | Ea. | 6 |
| 1.8 | - 103mm DB2 Coupling | Ea. | 5 |
| 1.9 | - 103mm PVC Coupling | Ea. | 5 |
| 1.10 | - 103 mm PVC to DB2 Adapter | Ea. | 5 |
| 1.11 | - 103mm PVC Expansion Coupling | Ea. | 3 |
| 1.12 | - 103mm PVC TA55 Terminal Adapter | Ea. | 4 |
| 1.13 | - 103mm Steel Locknut for TA55 Terminal Adapter | Ea. | 4 |
| 2 - 53mm Conduit and Fittings | | | |
| 2.1 | - 53mm DB2 | Ft. | 340 |
| 2.2 | - 53mm PVC | Ft. | 140 |
| 2.3 | - 53mm DB2 (90° elbow, 36" radius) | Ea. | 67 |
| 2.4 | - 53mm DB2 (90° elbow, 24" radius) | Ea. | 6 |
| 2.5 | - 53mm PVC (90° elbow, 36" radius) | Ea. | 20 |
| 2.6 | - 53mm DB2 (45° elbow, 24" radius) | Ea. | 40 |
| 2.7 | - 53mm DB2 (22° elbow, 24" radius) | Ea. | 0 |
| 2.8 | - 53mm DB2 Coupling | Ea. | 10 |
| 2.9 | - 53mm PVC Coupling | Ea. | 5 |
| 2.10 | - 53 mm PVC to DB2 Adapter | Ea. | 19 |
| 2.11 | - 53mm PVC Expansion Coupling | Ea. | 20 |
| 2.12 | - 53mm PVC TA35 Terminal Adapter | Ea. | 20 |
| 2.13 | - 53mm Steel Locknut for TA35 Terminal Adapter | Ea. | 20 |

| Item | Description | Units | Quantity |
|--|---|-------|----------|
| 3 - 27mm Conduit and Fittings | | | |
| 3.1 | - 27mm PVC | Ft. | 600 |
| 3.2 | - 27mm PVC (90° elbow, standard radius) | Ea. | 30 |
| 3.2 | - 27mm PVC (45° elbow, standard radius) | Ea. | 7 |
| 3.2 | - 27mm PVC Coupling | Ea. | 5 |
| 3.2 | - 27mm PVC TA20 Terminal Adapter | Ea. | 7 |
| 3.2 | - 27mm Steel Locknut for TA20 Terminal Adapter | Ea. | 7 |
| 4 - Electrical/Communication Junction Boxes | | | |
| 4.1 | 300mm (W) x 300mm (L) x 150mm (D) PVC Weatherproof Junction Box | Ea. | 14 |
| 4.2 | 200mm (W) x 200mm (L) x 100mm (D) PVC Weatherproof Junction Box | Ea. | 6 |
| 4.3 | 100mm (W) x 100mm (L) x 50mm (D) PVC Weatherproof Junction Box | Ea. | 2 |
| 4.4 | 53 mm PVC Weatherproof LB | Ea. | 2 |
| 4.5 | 53 mm PVC Weatherproof Type C Box | Ea. | 2 |
| 4.6 | 600mm(W) x 900mm(L) x 600mm(D) HDPE Structural Underground Pull Box c/w HDPE Lid Channell BULK424N07204 | Ea. | 4 |
| 4.7 | 350mm(W) x 575mm(L) x 600mm(D) HDPE Structural Underground Pull Box c/w HDPE Lid Channell BULK218N07204 | Ea. | 2 |
| 5 – Miscellaneous Electrical Components | | | |
| 5.1 | 7.32m Tall Steel Light Pole (Lumec SPS4V-24-BKTX) | Ea. | 3 |
| 5.2 | Fortis Approved Pre-cast Concrete Transformer Base | Ea. | 1 |
| 5.3 | Fortis Approved Pre-cast Concrete Protective Bollard | Ea. | 7 |
| 5.4 | Central Distribution Panel (cabinet and panel only) | Ea. | 1 |
| 6 - 25mm Gas Line and Fittings | | | |
| 6.1 | 25mm PE2406 SDR 11 Pipe | Ft. | 275 |
| 6.2 | 25mm PE2710 DR 11 to 25mm Steel Gas Riser (90° elbow, 36" radius) | Ea. | 1 |
| 6.3 | 25mm PE2406 SDR 11 Tee (fusion) | Ea. | 5 |
| 6.4 | 25mm PE2406 SDR 11 End Cap (fusion) | Ea. | 1 |
| 6.5 | 25mm x 19mm PE2406 SDR 11 Reducer (fusion) | Ea. | 4 |
| 7 - 19mm Gas Line and Fittings | | | |
| 7.1 | 19mm SDR 11 Pipe | Ft. | 60 |
| 7.2 | 19mm PE2710 DR 11 to 19mm Steel Gas Riser (90° elbow, 36" radius) | Ea. | 4 |
| 7.3 | 19mm Luboseal Insulated IPS H11179 | Ea. | 4 |

| Item | Description | Units | Quantity |
|--------------------------|--|-------|----------|
| 8 - Miscellaneous | | | |
| 8.1 | 475mL Ipex 100 Conduit Solvent | Ea. | 4 |
| 8.2 | Red Underground Warning Tape - 3" Wide "Caution - Electrical Line Buried Below" | Ft. | 4000 |
| 8.3 | Orange Underground Warning Tape - 3" Wide "Caution - Communication Line Buried Below" | Ft. | 1000 |
| 8.4 | Yellow Underground Warning Tape - 3" Wide "Caution - Buried Gas Line" | Ft. | 1000 |
| 8.5 | 14-Gauge Gas Line Tracer Wire | Ft. | 350 |

- .2 Within ten days of contract award, the Contractor is to inspect the materials being supplied by Parks Canada to identify any quantity discrepancies or material deficiencies and provide written notification to Parks Canada of any issues. Failure to provide written notification of any discrepancies to Parks Canada within ten days, will be implied confirmation the material quantities according to the table above are accurate and suitable for use by the Contractor.
- .3 Many Parks Canada supplied items listed above are stored at the Parks Canada's Banff compound. The Contractor shall provide pick up service to bring supplies from Parks Canada's Banff compound to the construction site. Parks Canada will provide the necessary equipment to load the materials at the Banff compound.
- .4 Any unused items supplied by Parks Canada shall be returned to Parks Canada upon completion of the work; this is to include delivery to Parks Canada's Banff compound. Unused items do not include items which have been cut, damaged, or otherwise no longer in their original new state.
- .5 The Contractor is responsible for replacing any Parks Canada supplied materials which are damaged by the Contractor or under the Contractor's care at their own cost. Parks Canada will not resupply the contractor with replacement materials.

2.3 INSTALLATIONS TO BE COMPLETED BY PARKS CANADA

- .1 Temporary Electrical Services
 - .1 Prior to the Contractor mobilizing to site, Parks Canada will have installed temporary overland electrical services to Staff House 3/4, and Garages B, C and D as shown in Drawing ED1.0.
 - .2 Within seven days of the contractor installing the necessary conduits across the site entry driveway, Parks Canada will install temporary overland electrical services to Offices 1 & 2.
 - .3 Staff Houses 5/6 and 7/8, and Garage A will utilize the existing overhead cables for the temporary services.

- .4 Parks Canada will provide generator service to the Theatre Building as required to maintain temporary electrical services to that building during trenching to that building.
- .2 Parks Canada Owned Communication System Upgrades
 - .1 Prior to the Contractor mobilizing to site, Parks Canada will have removed all underground Parks Canada owned communication cables from conduit north of the existing underground junction box located south of Offices 1 & 2, and will have installed temporary over ground communication services between Office 1 & 2, as well as between the existing junction box located south of Offices 1 & 2 and Office 1.
 - .2 Upon completion of the necessary conduit and pull box installations by the Contractor, Parks Canada will install all new Parks Canada owned communication lines, and remove the temporary over ground lines.

PART 3 MEASUREMENT AND PAYMENT CLAUSES

3.1 GENERAL WORKS

.1 Mobilization / Demobilization

Payment for this item shall be compensation in full for costs of mobilization: permits; moving personnel, equipment, fencing, safety measures, and materials to the site; setting up temporary facilities; public notices; storage of materials; environmental measures; all preparation for performing the work; full demobilization of the above; site cleanup; and costs associated with the warranty period.

Payment: Lump sum price bid.

Measurement: 45% of the lump sum will be included in the first progress payment certificate; 40% of the lump sum will be included following the contractor's demobilization from site following substantial completion. The remaining 15% is to be included in the final progress payment certificate once all restoration is completed and redline drawings submitted. Mobilization/ demobilization will only be paid for once, regardless of the number of times the Contractor mobilizes and demobilizes, due to any condition or circumstance.

.2 Demolition (all required to complete project)

Payment for this item shall be compensation in full for all demolition required for the completion of this project, including but not limited to electrical, communication, gas, surface and building tie-ins demolition and disposal including all ancillary equipment and facilities related to above work. This item also includes associated building repairs required due to removals, the abandonment of underground utilities which will not otherwise be encountered with new trenching the removal of underground items encountered during trenching, as well as the required demolition staging required to support the temporary utilities requirements. Cost to also include all coordination with Fortis and Telus. All labour, equipment and materials required to complete the work; and any other incidental work for which payment is not specified elsewhere.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on percentage of demolition work completed.

.3 Trenching (single measurement for multiple conduits / utilities in shared trenches)

Payment for this item shall be compensated in full all costs associated with trenching required to install all new underground utilities. This includes layout, site preparation, sod, soil and gravel stripping, separation and storage, excavation of full trench width and depth to allow for all parallel running utilities to be installed in a common trench (where multiple utilities are required, removing encountered underground utilities or other obstructions encountered, backfilling to immediately below surface restoration scope, and disposal of excess material generated from trenching.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on percentage of total trenching work completed.

.4 Hydro-vac hole to expose sanitary/waterlines in PCA determined locations

Payment for this item shall full compensation for all costs associated with the excavation by hydro-vac and backfill of holes in locations determined on site by Parks Canada for the purpose of exposing existing utilities to allow for survey by Parks Canada. Hydro-vac holes are to be assumed to be up to 3ft long, by 1ft wide, by 7ft deep, with all removed material being removed outside of the Park. These holes are to be in addition to those required by the contractor to expose existing utilities for the purpose of safely installing the new utilities without disturbing existing services.

Payment: Unit rate bid price per hydro-vac hole completed.

Measurement: Each hole completed.

.5 All Other Scope Not Otherwise Noted in Bid Table

Payment for this item shall be full compensation for all other items outlined in the contract drawings, specifications, Appendix A and Appendix B, but which are not otherwise noted or presumed included elsewhere in the bid table. The contractor shall request clarification regarding any scope limitations they feel are unclear prior to submitting their bid.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on percentage of overall work completed according to contract amount billed.

3.2 CIVIL WORKS

.1 Regrading per. Appendix B

Payment for this item shall be compensation in full for all surface stripping, soil separating and salvaging, excavation to new grade outlined in Appendix B, disposal of excess excavated material, material handling and stockpiling, grading to support positive drainage away from Garages, supply /install gravel roadway structure in affected areas and restoration of affected vegetated areas according to landscape restoration requirements. Labour, equipment and materials, as well as accommodating existing underground utilities to maintain services, and movement of excess material generated to/from other areas of the site as required are also considered incidental to this item.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on percentage of regrading work completed. The contractor will be responsible for proposing a measurement method and receiving approval from the Departmental Representative if they wish to claim for disposal of additional excess material from the Appendix B scope area above the quantity outlined in Appendix B.

.2 Site Restoration incl. All Roads, Pathways, and Vegetated Areas

Payment for this item shall be full compensation for the restoration of all site surfaces which are affected in any way to their original condition or better as outlined in the contract specifications unless otherwise noted in this contract package.

For roads, this includes but is not limited to sub-cutting and disposal to outside of the Park of existing material to allow for placement of the new gravel structure, grading of the subgrade, supply / install of the new gravel road structure according to the contract drawings and clearing of subsoils from existing roadway areas which are not being trenched to return them to their original condition.

For pathways, this includes but is not limited to sub-cutting and disposal to outside the Park of existing material to allow for placement of new pathway structure, supply / install root barrier fabric and supply / install 1m wide by 100mm thick City of Calgary trail mix.

For vegetated areas, this includes but is not limited to repairing any wheel ruts and damaged sod, fine grading of prepared subgrade, hauling, handling and placement of salvaged topsoil, placing any salvaged sod and rocks or boulders and all management of non-native vegetation as identified by Parks Canada to allow native vegetation to grow uninhibited within the warranty period.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on percentage of overall site restoration work completed.

3.3 ELECTRICAL SYSTEM

.1 Install All Parks Canada Supplied Conduit, JBs, LBs and U/G PBs

Payment for this item shall be compensation in full for all costs associated with the installation of all sizes of underground electrical and communication conduit and underground pull boxes, as well as all above ground conduit, junction box, and LB installations, and associated terminations according to Appendix A and the contract drawings within the project area.

This includes all layout, record keeping, installation of conduit, bends, fittings and warning tape, as well as the supply and install of bedding material, pull rope and any other materials required but not supplied by Parks Canada. This item includes conduit for Parks Canada owned lines, as well as Fortis and Telus lines; coordination for installation, inspections and staging with Fortis and Telus is considered incidental this item.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on percentage of work completed, calculated by comparing items installed against quantities identified under item 3.1 in the bid table.

.2 Supply / Install Wooden Posts and Rails

Payment for this item shall be compensation in full for all costs associated with the supply and installation of the vehicle plug in stations and conduit stub ups on site. This includes but is not limited to the material supply costs for all wood, fastening hardware and bedding/backfill material, as well as the equipment and labour costs associated with completing the installations according to the contract drawings. Also included is coordination with Parks Canada, layout, clean up; and any other incidental work for which payment is not specified elsewhere is included.

Payment: Lump sum price bid.

Measurement: 35% of the lump sum amount is payable upon the completion of the eastern parking area post and rail. 55% of the lump sum amount is payable upon completion of the western parking area post and rail installation. 10% of the lump sum amount is payable upon completion of the standalone conduit stub ups on posts.

.3 Install Fortis Approved Transformer Pad

Payment for this item shall be compensation in full for all materials and installation required for the installation of the Fortis approved transformer base for the new Fortis supplied pad-mounted transformer as per the contract and Fortis requirements. This includes but is not limited to coordination with Fortis for inspections and testing, supply and installation all materials not supplied by Parks Canada, including installation of the Fortis approved pre-fabricated concrete transformer base and three protective bollards, and the supply/installation of the gravel base, grounding grid. This also includes all testing and commissioning, and all material, labour and equipment, not included in other items, but necessary to meet the intent of the design. All clean up; and any other incidental work for which payment is not specified elsewhere is included.

Payment: Unit rate bid price per complete transformer base installation.

Measurement: Each installed.

.4 Supply / Install CDP Base

Payment for this item shall be compensation in full for the supply and installation of one concrete pad suitable for the specified future CDP cabinet, complete with conduit terminations to 25mm above the top of the concrete pad, grounding plate and 10m of wiring suitable for the specified CDP panel, and testing of grounding. This also includes the supply and install of a self consolidating gravel material for all conduit backfill beneath the concrete base and the gravel pad beneath the concrete base to prevent future settlement and the installation of four Fortis approved pre-fabricated protective bollards. All material, labour and equipment, not included in other items, but necessary to meet the intent of the design, as well as all clean up and any other incidental work for which payment is not specified elsewhere are to be included in the cost. This item is also to include the installation of the Parks Canada supplied CDP onto the concrete base, and terminating CDP to Fortis Transformer and grounding.

Payment: Unit rate bid price per complete CDP installation.

Measurement: 85% for base and underground installations

15% for installing CDP onto base

.5 Install Streetlight Concrete Base

Payment for this item shall be compensation in full for all costs associated with the supply and installation of street light concrete bases, complete with hardware for light pole mounting, the necessary conduit tie-ins, and installation of the Parks Canada supplied steel light poles. This includes follow up visits for up to two years to straighten any leaning poles, all material, labour and equipment, not included in other items, but necessary to meet the intent of the design. All clean up; and any other incidental work for which payment is not specified elsewhere is included.

Payment: Unit rate bid price per streetlight pole and base installed.

Measurement: Each installed.

3.4 GAS SYSTEM

.1 Install All Parks Canada Supplied PE Gas Main and Associated Parts

Payment for this item shall be compensation in full for all costs associated with the installation of all PE gas main as per the design. This includes the installation of all PE gas lines, bends, tees, reducers and other fittings, using pipe welding, and installation of tracer wire, warning tape, etc. Also to include all layout, record keeping and the supply and installation of bedding material and any other materials required but not supplied by Parks Canada.

To include coordination with Parks Canada be installed in common trench wherever possible. Includes pressure testing of connection points prior to backfill.

Payment: Lump sum price bid.

Measurement: Lump sum payable based on percentage of work completed, assuming approximately 85m of total gas pipe installed,

.2 Building Tie-in incl. Install Steel Riser, Shut Off Valve, Termination, etc.

Payment for this item shall be compensation in full for the complete scope associated with each building tie-in as shown in Appendix A and noted in the contract drawings. This includes the installation of the steel gas riser and shut off valves as well as the supply and installation of all additional steel piping, bends, caps, fittings, etc. required to allow for the tie-in to existing gas services or regulators. Stabilizing, painting and any other items required to complete each building tie-in are also considered incidental to this item.

Payment: Unit rate bid price per building tie-in completed.

Measurement: Payable upon completion of each building tie-in.

.3 Commissioning Gas System

Payment for this item shall be compensation in full for the successful purging, testing, commissioning and training of Parks Canada staff on all aspects of the new gas system according to the commissioning plan to be submitted by the contractor and approved by the Departmental Representative. To include coordination with Parks Canada, restarting of affected natural gas appliances and fixtures, third party permitting and inspection costs, O&M manual production costs, all labour, materials and equipment not otherwise noted but required to complete and commission the new electrical and communication systems.

Payment: Lump Sum price bid.

Measurement: Payable upon completion and issuing of occupancy permit.

END OF SECTION

PART 1 GENERAL

1.1 PRECONSTRUCTION MEETING

- .1 Preconstruction start up meeting will be arranged by the Departmental Representative after the Contract is awarded.
- .2 As described in Section 01 35 43 – Environmental Procedures, an environmental briefing for all staff will take place before beginning work at the site.

1.2 PROGRESS MEETINGS

- .1 The Contractor will not be required to provide a site trailer for progress meetings on-site. Due to Covid-19, progress meetings will be held by phone whenever possible to minimize physical interaction. Arrangements will be made for onsite meetings if necessary to discuss on site issues.
- .2 Progress meetings will be held on a weekly basis or as assigned by the Departmental Representative until all trenching and access/service disruptions are completed. Upon that time, meeting frequency will be reduced a bi-weekly basis until the project is complete. Meeting frequency will be determined by the work in progress.
- .3 Contractor, major Subcontractors involved in Work and the Departmental Representative are to be in attendance. Representatives of the Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- .4 The Departmental Representative will give to all parties advance notice of meeting dates, times and locations.
- .5 Minutes will be taken by the Consultant and draft copies will be distributed to attendees for review within three (3) working days after each meeting. Meeting minutes will be finalized and accepted at the start of the next meeting.
- .6 The agenda will include among other things, approval of the previous meeting's minutes, general construction, payment, scheduling, risk, quality, environmental, and safety management items as well as any other reasonably requested by the parties.
- .7 In each progress meeting, the contractor shall discuss in detail an accurate schedule for work planned to take place in the next week and/or up until the following scheduled progress meeting. This includes but is not limited to general site access, service disruptions, planned work areas, and changing safety concerns.
- .8 The Contractor shall keep one complete set of contract documents and drawings at the site at all times. Ensure that the documents and the drawings are the current "issued for construction" set.

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), plus or minus approved scope changes.
- .4 Construction Work Week: Will 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. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. 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.
- .9 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 Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

- .5 Ensure schedule is of sufficient detail regarding site access disruptions, utility service disruptions and building access requirements to allow Parks Canada to modify operations as required to accommodate the ongoing works.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to the Departmental Representative within five (5) working days of Award of Contract Bar (GANNT) Chart schedule that details monitoring and reporting of project progress.

1.4 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 General
 - .1 Award.
 - .2 Submittals review and implementation
 - .3 Shop Drawings.
 - .4 Permits.
 - .5 Survey.
 - .6 Mobilization.
 - .7 Demobilisation
 - .8 Individual building and area access impacts and restrictions.
 - .2 Electrical System
 - .1 Trenching and Conduit installations
 - .2 Cable pulling / installations
 - .3 Fortis Transformer Base installation
 - .4 CDP installation
 - .5 Building Tie-ins (separate buildings and stages if necessary)
 - .6 Streetlights and vehicle chargers installations (separate if necessary)
 - .7 Individual building service disruptions (separate for buildings)
 - .8 Installations to be completed by Fortis
 - .9 Testing and Commissioning
 - .3 Communications Systems
 - .1 Trenching and Conduit installations
 - .2 Garage D fiber optic service disruption
 - .3 Garage D new fiber service upgrade completed / commissioned
 - .4 Office 1 fiber optic service disruption and upgrade complete / commissioned
 - .5 Office 2 service disruptions

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- .6 Office 2 new communication lines install completed / commissioned
 - .7 Building Tie-ins (separate buildings and stages if necessary)
 - .8 Temporary Telus services in place
 - .9 Permanent installations to be completed by Telus
 - .4 Gas System
 - .1 Trenching and gas line installations
 - .2 Service disruption to disrupted buildings
 - .3 Building Tie-ins (separate buildings and stages if necessary)
 - .4 Testing and Commissioning
 - .5 Surface Works
 - .1 Appendix B initial grading
 - .2 Vegetated areas restoration, including Appendix B area
 - .3 Road structure restoration, including Appendix B area
 - .4 Pathways restoration

1.5 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on a monthly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.6 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings, 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. Progress payments may be withheld if Contractor does not provide an acceptable schedule upon request of the Department Representative.
- .2 Do not start work until the schedule has been reviewed and approved by Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 ADMINISTRATIVE

- .1 Submit to the Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 The Contractor should provide all submittals at-least five (5) days prior to any work that will involve the use of the information or material indicated in the submittal
- .3 Do not proceed with Work affected by submittal until review by the Departmental Representative is complete.
- .4 Present shop drawings, product data, and samples in SI Metric units.
- .5 Where items or information is not produced in SI Metric units converted values are acceptable.
- .6 Review submittals prior to submission to the Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .7 Notify the Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations, and any cost changes.
- .8 Verify field measurements and affected adjacent works are co-ordinated.
- .9 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .11 Keep one reviewed copy of each submission on site.
- .12 Electronic submittals in PDF format only.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of Work.
- .2 Submit shop drawings bearing stamp and signature of the Contractor's Engineer registered or licensed in the Province of Alberta, Canada, or the suppliers' certified stamp.

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- .3 Submittals pertaining to structural steel, structural timber, prefabricated or post tensioned structures shall be accompanied by an affidavit (seal on drawings or written statement) of a qualified Professional Engineer registered in the Province of Alberta, certifying their acceptance/approval of indicated design/details. Additionally, the submittals of any other discipline, which by reason of the various codes of practice, shall be accompanied by a similar affidavit. Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .4 Allow five (5) days Departmental Representative's review of each submission.
 - .5 Adjustments made on shop drawings by the Departmental Representative do not change the Contract Price. If adjustments affect value of Work, state such in writing to the Departmental Representative prior to submittal and proceeding with Work.
 - .6 For additional work not included in the original contract, Contractor shall not proceed with work unless the Departmental Representative issues a change order.
 - .7 Do not proceed with work without an approved Change Order (CO).
 - .8 Make changes in shop drawings as the Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify the Departmental Representative in writing of revisions other than those requested.
 - .9 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .10 Submissions include:
 - .6 Date and revision dates.
 - .7 Project title and number.
 - .8 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier
 - .3 Manufacturer.
 - .9 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .10 Details of appropriate portions of Work as applicable:
 - .4 Fabrication.
 - .5 Layout, showing dimensions, including identified field dimensions, and clearances.

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- .6 Setting or erection details.
 - .7 Capacities.
 - .8 Performance characteristics.
 - .9 Standards.
 - .10 Operating weight.
 - .11 Wiring diagrams.
 - .12 Single line and schematic diagrams.
 - .13 Relationship to adjacent work.
- .11 After Departmental Representative's review, distribute copies of approved drawings.
 - .12 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as the Departmental Representative may reasonably request.
 - .13 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
 - .14 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .11 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .12 Testing must have been completed within three (3) years of date of contract award for project.
 - .15 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .13 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .14 Certificates must be dated after award of project contract complete with project name.
 - .16 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .15 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
 - .17 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by the Departmental Representative. Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
 - .18 Submit electronic copies in PDF format of Operation and Maintenance Data for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .19 Delete information not applicable to project.

- .20 Supplement standard information to provide details applicable to project.
- .21 If upon review by the Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to the Departmental Representative.
- .3 Notify the Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by the Departmental Representative do not change the Contract Price. If adjustments affect value of Work, state such in writing to the Departmental Representative prior to submittal and proceeding with Work.
- .6 Make changes in samples which the Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of digital photography in .jpg format, monthly with progress statement.
- .2 Project identification: name and number of project and date photograph taken indicated.
- .3 Photos should be taken of:
 - .16 All exposed existing utilities which are to remain in place.
 - .17 All underground conduit installations once conduit is placed but prior to placement of above bedding material.
 - .18 Both close up to show all details and from further away to show placement with respect to surrounding infrastructure.
- .4 Frequency of photographic documentation: monthly.
 - .19 Prior to commencement of Work
 - .20 Before concealment of Work
 - .21 Upon completion of items in bid and acceptance form.
- .5 Submit USB or portable hard drive with all electronic pictures as part of closeout package

1.5 REQUIRED CONTRACTOR SUBMITTALS

- .1 General
 - .22 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.
- .3 Pre-Mobilization Submittals
 - .1 The contractor shall not begin any Work until the Departmental Representative has authorized acceptance of submittals in writing. Submit the following plans and programs to the Departmental Representative for review a minimum of five (5) business days prior to mobilization to the project site:
 - .1 Construction Schedule
 - .2 Construction Staging Plan
 - .3 Site specific Environmental Protection Plan
 - .4 Peyto Lagoon Hydro-vac Dumping and Site Cleanup Plan
 - .5 Traffic Control and Site Access Plan
 - .6 Site Specific Health and Safety Plan
 - .7 On Site Emergency Response Plan
 - .8 Quality Management Plan
 - .9 Subcontractor List, including proof of Fortis approval
 - .10 Proof of Third Party Permits
- .4 Construction Phase Submittals
 - .1 Weekly Progress Reports that outline the Work completed to date as well as the anticipated Work to be performed for the following week on a day to day basis. At a minimum, these are to include:
 - .1 Summary of work completed.
 - .2 Upcoming site access disruptions for Parks Canada staff.
 - .3 Upcoming utility service disruptions.
 - .4 Upcoming contractor access requirements to inside of buildings.
 - .5 Upcoming work areas.
 - .2 Shop Drawings for all applicable contract items are to be submitted to the Departmental Representative for review. Shop Drawings are to be submitted within ten (10) days of contract award. The Departmental Representative shall have five (5) business days to review shop drawings. At minimum, the following shop drawings are required:
 - .1 CDP concrete base.
 - .2 Street light concrete bases.
 - .3 Product sheet for root barrier
 - .3 Quality Inspection Reports – The Contractor shall maintain daily inspection reports that itemize the results of all Quality Control Inspections conducted by the Contractor. The reports shall be made available for review by the

Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each payment request.

- .4 Sieve analysis for granular base course and bedding materials.
- .5 All testing reports
- .5 Project Completion Submittals
 - .1 The contractor shall provide to the Departmental representative with the following close out items within 30 days of substantial completion. In case of staging not allow all submittals to be provided within 30 days, the Departmental Representative may at their sole discretion provide the contractor with a written extension for all or some of the submittals. Required closeout submittals include but may not be limited to:
 - .1 Redline drawings of all Work completed
 - .2 Quality Assurance/Quality Control Records
 - .3 USB with all construction photos
 - .4 Operating and Maintenance manual
 - .5 Warranty Management Plan

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 41 00 - Regulatory Requirements

1.2 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 Alberta
 - .1 Occupational Health and Safety Act, R.S.A. 2000.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within five (5) business days after date of Notice of Award and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Special project protocols and mitigation to address Covid-19 health and safety concerns.
- .3 Submit electronic copy of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 61 33 - Hazardous Materials.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan to the 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.

1.4 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work. Provide copies of documents to Departmental Representative. Notice of Project to be posted onsite upon mobilization and remain posted until project completion.

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with the Departmental Representative prior to commencement of Work. This meeting may be combined with the Organization and Start-Up meeting identified elsewhere.
 - .1 At this meeting the Contractor is required to complete and sign an Attestation to certify the Contractor will comply with the requirements set out in the Attestation and the terms and conditions of the Contract.

1.7 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements and National Parks Act.

1.8 GENERAL REQUIREMENTS

- .1 Submit 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 Include in Health and Safety Plan detailed Covid-19 mitigations that meet or exceed the more stringent of current Province of Alberta guidelines and Parks Canada policy. This may require regular updates to accommodate changing guidelines and policies to address changing Covid-19 conditions.
- .3 The Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 RESPONSIBILITY

- .1 The Contractor shall act as the Prime Contractor in all matters relating to Occupational Health and Safety for all aspects of the project.
- .2 The contractor shall be responsible for health and safety of all persons and contractors 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.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg.
- .2 Comply with Occupational Health and Safety Regulations.
- .3 Comply with Occupational Health and Safety Act, General Safety Regulations, O.I.C.
- .4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.11 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 the Provide having jurisdiction and advise the Departmental Representative verbally and in writing.

1.12 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 minimum 2 years site-related working experience specific to activities associated with general construction.
 - .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 Coordinate with Departmental Representative to arrange for a Parks Canada environmental officer to provide an environmental and wildlife briefing to Contractor's employees.
 - .6 Have valid First Aid Certification.

1.13 POSTING OF DOCUMENTS

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

1.14 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by the Departmental Representative.
- .2 Provide the Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 The Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.15 WORK STOPPAGE

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

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; unfavorably 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. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.
- .3 National Parks Act: Federal law that regulates protection of natural areas of national significance.
- .4 Canada Environmental Assessment Act (CEAA). The CEAA is a federal statute that requires federal departments to conduct environmental assessments for prescribed projects and activities before providing federal approval or financial support.
- .5 Parks Canada Environmental Surveillance Officer (ESO) Briefing: ESOs communicate information such as the environmental, wildlife and cultural concerns for the site.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by the Departmental Representative. The Environmental Protection Plan (EPP) is to present a comprehensive overview of known or potential environmental issues which must be addressed during construction. Work shall not be permitted to start until the EPP has been approved by the Departmental Representative.
- .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .4 The EPP shall include:
 - .1 All information required to communicate how the contractor intends to implement all environmental mitigations outlined in the contract documents.
 - .2 Project setting and pertinent site specific information and/or conditions.
 - .3 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .4 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .5 Erosion and sediment control plan which identifies 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, Federal, Provincial, and Municipal laws and regulations.
- .6 Work area plan showing proposed staging areas, waste storage facility location, fuel storage and refueling areas, soil and material stockpiling and storage areas, and Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
 - .7 Spill Response Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .8 Waste Management and Disposal Plan identifying methods and locations for solid waste disposal including demolition and construction waste, clearing debris and excess soil to be disposed of outside the Park.
 - .9 Regulatory Framework – identifying plan to follow all applicable regulatory requirements.
 - .10 Emergency Response Plan as it pertains to environmental considerations on site not otherwise covered in the EPP. This may include but is not limited to dealing with wildlife, unforeseen site conditions, accidents, etc.
- .5 The Peyto Lagoon Hydro-vac Dumping and Site Cleanup Plan shall include:
- .1 Site plan showing where in Peyto Lagoon dumping site will be located.
 - .2 Plan for installing hydro-vac dumping area containment, including lining to contain dumped material in one distinct area to allow for future clean up.
 - .3 Plan for dewatering of containment area.
 - .4 Environmental testing to be completed on dumped material prior to removal from site. Representative testing must be completed on all material once all material has been processed into the site.
 - .5 Plan for removing dumped material from site, including details on where it will be removed to. Must be permanently disposed of at a provincially approved facility to accept the material.
 - .6 Plan for restoration of the affected area to it's original condition or better.

1.3 FIRES

- .1 Fires and burning of rubbish or clearing and grubbing debris on site is not permitted.

1.4 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on site. All rubbish and waste materials are to be removed and hauled to an approved waste facility.
- .2 All commercial waste, construction waste and surplus soil generated from excavations and grading must be removed from Banff National Park and disposed of at an appropriate waste disposal facility.
- .3 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .4 All food and domestic waste is to be continuously secured from wildlife and removed from site daily. Contractor to supply bear proof waste bins.

- .5 Surplus bedding sand and imported gravel to be removed from the operations area and can be disposed of in a neat stockpile in an area to be identified on site by the Departmental Representative in the northeast corner of Trailer Court..
- .6 No waste is to be disposed of in the existing campground bins.
- .7 Contractor to provide portable sanitary facilities (Porta Potties) for Contractor's use. Existing campground public facing facilities may also be used, however Parks Canada reserves the right to revoke this privilege at any time at their sole discretion. The contractor will at no time be permitted to use the Parks Canada staff washroom facilities.
- .8 The contractor shall make every reasonable effort to recycle waste materials whenever possible.
- .9 Parks Canada reserves the right to obtain appropriate records from the contractor to confirm waste has been properly disposed of.

1.5 DRAINAGE

- .1 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan: include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .3 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 All anticipated necessary tree clearing has already been completed in advance of this contract. No additional trees are to be removed or harmed without the prior written permission of the Departmental Representative.
- .3 Protect roots of all trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid excavation within 1 meter of the drip line of existing trees and where excavation within the drip line is required, the contractor shall adjust excavation methods as required to prevent avoidable root damage. Parks Canada reserves the right to at their sole discretion, require the contractor install hoarding around the dripline of any or all trees within the project area to minimize risk of damage.
- .4 Avoid unnecessary traffic, dumping, stockpiling and storage of materials over root zones and within 1m of drip line of existing trees.

- .5 Minimize stripping of topsoil and vegetation to only where necessary for the scope of this contract.
- .6 Contractors are to avoid disturbance or damage to Douglas Fir trees within the project area, at all costs. Contractor is liable to severe penalties if Douglas Fir trees are damaged or removed.
- .7 Avoid ground disturbance outside of the delineated work area and utility alignments.
- .8 Protect Vertical (Rocky Mountain) Juniper shrubs if encountered.
- .9 Ensure stockpiled material is not placed on top of existing shrubs, small trees or saplings.

1.7 EQUIPMENT

- .1 Ensure all equipment is in good working order, free of leaks, properly tuned and fitted with standard air emission control devices.
- .2 All equipment must be steam cleaned prior to mobilization to site. The contractor shall inspect all equipment to ensure it is clean and free of excess grease, vegetative debris and dirt prior to arrival in Banff National Park.
- .3 All equipment being brought to site is subject to a mandatory equipment inspection by the Parks Canada ESO. 48 hours' notice is required to schedule an equipment inspection.
- .4 Any equipment to be operated off hardened surfaces should have low pressure rubber-tracked tires or be operated to minimize damage to vegetation and soil.
- .5 Equipment is to be shut down when not in immediate use to minimize idling.
- .6 All equipment is to have a spill containment kit.
- .7 All equipment is to be refueled within the designated refueling area. The designated refueling area is to be located to prevent any spills from entering drainage paths or sanitary systems.
- .8 Within vegetated areas, construction equipment is to stay on proposed utility right-of-ways. Equipment is not to travel through otherwise undisturbed areas.
- .9 Minimize or halt equipment operation during wet conditions when the soil shows signs of ponding or rutting.
- .10 Careful machine operation is required to ensure that damage to surrounding vegetation does not occur.
- .11 Have a water source available to wet down exposed soil and dry areas to minimize dust on site.

1.8 EXCAVATIONS, SOIL, VEGETATION RECLAMATION

- .1 See Sections:
 - .1 31 14 13.00 Soil Stripping and Stockpiling
 - .2 31 23 33.00 Excavation, Trenching and Backfill
 - .3 32 91 13.13 Topsoil Placement and Grading

1.9 NON-NATIVE VEGETATION (NNV)

- .1 Review locations of NNV infestations within the project area with the Parks Canada ESO prior to start-up. Plan activities to avoid these areas where possible. If NNV infestation areas are within the project footprint and require disturbance, plan to work in these areas last and do not mix soils from these areas with the soils from un-infested areas on the site.

1.10 WILDLIFE

- .1 All wildlife attractants must be secured (e.g., petroleum products, food, drink containers and garbage) within wildlife proof containers, a secure building or vehicle. Keep food waste separated from construction waste and remove daily.
- .2 Notify the Parks Canada ESO and Banff Dispatch (403-762-1470) immediately should wildlife gain access to attractants.
- .3 If wildlife is observed at or near the work site, allow the animal(s) the opportunity to leave the work area on their own away from areas of potential conflict.
- .4 Banff Dispatch must be alerted immediately to any potential human-wildlife conflict (e.g., aggressive behaviour, persistent intrusion), distress or mortality. In the case of aggressive behaviour or persistent intrusion, stop work and evacuate the area.
- .5 Should active nests, dens, roost or calving areas be discovered, stop work and contact the Parks Canada ESO immediately for direction.
- .6 Conduct activities during the approved work hours for the project, avoiding critical wildlife foraging times (dusk and dawn).
- .7 Never approach, feed or harass wildlife.
- .8 The Parks Canada ESO will inspect old infrastructure to be removed (power poles, etc.) within five days prior to removal to confirm no wildlife species (e.g., birds and bats) are present. If wildlife species are present, infrastructure cannot be removed until after the wildlife have vacated.
- .9 The Parks Canada ESO will assess the alignments for the presence of ground squirrel burrows prior to start-up. If burrows are identified in the area, excavations must be timed to occur between April 15th and September 15th, to the extent practical. If excavations cannot occur between those dates, additional mitigation may be required at the direction of the Parks Canada ESO.

1.11 CULTURAL RESOURCES

- .1 The Accidental Finds Clause applies to all project activities.
 - .1 Accidental Finds Clause: There may be cultural resources present in the project area that have not yet been discovered (even after an archaeological assessment has been carried out or no assessment was deemed necessary for the project). If staff observe any significant cultural resources while working, they should stop work in the immediate area, and contact the Departmental Representative, or the Parks Canada ESO, to discuss any protective measures that might be needed. Significant resources that could be considered grounds for work stoppage include, but are not limited to, human remains, unique or diagnostic artifacts, and/or artifacts directly associated with known sites and/or unidentified sites in the area.

1.12 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.
- .5 Cover or wet down dry materials and dispose of rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.13 ENVIRONMENTAL ORIENTATION

- .1 A mandatory Environmental Orientation must be attended by all on-site personnel prior to start-up. This orientation can be scheduled through the Departmental Representative. 48 hours' notice is required to schedule this orientation.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with contract documents, Alberta Building Code and National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial 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 Provincial Codes.
 - .4 Parks Canada Permits and Codes.

1.2 CANADIAN ENVIRONMENTAL PROTECTION ACT

- .1 Perform Work in accordance with Canadian Environmental Protection Act.

1.3 NATIONAL PARKS ACT

- .1 Perform Work in accordance with Canada National Parks Act and Regulations.

1.4 THIRD PARTY PERMITS

- .1 The contractor shall obtain third party inspection permits for all gas and electrical works to be completed under this contract.
- .2 Third party final inspection reports are to be provided to the Departmental Representative prior to issuing the Occupancy Permit and Certificate of Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 DEFINITIONS

- .1 Quality Control (QC): The process of checking specific product or services to determine if they comply with relevant quality standards and identify ways to eliminate causes of unsatisfactory product or service performed.
- .2 Quality Assurance (QA): The process of ensuring that the Contractor's Quality Management Plan (QMP) (QC, non-conformances, etc.) is being followed. The results of the QA are provided as feedback to both the Contractor and the Departmental Representative. Where required, the Contractor shall implement changes to the project based on the feedback received from the QA process.

1.2 QUALITY MANAGEMENT PROGRAM

- .1 The Contractor shall prepare a Quality Management Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.
- .2 The Quality Management Program shall be described in a Quality Management Plan. The Contractor shall submit the Quality Management Plan to the Departmental Representative for acceptance in accordance with Section 01 33 00 - Submittal Procedures. The Plan shall develop a logical system for tracking and documenting the Quality Control of the Work as well as the Contractor's internal Quality Assurance procedures to verify the compliance of the Quality Control process. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
- .3 The Contractor shall appoint qualified and experienced Quality Control Personnel, who is dedicated to quality matters and who will report regularly to the Quality Control Manager as well as Contractor's management at a level which shall ensure that Quality Control requirements are not to be subordinated to manufacturing, construction or delivery. The Quality Control Personnel shall be empowered by the Contractor to resolve quality matters. Personnel involved in Quality Assurance shall be independent of the Quality Control Process.
- .4 The Quality Management Plan shall include samples of all forms to be filled in by the Quality Control Personnel. All forms shall be signed by the Quality Control Manager and submitted promptly to the Departmental Representative.
- .5 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of products and workmanship with Contract requirements. Quality Assurance Inspectors retained by the Departmental Representative, will periodically perform a second independent check to assess if the Quality Control process is being followed.
- .6 The Contractor must facilitate any independent Quality Assurance checks by representatives designated by the Departmental Representative.

- .7 At completion of the Work a bound and itemized copy of all Quality Control documents and reports shall be prepared by the Contractor's Quality Control Manager and submitted to the Departmental Representative.

1.3 TESTING

- .1 Testing required to provide Quality Control to assure that the Work strictly complies with the Contract requirements shall include, not be limited to:
 - .1 Testing of all granular and bedding material.
 - .2 Compaction Testing of all backfill and road base materials.
 - .3 Pressure testing of new gas system installations.
 - .4 Testing of new electrical distribution system for safe operation.
 - .5 Testing of communication system upgrades and terminations.
 - .6 All other testing specified in the Contract Documents.
 - .7 Any other testing required as a condition for deviation from the specified Contract procedures.

1.4 INSPECTION

- .1 Refer to GC 2.5 – Review and Inspection of Work.
- .2 Further to GC 2.5:
 - .1 The Contractor shall notify the Departmental Representative 72 hours prior to any special tests or inspections required.
 - .2 The contractor shall be responsible for coordinating with Fortis all inspections to be completed on contractor installed Fortis owned or Fortis supporting infrastructure.

1.5 INDEPENDENT INSPECTION AGENCIES

- .1 The contractor shall be responsible for engaging an independent third party permitting and inspection service. Cost of such services will be borne by the contractor and are to be considered incidental to the contract.
- .2 Parks Canada has engaged the design consultant to provide ongoing inspection services to ensure work is completed according to the contract. The presence of those services does not relieve the contractor from their quality control and inspection responsibilities.
- .3 Provide equipment required for executing inspection and testing by appointed agencies.
- .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the independent testing firm at no cost to the Departmental Representative. Pay costs for retesting and re-inspection.

1.6 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.7 PROCEDURES

- .1 Notify appropriate agency and the Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- .4 Provide Departmental Representative with list of required inspection milestones.

1.8 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of the Departmental Representative, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Departmental Representative will deduct from the Contract Price difference in value between Work performed and that called for by Contract Documents, the amount of which will be determined by the Departmental Representative.

1.9 REPORTS

- .1 Submit one electronic copy of all inspection and test reports to the Departmental Representative.
- .2 Submit to the Departmental Representative one paper copy and one electronic copy of all Non-Conformance Reports.
- .3 Provide copies to the subcontractor of work being inspected or tested and the manufacturer or fabricator of material being inspected or tested.

1.10 TESTS AND MIX DESIGNS

- .1 Furnish test results as requested.
- .2 Cost of tests beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by the Departmental Representative and may be authorized as recoverable.

1.11 EQUIPMENT AND SYSTEMS

- .1 Submit commissioning reports for mechanical and electrical equipment systems.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

- .1 The contractor shall notify Parks Canada in writing of all planned service disruptions a minimum of five (5) business days in advance of the disruption.
- .2 The contractor shall provide verbal confirmation to Parks Canada 24 hours in advance, that the disruption will still go ahead as originally communicated in writing.

1.2 INSTALLATION AND REMOVAL

- .1 Provide additional temporary utilities controls in order to execute work expeditiously and within the allowable service disruptions where the existing and already installed temporary services do not provide for sufficient capacity or flexibility for the Contractor to complete their work.
- .2 Upon completion of work, the temporary services including those installed by Parks Canada and any additional works completed by the contractor which are necessary to maintain services are to be left in place and become the property of Parks Canada unless otherwise noted.
- .3 Remove from site all additional temporary services installed to allow the project to go ahead which are not required to maintain the services outlined below.

1.3 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 WATER SUPPLY AND SANITARY SERVICES

- .1 The Contractor shall not in any way impact water and sanitary services on site, except where such allowances are specifically permitted in the contract documents.
- .2 Water for construction is available from within the work area for hose hookups or within Village 2 for filling a water truck. The contractor shall gain approval from the Departmental Representative prior to using the water.
- .3 Arrange for backflow protected connection and pay costs for installation, maintenance and removal.

1.5 ELECTRICAL SERVICES

- .1 General
 - .1 Parks Canada will be responsible for installing above ground temporary electrical services in the approximate layouts as shown on drawing ED1.0. The Contractor will be responsible for determining if any additional modifications or temporary service installations are required in order to allow their construction to go ahead to meet the requirements of the contract. In the case that any additional

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- modifications or installations are to be required, the Contractor shall seek prior approval from Parks Canada and complete the changes at their own expense.
- .2 Should the Contractor's chosen methods of work not meet the requirements set out below to the Departmental Representative's satisfaction for maintaining temporary services on site, the Departmental Representative may order the Contractor to implement additional measures or directly implement additional measures should the contractor refuse or not have the capacity to do so, and the costs for such additional measures will be the responsibility of the Contractor.
 - .3 The Departmental Representative reserves the right to request changes to the requirements set out below and the Contractor shall promptly implement such changes. In such case that those changes result in additional costs to the Contractor, they will be eligible to receive payment for justifiable additional costs.
 - .4 All temporary electrical services shall meet electrical code.
 - .5 Electrical service shall be maintained to all buildings at all times throughout the project unless otherwise noted.
- .2 Theatre Building
- .1 Existing underground electrical service shall remain in service until the Contractor begins trenching through the forested area to the theatre building; at such time, the Contractor may disconnect the existing overhead service connection at Staff House 7/8 to allow for safe trenching of the new lines.
 - .2 Once the existing electrical service is removed, Parks Canada will provide temporary electrical services to the Theatre Building on an as and when required basis until the permanent new power service is installed and commissioned.
- .3 Staff House 3/4, Staff House 5/6, Staff House 7/8, Garage A, Garage B, Garage C, Garage D
- .1 Prior to the Contractor mobilizing to site, Parks Canada will have an electrical service installed according to drawing ED1.0. Electrical services to these buildings will be comprised of the existing overhead lines and some newly installed over surface temporary lines. The contractor will be responsible for moving over surface lines as required to accommodate their work without damage to those lines.
 - .2 Uninterrupted electrical services to these buildings are to be maintained throughout the project; the Contractor shall not interfere with these services without prior written approval by Parks Canada.
- .4 Office 1, Office 2
- .1 Upon contractor mobilization to the site, electricity to these buildings will be supplied by the existing overhead and underground cable connection which are required to be removed/abandoned as part of this project.
 - .2 No later than seven days following the installation of the necessary conduits crossing the entry roadway into the operations area as per drawing ED1.0, Parks Canada will install a new temporary over ground electrical cable to service these buildings throughout construction. The Contractor will be permitted to demolish the existing power lines supplying these buildings only after that temporary line is commissioned by Parks Canada.

- .3 Parks Canada will be responsible for scheduling and completing the service outage required to complete the change over from the existing electrical service to the new temporary service.
- .4 The Contractor will be required to maintain uninterrupted electrical service to these buildings throughout the project with the exception of the scheduled disruption Parks Canada will be performing to complete the service change over.

1.6 COMMUNICATION SERVICES

.1 General

- .1 Parks Canada will be responsible for installing above ground temporary communication services to Offices 1 and 2 to allow the Contractor's work to go ahead as required. These temporary services are shown on drawing ED1.0. Existing underground communication service to Garage D will also be removed to prevent damage to those existing lines. The Contractor will be responsible for determining if any additional modifications or temporary service installations are required in order to allow their construction to go ahead to meet the requirements of the contract. In the case that any additional modifications or installations are to be required, the Contractor shall seek prior approval from Parks Canada and complete the changes at their own expense.
- .2 The Contractor shall be responsible for maintaining the installed temporary services in a manner which protects the lines from any form of damage and maintains connectivity.
- .3 The Contractor shall be responsible for all costs associated with maintaining the temporary services except for where Parks Canada will complete additional work on the system to relocate the services into their new permanent underground locations.
- .4 Should the Contractor's chosen methods to maintain the services not meet the requirements set out below to the Departmental Representative's satisfaction, the Departmental Representative may order the Contractor to implement additional measures or directly implement additional measures should the Contractor refuse or not have the capacity to do so, and the costs for such additional measures will be the responsibility of the Contractor.
- .5 The Departmental Representative reserves the right to request changes to the requirements set out below and the Contractor shall promptly implement such changes. In such case that those changes result in additional costs to the Contractor, they will be eligible to receive payment for justifiable additional costs.

.2 Telus Service to Office 1

- .1 Telus has been contracted by Parks Canada to provide a temporary phone line between the main Telus pedestal and Office 1, as well as to install the new permanent Telus service within the Contractor installed communications conduit to Office 1 once that installation is completed.
- .2 No later than seven days following the installation of the necessary conduits crossing the entry roadway into the operations area as per drawing ED1.0, Parks Canada will coordinate with Telus to install a new temporary over ground phone line to service Office 1 throughout construction. The Contractor will be permitted

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- to demolish the existing phone lines supplying all buildings only after that temporary line is commissioned by Telus.
- .3 Upon completion of all necessary new underground communication conduit installations, Parks Canada will coordinate with Telus to have the new permanent underground phone line installed and the temporary over ground line to be removed.
 - .4 The Contractor will be required to maintain the temporary Telus line to Office 1 throughout the project with the exception of the scheduled disruption Telus will be performing to install the permanent new service.
- .3 Fiber Optic Service from Village 2 to Office 1
- .1 Prior to the Contractor mobilizing to site, Parks Canada will have relocated the existing underground fibre optic service into Office 1 from the nearest junction box to run over ground to permit the necessary underground conduit replacement work. The Contractor will be responsible for moving the surface lines as required to accommodate their underground work without damage to those lines.
 - .2 Uninterrupted fibre optic services to Office 1 are to be maintained throughout the project; the Contractor shall not interfere with this over ground cable without prior written approval by Parks Canada.
 - .3 Upon completion of the installation of all new underground communication conduit between Office 1 and the new junction box south of Office 1 and 2, and the installation of the junction box itself, the Contractor shall coordinate with Parks Canada a plan for completing the interception of the existing conduit from Village 2 into the newly installed junction box. This will require:
 - .1 The Contractor to first hydro-vac expose the existing conduit and adjacent gas line south of the new junction box at the proposed interception location.
 - .2 Once the Contractor has sufficiently prepared the area to allow the necessary conduit interception and rerouting into the new junction box to be made in less than three hours, Parks Canada will remove the fibre optic cable from inside the conduit to allow the contractor to cut and reroute the conduit.
 - .3 The Contractor will have three hours to complete the conduit rerouting into the newly installed junction box; this includes the placing of all bedding sand and one lift of native fill overtop of the conduit, and the running of a new pull rope.
 - .4 Once one lift of backfill has been placed and compacted, the Contractor shall vacate and make the area available to Parks Canada to reinstall the salvaged fibre optic cable in through the newly installed underground conduit.
 - .5 Once the service is restored, the Contractor will be permitted to complete their work in the area.
 - .6 This work is required to take place between 10pm and 5am, Tuesday to Thursday.
 - .4 The Contractor will be required to maintain the temporary over ground fibre optic line to Office 1 throughout the project with the exception of the scheduled disruption Parks Canada will be performing to install the permanent new service.

- .4 Fiber Optic Service from Office 1 to Garage D
 - .1 Parks Canada will remove this existing fiber optic cable prior to the Contractor mobilizing to site. The Contractor will be permitted to demolish the existing conduits servicing Garage D with no further need for approval from Parks Canada.
- .5 Communication Cables between Office 1 & Office 2
 - .1 Prior to the Contractor mobilizing to site, Parks Canada will have relocated the existing underground communication cables between Offices 1 and 2 to run over ground to permit the necessary underground conduit work. The Contractor will be responsible for moving the surface lines as required to accommodate their underground work without damage to those lines.

1.7 NATURAL GAS SERVICES

- .1 General
 - .1 The Contractor shall be responsible for determining the method for maintaining natural gas services to all buildings in a manner which will provide the least overall disturbance to Parks Canada's ongoing operations while meeting the requirements below.
 - .2 The Contractor shall be responsible for all costs associated with providing temporary natural gas services should they be required.
 - .3 Any temporary natural gas services shall meet current plumbing code.
- .2 Offices 1, Office 2, Staff House 5/6, Staff House 7/8
 - .1 Gas service is to be maintained without interruption to each of these buildings throughout the project.
- .3 Staff House 3/4
 - .1 Gas service must be continuously maintained 24 hours a day to this building throughout the project with the exception of two permitted outages of up to a maximum of six hours each, to be scheduled between the hours of 09:00 – 17:00 Monday to Friday.
- .4 Garage A, Garage C, and Garage D
 - .1 Gas service may be continuously shut down 24 hours a day to each of these buildings for a maximum of six four continuous weeks in order to accommodate the removal of existing services and installation of new services.
 - .2 The Contractor's schedule must show the planned natural gas service outage to these buildings.
 - .3 The natural gas service outage to these buildings must be limited to only the length of time required for the contractor to complete their work. Activities required to restore natural gas service to these buildings should be prioritized to minimize the duration of the service outage.
- .5 Theatre Building, Garage B
 - .1 No existing gas services to these buildings; services will not be impacted.

1.8 TEMPORARY HEATING AND VENTILATION

- .1 Should the work not be completed according to the schedule set out in Section 01 11 00 – Summary of Work, the contractor shall be responsible for providing temporary heating to any affected buildings and/or on going work areas to allow work to be completed as quickly as possible.
- .2 Where work affects existing passive or mechanical ventilation of building interiors, the contractor shall provide alternative measures to maintain a similar level of building ventilation or to address any new ventilation or air quality issues caused by the contractor's Work.

1.9 FIRE PROTECTION

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

PART 2 PRODUCTS

2.1 NO PRODUCTS

PART 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to the requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CSA-S269.2-M1987 (R2003), Access Scaffolding for Construction Purposes.

1.2 SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

- .1 Install and remove construction facilities only after securing approval from Departmental Representatives.
- .2 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, access to fenced area and details of fence installation.
- .3 Identify areas which have to be gravelled to prevent tracking of mud.
- .4 Indicate use of supplemental or other staging area, if required.
- .5 Provide construction facilities in order to execute work expeditiously.
- .6 Remove from site all such work after use.

1.4 HOISTING

- .1 Provide, operate and maintain hoists and cranes required for moving of materials and equipment. Make arrangements with Subcontractors for their use of hoists if required.
- .2 Hoists and cranes to be operated by qualified operators.
- .3 Secure area equal to 1.5 times lighting height for any crane or hoisting operations. Securing area is defined having Parks Canada remove any vehicles, flagging the area off to prevent Parks Canada staff or public access, and having a flagger present to manage foot traffic during active lifts.

1.5 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.

1.6 CONSTRUCTION PARKING

- .1 Parking will be permitted on site in areas designated by the Departmental Representative.

- .2 Provide and maintain adequate access to project site.

1.7 SECURITY

- .1 The contractor is responsible for the security of the site through the duration of the project. The contractor shall implement suitable security options to secure construction materials, equipment, facilities and incomplete work areas, as well as any affected Parks Canada facilities to the discretion of the Departmental Representative.
- .2 The contractor shall provide and pay for all security measures, including personnel to guard the site if required.

1.8 OFFICES

- .1 The contractor may determine if a site trailer or office is required to complete the work. If no such space is to be provided, the contractor must demonstrate to the Departmental Representative prior to mobilization, how all contract requirements including but not limited to posting materials, and maintaining redline drawings will be completed.
- .2 The contractor will not be permitted to utilize any Parks Canada facilities to set up a site office.
- .3 Provide marked and fully stocked first aid case in a readily available location.
- .4 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.9 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities and Parks Canada operations.

1.10 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.

1.11 CLEAN-UP

- .1 Clean up to be in accordance with Section 01 74 11 – Cleaning.

1.12 ACCESS ROADS

- .1 Construct, remove and rehabilitate access roads only after securing approval from Departmental Representative.

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- .2 Construct temporary access roads as necessary to perform the work, and maintain temporary access roads until construction is over or until permanent access is established.
 - .3 No direct payment will be made to the Contractor for construction of temporary access roads and removal and restoration after construction completion.
 - .4 If authorized to use existing roads for access to the project site, the Contractor shall maintain such roads for duration of the contract and make good damage resulting from Contractor's use of road.
 - .5 Any driving off road requires prior approval from the Departmental Representative.

1.13 EXISTING UTILITIES AND STRUCTURES

- .1 Existing utilities and structures include the following: pipes, culverts, ditches or other items which are a part of an existing sewerage, drainage or water system; or which are a part of a gas, electrical, telephone, television, telecommunications or other utility system. Also included are swales, poles, fences or any other structures encountered during construction.
- .2 The Contractor shall be responsible for protection, removal or replacement of existing utilities and structures, or for repair of any damage, which may occur during construction.
- .3 Existing utilities and structures may be shown on the drawings, or described in the specifications. Such information is shown for design purposes and the existence, location and detail given is information that is obtained during the design period and is not necessarily complete, correct or current.
- .4 The Contractor shall pay all costs and be responsible for establishing locations and state of use of all existing utilities that may affect the work. The Contractor shall make satisfactory arrangements with the utilities companies involved for the location, protection and inspection of existing utilities.
- .5 Notices in writing shall be given by the Contractor to the utilities companies 96 hours before work commences in the vicinity of existing utilities.
- .6 The Contractor shall pay all the costs involved in protection of utilities, inspection of utilities, and all costs due to delays because of existing utilities and structures.
- .7 The Contractor shall provide for the uninterrupted flow of all water courses, sewers and drains encountered during the work.
- .8 Access shall be maintained to all existing structures such as valves, hydrants, meter chambers and control structures at all times during construction.
- .9 If interruption of service provided by an existing utility is necessary, the planned shutdown shall be approved by the utility companies and the Departmental Representative. Requests for shutdown shall be made by the Contractor in writing at least 96 hours in advance.
- .10 The Contractor shall notify all customers or make arrangements with the utility company and the Departmental Representative to notify all customers 48 hours in advance of a shut-down.

1.14 CONSTRUCTION SIGNAGE AND SAFETY

- .1 The Contractor shall be responsible for the regulation of traffic during construction, and shall perform the work in a manner that will cause the least disruption of traffic.
 - .1 Normal vehicle traffic includes Parks Canada operational vehicles, staff personal vehicles, and delivery vehicles on the gravel areas of the site.
 - .2 Normal pedestrian traffic includes Parks Canada staff and visitor foot traffic through all areas of the site.
- .2 The Contractor shall co-ordinate the work with the Departmental Representative to minimize traffic problems.
- .3 Provision of flagmen, traffic signs, and other traffic controls shall be the Contractor's responsibility and shall be in accordance with the RTAC Manual of Uniform Traffic Control Devices and shall be located to the satisfaction of the Departmental Representative.
- .4 The Contractor shall supply and maintain at no extra cost all barriers, barricades, warning signs, detours, fences, flagmen and all other devices to protect the workers and general public against accidents or injury. All applicable safety standards shall be followed. All excavations or obstructions shall be clearly marked between sunset and sunrise with proper warning flares or lights.

1.15 HAUL ROUTES

- .1 Haul routes (roadways, lanes) shall be subject to the approval of the Departmental Representative. The Contractor shall be responsible for damage and/or spillage on all roads used for hauling materials and equipment to and from the site. The Contractor shall immediately clean and/or restore the affected areas.
- .2 Trucks must be loaded in such a manner that no spillage occurs during the haul.

1.16 TRAFFIC REGULATION

PART 2 PRODUCTS

2.1 NO PRODUCTS.

PART 3 EXECUTION

3.1 NOT USED.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121-M1978 (R2003), Douglas Fir Plywood.
- .3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', Version 10-2a (2010-10-07).

1.2 INSTALLATION AND REMOVAL

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

1.3 HOARDING

- .1 Erect temporary site enclosures using construction grade lumber framing at and exterior grade fir plywood to CSA O121.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
- .3 All material and ground thawing and heating areas must be covered with insulated tarps when the material or area is not in immediate use by the Contractor.
- .4 Hoarding must not cover open trenches or holes in a manner which may give a false sense of ground continuity. This is to prevent, wildlife, pedestrians and vehicles from falling through hoarding into open trenches or holes.

1.4 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails, pylon and rope, barricades and/or fencing around all excavations which are left unattended for any duration of time, including sections of longer trenches which are not immediately being worked on. Trench protections are to prevent accidental pedestrian or vehicle access during both daylight and nighttime hours, as well as wildlife access during overnight hours.
- .2 Barricade requirements are as follows:
 - .1 For trenches not immediately attended during daylight hours, provide pylons and continuous rope approximately 1.2m above ground, or other approved traffic barricades providing similar level of protection.

- .2 For trenches left open overnight, provide temporary minimum 1.5m tall fencing surrounding excavations to prevent access into the trench while maintaining all building access requirements.
- .3 For trenches which are covered in tarps or hoarding when not immediately attended by the Contractor.
- .4 Provide continuous minimum 1.5m tall fencing around construction staging area, unless otherwise approved in writing by the Departmental Representative.

1.5 WEATHER ENCLOSURES

- .1 Provide weather tight closures to building openings in floors, walls and roofs caused by contract work such as demolitions or building tie-ins.
- .2 Design enclosures to withstand wind pressure and rain.

1.6 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work. Obtain approval from Departmental Representative prior to installation.

1.7 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.8 FIRE ROUTES

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

1.9 PROTECTION FOR OFFSITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.10 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Within text of each specification section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, the Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.
- .5 Cost for such testing will be born by the Departmental Representative in event of conformance with Contract Documents or by the Contractor in event of non-conformance.

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with the Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout the project

1.3 AVAILABILITY

- .1 Within ten (10) business days of award of contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify the Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work. The contractor shall also revise and resubmit the progress schedule accordingly.
- .2 In event of failure to notify the Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Departmental

Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of the Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to the Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.
- .10 Handle and install materials which may become brittle in the cold, in a manner which reduces the material brittleness. DB2 and PVC conduit is to be heated to a minimum of 5 degrees Celsius prior to and during installation.

1.5 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by the Departmental Representative will be paid for by the Departmental Representative. Unload, handle and store such products.

1.6 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in the specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify the Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that the Departmental Representative will establish course of action.

- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify the Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. The Departmental Representative reserves the right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with the Departmental Representative, whose decision is final.

1.8 COORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform the Departmental Representative if there is interference. Install as directed by the Departmental Representative.

1.10 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate. Complete walkthrough with Departmental Representative prior to starting work to confirm actual precise locations.
- .2 Inform the Departmental Representative of conflicting installation. Install as directed by the Departmental Representative.

1.12 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of the Departmental Representative.

1.15 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather exposed or moisture resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight exposed elements.
 - .5 Work of the Departmental Representative or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of the Departmental Representative or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.2 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit a written request for substitution and do not proceed until authorized by Departmental Representative.

1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

- .1 Survey is not required to be completed for layout of proposed utilities prior to beginning work. Contractor will be required to install layout stakes with offsets and grading details for Parks Canada inspection and approval prior to beginning work. Layout reference stakes must be installed at all bends, connections/junctions, and no greater than 20 metres apart on straight sections of pipe. Layout stakes must be maintained throughout construction.
- .2 During construction, the contractor must install and make note of additional layout stakes, as well as revise reference distances on layout stakes/record drawings to reflect any changes from the original layout approved by Parks Canada. The layout stakes must correspond to redline drawings which are updated daily.
- .3 Prior to removing or relocating any layout stakes, the contractor must have the layout stakes surveyed and submit survey data to Parks Canada for review.
- .4 Execute cutting, fitting, and patching to complete Work.
- .5 Fit several parts together, to integrate with other Work.
- .6 Uncover Work to install ill-timed Work.
- .7 Remove and replace defective and non-conforming Work.
- .8 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .9 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .10 Employ original installer to perform cutting and patching for weather exposed and moisture resistant elements, and sight exposed surfaces.
- .11 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .12 Restore work with new products in accordance with requirements of Contract Documents.
- .13 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .14 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .15 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.
- .2 All excavated soil material, including hydro-vac excavated material must be removed from the Park and disposed of at an approved facility at the Contractor's expense. Scale tickets from the receiving facility must be provided to Parks Canada.

END OF SECTION

PART 1 GENERAL

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Departmental Representative or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Departmental Representative. Do not burn waste materials on site.
- .3 Clear snow and ice from access to site, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site a container for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Dispose of waste materials and debris off site.
- .8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .9 Clean interior areas and return all furniture, appliances and other fixtures to their original placement upon completion of work each day unless otherwise directed by the Departmental Representative. Interior areas are to be returned to their original condition prior to starting work, or better to the Departmental Representative's discretion.
- .10 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .11 Provide adequate ventilation during use of volatile or noxious substances.
- .12 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .13 Restore roadway and vegetated areas promptly according to the contract documents.

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.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by the Departmental Representative or other Contractors.

- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by the 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.
- .7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .8 Clean lighting reflectors, lenses, and other lighting surfaces.
- .9 Prior to handover to Parks Canada, ensure all new installations and affected work are thoroughly cleaned or returned to their original state or better.
- .10 Obtain Departmental Representative's approval of final site cleaning.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.

END OF SECTION

PART 1 GENERAL

1.1 INSPECTION AND DECLARATION

- .1 Contractor's Inspection: Contractor and Sub-Contractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify the Departmental Representative in writing of satisfactory completion of the Contractor's Inspection and that corrections have been made.
 - .2 Request Departmental Representative Inspection.
- .2 Departmental Representative Inspection: The Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. The Contractor to correct work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Required Certificates have been submitted.
 - .5 All third party permits have been closed out and final inspection reports submitted to the Departmental Representative.
 - .6 Operation of systems has been demonstrated to Departmental Representative's personnel.
 - .7 Work is complete and ready for final inspection.
- .4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by the Departmental Representative, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: when the Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Successful completion of the Start-up Test Period is a prerequisite to achieving Substantial Performance.
- .6 Commencement of Warranty Periods: date of Departmental Representative's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

1.2 FINAL CLEANING

- .1 Undertake a final cleaning in accordance with Section 01 74 11 – Cleaning.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare instructions and data in accordance with Section 01 91 61 - Operation and Maintenance Manual using personnel experienced in maintenance and operation of described products.
- .3 Copy will be returned after final inspection, with the Departmental Representative's comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, electronic copy of operating and maintenance manuals in English and redline drawings.
- .6 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .7 Furnish evidence, if requested, for type, source and quality of products provided.
- .8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .9 Pay costs of transportation.
- .10 Parks Canada will retain a holdback amount to their sole discretion to cover the cost to have a third party complete the Operation and Maintenance Manual should the contractor fail to meet the submittal requirements set out in Section 01 91 61 – Operation and Maintenance Manual.
- .11 Parks Canada will retain a holdback amount to their sole discretion to cover the cost to obtain all as built data following final completion should the contractor fail to submit a detailed set of redline drawings. Should the submitted redline drawings be incomplete or fail to capture all changes from the Issued for Construction drawing package, a holdback amount will be retained to cover the cost for investigating and confirming those missing details.

1.2 OPERATION AND MAINTENANCE MANUAL

- .1 In accordance with Section 01 91 61 - Operation and Maintenance Manual.

1.3 AS-BUILTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for the Departmental Representative, one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.

-
- .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples. Field test records.
 - .6 Inspection certificates.
 - .7 Manufacturer's certificates.
 - .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
 - .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
 - .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
 - .5 Keep record documents and samples available for inspection by the Departmental Representative.

1.4 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on a clean set of black line construction drawings.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements and layout stakes.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

1.5 CONSTRUCTION PHOTO LOGS

- .1 Submit to the Departmental Representative a USB stick containing photos taken by the contractor throughout construction. Photos are to be organized into folders for each work area and utility type where applicable.
- .2 Construction photos are to be provided for:
 - .1 All underground utility installations prior to placement of bedding material over conduits and pipes.
 - .2 All works which will be covered or closed upon project completion.
 - .3 To document all works completed on site to the Departmental Representatives satisfaction.

1.6 FINAL SURVEY

- .1 The Contractor shall complete one survey of all completed exposed utilities, final layout stakes and any other reference points, for the purpose of complimenting redline drawings. Survey data is to be provided to Parks Canada along with the submission of redline drawings which show the labeled surveyed reference points.
- .2 Make all necessary arrangements with the Departmental Representative during construction to allow all desired survey to be completed during construction prior to backfilling underground utilities. Should such coordination not be completed, the Departmental Representative reserves the right to direct the contractor to complete additional survey to obtain such data, at the contractor's cost.

1.7 SPARE PARTS

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

1.8 MAINTENANCE MATERIALS

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

1.9 SPECIAL TOOLS

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items. Submit inventory listing to the Departmental Representative. Include approved listings in Maintenance Manual.

1.10 STORAGE, HANDLING AND PROTECTION

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

1.11 WARRANTIES AND BONDS

- .1 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .2 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .3 Respond in a timely manner to oral or written notification of required construction warranty repair work.
- .4 Written verification will follow oral instructions. Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.12 PRE-WARRANTY CONFERENCE

- .1 Meet with the Departmental Representative, to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by the Departmental Representative.
- .2 The Departmental Representative will establish communication procedures for:
 - .1 Notification of construction warranty defects.
 - .2 Determine priorities for type of defect.
 - .3 Determine reasonable time for response.
- .3 Provide name, telephone number and address of licensed and bonded company that is authorized to initiate and pursue construction warranty work action.
- .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.13 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by the Departmental Representative.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
- .5 Construction Contractor.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction.
 - .2 CAN3-A23.3-04, Design of Concrete Structures for Buildings.
 - .3 CAN/CSA-G30.18-M92 (R2007), Billet Steel Bars for Concrete Reinforcement.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00- Submittal Procedures.
- .2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative with identifying code marks to permit correct placement without reference to structural drawings. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.
- .3 Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide Type C tension lap splices unless otherwise indicated.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CAN/CSA G30.18
- .4 Cold drawn annealed steel wire ties: to CSA G30.5
- .5 Deformed steel wire for concrete reinforcement: to CSA G30.14.
- .6 Welded steel wire fabric: to CSA G30.5
- .7 Welded deformed steel wire fabric: to CSA G30.15
- .8 Epoxy coating of non-prestressed reinforcement: to ASTM A775/A775M
- .9 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.

.10 Mechanical splices: subject to approval of Departmental Representative.

.11 Plain round bars: to CSA G40.20/G40.21

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada unless indicated otherwise.

.2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum two (2) weeks prior to commencing reinforcing work.

.2 Upon request inform Departmental Representative of proposed source of material to be supplied.

PART 3 EXECUTION

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized 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.

.4 Field bending shall not be done during the following occurrences:

.1 on rebar sizes, larger than 35M;

.2 when the ambient air temperature is lower than 8°C;

.3 by means of hammer blows or other impact loads;

.4 while using the application of heat, the bar temperature is in the range between 200°C to 340°C.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.

.2 Use plain round bars as slip dowels in concrete:

- .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
- .2 When paint is dry, apply thick even film of mineral lubricating grease
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C260-94, Specification for Air Entraining Admixtures for Concrete.
 - .2 ASTM C309-94, Specification for Liquid Membrane Forming Compounds for Curing Concrete.
 - .3 ASTM C494-92, Specification for Chemical Admixtures for Concrete.
 - .4 ASTM D1752, Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A3000-03 Consolidation.
 - .2 CAN/CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction.
 - .3 CAN/CSA-A23.2-04, Methods of Test for Concrete.
 - .4 CAN/CSA A5, Portland Cement.
 - .5 CAN/CSA A3001, Cementitious Materials for Use in Concrete

1.3 CERTIFICATES

- .1 Submit certificates in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Minimum two (2) weeks prior to starting concrete work submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
 - .1 Portland cement.
 - .2 Supplementary cementing materials.
 - .3 Admixtures.
 - .4 Aggregates.
 - .5 Water.
 - .6 Waterstops.
- .3 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.
- .4 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

1.4 QUALITY ASSURANCE

- .1 Minimum two (2) weeks prior to starting concrete work, submit proposed quality control procedures in accordance with Section 01 45 00 - Quality Control for Departmental Representative's approval for following items:
 - .1 Hot weather concrete.
 - .2 Cold weather concrete.
 - .3 Curing.
 - .4 Finishes.
 - .5 Quality Assurance Testing

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Designate a cleaning area for tools to limit water use and runoff.
- .3 Carefully coordinate the specified concrete work with weather conditions.
- .4 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .5 Prevent plasticizers, water reducing agents and air entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.
- .6 Choose least harmful, appropriate cleaning method which will perform adequately.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Portland cement with 15% fly ash replacement: to CAN/CSA-A3001-03.
- .2 Supplementary cementing materials: to CAN/CSA-A23.5.
- .3 Water: to CAN/CSA-A23.1.
- .4 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal low high density.
- .5 Air entraining admixture: to ASTM C260.
- .6 Chemical admixtures: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Use of calcium chloride or admixtures containing calcium chloride is not permitted
- .8 Curing compound: to CSA A23.1 and to ASTM C309, Type 1-chlorinated rubber
- .9 Concrete retarders: to ASTM C494 water based. Do not allow moisture of any kind to come in contact with the retarder film.

- .10 Concrete Curing Compounds: maximum VOC limit 100 g/L in accordance with SCAQMD Rule #1113.
- .11 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents.
 - .1 Compressive strength: 50 MPa at 28 days.
 - .1 Dry pack to manufacturer's requirements.
 - .2 Curing compound: to CAN/CSA-A23.1 white and to ASTM C309.

2.2 MIXES

- .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative 1 to give the following quality for all exterior flatwork concrete:
 - .1 Cement: Type GU Portland cement.
 - .2 CSA Exposure Class: C-1
 - .3 Minimum compressive strength at 56 days: 35 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 80 - 120 mm.
 - .6 Air content: 5 to 7 %.
 - .7 Chemical admixtures: following admixtures in accordance with ASTM C494, type, quantity, water reducing strength increasing air entraining.
- .2 Do not change concrete mix without prior approval of Departmental Representative. Should change in materials source be proposed, the new mix design is to be approved by Departmental Representative.
- .3 Mix design to minimize shrinkage and to maximize water-tightness.
- .4 Temperature of the concrete during discharge into the forms is to be between 10°C and 20°C. The temperature of the mix is to be maintained below 20°C maximum temperature. Typical methods of reducing mix temperature include evaporative cooling of aggregate stockpiles, use chilled batch water or the inclusion of ice to the mix at the plant, taking care to maintain the design water/cementing material ratio. Obtain Departmental Representative's approval of proposed method of temperature control

PART 3 EXECUTION

3.1 PREPARATION

- .1 Obtain Departmental Representative's approval before placing concrete. Provide 48 hours notice prior to placing of concrete.
- .2 Pumping of concrete is permitted only after approval of equipment and mix.
- .3 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .4 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.

- .5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .6 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
- .7 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.
- .2 Sleeves and inserts
 - .1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
 - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated, must be approved by Departmental Representative.
 - .3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Departmental Representative before placing of concrete.
 - .4 Check locations and sizes of sleeves and openings shown on drawings.
 - .5 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts
 - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
 - .2 With approval of Departmental Representative, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be minimum 100 mm diameter. Drilled holes to be minimum 25 mm larger in diameter than bolts used or to manufacturer's recommendations.
 - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
 - .4 Set bolts and fill holes with epoxy grout.
 - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.
- .5 Finishing
 - .1 Finish concrete in accordance with CAN/CSA-A23.1.
 - .2 Use procedures acceptable to Departmental Representative or those noted in CAN/CSA-A23.1 to remove excess bleed water. Ensure surface is not damaged.

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- .3 Protect slab surfaces from excessive drying before and during finishing operations. The use of fly ash concrete will tend to increase the setting time of a concrete mix while reducing the amount of bleed water available to balance evaporation. Rapid loss of moisture from the surface of the concrete can result in defects such as plastic shrinkage cracking, crazing and/or crusting. When weather forecasts indicate surface moisture evaporation can be expected to exceed $0.4 \text{ kg}/(\text{m}^2 \cdot \text{hr})$, the Contractor shall be prepared to apply fog spray immediately after placement and before finishing. Care shall be taken to prevent an accumulation of water that may reduce the quality of the surface finish.
 - .4 Provide screed float steel swirl-trowelled finish unless otherwise indicated.
 - .5 Provide broom finish on all exterior concrete slabs or aprons.
 - .6 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
 - .7 Finish horizontal surfaces to provide positive drainage off of slab.
 - .8 Pads which are to have cabinets installed on top are to be finished to allow the cabinet to be installed level.
- .6 Joint fillers
- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .2 Locate and form construction joints as indicated. Install joint filler.
 - .3 Use 12 mm thick joint filler where joint fillers are indicated.
- .7 Curing
- .1 In accordance with CSA A23.1.
 - .2 The concrete will be wet cured for not less than seven (7) consecutive days, in all cases at not less than 10°C . In addition, suspended slabs shall be continuously cured until the concrete has attained a minimum of 80% of the specified strength.
 - .3 Acceptable curing methods:
 - .1 Ponding or continuous sprinkling.
 - .2 Absorptive mat or fabric kept continuously wet.
 - .3 Exposed flatwork: Curing compounds approved by the Departmental Representative.
 - .4 Other moisture retaining method approved by the Departmental Representative.
 - .4 Apply curing compounds in two (2) applications at right angles to each other.
 - .5 Do not use curing compounds on concrete surfaces to receive topping, hardener or other type of bonded finish unless approved by the Departmental Representative. Confirm that the coatings and curing compound are compatible.
 - .6 Provide insulation, hoarding and/or heating as required to prevent freezing during inclement weather.
 - .7 During hot weather, begin curing process immediately after finishing. Continuous water or absorptive mats are mandatory.

3.3 SITE TOLERANCE

- .1 Concrete tolerance in accordance with CAN/CSA-A23.1 straight edge method.

3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Departmental Representative in accordance with CAN/CSA-A23.1 and Section 01 45 00 - Quality Control.
- .2 The Contractor will pay for costs of Field Quality Control testing.
- .3 Every load or batch of concrete shall be tested for slump until satisfactory control of the slump is established and fewer tests are required by the Departmental Representative. Whenever a test falls outside the specified limits, the testing frequency shall revert to one (1) test per load or batch until satisfactory control is re-established.
- .4 Slump and Air-Content Tests
 - .1 Make test at the time of concrete placement where strength specimens are made, as often are required by the Departmental Representative but not less frequently than one test each of slump and air content for every truckload of concrete placed.
- .5 Strength Tests
 - .1 Frequency: one strength, slump and air-content test for each 50 m³ of each class of concrete or at least one set of tests each day when concrete is poured.
 - .2 Cylinders: take not less than 4 cylinders for each test. Prepare cylinders in accordance with CSA A23.2.
 - .1 For concrete with specified fifty-six (56) day strength, strength test shall consist of minimum four (4) test cylinders. Test first cylinder at seven (7) days, one (1) at twenty-eight (28) days and the remaining two (2) cylinders at fifty-six (56) days.
 - .2 For concrete with specified twenty-eight (28) day strength, strength test shall consist of minimum three (3) test cylinders. Test first cylinder at seven (7) days and remaining two (2) at twenty-eight (28) days.
 - .3 Compressive Strength: use the average of the compressive strength of two standard cylinders tested at the age specified. If either of the two cylinders shows definite evidence, other than low strength, of improper sampling, moulding, handling, curing or testing, discard cylinder and use the strength of the remaining cylinder for test result.
 - .4 Strength Requirements: strength requirements for each class of concrete are met if the averages of all sets of three consecutive strength tests equal or exceed the specified strength and no single test falls more than 3.5 MPa below specified compressive strength.
 - .6 Departmental Representative may take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

- .7 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.
- .8 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A123/A123M-02, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A653/A653M-06, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O121-M1978 (R2003), Douglas Fir Plywood.
 - .4 CSA O141-05, Softwood Lumber.
 - .5 CSA O151-04, Canadian Softwood Plywood.
 - .6 CSA O153-M1980 (R2003), Poplar Plywood.
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2005.

1.2 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.

PART 2 PRODUCTS

2.1 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver wood products bundled or crated to provide adequate protection during transit. Inspect wood products for damage upon delivery and remove and replace damaged materials.
- .2 Store materials a minimum of 150 mm off the ground on blocking. Keep materials under cover and dry. Provide for air circulation within and around stacks and under temporary coverings.
- .3 Protect sheet materials to prevent breaking of corners and damage to surfaces.

2.2 LUMBER MATERIAL

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:

- .1 CAN/CSA-O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, and sleepers:
 - .1 S2S is acceptable.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.

2.3 PANEL MATERIALS

- .1 Douglas fir plywood: to CSA O121, standard construction.
- .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .3 Poplar Plywood: to CSA O153, standard construction.

2.4 ACCESSORIES

- .1 Nails, spikes and staples: to CSA B111.
- .2 Bolts: 12.5 mm minimum diameter unless indicated otherwise, complete with nuts and washers.
- .3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

2.5 FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for all work.

2.6 WOOD PRESERVATIVE

- .1 Where lumber or plywood is indicated as preservative treated or is specified to be treated, treated in accordance with CAN/CSA O80.9M and AWWA.
- .2 Wood preservatives containing arsenic or chromium are not permitted.
- .3 Pressure treat above ground items with waterborne preservatives to minimum retention of 4.0 kg/m³. Treat indicated items and the following:
 - .1 Wooden vehicle plug-in posts.
 - .2 Any other wood installations to be included in this project which will be in contact with the ground or exposed to weather.
- .4 Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to minimum of 6.4kg/m³.
- .5 Complete fabrication of treated items before treatment where possible. If cut after treatment apply field treatment to cut surfaces.
- .6 Wood Preservatives: Maximum allowable VOC limit 350 g/L in accordance with SCAQMD Rule #1113 - Architectural Coatings.

2.7 FASTENER FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work pressure-preservative or fire-retardant treated lumber.

PART 3 EXECUTION

3.1 ERECTION

- .1 Comply with requirements of NBC, supplemented by the following paragraphs.
- .2 Countersink bolts where necessary to provide clearance for other work.
- .3 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .4 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.

3.2 INSTALLATION

- .1 Comply with requirements of Building Code supplemented by following paragraphs
- .2 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .3 Install members true to line, levels and elevations, square and plumb.
- .4 Construct continuous members from pieces of longest practical length.
- .5 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

3.3 EQUIPMENT BACKBOARDS

- .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use 19 mm thick fir plywood; coordinate size, location and finishing with Departmental Representative prior to starting work.
- .2 Paint panels with 2 coats of light coloured fire retardant intumescent paint finish; coat all sides of panels (back, front and sides) to meet the intent of fire rated panel requirements listed in CSA T530 and ANSI/TIA/EIA 569-B requirements.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2007.
 - .2 MPI - Maintenance Repainting Manual, 2007.

1.2 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used.
 - .2 Submit product data for the use and application of paint thinner.
 - .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.
 - .4 Submit paint colour samples to Departmental Representative for approval prior to beginning work.

1.3 STORAGE AND HANDLING

- .1 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well-ventilated area within temperature as recommended by manufacturer.
- .2 Fire Safety Requirements:
 - .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

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 01 00 10 - General Instructions.

- .2 Place materials defined as hazardous or toxic waste, including tubes and containers, in containers designated for hazardous waste.
- .3 Paint finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Alberta Environment.

1.5 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces.
 - .2 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.
 - .2 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Conform to latest MPI requirements for all painting work including preparation and priming.
- .4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual "Approved Product" listing.

2.2 MIXING AND TINTING

- .1 Paint colours for building touch ups and building repairs are to be custom mixed to match existing building colour.
- .2 Perform colour tinting operations prior to delivery of paint to site, in accordance with manufacturer's written instructions. Obtain written approval from the Departmental Representative for tinting of painting materials.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.

- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.3 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

| | Gloss @ 60 degrees | Sheen @ 85 degrees |
|---|--------------------|--------------------|
| Gloss Level 1 - Matte Finish (flat) | Max. 5 | Max. 10 |
| Gloss Level 2 - Velvet-Like Finish | Max.10 | 10 to 35 |
| Gloss Level 3 - Eggshell Finish | 10 to 25 | 10 to 35 |
| Gloss Level 4 - Satin-Like Finish | 20 to 35 | min. 35 |
| Gloss Level 5 - Traditional Semi-Gloss Finish | 35 to 70 | |
| Gloss Level 6 - Traditional Gloss | 70 to 85 | |
| Gloss Level 7 - High Gloss Finish | More than 85 | |

2.4 GENERAL

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

2.5 EXAMINATION

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to the Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

2.6 PREPARATION

- .1 Protection:
- .1 Protect existing surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by the Departmental Representative.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
- .2 Surface Preparation:
- .1 Remove surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
 - .2 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
- .3 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.

- .4 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .5 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.
- .6 Touch up of shop primers with primer as specified.
- .7 Do not apply paint until prepared surfaces have been accepted by the Departmental Representative

2.7 APPLICATION

- .1 Method of application to be as approved by Departmental Representative. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .3 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .4 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of pipe and supports.

2.8 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.
- .2 Do not paint over nameplates.

2.9 PIPING COLOUR SCHEDULE

- .1 The colour schedule is as follows, the entire length of the pipe shall be painted in the basic colour.

| Line | Colour |
|-----------------------------|--|
| Natural Gas Pipe | Yellow |
| Sanitary Waste Pipe | C-351 Sand |
| Hangers, Brackets, Supports | C-421 Black |
| Handles | C-421 Black |
| Electrical Conduit | Match colour of conduit to surrounding wall color ¹ |

Note 1 – Confirm with Departmental Representative whether specific exterior wall mounted conduits are to be painted or left as uncoated PVC.

- .2 The above color codes are for reference use and color selection only. They are not intended as an endorsement of the products specified above, nor are they an exclusion of other manufacturers or suppliers.

2.10 PIPING, FITTINGS AND VALVES:

- .1 Prime - iron oxide primer (etch type primer for PVC piping and galvanized metal).
.2 INT 5.3C - Alkyd gloss level 4
.3 INT 5.3C - Alkyd gloss level 4

2.11 EQUIPMENT (FOR UNITS HAVING FACTORY-APPLIED FINISH)

- .1 Prime - touch-up finish with paint compatible with manufacturer's paint.
.2 INT 5.3C - Alkyd gloss level 4

2.12 EQUIPMENT (FOR UNITS WITH PRIME COAT ONLY)

- .1 Prime - touch-up prime coat with paint compatible with manufacturer's prime.
.2 INT 5.3C - Alkyd gloss level 4
.3 INT 5.3C - Alkyd gloss level 4

2.13 ITEMS TO BE PAINTED

- .1 All piping, mechanical and electrical equipment, including sleeves through floors are to be painted unless otherwise directed in writing by the Departmental Representative.
.2 All building areas which become exposed as a result of existing services demolition and removals, and do not match the surrounding unaffected areas of wall, as well as building repairs and hole patches required due to the removal of services.

END OF SECTION

23 11 23 FACILITY NATURAL GAS PIPING

Part 1 General

1.1 DELIVERY, STORAGE AND HANDLING

- .1 Contractor will keep Departmental Representative informed as to the locations of its unloading gangs so that Parks Canada may place checkers at points where Contractor is unloading material.
- .2 Material shall be checked for quantity and condition by representatives of both Contractor and Parks Canada. The authorized representatives making such checks shall make a written record thereof, which shall set forth the quantity and condition of the material; and upon completion, the same shall be signed by the parties making the same; and such record shall thereafter be conclusive as between the parties hereto.
- .3 If the material is received in a damaged condition, an inspection must be made by an agent of the carrier before unloading or removal of such material and report of such inspection prepared and forwarded to the Departmental Representative.
- .4 Coating and primer shall be unloaded from cars at destination points in such a manner as to prevent injury to containers. Containers of coating materials shall not be handled with hooks at any time and shall be stored with tops of containers up.
- .5 Valves, fittings and other materials shall be unloaded in a manner to prevent their being damaged and shall be stored in a manner to preserve their conditions, prevent loss and permit easy access for checking of quantities.
- .6 Valves, flanged fittings or other materials with finished surfaces shall always be placed on skids to prevent the finished surfaces from coming into contact with the earth.
- .7 Small fittings, fibreglass wrapping material, felt and supplies shall be kept in suitable warehouses provided by Contractor at his expense.

Part 2 Products

2.1 MATERIALS

2.2 PIPE

- .1 As per drawings

2.3 JOINTING MATERIAL

- .1 As per drawings

2.4 FITTINGS

- .1 As per drawings

2.5 VALVES

- .1 As per drawings

2.6 TRACER WIRE

- .1 Coated copper clad steel tracer wire, #12AWG (or larger).

2.7 WARNING TAPE

- .1 Yellow polyethylene with black printing "CAUTION Buried Gas Line Below".

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 PIPING

- .1 Install in accordance with Section CSA B149.1/1149.2.

3.3 VALVES

- .1 Install valves with stems upright or horizontal unless otherwise approved by Departmental Representative.
- .2 Install valves at branch take-offs to isolate pieces of equipment, and as indicated.

3.4 TRACER WIRE

- .1 Install a continuous run of insulated tracer wire in the trench above the pipe approximately 6 inches above the pipe. Tracer wire shall not be wrapped around pipe or connectors except at the riser. Tracer wire shall not be wrapped around pipe or fittings. Strip insulation back one inch for connections and join the two ends using an approved mechanical connector and split bolt connector. (Twisting of copper wire will not be acceptable.) Wrap all exposed wire with multiple passes of electrical tape for a thorough connection. Leave a minimum 5 foot of additional tracer wire, coiled, buried and terminated at the ends of the gas pipeline. Of the 5 foot tracer wire section at the ends of the pipeline, one foot of insulation will be stripped back, prior to scheduling backfill.
- .2 Parks Canada and Consultant shall inspect installation of tracer wire prior to backfill.

3.5 WARNING TAPE

- .1 Warning tape shall be installed as indicated on drawings.

3.6 WELDING AND COATING

- .1 All welding shall be done by the manual, electric shield-arc process unless written approval of an alternate method has been obtained from the Engineer prior to commencement of the work. The Contractor shall furnish all equipment and material necessary for this portion of the work.
- .2 All welding done under this specification shall be in accordance with latest edition of the API Standard Code No. 1104, "Standard for Field Welding of Pipelines".
- .3 The internal surface of each pipe end shall be machine buffed a minimum length of 20 millimetres to remove all rust, scale, dirt, or other foreign materials before placing in alignment for welding.

- .4 Preparatory to aligning pipe, all paint, rust, scale, dirt, or other foreign materials that might affect the welding operation shall be removed prior to welding; and any suitable means approved by Engineer may be used for thoroughly cleaning and bevelled ends of pipe prior to the actual welding.
- .5 Striking the arc on the pipe at any point other than the welding groove shall not be permitted. At the discretion of Engineer, any section of pipe which has been arc burned shall be cut out and replaced at Contractor's expense.
- .6 If any weld is burned or oxidized during welding, the entire weld shall be cut out by Contractor and the joint welded at Contractor's expense. No metal shall be allowed to run inside the pipe. Under no circumstances shall mitred welds be allowed. All welds which in the judgement of Engineer are under the specified size or grooved, riveted, or undercut on the sides shall be cut out and rewelded at Contractor's expense.
- .7 The Contractor shall follow approved pipeline coating practices and maintain a high degree of workmanship throughout all phases of the pipeline construction.
- .8 Parks Canada proposes to use one or both of the following coatings:
 - .1 Polyethylene Shrink-on Sleeves.
 - .1 Pipe shall be thoroughly cleaned by use of approved scrapers or steel-wire brushes. The shrink-on sleeves shall be placed over pipe prior to welding of a joint. When weld has sufficiently cooled, apply heat to polyethylene sleeve with propane torch until sleeve is firmly and smoothly shrunk on pipe joint. Shrink-on sleeves shall not be used for appurtenances.
 - .2 Polyethylene Sheathe
 - .1 The pipe surface shall be cleaned as above in Paragraph (a). A thin, even coating of primer shall then be applied to the part of the pipe to be wrapped. The primer must not be applied when the pipe is wet or when conditions are such that dust can settle on the wet primer. Following this, the primed surface shall be taped smoothly with polyethylene tape as supplied by Parks Canada. The tape shall be applied so that the finished surface is free of wrinkles.
Appurtenances shall be hand cleaned and coated with a cold coating compound as supplied by Parks Canada.

3.7 TEST LEADS

- .1 Test leads shall be installed by Contractor at locations specified by the Engineer and in accordance with the drawings.
- .2 Test leads shall be installed by the Cadweld method using a No. 15(15 gram) charge of powder and shall be connected to the terminal blocks on the Pipeline Danger Sign markers according to the drawings. The connection shall be hand coated to provide the same quality of protection as the rest of the pipeline.
- .3 Test lead installations are to be installed during crossing installations and are to be completed during backfilling.

3.8 FUSION

- .1 Contractor shall recut or trim all such pipe ends as may be necessary to maintain correct alignment by using a chamfering or shaving tool approved by Parks Canada. The chamfering tool shall only be used in socket fusion operations.
- .2 The maximum high-low allowed in butt fusion is 0.4 mm for pipe up to and including 50 mm and 0.8 mm for any pipe larger than 50 mm.
- .3 It is Contractor's responsibility to pick up and to dispose of all pipe shavings and paper towels and/or any other debris off the right-of-way and shall do so immediately after the fusion operation.
- .4 Contractor shall conduct fusion operations according to the manufacturer's specifications of the pipe being used and according to Parks Canada's procedure on plastic pipe fusion. A fusion joint will not be allowed on any bent section of the pipeline.
- .5 All short sections of plastic pipe shall be installed into the pipe line and used up as the work progresses.

3.9 CUSTOMER SERVICES

- .1 All plastic service lines shall be installed by the ploughing in method as described in Section 31 23 33.01 - Excavating, Trenching and Backfilling. All steel pipe service lines shall be installed by the trenching method. Minimum cover on customer service lines is 60 centimetres.
- .2 Plastic service lines will terminate 1-meter perpendicular to the building being served. The remaining distance shall be installed using anodeless riser. Butt fusion will be used for joining anodeless riser to PE pipe.
- .3 Branch connections shall be P.E. tapping saddle tee and joined by heat fusion. P.E. services shall be tapped in a good workmanlike manner using a 13-millimetre bit. The procedure and quality of plastic joints shall be in conformance with Section 6.11.
- .4 Services must be fabricated according to approved standard drawings. Pipe cutting, threading, reaming, and treating shall conform to standard accepted good pipe fitting practice.
- .5 The service entrance must be level as well as straight through and any possible damage occurring during drilling repaired, including removal of debris. The service entrance nipple shall be suitably capped before installation to prevent possible entry of foreign material.
- .6 When conditions require the use of a riser, 1.5 meters and over in length, down stream of the regulator, it shall be installed plumb and securely fastened to the premises by suitable means.
- .7 The use of blind nipples down stream of the lockwing cock shall be mandatory on all services.
- .8 Before testing, all services shall be vented to atmosphere to prove the operable condition of the service by breaking the service immediately down stream of the lockwing stopcock. Services shall be tested simultaneously with lateral pipelines as described in section 6.18.
- .9 Sufficient venting time shall be allowed to clear line of any debris and to determine that no restriction exists in the line. The service shall then be reassembled and shut in for testing. Above ground service piping shall be painted as directed by Departmental Representative.

3.10 HDPE BUTT FUSION PROCEDURES

- .1 Properly arrange the fusion machine on level ground with adequate number of roller supports to allow ease of pipe loading and positioning into the fusion machine.
- .2 Secure the pipe in the machine by clamping the pipe allowing sufficient pipe extending into the mid zone of the machine for facing, adjustment, and possibly additional facing after alignment adjustments. Move the pipe ends together to check for mis-alignment between the two pipe ends and make any adjustments using the machine allowances, if necessary. Although perfect alignment is preferred and is typically possible under normal circumstances, the maximum misalignment should be within 10% of the minimum wall thickness of the pipe being fused. Clean the pipe ends using a clean, dry, lint-free cloth to remove all foreign matter.
- .3 While the facing plate is rotating, apply light pressure until a continuous ribbon of polyethylene appears from each facer blade location. Observing the facing plate as it progresses with the facing operation will dictate adjustments to the appropriate level of pressure. Never start and stop the facing procedure with the pipe ends in contact with the facer plate. Always move the pipe towards or away from the facer plate while it is rotating.
- .4 Initially face the pipe ends so that the alignment of the pipe can be checked, leaving sufficient pipe in the event that adjustments are needed and additional facing is required to re-square the pipe ends. All adjustments for pipe alignment, or delays of more than 15 minutes following facing, should be followed by additional facing to maintain proper alignment of the pipe ends or remove potential contamination.
- .5 Remove any pipe chips from the facing operation and wipe the pipe ends again with a clean, dry, lint-free cloth. Move the pipe ends together to re-check the alignment. At this stage, the heater plate should be inserted without delay to minimize the potential of contamination affecting the fusion process.
- .6 For every fusion joint, the system drag force must be measured to assure the proper compensation is applied to the fusion force. In most cases, the system drag will be the inherent drag in the hydraulic components of the machine for which the manufacturer will have a recommended value to use. However, to assure this has not changed due to the system set-up (ground slope or length of pipe being moved), it should be checked using the following procedure:
 - .7 Slowly adjust upward the machine hydraulic control, or slowly increase torque on manually operated machines, to initiate carriage movement. The System Drag Pressure is the gauge pressure at which the carriage starts to move on hydraulic fusion machines. The System Drag Force is the observed force or torque at which the carriage starts to move on manually operated fusion machines. Repeat this measurement to verify the observed reading.
 - .8 If not already done, consult your pipe supplier for the proper fusion pressures for the fusion machine you are using.
 - .9 On manually operated fusion machines, a torque wrench can be used to accurately apply the proper Fusion Force. For hydraulically operated fusion machines, the Fusion Pressure can be measured using a hydraulic gauge on the machine. In both cases, the System Drag Force or Pressure must be added to the Fusion Force or Pressure to obtain the actual pressure required to make a proper fusion joint.
- .10 Heater plate surface temperature shall be $425^{\circ}\text{F} \pm 25^{\circ}\text{F}$ ($218^{\circ}\text{C} \pm 14^{\circ}\text{C}$). Verify with a mechanical pyrometer or tempil stick.
- .11 Move the pipe ends against the heater plate to establish pressure. A pressure from

approximately 1/3 of the fusion interfacial pressure to full fusion pressure is suitable. After holding the pressure until melted material is visible on the complete circumference of both pieces of pipe, it should be released without breaking contact. Continue to hold the components in place at zero pressure, without movement, for a "soak" time while a bead of molten polyethylene develops between the heater plate and pipe ends as a result of thermal expansion. Following the "soak" time, approximate melt bead sizes should be as follows:

| Pipe Size | Approximate Melt Bead |
|----------------------------|-----------------------|
| 2" and less | 1/16" |
| 3" to 5" | 1/8" |
| 6" to 12" | 3/16" |
| 13" to 22" | 1/4" to 5/16" |
| 24" to 63" (1600mm) | 5/16" to 7/16" |

- .12 Once the appropriate melt bead size is established, commence pipe pull back from the heater plate. If any softened material sticks to the heater plate, discontinue the joint and recommence at Step 2. Once the pipe ends have been separated from the heater plate, quickly remove the heater plate from the fusion zone.
- .13 After the heater plate has cleared the fusion zone, immediately initiate movement to contact the pipe ends together, do not slam, until a double roll back bead is formed against the pipe wall. Transfer time after starting heater plate removal and re-contacting the pipe ends together should not exceed the following:

| Pipe Size | Maximum Transfer Time |
|---------------------------------|-----------------------|
| 3" and smaller | 4 seconds |
| 4" to 12" | 6 seconds |
| 13" to 24" | 9 seconds |
| 26" to 36" | 12 seconds |
| 40" (1,000mm) and larger | 15 seconds |

- .14 Maintain Final Fusion Force or Pressure until the pipe is cool to the touch. This time will vary with pipe size, heater plate temperature setting and environmental conditions. Guideline cooling times under pressure in the fusion machine are as follows: (note, these are guidelines only, use "cool to the touch"):

| Wall Thickness Up to 0.2" | Cooling Time (@ 23°C, 74°F) |
|---------------------------|-----------------------------|
| | 5 minutes |
| 0.2" to 0.4" | 5 to 10 minutes |
| 0.4" to 0.6" | 10 to 15 minutes |
| 0.6" to 0.8" | 15 to 20 minutes |
| 0.8" to 1.2" | 20 to 30 minutes |
| 1.2" to 1.6" | 30 to 40 minutes |
| 1.6" to 2.0" | 40 to 50 minutes |
| 2.0" to 2.4" | 50 to 60 minutes |
| 2.4" to 2.8" | 60 to 70 minutes |
| 2.8" to 3.2" | 70 to 80 minutes |

- .15 Allow the joint to cool an additional thirty (30) minutes minimum outside of the fusion machine before subjecting the fusion joint to any rough handling or severe bending.
- .16 Precautions

- .1 Assure that the operator is skilled, experienced and knowledgeable regarding the function of the fusion machine, the fusion procedures and handling of the pipe.
- .2 Check facer blades frequently during daily operation to ensure that blade projection is 0.010" to 0.015" (0.25mm to 0.38mm) and that the blades are parallel to the facer plate.
- .3 Check heater plate surface temperature at least 4 times per day during operation, at 8 evenly spaced locations around the plate (on each face) in the general contact area of the pipe.
- .4 Shell covers are potential pinch points. Lift shells using handles provided. Do not place fingers inside shell. Wear gloves. When handling pipe into the machine, watch for pinch points between pipe and shell, and also between pipe ends.
- .5 Fusion of polyethylene occurs at temperatures above 400°F. Do not touch heater plate while in use. Use handles provided. Wear gloves.
- .6 Heater plates are typically supplied with a Teflon coating on the contact surface, to reduce problems of molten polyethylene sticking to the heater plate. Take care to avoid scratching this thin coating. Remove any built-up material on the heater plate by rubbing the hot plate with a clean, dry, lint-free cloth. Caution must be used when working close to the heater plate.
- .7 The heating tool should be shielded and insulated in a suitable container to prevent excessive heat loss. Care should be practiced to prevent debris from being blown or contacted with the heater plate.
- .8 When performing fusion work below 55°F, fusion heating time and heater plate temperature must be carefully understood. Adjustment to dwell times during heating and regular monitoring of the heater plate temperature are critical. In addition, where noticeable wind conditions exist, the fusion operation should be shielded from their effects.
- .9 The pipe fusion area and equipment should be shielded from wind, snow and rain by using a canopy or similar set-up. Where temperatures below 32°F persist, consideration to provide internal heating of the canopy is suggested to provide workable quarters and prevent cold temperature effects on the equipment functions. Consideration shall be given as to increased heating cycle time to produce the required melt bead and heat penetration into the pipe end.
- .10 When an improper function or fusion bead appearance results, assure proper corrective action is taken to correct improper procedures or repair equipment. Under no circumstances should fusion be conducted under faulty equipment conditions.

3.11 TESTING, TIE-IN AND PURGING

- .1 Contractor shall furnish all labour and material necessary to air test and repair installed sections between crossings and customer services to demonstrate that the plastic pipeline does not leak. Pipe and materials which prove to be defective under this test shall be immediately located and repaired.
- .2 The final air test shall be performed after back filling is completed. Departmental Representative shall provide supervision during testing procedure. The proper time, method, and sequence of operations of testing the line shall be at Departmental Representative's discretion and supervision. The test air shall be odorized with odorant

supplied by Parks Canada. The odorant must enter the line in a vapour. No liquid odorant is to come in contact with the plastic pipe. The required test pressure shall be twice the maximum allowable working pressure and held for twenty-four (24) hours. The temperature of compressed air shall be less than 100 degrees.

- .3 All labour and materials necessary to replace or repair inferior workmanship and/or materials originally furnished by Contractor which prove to be defective under testing and the cost of locating such defects shall be furnished and paid for by the Contractor, and Contractor shall make good any damages due to or resulting from the same. Contractor shall furnish labour and equipment as requested by the Departmental Representative. On completion of the test to the satisfaction of the Engineer, the system shall be completely purged of test air with natural gas and the system put into operation under the Departmental Representative's direction.
- .4 The proper time and method of purging of the distribution system shall be at the Departmental Representative's discretion and supervision. When natural Gas is not available at the completion of the twenty-four (24) hour air test, the Contractor shall within a thirty (30) day period at no added expense to Parks Canada, return at the designated time and carry out the purging operations as directed by the Engineer.

3.12 FIELD QUALITY CONTROL

- .1 Site Tests/Inspection:
 - .1 Contractor shall pass a Stearns Electronic Holiday Detector or equal type of holiday detector set at ten thousand (10,000) volts over pipe after all pipe is coated and just ahead of the lowering operation. All holidays shall be plainly marked immediately after detection and shall be patched to the satisfaction of the Engineer. Parks Canada reserves the right to have the Contractor re-pass the Holiday Detector over any section of the pipeline when, in the opinion of the Departmental Representative, it is necessary and without additional cost to Parks Canada.

3.13 CLEANING

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

1 GENERAL

1.01 REFERENCES

- .1 Division 00 and Division 01 apply to and are a part of this Section.

1.02 APPLICATION

- .1 This Section specifies requirements that are common to Electrical Divisions work Sections and it is a supplement to each Section and is to be read accordingly. Where requirements of this Section contradict requirements of Divisions 00 or 01, conditions of Division 00 or 01 to take precedence.
- .2 Be responsible for advising product vendors of requirements of this Section.

1.03 DEFINITIONS

- .1 "concealed" – means hidden from normal sight in furred spaces, shafts, ceiling spaces, walls and partitions.
- .2 "exposed" – means work normally visible, including work in equipment rooms, service tunnels, and similar spaces.
- .3 "finished" - means when in description of any area or part of an area or a product which receives a finish such as paint, or in case of a product may be factory finished.
- .4 "provision" or "provide" (and tenses of "provide") – means supply and install complete.
- .5 "install" (and tenses of "install") – means secure in position, connect complete, test, adjust, verify and certify.
- .6 "supply" – means to procure, arrange for delivery to site, inspect, accept delivery and administer supply of products; distribute to areas; and include manufacturer's supply of any special cables, standard on site testing, initial start-up, programming, basic commissioning, warranties and manufacturers' assistance to Contractor.
- .7 "governing authority" and/or "authority having jurisdiction" and/or "regulatory authority" and/or "Municipal authority" – means government departments, agencies, standards, rules and regulations that apply to and govern work and to which work must adhere.
- .8 "OSHA" and "OHSA" – stands for Occupational Safety and Health Administration and Occupational Health and Safety Act, and wherever either one is used, they are to be read to mean local governing occupational health and safety regulations that apply to and govern work and to which work must adhere, regardless if Project falls within either authority's jurisdiction.
- .9 "Mechanical Divisions" - refers to Divisions 20, 21, 22, 23, 25 and other Divisions as specifically noted, and which work as defined in Specifications and/or on drawings is responsibility of Mechanical Contractor, unless otherwise noted.

- .10 "Electrical Divisions" – refers to Divisions 26, 27, 28 and other Divisions as specifically noted, and which work as defined in Specifications and/or on drawings is responsibility of Electrical Contractor, unless otherwise noted.
- .11 "Parks Canada Representative" – means the Parks Canada employee or the person, firm or corporation appointed by Parks Canada to act for Parks Canada in a professional capacity in relation to the Work.
- .12 Wherever words "indicated", "shown", "noted", "listed", or similar words or phrases are used in Contract Documents they are understood, unless otherwise defined, to mean product referred to is "indicated", "shown", "listed", or "noted" on Contract Documents.
- .13 Wherever words "reviewed", "satisfactory", "as directed", "submit", or similar words or phrases are used in Contract Documents they are understood, unless otherwise defined, to mean that work or product referred to is "reviewed by", "to the satisfaction of", "submitted to", etc., Parks Canada Representative.

1.04 DOCUMENTS

- .1 Documents for bidding include but are not limited to issued Drawings, Specifications and Addenda.
- .2 Specification is arranged in accordance with CSI/CSC 50 Division Sections MasterFormat.
- .3 Drawings and Specifications are portions of Contract Documents and identify labour, products and services necessary for performance of work and form a basis for determining pricing. They are intended to be cooperative. Perform work that is shown, specified, or reasonably implied on the drawings but not mentioned in Specification, or vice-versa, as though fully covered by both.
- .4 Review Drawings and Specification in conjunction with documents of other Divisions and, where applicable, Code Consultant's report.
- .5 Unless otherwise specifically noted in Specifications and/or on Drawings, Sections of Electrical Divisions are not intended to delegate functions nor to delegate work and supply of materials to any specific trade, but rather to generally designate a basic unit of work, and Sections are to be read as a whole.
- .6 Drawings are performance drawings, diagrammatic, and show approximate locations of equipment and materials. Any information regarding accurate measurement of building is to be taken on site. Do not scale Drawings, and do not use Drawings for prefabrication work.
- .7 Drawings are intended to convey scope of work and do not show architectural and structural details. Provide fittings, offsets, transformations and similar items required as a result of obstructions and other architectural and/or structural details but not shown on Drawings.

- .8 Locations of equipment and materials shown may be altered, when reviewed by Parks Canada Representative, to meet requirements of equipment and/or materials, other equipment or systems being installed, and of building, all at no additional cost to Contract.
- .9 Specification does not generally indicate specific number of items or amounts of material required. Specification is intended to provide product data and installation requirements. Refer to schedules, Drawings (layouts, riser diagrams, schematics, details) and Specification to provide correct quantities. Singular may be read as plural and vice versa.
- .10 Drawings and Specifications are prepared solely for use by party with whom Parks Canada Representative has entered into a contract and there are no representations of any kind made by Parks Canada Representative to any other party.
- .11 When scale and date of Drawings are same, or when discrepancy exists within Specification, include most costly arrangement to take precedence.
- .12 In case of discrepancies or conflicts between Drawings and Specification, documents will govern in following order:
 - .1 Specification;
 - .2 Drawings of larger scale;
 - .3 Drawings of smaller scale;
 - .4 Drawings of later date when scale of Drawings is same.

1.05 METRIC AND IMPERIAL MEASUREMENTS

- .1 Generally, both metric and imperial units of measurement are given in Sections of Specification governed by this section. Measurement conversions may be generally "soft" and rounded off. Exact measurements to be confirmed based on application. Where measurements are related to installation and onsite applications, confirm issued document measurements with applicable local code requirements, and/or as applicable, make accurate measurements onsite. Where significant discrepancies are found, immediately notify Parks Canada Representative for direction.

1.06 EXAMINATION OF BID DOCUMENTS AND SITE

- .1 Carefully examine Documents and visit site to determine and review existing site conditions that will or may affect work, and include for such conditions in Bid Price.
- .2 Report to Parks Canada Representative, prior to Bid Submittal, any existing site condition that will or may affect performance of work as per Documents. Failure to do so will not be grounds for additional costs.
- .3 Upon finding discrepancies in, or omissions from Documents, or having doubt as to their meaning or intent, immediately notify Parks Canada Representative, in writing.

1.07 WORK STANDARDS

- .1 Where any code, regulation, bylaw, standard, contract form, manual, printed instruction, and installation and application instruction is quoted it means, unless otherwise specifically noted, latest published edition at time of submission of Bids adopted by and enforced by local governing authorities having jurisdiction. Include for compliance with revisions, bulletins, supplementary standards or amendments issued by local governing authorities.
- .2 Where regulatory codes, standards and regulations are at variance with Drawings and Specification, more stringent requirement will apply unless otherwise directed by Parks Canada Representative.
- .3 Supplementary mandatory Specifications and requirements to be used in conjunction with project include but are not limited to following:
 - .1 American National Standards Institute (ANSI);
 - .2 Canadian Standards Association (CSA);
 - .3 CSA Z462, "Workplace Electrical Safety";
 - .4 Electrical and Electronic Manufacturers Association of Canada (EEMAC);
 - .5 Electrical Safety Authority (ESA);
 - .6 National Building Code of Canada (NBC);
 - .7 National Electrical Manufacturers Association (NEMA);
 - .8 Occupational Health and Safety Act (OHSA);
 - .9 Alberta Building Code (ABC);
 - .10 Canadian Electrical Code (CEC);
 - .11 Underwriters' Laboratories of Canada (ULC);
 - .12 Material Safety Data Sheets by product manufacturers;
 - .13 local utility inspection permits;
 - .14 codes, standards, and regulations of local governing authorities having jurisdiction;
 - .15 additional codes and standards listed in Trade Sections;
 - .16 Parks Canada standards.
- .4 Provide applicable requirements for barrier free access in accordance with latest edition of local governing building code.

- .5 Where any governing Code, Regulation, or Standard requires preparation and submission of special details or drawings for review they are to be prepared and submitted to appropriate authorities. Be responsible for costs associated with these submittals.
- .6 Unless otherwise specified install, equipment in accordance with equipment manufacturer's recommendations and instructions, and requirements of governing Codes, Standards, and Regulations. Governing Codes, Standards, and Regulations take precedence over manufacturer's instructions.
- .7 Work is to be performed by journeyperson tradesmen who perform only work that their certificates permit, or by apprentice tradesmen under direct on site supervision of experienced journeyperson tradesman.
- .8 Journeyperson tradesmen are to have a copy of valid trade certificates available at site for review by Parks Canada Representative at any time.
- .9 Experienced and qualified superintendent is to be on-site at times when work is being performed.
- .10 Coordinate work inspection reviews and approvals with governing inspection department to ensure that construction schedule is not delayed. Be responsible for prompt notification of deficiencies to Parks Canada Representative and submission of reports and certificates to Parks Canada Representative.
- .11 Properly protect equipment and materials on site from damage due to elements and work of trades, to satisfaction of Parks Canada Representative. Equipment and materials are to be in new condition upon Substantial Performance of the Work.

1.08 PERMITS, CERTIFICATES, APPROVALS AND FEES

- .1 Contact and confirm with local authorities having jurisdiction including utility providers, requirements for approvals from such authorities.
- .2 Submit required applications, shop drawings, electrical distribution system protection device coordination studies, and short circuit calculations, and any other information requested by local authority.
- .3 Be responsible for ensuring that authorities having jurisdiction which require on-site inspection of work, have ample notification to perform inspection, with sufficient lead time to correct deficiencies in a manner that will not impede schedule of completion of Work. If any defect, deficiency or non-compliance is found in work by inspection, be responsible for costs of such inspection, including any related expenses, making good and return to site, until work is passed by governing authorities.
- .4 Obtain and submit to Parks Canada Representative, approval/inspection certificates issued by governing authorities to confirm that Work as installed is in accordance with rules and regulations of local governing authorities and are acceptable.
- .5 Include in each copy of operating and maintenance instruction manuals, copies of approvals and inspection certificates issued by regulatory authorities.

- .6 Where electromagnetic locks are provided whether by this Division or by others, be responsible for obtaining and paying for required certificates of work with regards to such electromagnetic lock work.

1.09 WORKPLACE SAFETY

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials. Submit WHMIS MSDS (Material Safety Data Sheets) for products where required, and maintain one copy at site in a visible and accessible location available to personnel.
- .2 Comply with requirements of Occupational Health and Safety Act and other regulations pertaining to health and safety, including worker's compensation/ insurance board and fall protection regulations.

1.10 PLANNING AND LAYOUT OF WORK

- .1 Base installation layout, design, terminations, and supply of accessories, on Contract Documents with specific coordination with reviewed shop drawings.

1.11 COORDINATION OF WORK

- .1 Review Contract Documents and coordinate work with work of each trade. Coordination requirements are to include, but not be limited to following:
 - .1 requirements for openings, sleeves, inserts and other hardware necessary for installation of work;
 - .2 concrete work such as housekeeping pads, sumps, bases, etc., required for work, and including required dimensions, operating weight of equipment, location, etc.;
 - .3 depth and routing of excavation required for work, and requirements for bedding and backfill;
- .2 Ensure materials and equipment are delivered to site at proper time and in such assemblies and sizes so as to enter into building and be moved into spaces where they are to be located without difficulty.
- .3 Wherever possible, coordinate equipment deliveries with manufacturers and/or suppliers so equipment is delivered to site when it is required, or so it can be stored within building subject to available space as confirmed with Parks Canada Representative and protected from elements.
- .4 Ensure proper access and service clearances are maintained around equipment, and, where applicable, access space for future equipment removal or replacement is not impeded. Comply with code requirements with regards to access space provision around equipment. Remove and replace any equipment which does not meet this requirement.
- .5 Where work is to be integrated, or is to be installed in close proximity with work of other trades, coordinate work prior to and during installation.

1.12 COMPONENT FINAL LOCATIONS

- .1 Parks Canada Representative reserve right to relocate electrical components such as receptacles, switches, communication system, outlets, hard wired outlet boxes and luminaries at a later date, but prior to installation, without additional cost to Parks Canada, if relocation per components do not exceed 3 m (10') from original location. No credits will be anticipated where relocation per components of up to and including 3 m (10') reduces materials, products and labour. Should relocations exceed 3 m (10') from original location, adjust contract price for that portion beyond 3 m (10') in accordance with provisions for changes in Contract Documents.

1.13 SYSTEMS COORDINATION

- .1 Be responsible for and perform specific coordination of various low voltage systems supplied by Electrical Divisions and also with systems supplied by other Divisions of Work. Include for but not be limited to provision of following, as applicable:
 - .1 coordinate with General Contractor and other Subcontractors, various systems of trades which in any way are interfaced with or monitored by or integrated to, or need to be coordinated with;
 - .2 review systems requirements for component back boxes and conduits; ensure that system of conduits and boxes meet respective system wiring bending radii requirements;
 - .3 review system shop drawings prior to submission to Parks Canada Representative, to verify that each system has been coordinated with other systems and that required options and features are selected to meet coordination requirements;
 - .4 be present at testing and commissioning functions of each system and provide technical assistance with regards to system operations;
 - .5 be "on-site" coordinator of respective system trades with regards to respective system coordination of installation and testing;
 - .6 coordinate and review with Parks Canada Representative with regards to ensuring that systems coordinate and integrate properly to satisfaction of Parks Canada Representative;
 - .7 document coordination and integration requirements and maintain records for submission as part of shop drawings;
 - .8 respond to coordination and integration requirements and be responsible for such work;
 - .9 where a system integrator has been included for, coordinate integration requirements with system integrator.

1.14 PRODUCTS

- .1 Be responsible for ordering of products (equipment and materials) in a timely manner in order to meet project-scheduling timelines. Failure to order products to allow manufacturers sufficient production/delivery time to meet project-scheduling timelines is an unacceptable reason to request for other suppliers or substitutions.
- .2 Provide Canadian manufactured products wherever possible or required and when quality and performance is obtainable at a competitive price. Products are to be supplied from manufacturer's authorized Canadian representative, unless otherwise noted. Unless otherwise specified, products are to be new and are to comply with applicable respective Canadian standards. References to UL listings of products to include requirements that products are to be also Underwriters Laboratories of Canada (ULC) listed for use in Canada. Products are to meet or exceed latest ANSI/ASHRAE/IES 90.1 standards, as applicable. Do not supply any products containing asbestos materials or PCB materials.
- .3 Products scheduled and/or specified have been selected to establish a performance and quality standard, and, in some instances, a dimensional standard. In most cases, base specified manufacturers are stated for any product specified by manufacturer's name and model number. Where acceptable manufacturers are listed, first name listed is base specified company. Bid Price may be based on products supplied by any of manufacturers' base specified or named as acceptable for particular product. If acceptable manufacturers are not stated for a particular product, base Bid Price on product supplied by base specified manufacturer.
- .4 Documents have been prepared based on product available at time of Bidding. If, after award of Contract, and if successful manufacturer can no longer supply a product that meets base specifications, notify Parks Canada Representative immediately. Be responsible for obtaining other manufacturers product that complies with base specified performance and criteria and meets project timelines. Proposed products are subject to review and consideration by Parks Canada Representative and are considered as substitutions subject to a credit to Contract. In addition, if such products require modifications to room spaces, mechanical systems, electrical systems, etc., include required changes. Such changes are to be submitted in detail to Parks Canada Representative for review and consideration for acceptance. There will be no increase in Contract Price for revisions. Above conditions supplement and are not to supersede any specification conditions in Division 01 with regards to substitutions or failure to supply product
- .5 Listing of a product as "acceptable" does not imply automatic acceptance by Parks Canada Representative. It is responsibility of Contractor to ensure that any price quotations received and submittals made are for products that meet or exceed specifications included herein.

- .6 If products supplied by a manufacturer named as acceptable are used in lieu of base specified manufacturer, be responsible for ensuring that they are equivalent in performance and operating characteristics (including energy consumption if applicable) to base specified products. It is understood that any additional costs (i.e. for larger starters, larger feeders, additional spaces, etc.), and changes to associated or adjacent work resulting from provision of product supplied by a manufacturer other than base specified manufacturer, is included in Bid Price. In addition, in equipment spaces where equipment named as acceptable is used in lieu of base specified equipment and dimensions of such equipment differs from base specified equipment, prepare and submit for review accurately dimensioned layouts of rooms affected, identifying architectural and structural elements, systems and equipment to prove that equipment in room will fit properly meeting design intent. There will be no increase in Contract Price for revisions.
- .7 In addition to manufacturer's products base specified or named as acceptable, other manufacturers of products may be proposed as substitutions to Parks Canada Representative for review and consideration for acceptance, listing in each case a corresponding credit for each substitution proposed. However, base Bid Price on products base specified or named as acceptable. Certify in writing to Parks Canada Representative that proposed substitution meets space, power, design, energy consumption, and other requirements of base specified or acceptable product. It is understood that there will be no increase in Contract Price by reason of any changes to associated equipment, mechanically, electrically, structurally or architecturally, required by acceptance of proposed substitution. Parks Canada Representative has sole discretion in accepting any such proposed substitution of product. Indicate any proposed substitutions in areas provided on Bid Form. Do not order such products until they are accepted in writing by Parks Canada Representative.
- .8 Indicate in Supplementary Electrical Bid Form, names of manufacturers for proposed products to be supplied, and which were base specified or scheduled with a manufacturer's name. Names of proposed manufacturers on list must be one of names stated as acceptable for particular products, unless prior approval from Parks Canada Representative has been given for use of products by other manufacturers. Submit to Parks Canada Representative for review as directed.
- .9 Where products are listed as "or approved equal", certify in writing that product to be used in lieu of base specified product, at least meets space, power, design, energy consumption, and other requirements of base specified product and is equivalent or better than base specified product. When requested by Parks Canada Representative, provide full design detail drawings and specifications of proposed products. Acceptance of these "or approved equal" products is at sole discretion of Parks Canada Representative. It is understood that there will be no increase in Contract Price by reason of any changes to associated equipment, mechanically, electrically, structurally or architecturally, required by acceptance of approved equal product. There must be no increase in Contract price due to Parks Canada Representative's rejection of proposed equivalent product.

- .10 Whenever use of product other than base specified product is being supplied, ensure corresponding certifications and product information (detailed catalogue and engineering data, fabrication information and performance characteristics) are submitted to Parks Canada Representative for review. Failure of submission of these documents to Parks Canada Representative in a timely manner to allow for review will result in base specified product to be supplied at Parks Canada Representative's discretion, at no additional cost to Contract.
- .11 Products supplied by a manufacturer/supplier other than a manufacturer listed as acceptable may be considered for acceptance by Parks Canada Representative if requested in writing with full product documentation submitted, a minimum of 10 working days prior to Bid closing date.
- .12 Any proposed changes initiated by Contractor after award of Contract may be considered by Parks Canada Representative at his discretion, with any additional costs for such changes if accepted by Parks Canada Representative, and costs for review, to be borne by Contractor.
- .13 Whenever use of product other than based specified products or named as acceptable is being supplied, allow sufficient time for processing of product submissions and time for Parks Canada Representative's review, such that there will not be significant impact on contract time or work schedule.
- .14 Requirements for low voltage systems of this project that are of technology that changes rapidly and are forever evolving and changing, resulting in systems that may be out dated by time of installation, are to include provisions to allow Parks Canada Representative option to select most updated technology. Shop drawings for such systems and equipment are to include provisions for a minimum 6-week review time for Parks Canada Representative to review degree of technology of each system and determine acceptance. Parks Canada Representative will have right to substitute a more advanced technology subject to negotiated pricing.

1.15 SHOP DRAWINGS

- .1 At start-up meeting review with Parks Canada Representative, products to be included in shop drawing submission. Prepare and submit list of products to Parks Canada Representative for review.
- .2 Submit electronic copies of shop drawings unless otherwise directed by Parks Canada Representative. Review exact requirements with Parks Canada Representative.
- .3 Submit for review, drawings showing in detail design, construction, and performance of equipment and materials as requested in Specification. Submit shop drawings to Parks Canada Representative for review prior to ordering and delivery of product to site. Include minimally for preparation and submission of following, as applicable:
 - .1 product literature cuts;
 - .2 equipment data sheets;

- .3 equipment dimension drawings;
- .4 system block diagrams;
- .5 sequence of operation;
- .6 connection wiring schematic diagrams;
- .4 Each shop drawing or product data sheet is to be properly identified with project name and product drawing or specification reference. Shop drawing or product data sheet dimensions are to match dimension type on drawings.
- .5 Where any item of equipment is required by Code or Standard or By-Law to meet a specific energy efficiency level, or any other specific requirement, ensure this requirement is clearly indicated on submission.
- .6 Ensure proposed products meet each requirement of Project. Endorse each shop drawing copy "CERTIFIED TO BE IN ACCORDANCE WITH ALL REQUIREMENTS". Include company name, submittal date, and sign each copy. Shop drawings that are received and are not endorsed, dated and signed will be returned to be resubmitted.
- .7 Parks Canada Representative to review shop drawings and indicate review status by stamping shop drawing copies as follows:
 - .1 "REVIEWED" or "REVIEWED AS NOTED" (appropriately marked) – If Parks Canada Representative's review of shop drawing is final, Parks Canada Representative to stamp shop drawing;
 - .2 "RETURNED FOR CORRECTION" – If Parks Canada Representative's review of shop drawing is not final, Parks Canada Representative to stamp shop drawing as stated above, mark submission with comments, and return submission. Revise shop drawing in accordance with Parks Canada Representative's notations and resubmit.
- .8 Following is to be read in conjunction with wording on Parks Canada Representative's shop drawing review stamp applied to each and every shop drawing submitted:

"THIS REVIEW BY PARKS CANADA REPRESENTATIVE IS FOR SOLE PURPOSE OF ASCERTAINING CONFORMANCE WITH GENERAL DESIGN CONCEPT. THIS REVIEW DOES NOT MEAN THAT CONSULTANT APPROVES DETAILED DESIGN INHERENT IN SHOP DRAWINGS, RESPONSIBILITY FOR WHICH REMAINS WITH CONTRACTOR. CONSULTANT'S REVIEW DOES NOT RELIEVE CONTRACTOR OF RESPONSIBILITY FOR ERRORS OR OMISSIONS IN SHOP DRAWINGS OR OF CONTRACTOR'S RESPONSIBILITY FOR MEETING REQUIREMENTS OF CONTRACT DOCUMENTS. BE RESPONSIBLE FOR DIMENSIONS TO BE CONFIRMED AND CORRELATED AT JOB SITE, FOR INFORMATION THAT PERTAINS SOLELY TO FABRICATION PROCESSES OR TO TECHNIQUES OF CONSTRUCTION AND INSTALLATION, AND FOR CO-ORDINATION OF WORK OF SUB-TRADES."

- .9 Submit each system and each major component as separate shop drawing submissions. Submit together, shop drawings for common devices such as devices of each system.
- .10 Obtain shop drawings for submission from product manufacturer's authorized representatives and supplemented with additional items specified herein.
- .11 Do not order product until respective shop drawing review process has been properly reviewed with Parks Canada Representative.
- .12 Where extended warranties are specified for equipment items, submit specified extended warranty with shop drawing submittal.
- .13 Refer to specific requirements in other Sections.

1.16 EQUIPMENT LOADS

- .1 Supply equipment loads (self-weight, operating weight, housekeeping pad, inertia pads, etc.) to Parks Canada Representative, via shop drawing submissions, prior to construction.
- .2 Where given choice of specific equipment, actual weight, location and method of support of equipment may differ from those assumed by Parks Canada Representative for base design. Back-check equipment loads, location, and supports, and include necessary accommodations.
- .3 Where supporting structure consists of structural steel framing, it is imperative that equipment loads, location, and method of support be confirmed prior to fabrication of structural steel. Review locations of equipment with Parks Canada Representative prior to construction.

1.17 OPENINGS

- .1 Supply opening sizes and locations to Parks Canada Representative to allow verification of their effect on design, and for inclusion on structural drawings where appropriate.
- .2 No openings are permitted through completed structure without written approval from Parks Canada Representative and review with Parks Canada Representative. Show required openings on a copy of structural drawings. Identify exact locations, elevations, and size of proposed openings and submit to Parks Canada Representative for review, well in advance of doing work.
- .3 Prior to leaving site at end of each day, walk through areas of work and check for any openings, penetrations, holes, and/or voids created under scope of work of project, and ensure that any openings created under scope of work have been closed off, fire-stopped and smoke-sealed. Unless directed by Parks Canada Representative, do not leave any openings unprotected and unfinished overnight.

1.18 CHANGES IN THE WORK

- .1 Whenever Parks Canada Representative proposes in writing to make a change or revision to design, arrangement, quantity, or type of any work from that required by Contract Documents, prepare and submit to Parks Canada Representative for review, a quotation being proposed cost for executing change or revision.
- .2 Quotation to be a detailed and itemized estimate of product, labour, and equipment costs associated with change or revision, plus overhead and profit percentages and applicable taxes and duties.
- .3 If overhead and profit percentages are not specified in Division 00 or 01, but allowable under Contract as reviewed with Parks Canada Representative prior to contract signing, then allowable maximum percentages for overhead and profit are to be 7% and 5% respectively.
- .4 Unless otherwise specified in Divisions 00 or 01, following additional requirements apply to quotations submitted:
 - .1 when change or revision involves deleted work as well as additional work, cost of deleted work (less overhead and profit percentages but including taxes and duties) is to be subtracted from cost of additional work before overhead and profit percentages are applied to additional work;
 - .2 material costs are not to exceed those published in local estimating price guides;
 - .3 electrical material labour unit costs are to be in accordance with National Electrical Contractors Association Manual of Labor Units at difficult level, less 25%;
 - .4 mechanical material labour unit costs are to be in accordance with Mechanical Contractors Association of America Labor Estimating Manual, less 25%;
 - .5 costs for journeyman and apprentice labour must not exceed prevailing rates at time of execution of Contract and must reflect actual personnel performing work;
 - .6 cost for site superintendent must not exceed 10% of total hours of labour estimated for change or revision, and change or revision must be such that site superintendent's involvement is necessary;
 - .7 costs for rental tools and/or equipment are not to exceed local rental costs;
 - .8 overhead percentage will be deemed to cover quotation costs other than actual site labour and materials, and rentals;
 - .9 quotations, including those for deleted work, to include a figure for any required change to Contract time.
- .5 Quotations submitted that are not in accordance with requirements specified above will be rejected and returned for re-submittal. Failure to submit a proper quotation to enable Parks Canada Representative to expeditiously process quotation and issue a Change Order will not be grounds for any additional change to Contract time.

- .6 Make requests for changes or revisions to work to Parks Canada Representative in writing and, if Parks Canada Representative agrees, will issue Notice of Change.
- .7 Do not execute any change or revision until written authorization for change or revision has been obtained from Parks Canada Representative.

1.19 PROGRESS PAYMENT BREAKDOWN

- .1 In accordance with Division 01.

1.20 NOTICE FOR REQUIRED FIELD REVIEWS

- .1 Whenever there is a requirement for Parks Canada Representative to perform a field review prior to concealment of any work, to inspect/re-inspect work for deficiencies prior to Substantial Performance of the Work, for commissioning demonstrations, and any other such field review, give minimum 10 working days' notice in writing to Parks Canada Representative.
- .2 If Parks Canada Representative is unable to attend a field review when requested, arrange an alternative date and time.
- .3 Do not conceal work until Parks Canada Representative advises that it may be concealed.
- .4 When Parks Canada Representative is requested to perform a field review and work is not ready to be reviewed, reimburse Parks Canada Representative for time and travel expenses.

1.21 PRELIMINARY TESTING

- .1 When directed by Parks Canada Representative, promptly arrange, pay for, and perform site tests on any piece of equipment or any system for such reasonable lengths of time and at such times as may be required to prove compliance with Specification and governing Codes and Regulations, prior to Substantial Performance of the Work.
- .2 When, in Parks Canada Representative's opinion, tests are required to be performed by a certified testing laboratory, arrange and pay for such tests.
- .3 These tests are not to be construed as evidence of acceptance of work, and it is agreed and understood that no claim for delays or damage will be made for injury or breakage to any part or parts of equipment or system due to test where such injuries or breakage were caused by faulty parts and/or workmanship of any kind.
- .4 When, in Parks Canada Representative's opinion, tests indicate that equipment, products, etc., are defective or deficient, immediately remove such equipment and/or products from site and replace them with acceptable equipment and/or products, at no additional cost.

1.22 PROVISIONS FOR SYSTEMS/EQUIPMENT USED DURING CONSTRUCTION

- .1 Any system or piece of equipment that is specified to be provided under requirements of Documents and is required to be used during construction stages of work prior to issuing of Certificate of Substantial Performance of the Work, are to be provided with special interim maintenance and service to cover systems/equipment during time of use during construction period of project until project has been certified as substantially performed and such systems/equipment are turned over to Parks Canada.
- .2 During this period of construction, such systems/equipment to not become property of Parks Canada or be Parks Canada's responsibility for maintenance or service. Systems/equipment are to remain property of respective manufacturers/suppliers or Contractor, who are responsible for full maintenance and servicing of systems/equipment in order to maintain validity of warranties after turn over to Parks Canada.
- .3 Prior to application for a Certificate of Substantial Performance of the Work and turn over to Parks Canada, such systems/equipment to be cleaned, restored to "new" condition, luminaries re-lamped with "new" lamps, paint finishes "touched-up", etc.

1.23 TEMPORARY SERVICES

- .1 Coordinate carry costs for requirements for temporary services including but not limited to temporary electrical power, lighting, heating in accordance with Division 01. Unless otherwise noted, provide required services in accordance with requirements of local governing building code and local governing inspection authorities.

1.24 CLEANING

- .1 During construction, keep site reasonably clear of rubbish and waste material resulting from work on a daily basis to the satisfaction of Parks Canada Representative. Before applying for a Certificate of Substantial Performance of the Work, remove rubbish and debris, and be responsible for repair of any damage caused as a result of work.
- .2 At time of final cleaning, clean luminaire reflectors, lenses, and other luminary surfaces that have been exposed to construction dust and dirt, including top surface, whether it is exposed or in ceiling space.
- .3 Clean switches, receptacles, communications outlets, coverplates, and exposed surfaces.
- .4 Clean other electrical equipment and devices installed as part of this project.
- .5 For work performed in electrical equipment rooms, electrical closets and communication closets, perform following:
 - .1 HEPA vacuum and clean interiors and buswork of switchboards, panels, cabinets and other electrical equipment of construction debris and dust prior to energization;

1.25 RECORD AS-BUILT DRAWINGS

- .1 Drawings for this project have been prepared on a CAD system using AutoCAD software of release version reviewed with Parks Canada Representative. For purpose of producing record "as built" drawings, copies of Contract Drawings can be obtained from Parks Canada Representative, at expense of \$25.00 CDN plus HST, per drawing, up to first 10 drawings, and \$5.00 CDN plus HST, per any additional drawings thereafter. Drawings may also to be used for preparation of layouts and interference drawings.
 - .1 dimensioned location of inaccessible concealed work;
 - .2 for underground piping and ducts, record dimensions, invert elevations, offsets, fittings, cathodic protection and accessories if applicable, and locate dimensions from benchmarks to be preserved after construction is complete;
 - .3 location of concealed services terminated for future extension and work concealed within building in inaccessible locations.
 - .4 identify routing and location of concealed conduits/ducts of diameter 50 mm (2") and greater;
- .2 Before applying for a Certificate of Substantial Performance of the Work, update a clean copy of Contract Drawing set in accordance with marked up set of "as-built" white prints including deviations from original Contract Drawings, thus forming an "as-built" drawing set. Submit "as-built" site drawing prints to Parks Canada Representative for review. Make necessary revisions to drawings as per Parks Canada Representative's comments, to satisfaction of Parks Canada Representative.
- .3 Use final reviewed "as-built" drawing set to provide CAD files of drawings thus forming true "as-built" set of Contract Drawings. Identify set as "Project Record Copy". Load digital copies of final reviewed by Parks Canada Representative as-built drawings onto USB type flash drive. Provide 2 complete sets of "as-built" drawings on separate USBs. Submit "as-built" sets of white prints and USBs to Parks Canada Representative.
- .4 Submitted drawings are to be of same quality as original Contract Drawings. CAD drawing files are to be compatible with AutoCAD software release version confirmed with Parks Canada Representative.
- .5 Unless otherwise noted in Divisions 00 or 01, failure to maintain accurate record drawings will incur additional 5% holdback on progress claims until drawings are brought up to date to satisfaction of Parks Canada Representative.

1.26 OPERATING AND MAINTENANCE MANUALS

- .1 For each item of equipment for which a shop drawing is required (except for simple equipment), supply minimum 3, project specific, indexed copies of equipment manufacturers' operating and maintenance (O&M) instruction data manuals. Review exact quantity of manuals with Parks Canada Representative. Consolidate each copy of data in an identified hard cover three "D" ring binder. Each binder to include:

- .1 front cover: project name label; wording – "Electrical Systems Operating and Maintenance Manual"; and date;
 - .2 introduction sheet listing Parks Canada Representative, Contractor, and Subcontractor names, street addresses, telephone and fax numbers, and e-mail addresses;
 - .3 equipment manufacturer's authorized contact person name, telephone number and company website;
 - .4 Table of Contents sheet, and corresponding index tab sheets;
 - .5 copy of each "REVIEWED" or clean, updated "REVIEWED AS NOTED" shop drawing or product data sheet, with manufacturer's/supplier's name, telephone and fax numbers, email address, company website address, and email address for local source of parts and service; when shop drawings are returned marked "REVIEWED AS NOTED" with revisions marked on shop drawing copies, they are to be revised by equipment supplier to incorporate comments marked on "reviewed" shop drawings and a clean updated copy is to be included in operating and maintenance manuals;
 - .6 Maintenance data is to include:
 - .1 operation and trouble-shooting instructions for each item of equipment and each system;
 - .2 schedules of tasks, frequency, tools required, and estimated task time;
 - .3 recommended maintenance practices and precautions;
 - .4 complete parts lists with numbers.
 - .7 Performance data is to include:
 - .1 equipment and system start-up data sheets;
 - .2 equipment test reports;
 - .3 final verification and commissioning reports.
 - .8 wiring and connection diagrams;
 - .9 copies of additional and revised panelboard directories;
 - .10 warranties;
 - .11 items requested specifically in Section Articles.
- .2 Generally, binders are not to exceed 75 mm (3") thick and not to be more than 2/3 full.

- .3 Operating and maintenance instructions are to relate to job specific equipment supplied under this project. Language used in manuals is to contain simple practical operating terms and language easy for in-house maintenance staff to understand how to operate and maintain each system.
- .4 Before applying for a Certificate of Substantial Performance of the Work, assemble one draft copy of O & M Manual and submit to Parks Canada Representative for review prior to assembling remaining copies. Incorporate Parks Canada Representative's comments into final submission.

1.27 WARRANTY

- .1 Unless otherwise specified in Divisions 00 and 01, warrant work to be in accordance with Contract Documents and free from defects for a period of 1 year from date of issue of a Certificate of Substantial Performance of the Work.
- .2 Where equipment includes extended warranty period, e.g., 5 years, first year of warranty period is to be governed by terms and conditions of warranty in Contract Documents, and remaining years of warranty are to be direct from equipment manufacturer and/or supplier to Parks Canada. Submit signed and dated copies of extended warranties to Parks Canada Representative.
- .3 Warranty to include parts, labour, travel costs and living expenses incurred by manufacturer's authorized technician to provide factory authorized on-site service.
- .4 Repair and/or replace any defects that appear in Work within warranty period without additional expense to Parks Canada. Be responsible for costs incurred in making defective work good, including repair or replacement of building finishes, other materials, and damage to other equipment. Ordinary wear and tear and damage caused wilfully or due to carelessness of Parks Canada staff or agents is exempted.
- .5 Do not include Owner deductible amounts in warranties.

1.28 PROJECT CLOSE OUT SUBMITTALS

- .1 Prior to application for Substantial Performance of the Work, submit required items and documentation specified, including following:
 - .1 Operating and Maintenance Manuals;
 - .2 as-built record drawings and associated data;
 - .3 extended warranties for equipment as specified;
 - .4 operating test certificates;
 - .5 identified keys for equipment and/or panels for which keys are required, and other items required to be submitted;
 - .6 other data or products specified.

1.29 INSTRUCTIONS TO PARKS CANADA REPRESENTATIVE

- .1 Refer to equipment and system operational and maintenance training requirements specified in Division 01.
- .2 Train Parks Canada Representative's designated personnel in aspects of operation and maintenance of equipment and systems as specified. Demonstrations and training are to be performed by qualified technicians. Supply hard copies of training materials to each attendee.
- .3 Unless where specified otherwise in trade Sections, minimum requirements are for manufacturer/suppliers of each system and major equipment, to provide minimum one sessions each consisting of minimum one hours on site, of Parks Canada Representative's designated personnel (for up to 6 people each session), on operation and maintenance procedures of system.
- .4 For each item of equipment and for each system for which training is specified, prepare training modules as specified below. Use Operating and Maintenance Manuals during training sessions. Training modules include but are not limited to:
 - .1 Operational Requirements and Criteria: equipment function, stopping and starting, safeties, operating standards, operating characteristics, performance curves, and limitations;
 - .2 Troubleshooting: diagnostic instructions, test and inspection procedures;
 - .3 Documentation: equipment/system warranties, and manufacturer's/supplier's parts and service facilities, telephone numbers, email addresses, and the like;
 - .4 Maintenance: inspection instructions, types of cleaning agents to be used as well as cleaning methods, preventive maintenance procedures, and use of any special tools;
 - .5 Repairs: diagnostic instructions, disassembly, component removal and repair instructions, instructions for identifying parts and components, and review of any spare parts inventory.
- .5 Before instructing Parks Canada Representative's designated personnel, submit to Parks Canada Representative for review preliminary copy of training manual and proposed schedule of demonstration and training dates and times. Incorporate Parks Canada Representative's comments in final copy.
- .6 Obtain in writing from Parks Canada Representative, list of Parks Canada personnel to receive instructions. Submit to Parks Canada Representative prior to application for Certificate of Substantial Performance of the Work, complete list of systems for which instructions were given, stating for each system:
 - .1 date instructions were given to Parks Canada staff;
 - .2 duration of instruction;
 - .3 names of persons instructed;

- .4 other parties present (manufacturer's representative, consultants, etc.).
- .7 Obtain signatures of Parks Canada staff to verify they properly understood system installation, operation and maintenance requirements, and have received operating and maintenance instruction manuals and "as-built" record drawings.
- .8 Submit to Parks Canada Representative copy of electronic version of training materials loaded on USB flash drive. Include in operating and maintenance manuals submission.

1.30 FINAL INSPECTION

- .1 Submit to Parks Canada Representative, written request for final inspection of systems. Include written certification that:
 - .1 deficiencies noted during job inspections have been completed;
 - .2 field quality control procedures have been completed;
 - .3 maintenance and operating data have been completed and submitted to, reviewed with, and accepted by Parks Canada Representative;
 - .4 tags and nameplates are in place and equipment identifications have been completed;
 - .5 clean-up is complete;
 - .6 spare parts and replacement parts specified have been provided and acknowledged by Parks Canada Representative;
 - .7 as-built and record drawings have been completed and submitted to and reviewed and accepted by Parks Canada Representative;
 - .8 Parks Canada staff has been instructed in operation and maintenance of systems;
 - .9 Commissioning procedures have been completed.

2 PRODUCTS

NOT USED

3 EXECUTION

NOT USED

END OF SECTION

1 GENERAL

1.01 REFERENCE

- .1 Divisions 00, 01, 02, 03, 09, 31, 32 and all other Division 26 sections apply to and are a part of Electrical Materials and Methods for this project.

1.02 APPLICATION

- .1 This Section specifies products, criteria and characteristics, and methods and execution that are common to one or more Sections of Electrical Divisions. It is intended as a supplement to each Section of Electrical Divisions and is to be read accordingly.
- .2 Wherever references, products, execution of work, or any other requirements described within this section differ from other sections within this specification, the more robust or stringent shall apply.

1.03 SUBMITTALS

- .1 Submit shop drawings for products of this Section.
- .2 Additionally as part of shop drawing submission process, submit following to Parks Canada Representative for review:
 - .1 equipment nameplate and warning sign proposed nomenclature, print type, symbols, sizing and colours;
 - .2 copies of prior to start of construction approvals from local governing authorities having jurisdiction.
- .3 Prior to application for Substantial Performance of the Work, submit following to Parks Canada Representative for review (note: funds will be withheld until each of following items have been completed and documented to satisfaction of Parks Canada Representative):
 - .1 final distribution system testing performed and documented to satisfaction of Parks Canada Representative;

2 PRODUCTS

2.01 CONDUITS

- .1 EMT (Thinwall), galvanized electrical metallic tubing to CSA C22.2 No. 83, complete with factory made bends where site bending is not possible and joints and terminations made with steel couplers and steel set screw type connectors with insulated throats, and concrete tight where required.
- .2 Rigid galvanized steel to CSA C22.2 No. 45, with exterior zinc and interior enamel coatings, galvanized threads where factory cut and red lead coated threads where site cut. Factory made bends where site bending is not possible, factory made and threaded fittings, and connectors, and terminations with rigid couplings, and concrete tight where required.
- .3 Galvanized steel flexible liquid tight metallic conduit to CSA C22.2 No. 56, complete with Ideal "Steel Tough" liquid-tight flexible conduit connectors at terminations.
- .4 Galvanized steel flexible metallic conduit to CSA C22.2 No. 56, complete with proper and suitable squeeze type connectors at terminations.
- .5 CSA approved and labelled to CSA C22.2 No. 211.2, rigid plastic PVC conduit complete with site made heat gun bends on conduit to 50 mm (2") diameter, factory made elbows in conduit larger than 50 mm (2") diameter, solvent weld joints, factory made expansion joints where required, and terminations made with proper and suitable connectors and adaptors.
- .6 Only for underground horizontal installations embedded in sand beds within trenches, Type DB2 PVC conduit: to CSA C22.2 No. 211.1

2.02 PULLBOXES AND JUNCTION BOXES

- .1 Galvanized or prime coat plated steel, suitable in respects for application and complete with screw-on or hinged covers as required, and connectors suitable for connected conduit.
- .2 Boxes exposed exterior of building or in non-climate controlled locations to be weatherproof boxes complete with gasketed covers.

2.03 FASTENING AND SECURING HARDWARE

- .1 Metal framing channels – 40 mm (1-5/8") width, galvanized steel channels complete with required fittings and ancillary hardware; acceptable manufacturers are:
 - .1 Unistrut;
 - .2 Thomas & Betts;
 - .3 Eaton B-Line.

2.04 IDENTIFICATION NAMEPLATES

- .1 Laminated plastic (Lamacoid) black-white-black with bevelled edges, stainless steel screws, and proper identification engraving. Each nameplate to be sized to suit equipment for which it is provided, and required wording. Confirm nomenclature with Parks Canada Representative. Various colour configurations to be used to differentiate systems. Confirm exact colour scheme with Parks Canada Representative.
- .2 Brother "P-Touch", portable electronic labelling system complete with self-adhesive, permanent printed labels with required nomenclature.

3 EXECUTION

3.01 GENERAL CONDUIT INSTALLATION REQUIREMENTS

- .1 Install conduit concealed in finished areas, and concealed to degree made possible by finishes in partially finished and unfinished areas. Conduit may be exposed in unfinished areas such as Electrical and Mechanical Rooms, unless otherwise noted on drawings or specified herein. Refer to and examine architectural drawings and room finish schedules to determine finished, partially finished or unfinished areas of building. Documents do not identify exact routing. Where shown, routing is diagrammatic, identifying general requirements of routing and locations. Include for necessary offsets, fittings, transformations and similar items required as a result of obstructions and other architectural or structural details not shown.
- .2 Where conduits are exposed, arrange them to avoid interference with other work, parallel to building lines and install as high as possible. Do not install conduits within 150 mm (6") of "hot" pipes or equipment unless conduits are associated with equipment. Independently run conduit to be supported from wall/ceiling structure, not from ceiling hangers, ductwork, piping, cable trays, formed steel decking, etc. Do not run conduits within 900 mm (3') of equipment access opening covers.
- .3 Conduits are sized on drawings, but in absence of type and sizing, type and size to suit intended application in accordance with applicable local governing electrical code requirements. Sizes identified on drawings are minimum sizes and are not to be decreased unless reviewed and approved by Parks Canada Representative.

3.02 INSTALLATION OF CONDUIT

- .1 Provide conduit as shown on drawings and in these specifications.
- .2 Provide conduit as follows:
 - .1 For exposed conduit outside building, DB2 for underground horizontal installations buried in sand and rigid PVC in all other locations;
 - .2 All exterior conduit shall be installed at a minimum temperature of 5 degrees Celsius; this includes ambient temperature of sand bed for resting conduit.

- .3 All conduit to be buried shall be inspected by Parks Canada Representative prior to backfill of remaining sand bed. Sand covering conduit shall be minimum 5 degrees Celsius when covering process occurs. Sand shall be free of ice.
- .4 Support underground conduit on a well-tamped flat bed of earth, free from rocks or protrusions of any kind. Grade and slope bed to provide conduits and ducts with proper drainage. Coordinate with General Trades Contractor for provision of means to carry away drainage water.
- .5 Obtain required approvals of work from local governing electrical utility and review with Parks Canada Representative prior to back filling and covering. Provide pull cord in each duct run.
- .6 Replace any broken sections of conduit.
- .7 Install pull ropes in conduit and demonstrate to Parks Canada Representative that ropes move freely through conduit.
- .3 Install manufactured expansion joints in rigid PVC plastic conduit every 30 metres or spaced as required by conduit manufacturer.
- .4 Support and secure surface mounted and suspended single or double runs of metal conduit at support spacing in accordance with local governing electrical code requirements by means of galvanized pipe straps, conduit clips, ringbolt type hangers, or by other proper manufactured devices.
- .5 Support multiple mixed size metal conduit runs with Unistrut Ltd., Electrovert Ltd. "CANTRUSS" or Burndy Ltd. "FLEXIBLE" conduit racks spaced to suit spacing requirements of smallest conduit in group.
- .6 Unless otherwise noted, provide conduit fittings constructed of same materials as conduit and which are suitable in respects for application.
- .7 Provide proper adaptors for joining conduits of different materials.
- .8 Cut square and properly ream site cut conduit ends.
- .9 Provide conduit as sized on drawings. Size conduit not sized on drawings in accordance with latest edition of local governing electrical code with consideration that sizes of branch circuit conductors indicated are minimum sizes and must be increased as required to suit length of run and voltage drop in accordance with voltage drop schedule found on drawings or at end of this section. Where conductor sizes are increased to suit voltage drop requirements, increase scheduled or specified conduit size to suit. Unless otherwise noted on drawings or required by local governing electrical code or specified elsewhere, conduit to be of minimum size 13 mm (1/2") diameter. Structured network cabling system conduit to be of minimum 19 mm (3/4") diameter, unless otherwise noted.
- .10 Site made bends for conduit to maintain full conduit diameter with no kinking, and conduit finishes are not flake or crack when conduit is bent.

- .11 Plug ends of roughed-in conduits which are exposed during construction with approved plugs.
- .12 Ensure that conduit systems which are left empty for future wiring are clean, clear, capped and properly identified at each termination point. Provide end bushing and suitable fish wires in such conduits.
- .13 Provide empty conduits to ceiling spaces from flush mounted panelboards located below and/or near hung ceiling. Refer to drawing detail.

3.03 INSTALLATION OF OUTLET BOXES AND BACK BOXES

- .1 Provide an outlet box or back box for each luminaire, wiring device, and each other such outlet.
- .2 Size boxes to accommodate exact supplied components and for bending radii of installed cables. Confirm requirements with respective system vendors.
- .3 Outlet boxes flush mounted in interior construction, surface mounted in concealed interior locations, and surface mounted in exposed interior locations where connecting conduit is EMT, to be stamped and galvanized steel outlet boxes unless otherwise noted.
- .4 Provide sealing around boxes in walls where insulation and vapour barrier is present or for walls of rooms that are sealed. Maintain sealing system of wall.
- .5 Outlet boxes in underground plastic conduit systems to be rigid PVC plastic outlet boxes, unless otherwise noted.

3.04 INSTALLATION OF PULLBOXES AND JUNCTION BOXES

- .1 Provide pullboxes in conduit systems wherever shown on drawings, and/or wherever necessary to facilitate conductor installations. Generally, conduit runs exceeding 30 m (100") in length, or with more than two - 90° bends, are to be equipped with a pullbox installed at a convenient and suitable intermediate accessible location.
- .2 Size boxes to accommodate exact supplied system and for bending radii of installed cables. Confirm requirements with respective system vendors.
- .3 Provide junction boxes wherever required and/or indicated on drawings and as required by local governing electrical code.
- .4 Provide sealing around boxes in walls where insulation and vapour barrier is present or for walls of rooms that are sealed. Maintain sealing system of wall.
- .5 Boxes in rigid conduit and EMT inside building to be stamped galvanized or prime coated steel.
- .6 Boxes in exterior rigid conduit and boxes in perimeter wall where insulation and vapour barrier is present, to be "Condulet" cast gasketed boxes, unless otherwise noted.
- .7 Boxes in plastic conduit to be rigid PVC plastic boxes complete with required couplings.

- .8 Pullboxes and junction boxes to be accessible after work is completed.
- .9 Accurately locate and identify concealed pullboxes and junction boxes on "As-built" record drawings.

3.05 INSTALLATION OF FASTENING AND SECURING HARDWARE

- .1 Provide fasteners and similar hardware required for conduit, duct, raceway, conductors, etc. and for equipment hanger and/or support material unless otherwise noted.
- .2 Fasten hanger and support provisions to masonry with expansion shields and machine bolts, or, for light loads, use plugs, and screws.

3.06 INSTALLATION OF IDENTIFICATION NAMEPLATES

- .1 Panelboard nameplates to identify panelboard number as designated on drawings, unless otherwise instructed. Nameplates for disconnect switches, control panels, and cabinets to outline their service and source of supply.
- .2 Nameplates to be mechanically secured lamacoid, Black with white letters
- .3 Above identification nameplate and nomenclature requirements are for typical requirements for pricing only.
- .4 Confirm print size type and size, colours, sizing and nomenclature of nameplates with Parks Canada Representative prior to ordering.

3.07 INSTALLATION OF WARNING SIGNS

- .1 Provide warning signs as applicable for following:
 - .1 on outdoor distribution panels;
 - .2 for other applications as noted.
- .2 Secure signs to equipment with stainless steel screws. Number of signs required and sign wording, symbols, and colours to be reviewed and approved by Parks Canada Representative, and local electrical utility, where applicable.
- .3 Provide warning tape in all trenches as shown on drawings.

3.08 EQUIPMENT BASES AND SUPPORTS

- .1 Provide equipment bases, supports and concrete housekeeping pads for mounting of floor standing equipment and luminaire pole bases.
- .2 Secure floor mounted equipment in place on 100 mm (4") high concrete housekeeping pads, 100 mm (4") wider and longer than equipment base dimensions. Chamfer edges of bases. Include for seismic restrains as required by local governing building code.

- .3 Supply dimensioned drawings, templates, and anchor bolts for proper setting of equipment on bases and pads. Be responsible for required levelling, alignment, and grouting of equipment.
- .4 Submit to Parks Canada Representative for review, dimensioned shop drawings of structurally designed concrete pads or bases for support of large, heavy equipment. Indicate on shop drawings total weight of pad or base, reinforcement, and equipment for which it is required.
- .5 Unless otherwise noted, support equipment suspended above floor level with suitable welded or bolted prime coat painted structural steel angles or channels bracketed to wall or secured by hanger rods.

3.09 CONCRETE WORK

- .1 Provide concrete required for work, including formwork and reinforcing steel.
- .2 Unless otherwise noted in Division 03, concrete to be minimum 20700 kPa (3000 psi) ready mix concrete provided in accordance with latest editions of CAN/CSA-A23.1 "Concrete Materials and Methods of Concrete Construction" and CAN/CSA-A23.2 "Methods of Tests for Concrete".
- .3 Perform work to standards and general requirements of Division 03.
- .4 Comply with local governing authority and local standard practices in providing concrete to compensate for local frost level of Place of Work.

3.10 EXCAVATION AND BACKFILL

- .1 Refer to Section 31 23 33.00 - Excavating, Trenching And Backfilling.
- .2 Before commencement of excavation for work, determine in consultation with Parks Canada Representative, Municipality and utilities, presence, if any, of existing underground services at site. Engage local utilities to locate and mark out such services. Ensure that trades concerned are aware of their presence.
- .3 Be responsible for any damage done to underground services caused by neglect to determine and mark out location of such services prior to excavation work commences.
- .4 Inverts and locations of existing site services may have been site surveyed and approximate location may be shown on drawings. Be responsible for confirming that inverts and locations are correct, prior to commencing excavation. Where discrepancies are found, immediately inform Parks Canada Representative, and await a direction.
- .5 Where Work falls under jurisdiction of local governing utility, confirm requirements and comply with utility requirements.
- .6 Provide excavation, backfill, and related work required for your work. Obtain a copy of soil test report if available from Parks Canada Representative. Depth of excavations must accommodate local governing requirements and local standard practices to compensate for local frost levels of Place of Work.

- .7 Grade bottom of excavation. In firm, undisturbed soil, lay services on 100 mm (4") bed of sand. Grade bottom such that ducts are installed to drain as per Parks Canada Representative's direction.
- .8 Prepare new bedding under service in unstable soil, in fill, and in cases where bedding has been removed in earlier excavation, particularly near perimeter walls of buildings, and at pull boxes, compact to maximum possible density to prevent settlement. Refer further to details on drawings and Division 31.
- .9 Do not open trenches ahead of installation of services and backfilling more than weather permits. Break up rocks and boulders and remove by drilling and wedging. Do not use blasting unless specifically permitted by and reviewed with Parks Canada Representative.
- .10 Before backfilling, arrange for inspection of work by Parks Canada Representative Do not backfill work unless reviewed with Parks Canada Representative. Failure to do so prior to backfilling will require re-excavating work and re-backfill at no additional cost to Parks Canada. Remove shoring during backfilling.
- .11 Backfill trenches within building with clean sharp sand that is maintained at a minimum temperature of 5 degrees Celsius, in individual layers of maximum 150 mm (6") thickness, compacted to a density of 100% Standard Proctor. Hand compact first layers up to minimum compacted level of 100 mm (4") above top of service and 100 mm (4") below bottom of service. Hand or machine compact balance up to grade using approved equipment. Sand shall be free of ice.
- .12 Backfill trenches outside buildings (not under roads, parking lots or traffic areas), up to a compacted level of 450 mm (18") above service with Granular "A" material, hand compacted to a density of 95% Standard Proctor. Backfill balance with 150 mm (6") layers of approved excavated material compacted to 95% Standard Proctor density, using approved equipment.
- .13 Backfill trenches outside building under roads, parking lots or traffic areas with granular "A" material in layers not exceeding 150 mm (6") thickness, compacted to 100% Proctor density up to grade level.
- .14 Conduit installations for medium voltage electrical utility shall meet all Fortis Alberta requirements and shall be performed by a Fortis Alberta approved contractor.
- .15 Fill depressions to correct grade level with appropriate material, after an adequate period has passed to reveal any settlement. Use maximum possible compaction. Pay costs required to make good damages caused by settlement. Generally, final surface toppings are responsibility of another Division of Work. Coordinate exact requirements with General Contractor to ensure surface toppings are provided as required to match adjacent surfaces.
- .16 Unless otherwise directed in Division 02 and/or 31, store and dispose of excavated materials as follows:
 - .1 during progress of contract, place material as directed in such a manner that minimum damage or disfigurement of ground and which in no causes way impedes progress of work;

- .2 separately place surplus topsoil and subsoil as directed; leave site clean and unencumbered.
- .17 Provide pumping equipment as required to keep excavations free of water.
- .18 Engage services of independent soils testing agency to test final backfill compaction density of each backfilled location. Compact backfill to satisfaction of testing agency and in accordance with Specification. Submit a copy of testing agency's report to Parks Canada Representative for review.
- .19 Coordinate requirements for final surface toppings with Parks Canada Representative.
- .20 Supply and install warning tape as indicated on drawings.

3.11 FINISH PAINTING OF ELECTRICAL WORK

- .1 Unless otherwise noted, finish painting of exposed Electrical Divisions work is to be performed as part of work of Division 09, refer further to Section 09 91 99 Painting For Minor Works.

END OF SECTION

1 GENERAL

1.01 SUBMITTALS

- .1 Submit shop drawings for products and accessories.

2 PRODUCTS

2.01 BASIC MATERIALS

- .1 Ground Rods: To Fortis Alberta Standards.
- .2 Ground Conductors: To Fortis Alberta Standards.
- .3 Ground Connections: To Fortis Alberta Standards.
- .4 Ground Pits: To Fortis Alberta Standards.
- .5 Gravel/Stones: Provide gravel and crushed stones as required by Fortis Alberta to suit application. Layers to be of thickness not less than required by local governing authorities.
- .6 Miscellaneous ancillary components to complete grounding and bonding work to requirements of Fortis Alberta and all applicable Codes.

3 EXECUTION

3.01 GENERAL GROUNDING AND BONDING REQUIREMENTS

- .1 Provide required grounding and bonding work in accordance with drawings, local governing electrical authority, governing authorities having jurisdiction and local governing electrical inspection authority. Confirm requirements with Fortis Alberta (the local governing electrical utility).
- .2 Perform ground resistivity testing of soil to determine measurement expressed in ohm meters as defined by IEEE 80-2000 - IEEE Guide for Safety in A.C. Substation Grounding. Use 4-point method with Model 4610 or Model 4500 Ground Tester or equal, and insertion of four equally spaced and in-line electrodes into test area.
- .3 Grounding system for the electrical utility pad mount transformer is within the scope of this project shall and shall be supplied and installed by a Fortis Alberta approved contractor.
- .4 Supply and install grounding electrodes consisting of minimum four (4) ground rods as detailed on Fortis Alberta details shown on drawings E1.2 driven into grade in the arrangement shown, and as required by Fortis Alberta, and interconnected with the gradient control conductors. Drive and bury ground rods at depth in accordance with Fortis requirements. Contractor shall arrange with Fortis an inspect of the installation prior to backfill.
- .5 Extend utility transformer ground grid to protective bollards as shown in Fortis Alberta approved detail shown on drawing E1.2. Contractor shall arrange with Fortis Alberta an inspect of the installation prior to backfill.
- .6 Extend conductors to metal piping of main water service and connect ground conductor to street side of water meter. If piping is not metallic, make necessary connections as required by Fortis Alberta.
- .7 Effectively bond metallic pipe services such as, gas mains, water mains, and dry risers, to main grounding terminal at their point of entry. Make connections to services with purpose-made grounding clamps.
- .8 Ground conductors not sized on drawings are to be sized in accordance with Fortis Alberta for primary grounding and local governing electrical authority requirements for secondary grounding. Ground conductor size is to be no smaller than requirements specified herein this article or on drawings.

END OF SECTION

1 GENERAL

1.01 SUBMITTALS

- .1 Submit shop drawings for products specified in this Section.

2 PRODUCTS

2.01 CONCRETE HANDHOLES

- .1 Handhole types for splices, pulls and junction applications:
 - .1 Cast-in-place concrete handholes;
 - .2 Pre-cast concrete handholes;
 - .3 Pre-fabricated handholes made of semi-concrete or non-concrete materials polymer concrete.
- .2 Handholes to be CSA approved and in accordance with following, as applicable:
 - .1 OPSS 602;
 - .2 ASTM C857;
 - .3 ANSI/SCTE 77.
- .3 Concrete to be in accordance with CSA A23.1 and CSA A23.2. Minimum compressive strength to be of 32MPa (4600 psi), 6-8% air entrainment, and be suitable for installation and use through a temperature range of minus 40°C to 70°C. (-40°F to 158°F).
- .4 Polymer concrete to consist of aggregates in combination with polymer resin, and reinforced with fibreglass. Non-conductive and non-flammable. Stable under freeze / thaw conditions.
- .5 Enclosures to be designed and installed to withstand loads likely to be imposed and be of size, with wiring/duct entries, covers and bottoms (as noted) and of type to suit specific applications.
- .6 Steel Handhole Cover:
 - .1 Galvanized steel according to CAN/CSA-G40.20/G40.21 and CAN/CSA-G164M92 (R2003);
 - .2 Checkered tread on top side for skid resistance,
 - .3 Tamper-proof, stainless steel head bolts recessed into cover;
 - .4 Area for logo;
 - .5 Flush mounted with gaskets to prevent ingress of water;

- .6 Minimum thickness of cover is 10 mm (3/8").
- .7 Polymer Concrete Cover:
 - .1 Flush mounted with gaskets to prevent ingress of water;
 - .2 Skid resistant;
 - .3 Tamper-proof, stainless steel head bolts recessed into cover;
 - .4 Area for logo;
 - .5 Minimum thickness of cover is 20 mm (3/4").
- .8 Cable termination hardware to accommodate cables and required grounding hardware. Hardware to be corrosion resistant and in accordance with code requirements.
- .9 Provide PVC seals on cable entry openings.
- .10 Identification:
 - .1 Identification markings on each handhole embedded on outside vertical surface of handhole, showing manufacturer's name or trademark, and date of manufacture.
 - .2 Top surface of handhole cover permanently marked, showing manufacturer's name or trademark, and date of manufacture; this marking embedded into top surface of handhole cover, or embedded into a corrosion-resistant metal plate securely cemented to top surface of handhole cover.
- .11 Refer to drawings for handhole dimensions.
- .12 Acceptable manufacturers are:
 - .1 Armtec Ltd (Brooklin Concrete);
 - .2 Industrial Cast Stone Ltd.;
 - .3 Utility Structures Inc.;
 - .4 Hanson Pipe and Pre-cast;
 - .5 Hubbell.

2.02 PRECAST CABINET BASE

- .1 As indicated on drawings.
- .2 Install in accordance with manufacturer's instructions.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 74 11 - Cleaning
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2-M1984(R2006), Rigid PVC (Unplasticized) Conduit.
 - .6 CSA C22.2 No. 211.1-M1984(R2016), Rigid types EB1 and DB2/ES2 PVC (Unplasticized) Conduit.
 - .7 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.
- .3 Quality assurance submittals:
 - .1 Test reports: submit certified test reports.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling 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.

PART 2 PRODUCTS

2.1 CABLES AND REELS

- .1 Provide cables on reels or coils.
 - .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.
- .2 Each coil or reel of cable to contain only one continuous cable without splices.
- .3 Identify cables for exclusively dc applications.

2.2 CONDUITS

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .2 Supplied by Parks Canada: Type DB2 pvc conduit: to CSA C22.2 No. 211.1 for horizontal underground routes only, as shown on drawings.
- .3 Supplied by Parks Canada: Rigid pvc conduit: to CSA C22.2 No. 211.2.
- .4 Flexible pvc conduit: to CAN/CSA-C22.2 No. 227.3.

2.3 CONDUIT FASTENINGS

- .1 One hole malleable steel straps to secure surface conduits 50 mm and smaller.
 - .1 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.
- .4 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

- .1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified.
Coating: same as conduit.
- .2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
 - .1 Set-screws are not acceptable.

2.5 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 All underground conduits shall have weatherproof expansion fittings with internal bonding assembly suitable for 200 mm linear expansion at distances in accordance with manufactures requirements. Expansion fittings shall be inspected and photographed prior to backfill.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.6 FISH CORD

- .1 Polypropylene.

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 During installation and backfill, conduit shall be kept at a minimum temperature of 5 degrees Celsius to prevent cracking or other damage during installation.
- .2 Conduits in trenches shall be installed in accordance with side elevation details as shown on drawings.
- .3 Conduit installations shall be inspected by Parks Canada Representative prior to backfill.
- .4 Sand used to backfill conduits shall be a minimum 5 degrees Celsius to ensure conduits are not damaged during coverage material. Sand shall be free of any ice. Conduits shall be completely surrounded by sand at the minimum distances shown on side elevation details shown on drawings.
- .5 All remaining back fill shall be free of ice or large objects that may damage conduit during backfill.
- .6 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .7 DB2 pvc conduit is permitted only for horizontal underground installations completely surrounded by sand, in the manner indicated on drawings.
- .8 Use rigid pvc conduit for all installations where DB2 pvc conduit is not permitted.
- .9 Install expansion joints for underground conduit installations every 30 metres or in accordance with manufacturers calculated requirements.
- .10 Minimum conduit size for lighting and power circuits: 19 mm.
- .11 Bend conduit in accordance with manufacturers instructions.
- .12 Mechanically bend steel conduit over 19 mm diameter.
- .13 Install pull ropes in all conduit runs shown on drawings, leave sufficient slack at each end for using cable tuggers. Pull ropes shall be suitable for cable tuggers.
- .14 Demonstrate to Parks Canada Representative that pull ropes are able to move freely within underground conduits.
- .15 Remove and replace damaged or blocked conduit sections.
 - .1 Do not use liquids to clean out conduits.
- .16 Dry conduits out before installing pull ropes.

3.3 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 suspended] [surface] channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONDUITS IN CAST-IN-PLACE CONCRETE

- .1 Locate to suit reinforcing steel.
 - .1 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.
 - .1 Use cold mastic between sleeve and conduit.
- .5 Conduits in slabs: minimum slab thickness 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.

3.5 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

- .1 Run conduits below slab and encase in 75 mm concrete envelope.
 - .1 Provide 50 mm of sand over concrete envelope below floor slab.

3.6 CONDUITS UNDERGROUND

- .1 Install as per drawing details.
- .2 Slope conduits to provide drainage.
- .3 Fortis Alberta medium voltage utility conduits shall be installed by a Fortis Alberta approved Contractor.
- .4 Encase Fortis Alberta medium voltage utility conduits in concrete at the horizontal bends in accordance with Fortis Alberta standards.
- .5 Install red polyethylene warning tape as shown on drawings.

3.7 CLEANING

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

- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 - Cleaning
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal
- .4 Section 31 23 33.00 - Excavating, Trenching and Backfilling

1.2 REFERENCES

- .1 CSA International
 - .1 CAN/CSA-Z809-16, Sustainable Forest Management.
- .2 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-(latest edition), FSC Principle and Criteria for Forest Stewardship.
- .3 Insulated Cable Engineers Association, Inc. (ICEA)
- .4 Sustainable Forestry Initiative (SFI)
 - .1 SFI-2014 Standard.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for cables and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Wood Certification: submit vendor's and manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.

1.4 DELIVERY, STORAGE AND HANDLING

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

- .4 Develop Waste Reduction Workplan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse of pallets, crates, padding, packaging materials as specified in Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

PART 2 PRODUCTS

2.1 MARKERS

- .1 For Fortis Alberta Electric lines: warning method in accordance with Fortis Alberta Standards.
- .2 For electric 240V lines: Red 150mm wide polyethylene warning tape with black lettering, wording to be: "CAUTION: Buried Electric Line Below".
- .3 For Communication lines: Orange 150mm wide polyethylene warning tape with black lettering, wording to be: "CAUTION: Buried Communications Line Below".

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for cable installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Parks Canada Representative.
 - .2 Inform Parks Canada Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Parks Canada Representative.

3.2 BURIAL OF CABLES AND CONDUITS

- .1 After sand bed in accordance with Section 31 23 33.00 - Excavating, Trenching and Backfilling, is in place, lay cables and conduits maintaining a minimum of 75mm clearance from each side of trench to nearest cable or conduit.
 - .1 Do not pull cables into trench.
- .2 Install cables and conduits at depths in trenches as shown in trench details on drawings.
- .3 Include offsets for thermal action and minor earth movements.
 - .1 Offset cables 150 mm minimum for each 60m run, maintaining minimum cable separation and bending radius requirements.
- .4 Make cable terminations and splices only as indicated leaving 0.6 m minimum of surplus cable in each direction.

-
- .1 Make cable splices and terminations in accordance with manufacturer's written recommendations using approved splicing kits.
 - .5 Underground cable splices not acceptable.
 - .6 Minimum permitted radius at cable bends for rubber, plastic or lead covered cables, 8 times diameter of cable or in accordance with manufacturer's written recommendations; for metallic armoured cables, 12 times diameter of cables or in accordance with manufacturer's instructions.
 - .7 Cable and conduit separation:
 - .1 Maintain minimum separation between cables and conduits as shown on drawings.
 - .2 Maintain 300 mm minimum horizontal separation between low and high voltage cables and conduits.
 - .3 When low voltage cables cross high voltage cables maintain 300 mm vertical separation with low voltage cables in upper position.
 - .4 At crossover, maintain 75 mm minimum vertical separation between low voltage cables and 150 mm between high voltage cables.
 - .5 Maintain 300 mm minimum lateral and vertical separation for communication cables when crossing other cables, with communication cables in upper position.
 - .6 Maintain 1000 mm distance between existing gas lines and new cables or conduits (as shown in trench details on drawings).
 - .7 Maintain 1000 mm distance between existing telecommunication lines and new cables or conduits (as shown in trench details on drawings).
 - .8 Install treated planks on lower cables, or conduits 0.6 m minimum in each direction at crossings.
 - .8 After sand protective cover specified in Section 31 23 33.01 - Excavating, Trenching and Backfilling, is in place, install continuous red polyethylene warning tape as indicated on drawings to cover length of run.

3.3 CABLE INSTALLATION IN DUCTS

- .1 Install cables as indicated in ducts.
- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .5 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.
- .6 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- .7 After installation of cables, seal duct ends with duct sealing compound.

3.4 **MARKERS**

- .1 Install warning tape in accordance with drawings.
- .2 Mark underground splices.
- .3 Where markers are removed to permit installation of additional cables, reinstall existing markers.
- .4 Lay tape flat and centred over cable at depth from finish grade as indicated on drawings.

3.5 **FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using qualified personnel.
 - .1 Include necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds.
 - .1 Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance tests:
 - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V megger on each phase conductor.
 - .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
- .6 Acceptance Tests:
 - .1 Ensure that terminations and accessory equipment are disconnected.
 - .2 Ground shields, ground wires, metallic armour and conductors not under test.
 - .3 High Potential (Hipot) Testing.
 - .1 Conduct hipot testing to original factory test voltage in accordance with manufacturer's recommendations.
 - .4 Leakage Current Testing:
 - .1 Raise voltage in steps from zero to maximum values as specified by manufacturer for type of cable being tested.
 - .2 Hold maximum voltage specified time period by manufacturer.
 - .3 Record leakage current at each step.
- .7 Provide Parks Canada Representative a list of test results showing location at which each test was made, circuit tested and result of each test.
- .8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

3.6 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 in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

- .1 Repair damage to adjacent materials caused by installation of cables or conduits.

END OF SECTION

1 GENERAL

1.01 SUBMITTALS

- .1 Submit shop drawings for products specified in this Section.

1.02 LOCAL ELECTRICAL UTILITY REQUIREMENTS

- .1 Comply with latest conditions of supply requirements of local governing electrical utility. Confirm exact requirements with Fortis Alberta (AKA: local governing electric utility) and coordinate Fortis Alberta requirements with respective Divisions of Work providing such work. Provisions to accommodate local governing electrical utility requirements generally include but are not limited to following:
 - .1 preconstruction meeting;
 - .2 inspection: on site access for local governing electrical utility inspector to be on duty for duration of work;
 - .3 underground inspection: submission of approval drawings and application for inspection prior to any inspection of work;
 - .4 approval of work and materials by local governing electrical utility inspector prior to any backfilling work.
- .2 In case of discrepancies or conflicts between Drawings and Specifications and local governing authority standards, contact Parks Canada Representative and obtain direction. If direction is not available prior to close of Bids, include for most costly arrangement, but ensure that direction is obtained prior to start of Work.
- .3 All work related to electric utilities shall be completed by a Fortis Alberta approved contractor.

1.03 INCOMING ELECTRIC SERVICE WORK SCOPE

- .1 Included in this scope is the partial installation of a new electrical service for Fortis Alberta (the local governing electrical utility) to extend their electrical system to service on the property. Local governing electrical utility work to include but not be limited to provision of following:
 - .1 Installation of underground conduits;
 - .2 Supply and installation of two concrete bases;
 - .1 One (1) pre-cast concrete utility transformer pad,
 - .2 One (1) cast in place concrete pad for a future electrical central distribution panel (CDP),
 - .3 Supply and installation of protective bollards;
 - .4 Supply, installation and testing of a utility ground grid surrounding the transformer pad which shall be inspected by Fortis Alberta for acceptance.

1.04 PROTECTIVE COORDINATION AND EQUIPMENT WITHSTAND RATINGS

.1 Not in scope.

1.05 BREAKERS

.1 Not in scope.

2 PRODUCTS

3 EXECUTION

3.01 INCOMING ELECTRIC SERVICE WORK

.1 As confirmed with local governing electrical utility, include for but not be limited to provision of following:

- .1 All of the following work shall be completed by a Fortis Alberta contractor,
- .2 Installation of conduits for primary conductors; underground DB2 conduit for horizontal runs in sand beds and rigid PVC conduit elsewhere,
- .3 Supply and Installation of pre-cast transformer base,
- .4 Supply and Installation of cast in place CDP base,
- .5 Installation of conduits for secondary conductors; from concrete pre-cast transformer base to concrete CDP base underground in DB2 conduit for horizontal runs in sand beds and rigid PVC conduit elsewhere,
- .6 Installation of protective concrete bollards at locations shown on drawings,
- .7 Installation of a complete ground grid for transformer base in accordance with Fortis requirements.
- .8 Connection of grounding to bollards surrounding the transformer base.

3.02 ELECTRICAL CONNECTIONS FOR OWNER EQUIPMENT

.1 Provide underground raceways to all locations shown on drawings.

END OF SECTION

1 GENERAL

1.01 SUBMITTALS

- .1 Submit shop drawings for products of this Section and for scope indicated on drawings.

2 PRODUCTS

2.01 STEEL POLES

- .1 Steel poles: to CSA C22.2 No.206 designed for underground wiring and:
 - .1 Mounting on concrete anchor base
 - .2 Style: monotube, minimum 3.0 mm thick, to match existing on site; refer to luminaire schedule.
 - .3 Access handhole above pole base for wiring connections, with welded-on reinforcing frame and bolted-on cover.
 - .4 Anchor bolts: four with steel with shims, nuts and covers, refer to detail on drawings.
 - .5 Finish: match existing on site.
 - .6 Grounding lug.

3 EXECUTION

3.01 INSTALLATION

- .1 Install poles true and plumb in accordance with manufacturer's instructions.
- .2 Additionally, refer to testing and verification requirements in Section entitled Electrical Work Analysis and Testing and include applicable requirements.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29.06 - Health and Safety Requirements.

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-C22.2 No. 214-02, Communications Cables (Bi-National standard with UL 444).
 - .2 CSA-C22.2 No. 232-M1988 (R2004), Optical Fiber Cables.
- .2 Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA)
 - .1 TIA/EIA-568-B.1-(2001), Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.
 - .2 TIA/EIA-568-B.2-(2001), Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.
 - .3 TIA/EIA-568-B.3-(2000), Optical Fiber Cabling Components Standard.
 - .4 TIA/EIA-606-A-(2002), Administration Standard for the Commercial Telecommunications Infrastructure.
 - .5 TIA TSB-140-2004, Telecommunications Systems Bulletin - Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.
 - .6 TIA-598-C-(2005), Optical Fiber Cable Colour Coding.

1.3 DEFINITIONS

- .1 Refer to TIA/EIA-598-C, Annex A for definitions of terms: optical-fiber interconnect, distribution, and breakout cables.

1.4 SYSTEM DESCRIPTION

- .1 Structured telecommunications wiring system consist of unshielded-twisted-pair and optical fibre cables, terminations, connectors, cross-connection hardware and related apparatus, raceways and equipment installed outside and inside buildings for occupant's telecommunications systems, including voice (telephone) and data.
- .2 Installed in configuration shown on drawings.
 - .1 Horizontal cables link work areas to telecommunications room[s] located on same floor.
 - .2 Telecommunication cabinets linked to main terminal/equipment room (MT/ER) by fibre backbone cables.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 As-built Records and Drawings:
 - .1 Provide spreadsheet reflecting cable installation and cross-connections.
 - .2 Provide red-line as-built electronic drawings in PDF format depicting all construction details.
 - .3 Provide two (2) bound complete hard-copy sets of as-built records to the Parks Canada Representative.
 - .1 Provide and place one hard copy of as-built records for each telecommunications room in plan holder in each telecommunications room.

1.6 QUALITY ASSURANCE

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal: separate waste materials for recycling in accordance the Waste Management Plan.

PART 2 PRODUCTS

2.1 FOUR-PAIR 100 W BALANCED TWISTED PAIR CABLE

- .1 Outdoor rated, four-pair, 100 ohm balanced unshielded-twisted-pair (UTP) cable, flame test classification FT4 or MPG or CMG to: CSA-C22.2 No. 214, Category 6 (Cat 6) to: TIA/EIA-568-B.2.

2.2 WORK AREA UTP 4-PAIR MODULAR JACK

- .1 Modular jacks ("RJ-45"), type T568B Category 6 to: TIA/EIA-568- B.2:
 - .1 In existing self-contained surface-mount box.
 - .2 Mounted in compatible existing faceplate.
- .2 Existing telecommunications outlet assembly.

2.3 TERMINATION AND CROSS-CONNECTION HARDWARE FOR UTP

- .1 IDC Terminal strips, 25 pair, for terminating [multi] [4] pair 100 W balanced twisted pair cables and supporting cross-connections using jumper wires or compatible plug-ended patch cords: [Category 6] [Category 5e] to: TIA/EIA-568-[B.2].
- .2 Mount or block for housing [12] [10] IDC terminal strips, mounted on [wall] [rack or cabinet [____]cm wide].
 - .1 Distribution rings or channels capable of externally mating with the above mount for managing cross-connection wires.

- .3 Existing Patch panels.
- .4 Existing consolidation points.

2.4 UTP PATCH CORDS

- .1 2 metres long, with factory-installed male plug at one end to mate with "RJ-45" jack and with factory-installed male plug at other end to mate with Category 6, 4 pairs to: TIA/EIA-568-B.2.

2.5 UTP EQUIPMENT CABLE

- .1 Existing.

2.6 UTP WORK AREA CORDS

- .1 Existing.

2.7 OPTICAL-FIBER CABLE

- .1 Contractor have experience working with previous Parks Canada fibre installations and shall be familiar with Parks Canada specification. Each end terminated with connectors.

2.8 CONSOLIDATION POINT FOR OPTICAL FIBER

- .1 Existing consolidation points, match existing number of terminations from existing telecommunications cabinets at locations shown on drawings.

2.9 OPTICAL-FIBER CONNECTORS AT WORK AREA

- .1 Existing.

2.10 OPTICAL-FIBER PATCH PANEL

- .1 Existing.

2.11 OPTICAL-FIBER PATCH CORDS

- .1 Existing.

2.12 OPTICAL-FIBER WORK AREA CORDS

- .1 Existing.

PART 3 EXECUTION

3.1 INSTALLATION OF TERMINATION AND CROSS-CONNECT HARDWARE

- .1 Contractor have experience working with previous Parks Canada fibre installations and shall be familiar with Parks Canada specification for Banff National Park facilities.
- .2 Contractor installing and terminating structured cables shall be certified by the manufacturer of the products; provide Consultant and Parks Canada Representative

certification documents as proof prior to commencement of work. Receipt of such certifications shall be minuted in construction meeting minutes.

- .3 Install termination and cross-connect hardware on walls at existing locations and in existing racks and cabinets at locations indicated on drawings and according to manufacturers' instructions. Identify and label as indicated to: TIA/EIA-606-A.
- .4 Install consolidation points, as indicated according to manufacturer's instructions. Identify and label as indicated to: TIA/EIA-606-A.

3.2 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES

- .1 Install horizontal cables as indicated on drawings in micro-ducts and conduits between telecommunication cabinets and existing wall locations with individual work-area jacks. Identify and label as indicated to: TIA/EIA-606-A.
- .2 Horizontal cables shall be routed in conduits.
- .3 Install horizontal cables from consolidation point to individual work-area jacks.
 - .1 Use new and existing raceways as indicated on drawings.
 - .2 Identify and label as indicated to: TIA/EIA-606-A.
- .4 Terminate horizontal cables in telecommunications cabinets and at individual work-area jacks.
 - .1 Identify and label as indicated to: TIA/EIA-606-A.
- .5 Neatly coil minimum 2m spare cable lengths and store in crawl space.
- .6 Harness slack cable in cabinets, racks, and wall-mounted termination and cross-connection hardware.

3.3 INSTALLATION OF BACKBONE CABLES

- .1 Install backbone cables from each telecommunications room to main terminal/equipment room (MT/ER) as indicated and according to manufacturers' instructions.
 - .1 Identify and label as indicated to: TIA/EIA-606-A.
- .2 Install backbone cables from MT/ER to carrier demarcation point in [Entrance Room] as indicated and according to manufacturer's instructions.
 - .1 Identify and label as indicated to: TIA/EIA-606-A.

3.4 INSTALLATION OF EQUIPMENT CABLES

- .1 As part of work, verify integrity of existing cables from equipment patch panel as indicated.
 - .1 Identify and label as indicated to: TIA/EIA-606-A.

3.5 IMPLEMENT CROSS-CONNECTIONS

- .1 As part of work, verify integrity of existing cross-connection patch cords.

3.6 FIELD QUALITY CONTROL

- .1 The certified contractor shall test horizontal UTP cables as specified below and correct deficiencies provide record of results as hard copy and electronic record in PDF format.
 - .1 Perform tests for Permanent Link on installed cables, including spares:
 - .1 Category 6 using certified level III tester to: TIA/EIA-568-B.2.
 - .2 Perform tests for Channel of all new cross-connected data horizontal cabling installed from each telecommunications room.
 - .1 Category 6 using certified level III tester to: TIA/EIA-568-B.2.
- .2 The certified contractor shall test backbone UTP cables: provide record of results as hard copy and electronic record in PDF format.
 - .1 Perform tests for Permanent Link on 4-pair cables:
 - .1 Category 6 using certified level III tester to: TIA/EIA-568-B.2.
 - .2 Perform Wire Map tests on multi-pair UTP cables to: TIA/EIA-568-B.1.
- .3 The certified contractor shall test optical-fiber strands for attenuation to: TIA/EIA-568-B.1 and correct deficiencies: provide record of results as hard copy and electronic record in PDF format.
 - .1 Test horizontal links need at only one wavelength (850 nm or 1300 nm) and in one direction.
 - .1 Attenuation to be less than 2.0 dB, unless consolidation point is used.
 - .2 If consolidation point is used, attenuation test result to be less than 2.75 dB when testing between horizontal cross-connect and telecommunications outlet/connector.
 - .2 Test backbone links in both directions. Backbone links:
 - .1 Test multi-mode fibre at both applicable wavelengths (850 nm and 1300 nm).
 - .2 Test single-mode fibre at both applicable wavelengths (1550 nm and 1310 m).
 - .3 Maximum attenuation: Cable attenuation + Connector loss + Splice loss.
 - .1 Multi-mode-fiber attenuation coefficients:
 - .1 3.5 db/km @ 850 nm; and
 - .2 1.5 db km @ 1300 nm
 - .2 Single-mode fibre attenuation coefficients at both 1310 nm and 1550 nm:
 - .1 1.0 db/km for inside plant cable; and
 - .2 0.5 db/km for outside plant cables.
 - .3 Maximum connector insertion loss: 0.75 db per pair and maximum splice insertion loss: 0.3 db.
- .4 Perform additional Tier 2 tests using optical time domain reflectometer (OTDR) on all fibre pairs to: TSB-140.
 - .1 Correct deficiencies.
 - .2 Provide record of results as described in SUBMITTALS.

- .5 Provide record of results as hard copy and electronic record in PDF format to: TIA/TSB-140.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.2 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide supplier provided sieve analysis testing reports for all aggregates to be used on project within five (5) days of contract award and minimum five (5) days prior to intended importation of material to site.
- .3 Provide the Departmental Representative with access to source and processed material for sampling.
- .4 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert unused granular materials from landfill to local facility as approved by the Departmental Representative.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
 - .1 Greatest dimension to exceed five times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
 - .1 Crushed rock.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag and expanded shale.

2.2 SOURCE QUALITY CONTROL

- .1 Inform the Departmental Representative of proposed source of aggregates and provide access for sampling at least two (2) weeks prior to commencing production.
- .2 If, in opinion of the Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .3 Advise the Departmental Representative four (4) weeks in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Handling
 - .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- .2 Stockpiling
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by the Departmental Representative. Do not stockpile on completed pavement surfaces or within existing vegetated areas.
 - .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 150 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 150 mm of pile into Work.
 - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
 - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by the Departmental Representative within 48 h of rejection.
 - .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Max 1.5 m for coarse aggregate and base course materials.

- .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .9 Do not cone piles or spill material over edges of piles.
- .10 Do not use conveying stackers.
- .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 CLEANING

- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .2 Leave any unused aggregates in neat compact stockpiles at a site directed by the Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 74 11 – Cleaning.
- .2 Section 31 23 33 – Excavating, Trenching and Backfilling.

1.2 REFERENCES

- .1 Alberta Environmental Protection p
 - .1 Storm Water Management Guidelines for the Province of Alberta, 1999.
- .2 National Parks Act, 2011.
- .3 Canadian Environmental Assessment Act, 2011.

1.3 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- .3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
- .4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.
- .5 Grubbing consists of excavation and disposal of stumps and roots to not less than specified depth below existing ground surface.
- .6 All clearing and grubbing to be done according to the Canadian Environmental Assessment Act and National Parks Act as well. Where the above Acts and this specification disagrees, the above Acts will govern.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 1 33 00 - Submittal Procedures.
- .2 Samples:
 - .1 Submit 3 samples of each material listed below for approval prior to delivery of materials to project site.

- .2 Tree wound paint: one litre can with manufacturer's label.
- .3 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- .1 Safety Requirements: worker protection.
 - .1 Workers must wear gloves, eye protection and protective clothing.
 - .2 Clean up spills of preservative materials immediately with absorbent material and safely discard to landfill.

1.6 STORAGE AND PROTECTION

- .1 Prevent damage to fencing, trees, bench marks, existing buildings, utility lines, root systems of trees which are to remain.
 - .1 Repair damaged items to approval of the Departmental Representative.
 - .2 Replace trees designated to remain, if damaged, as directed by the Departmental Representative.

1.7 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 Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuel wood can be produced as saleable timber.
 - .1 Stockpile adjacent to site.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Bituminous based paint of standard manufacture specially formulated for tree wounds.
- .2 Soil Material for Fill:
 - .1 Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.
 - .2 Remove and store soil material for reused.

PART 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION

- .1 Inspect site and verify with the Departmental Representative, items designated for removal and items to remain. Submit to the Departmental Representative list and site map of vegetation on site to be affected by Work and required to be removed or cut back.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site. Both private and public utility locates are to be completed.
 - .1 Notify the Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.
 - .2 When utility lines which are to be removed are encountered within area of operations, notify the Departmental Representative in ample time to minimize interruption of service.
- .3 Notify utility authorities before starting clearing and grubbing.
- .4 Keep roads and walks free of dirt and debris.

3.3 APPLICATION

- .1 Manufacturer's instructions: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.4 CLEARING

- .1 Prior to beginning excavations, identify with the Departmental Representative any trees and shrubs within the anticipated disturbance limits suitable for transplanting, and transplant to undisturbed areas, or salvage to replant within the disturbance areas as part of area restoration. Transplanting is to be completed as directed by the Departmental Representative. Vegetation items to be identified for salvaging are as follows:
 - .1 Douglas Fir trees less than 1.5m tall.
 - .2 All other trees less than 0.3m tall.
 - .3 Shrubs less than 0.3m tall.

- .2 Clearing includes felling, trimming, and cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within cleared areas.
- .3 Clear as directed by the Departmental Representative, by cutting at height of not more than 300mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 300mm above ground surface.
- .4 Cut off unsound branches on trees designated to remain as directed by the Departmental Representative.
- .5 Do not cut Douglas Fir trees or significantly impact Douglas Fir tree roots for any reason whatsoever. In this case, significantly impacting roots is defined as any impacts which may negatively affect the tree's stability or stress or kill the tree.

3.5 CLOSE CUT CLEARING

- .1 Close cut clearing to ground level.

3.6 ISOLATED TREES

- .1 Cut off isolated trees as directed by the Departmental Representative at height of not more than 300mm above ground surface.
- .2 Grub out isolated tree stumps.

3.7 UNDERBRUSH CLEARING

- .1 Clear underbrush from areas as indicated at ground level.

3.8 GRUBBING

- .1 Grubbing is to be completed for all vegetation which is removed as part of this project, as well as for any existing stumps which are within the anticipated disturbance limits of the project.
- .2 Remove and dispose of roots larger than 5cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .3 Grub out stumps and roots to not less than 200mm below ground surface.
- .4 Grub out visible rock fragments and boulders, greater than 300mm in greatest dimension, but less than 0.25m³.
- .5 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground. Backfill of depressions under infrastructure is to be completed according to Section 31 23 33 – Excavating, Trenching and Backfilling to mitigate the risk of future settlement or damage to infrastructure.

3.9 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials to outside Banff National Park to a suitable disposal facility or as designated by Departmental Representative.
- .2 Cut timber greater than 125 mm diameter to 450mm lengths and stockpile at Peyto Pit. Stockpiled timber becomes property of the Departmental Representative.

3.10 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for immediate grading operations to approval of the Departmental Representative.

3.11 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 74 11 - Cleaning

1.2 REFERENCES

- .1 Alberta Environmental Protection
 - .1 Storm Water Management Guidelines for the Province of Alberta, 1999.
- .2 National Parks Act, 2011.
- .3 Canadian Environmental Assessment Act, 2011.

1.3 EXISTING CONDITIONS

- .1 No geotechnical investigation has been completed or is available for the site. Contractors are to raise any concerns which may affect construction as a result of having no geotechnical information during the tendering process.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STRIPPING OF TOPSOIL

- .1 Ensure that procedures are conducted in accordance with applicable Parks Canada and other Federal requirements.
- .2 Remove vegetation from targeted areas by non-chemical means and dispose of stripped vegetation outside the park.

- .3 Remove brush from targeted area by non-chemical means and dispose outside the park.
- .4 Remove and salvage topsoil before construction procedures commence to avoid loss or compaction of topsoil. Topsoil is considered high value material and not easily replaced if lost. All removed topsoil must be salvaged for reuse on site.
- .5 Stripped topsoil shall not be destroyed.
- .6 Handle topsoil only when it is dry and unfrozen.
- .7 Plan to conduct construction activities so that maximum topsoil volume is retained for reuse.
- .8 Strip topsoil to depths as directed by the Departmental Representative.
 - .1 Stripping depth to be determined on site to sufficiently separate topsoil from subsoil, while maximizing topsoil retention.
 - .2 Do not mix topsoil with subsoil.
- .9 Strip topsoil by area in coordination with the Departmental Representative to mitigate the risk of spreading non-native vegetation around site.
- .10 Where possible, salvage existing sod, surface litter, and other surface coverings to be upwards facing placed following the completion of work.

3.3 STOCKPILING OF TOPSOIL

- .1 Pile topsoil in berms in locations as directed by the Departmental Representative.
 - .1 Topsoil is not to be removed from site unless otherwise approved in writing by the Departmental Representative.
 - .2 Stockpile height not to exceed 2.5 m.
 - .3 Salvaged topsoil is to be stored as close as possible to where it was removed to limit potential for spread of non-native vegetation on site. Central storage of topsoil is not permitted.
 - .4 Maintain minimum 1m separation between topsoil and subsoil stockpiles or windrows to mitigate the risk of mixing.
- .2 Dispose of unused topsoil off-site only if directed by Departmental Representative.
- .3 Protect stockpiles from contamination, compaction, mixing and/or erosion.
- .4 Cover topsoil that has been piled for longer term storage, with tarp or fabric to maintain agricultural potential of soil. Topsoil must be tarped if stored for more than seven (7) days.
- .5 Topsoil stockpiles may require erosion and sedimentation control depending on location, weather conditions and duration of storage. This must be addressed in the Erosion and Sediment Control Plan included in the project EPP.

3.4 STRIPPING OF NON-TOPSOIL MATERIAL

- .1 Existing gravel materials within trenching areas are to be stripped and separated from the subsoils for the purpose of reuse by Parks Canada for purposes separate from this project.
- .2 Should the salvaged gravels be of suitable quality that they may be reused on site, the contractor shall submit a formal request and testing records for the existing material for review by the Departmental Representative. Should the material be deemed suitable for reuse, a suitable credit is to be negotiated prior to approval of the change in scope.
- .3 All surplus soils are to be disposed of outside the Park at the contractor's expense unless otherwise directed by the Departmental Representative.
- .4 Salvaged gravel material which is determined by Parks Canada to be of value for reuse, are to be neatly stockpiled in the staging area in the north east corner of Trailer Court.

3.5 STOCKPILING OF NON-TOPSOIL MATERIAL

- .1 Stockpiles shall:
 - .1 Be no greater than 2.5m in height.
 - .2 Be created to separate material types.
 - .3 Have a minimum of 1m separation between different material types.
 - .4 Located as close as possible to where the backfill areas for areas where the material is to be reused.
 - .5 Protected from contamination, compaction, mixing and/or erosion.
 - .6 May require erosion and sedimentation control depending on location, weather conditions and duration of storage. This must be addressed in the Erosion and Sediment Control Plan included in the project EPP.
 - .7 Be located in coordination with the Departmental Representative to minimize site disturbance footprint and operational disruptions, as well as to minimize site restoration requirements.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Equipment shall be thoroughly cleaned before moving from work areas with known non-native vegetation growth to areas with no known non-native vegetation growth. A map of those areas will be provided to the contractor during the start up meeting.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 31 23 33 - Excavating Trenching and Backfilling.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D698-00a1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).

1.3 EXISTING CONDITIONS

- .1 Visit the site and note:
 - .1 All characteristics and irregularities affecting the work of this section.
 - .2 Regrading requirements outlined in Appendix B.
- .2 Refer to dewatering in Section 31 23 33 - Excavating Trenching and Backfilling.

1.4 PROTECTION

- .1 Protect and/or transplant existing fencing, trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by the Parks Canada Representative. If damaged, restore to original or better condition unless directed otherwise.
- .2 Once prepared, protect all roadway subgrade areas from ponding water or provide sufficient drainage prior to placing gravel structure.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Fill material: Excavated material - Type 3 in accordance with of Section 31 23 33 - Excavating, Trenching and Backfilling.

PART 3 EXECUTION

3.1 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to following depths below finish grades:
 - .1 100 mm for grassed and/or vegetated areas.
 - .2 Bottom of subgrade for roads and pathways.

- .3 Slope rough grade away from all buildings, man holes, pull boxes, transformer and CDP bases.
- .4 Slope rough grade for roadways at 2.00% minimum to provide positive drainage in all areas and prevent surface ponding when final surface restoration is completed.
- .5 Rough grade for vegetated areas to mimic natural contours in surrounding undisturbed areas and eliminate uneven areas and low spots while supporting positive drainage away from adjacent roadways and buildings.
- .6 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .7 Upon completion of rough grading in vegetation areas and prior to placing topsoil, scarify surface to depth of 150 mm.
- .8 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials. Remove and dispose of soil contaminated with calcium chloride, toxic materials and petroleum products as per applicable guidelines and standards. Remove debris which protrudes more than 75 mm above surface.
- .9 Compact filled and disturbed areas to corrected maximum dry density, as follows:
 - .1 95% under landscaped areas.
 - .2 98 % under paved and gravel areas.
- .10 Do not disturb soil within branch spread of trees or shrubs to remain.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 01 56 00 - Temporary Barriers and Enclosures.
- .4 Section 31 11 00 – Clearing and Grubbing
- .5 Section 31 14 13 – Soil Stripping and Stockpiling.
- .6 Section 32 91 13.13 – Topsoil Placement and Grading.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117-03, Standard Test Method for Material Finer Than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-632002, 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/m³.
 - .5 ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort 2,700 kN-m/m³.
 - .6 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.
 - .2 CAN/CSA-A23.1/A23.2-00 (August 2001), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

1.3 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: any solid material in excess of 1.00 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material is not classified as rock.

- .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds and other litter, and free from cobbles, stumps, roots and other objectionable material larger than 25mm in any dimension.
- .3 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.
- .6 Recycled fill material: material, considered inert, obtained from alternate sources and approved by Parks Canada to meet requirements of fill areas. Submit material samples to Parks Canada Representative for testing and approval.
- .7 Surplus material: materials excavated as required for utility trenching, sub-cutting for road or pathway structures, or to meet site grading requirements and which cannot be placed as backfill on site without changing the final surface grading from the pre-construction state or different from what is required under the contract documents. Surplus materials are required to be removed from the Park.
- .8 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials.
 - .3 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.
 - .4 Coarse grained soils containing more than 20% by mass passing a 0.075mm sieve.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
 - .2 Submit records of underground utility locates, indicating location plan of existing utilities as found in field clearance record from utility authority location plan of relocated and abandoned services, as required.
 - .3 Submit plan showing proposed order of work by area for review by Departmental Representative.

- .4 Submit Quality Control Plan (QCP) including measures for backfilling, alignment and grading measures.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures
 - .2 Submit 70 kg samples of type of fill specified including representative samples of excavated material.
 - .3 Ship samples prepaid to testing firm selected by the Parks Canada Representative, in tightly closed containers to prevent contamination and exposure to elements.

1.5 QUALITY ASSURANCE

- .1 Parks Canada has engaged a third party inspector to complete quality assurance inspections and testing.
- .2 The contractor shall provide the Departmental Representative with a minimum 24 hours prior notification for inspections of installations which are to be buried prior to backfilling unless otherwise noted in the contract documents.
- .3 Do not use soil material until written report of soil test results are reviewed by Parks Canada Representative.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Construction/Demolition Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.
 - .2 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .3 Place materials defined as hazardous or toxic in designated containers.
 - .4 Handle and dispose of hazardous materials in accordance with Regional and Municipal regulations.
 - .5 Ensure emptied containers are sealed and stored safely.

1.7 EXISTING CONDITIONS

- .1 Storage and Protection:
 - .1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.
- .2 Existing buried utilities and structures:
 - .1 The contractor shall complete private and public utility locates and verify findings with the Departmental Representative prior to beginning work.
 - .1 Existing water and sanitary services are unable to be traced.
 - .2 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .3 Confirm locations of buried utilities by careful soil hydrovac methods.

- .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
- .5 Where utility lines or structures exist in area of excavation, obtain direction of Parks Canada Representative before removing or re-routing.
- .6 Record location of maintained, re-routed and abandoned underground lines.
- .7 Confirm locations of recent excavations adjacent to area of excavation.
- .3 Existing buildings and surface features:
 - .1 Conduct, with Parks Canada Representative, condition survey of existing buildings, plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work. Thoroughly photograph conditions prior to, throughout and following construction.
 - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Parks Canada Representative.
 - .3 Where required to cut tree roots or branches for excavation, seek prior approval from the Departmental Representative.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Type 1 and Type 2 fill: properties to the following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within the following limits:

| Sieve Designation | % Passing | | |
|-------------------|---------------------|-------------------------|------------------------|
| | Type 1 Road Base | Type 2 Road Sub-Base | Type 4 Bedding Sand |
| 75 mm | - | 100 | |
| 50 mm | - | - | |
| 37.5 mm | - | - | |
| 25 mm | 100 | - | |
| 19 mm | 75-100 | - | |
| 12.5 mm | - | - | |
| 9.5 mm | 50-100 | - | 100 |
| 4.75 mm | 30-70 | 22-85 | 90-100 |
| 2.00 mm | 20-45 | - | |
| 0.425 mm | 10-25 | 5-30 | |
| 0.180 mm | - | - | 20 |
| 0.075 mm | 3-8 | 0-10 | |

- .2 Type 3 fill: selected material from excavation or other sources, approved by Parks Canada Representative for use intended, unfrozen and free from rocks larger than 200 mm, clay, cinders, ashes, organics, sods, refuse or other deleterious materials.

- .3 Type 4 fill: clean sand, or free draining granular fill, free from clay, organic, friable or frozen materials, and other deleterious materials.
- .4 Use non-shrink fill approved by the Departmental Representative for backfilling any undermined building foundation components.
- .5 The contractor shall propose any substitute materials minimum of ten (10) business days prior to required importation to site.

PART 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove 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.

3.3 PREPARATION/PROTECTION

- .1 Protect existing features in accordance with applicable local regulations.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect.
- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect buried services that are required to remain undisturbed.

3.4 SOIL STRIPPING AND STOCKPILING

- .1 Perform in accordance with Section 31 14 13 – Soil Stripping and Stockpiling.

3.5 STOCKPILING

- .1 Stockpile fill materials in areas directed by Parks Canada Agency.

- .2 Stockpile granular materials in manner to prevent segregation.
- .3 The locations selected for stockpiling material shall be approved by Parks Canada Representative prior to commencement of work.
- .4 Fill material shall remain covered and protected from snow ice and water to ensure it remains useable for backfilling trenches.
- .5 Protect fill materials from contamination.
- .6 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies, storm drains and sanitary manholes.

3.6 SHORING AND BRACING

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with the Health and Safety Act for the Province of Alberta.
- .2 During backfill operation:
 - .1 Unless otherwise indicated or directed by Parks Canada Representative, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.
- .3 When sheeting is required to remain in place, cut off tops at elevations as indicated by the Parks Canada Representative.
- .4 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site and restore watercourses as indicated and as directed by Parks Canada Representative.

3.7 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of standing water at all times.
- .2 Submit for Parks Canada Representative's review details of proposed dewatering methods.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
 - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved collection areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.

- .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.8 EXCAVATION

- .1 Advise Parks Canada Representative at least five (5) business days in advance of excavation operations for initial cross sections to be taken. Provide schedule of excavation to Parks Canada Representative.
- .2 Excavate to lines, grades, elevations and dimensions as indicated.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within dripline of trees or shrubs without prior approval of the Departmental Representative.
 - .1 Measures to be put into place to minimize impact to remaining trees and shrubs according to Section 31 11 00 – Clearing and Grubbing.
 - .2 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 Dispose of surplus and unsuitable excavated material off site, as directed by the Parks Canada Representative. Surplus materials are by default to be removed to an approved disposal facility outside of the Park unless otherwise directed in writing by the Departmental Representative.
- .6 Keep excavated and stockpiled materials safe distance away from edge of trench in accordance with the Alberta Occupational Health and Safety Act, Regulations and Code (latest edition).
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Do not obstruct flow of surface drainage or natural watercourses.
- .9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .10 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .11 Notify Parks Canada Representative when bottom of excavation is reached.
- .12 Obtain Parks Canada Representative approval of completed excavation.
- .13 Correct unauthorized over excavation as follows:
 - .1 Fill under bearing surfaces and footings with concrete specified for footings.
 - .2 Fill under other areas with Type 2 fill compacted to not less than 98% of corrected Standard Proctor maximum dry density.
- .14 Hand trim, make firm and remove loose material and debris from excavations.

- .15 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
- .16 Open trenches shall:
 - .1 Be backfilled to the top of subgrade within 72 hours of the particular section of trench being initiated, unless approved in advance by the Departmental Representative, with the exception of termination points, PE gas line connections or other areas required to be left open for testing and inspections.
 - .2 Open trenches shall be barricaded as specified in Section 01 56 00 – Temporary Barriers and Enclosures.
 - .3 Be inspected by the contractor each morning for wildlife.
- .17 Trenching may only be started after proper surface stripping is completed according to Section 31 14 13 – Soil Stripping and Stockpiling.

3.9 **FILL TYPES AND COMPACTION**

- .1 Use types of fill as indicated or specified above. Compaction densities are percentages of maximum densities obtained from ASTM D698.
- .2 Compact filled and disturbed areas to standard proctor density, as follows:
 - .1 100% within building foundation impact zones. This includes up to minimum 2 metres away from building foundations where excavations extend beneath the concrete foundation (shallow footings and slab foundations).
 - .2 98% under roadway, parking and pathway areas, unless within a building foundation impact zone.
 - .3 95% under landscaped and vegetated areas, unless within a building foundation impact zone.

3.10 **BACKFILLING**

- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Parks Canada Representative has inspected and approved of construction below finish grade.
 - .2 Inspection, testing, approval, and recording location of underground utilities.
 - .3 Removal of concrete formwork.
 - .4 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris. Material used to backfill shall remain covered and protected from snow ice and water to ensure it remains useable for backfilling trenches.
- .4 Backfill to be completed to reinstate pre-construction soil layers. Subsoils to be kept separate at all times from topsoil or other organics or vegetation materials.
- .5 Place backfill material in uniform layers not exceeding 150mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .6 Backfilling around installations:

- .1 Place bedding and surround material as specified elsewhere.
- .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
- .3 Place layers simultaneously on both sides of installed Work to equalize loading.
- .4 Difference not to exceed 300 mm.
- .7 Consolidate and level unshrinkable fill with internal vibrators.

3.11 TESTING

- .1 The following shall be the minimum acceptable standard for backfill testing:
 - .1 Tests are taken within 24 hours of the backfill being placed in the trench or cut. Reports indicate date when the backfill was placed and testing completed.
 - .2 Soil density and moisture content tests are taken on each 150mm of depth for a maximum of 75 meters of trench length or as directed by the Parks Canada Representative.
 - .3 Tests shall be so distributed that they are representative of the entire area of the backfill operations.
- .2 Trenches shall be tested from pipe zone to finished sub-grade.

3.12 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Parks Canada Representative.
- .2 Replace topsoil according to Section 32 91 13.13 – Topsoil Placement and Grading and to the satisfaction of the Parks Canada Representative.
- .3 Reinststate surfaces to preconstruction elevations or as otherwise outlined in the contract documents.
- .4 Rebuild damaged and disturbed road structures to drawing detail upon completion of trenching.
- .5 Clean and reinststate areas affected by Work as directed by Parks Canada Representative.

3.13 TRENCH SETTLEMENT DURING WARRANTY PERIOD

- .1 During the warranty period, the Contractor shall replace material and rectify all failures that occur as a result of settlement of trench backfill or collapse of trench walls.
- .2 Trenches in which backfill settles shall be refilled with the specified backfill material. Paved surfaces that are adjacent to trenches or on trench backfill, which fail during the period, shall be replaced or repaired in an approved manner.
- .3 Replacement or materials and rectification of failures that occur as a result of settlement of trench backfill or collapse of trench walls is entirely the responsibility of the Contractor and such repairs work shall be done at the Contractor's expense.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C117, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .3 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - .4 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m³).
 - .5 ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils
 - .6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

1.2 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver and stockpile, aggregates as noted below.
 - .1 Handle and transport aggregates to avoid segregation, contamination and degradation
 - .2 Stockpiling of aggregate to be permitted in locations approved by the Departmental Representative only. Do not stockpile outside of existing gravel or pavement surfaces.
 - .3 Stockpile aggregates in sufficient quantities to meet project schedules.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site any unused granular material to outside the Park or as directed by the Departmental Representative to a location inside the Park.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Granular base and sub-base: material in accordance Alberta Transportation Standard Specifications for Highway Construction.

PART 3 EXECUTION

3.1 SEQUENCE OF OPERATION

- .1 Place granular base only after sub-base or subgrade surface is inspected and approved by Engineer.
- .2 Placing:
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed. Material shall also be free of ice.
 - .3 Do not place aggregate on surfaces with ponding water or which are saturated and soft.
 - .4 Place material only on clean unfrozen surface properly shaped and compacted, and free from snow and ice.
 - .5 Begin spreading base material on crown line or on high side of one-way slope.
 - .6 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .7 Place material 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 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment:
 - .1 Compaction equipment to be capable of obtaining required material densities.
 - .2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Consultant before use.
 - .3 Equipped with device that records hours of actual work, not motor running hours.
- .4 Compacting:
 - .1 Compact to density not less than 100% of Standard Proctor Density ASTM D698 at optimum moisture content.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
 - .4 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
 - .6 The top of the finished base shall exhibit a smooth, continuously dense surface.

- .5 Proof Rolling:
 - .1 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.
 - .2 Obtain approval from Consultant to use non- standard proof rolling equipment.
 - .3 Proof roll at level in granular base as indicated. If use of non- standard proof rolling equipment is approved, Consultant to determine level of proof rolling.
 - .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
 - .5 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove base, sub-base and subgrade material to depth and extent as directed by Engineer.
 - .2 Replace sub-base material and compact.
 - .6 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Consultant and replace with new materials in accordance with this section at no extra cost.

3.2 SITE TOLERANCES

- .1 Finished base surface to be finished to tie-in neatly with adjacent existing gravel surfaces and vegetated areas.
- .2 Correct surface irregularities and adding or removing material until surface is within specified tolerance.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
 - .1 PN1340-2005, Guidelines for Compost Quality.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include in the EPP, erosion and sedimentation control plan for areas where topsoil is to be placed as part of the site restoration work.
- .3 Should topsoil importation be required, submit all testing results identified below minimum of 15 business days prior to planned importation of material.

PART 2 PRODUCTS

2.1 TOPSOIL

- .1 The contractor shall only utilize topsoil material salvaged from the site as part of the site restoration scope unless otherwise directed by the Departmental Representative.
- .2 Importing of topsoil or substitute organic materials will not be permitted unless approved by the Departmental Representative.
- .3 The contractor shall notify the Departmental Representative as soon as possible if they suspect there may be a shortage of topsoil salvaged from the site to allow for restoration.

2.2 TOP SOIL TESTING

- .1 Importing of topsoil or substitute organic materials will be subject to strict testing requirements to be identified by Parks Canada.
- .2 Testing consists of chemical, particle size and seed analysis at a frequency to be determined by the Departmental Representative. Specific requirements to be provided to the contractor upon request. The contractor shall submit testing results to the Departmental Representative a minimum of 14 days prior to planned importation to site.

- .3 The importation of topsoil material, including all costs associated with testing, will be addressed using the Contemplated Change Notice and Change Order process established under the General Conditions.

PART 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION OF SUBGRADE

- .1 Coordinate with the Departmental Representative to confirm that grades are correct. Do not begin placing of topsoil over subgrade until instructed by the Departmental Representative.
- .2 Grade area only when soil is dry to lessen soil compaction. Otherwise mechanically loosen subgrade and hand rake to level prior to placing topsoil unless directed by the Departmental Representative.
- .3 Grade soil establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage away from buildings and roadways.
- .4 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
- .5 Cultivate entire area which is to receive topsoil to minimum depth of 150 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING OF TOPSOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm, over unfrozen subgrade free of standing water.
- .3 Topsoil is to be placed in total thickness matching the pre-construction thickness identified for each area unless otherwise directed by the Departmental Representative.
- .4 Establish traffic patterns for equipment to prevent driving on topsoil after it has been spread to avoid compaction.

- .5 Establish traffic patterns for equipment to prevent mixing of topsoil with subsoils during the topsoil placement process.
- .6 Cultivate soil following spreading procedures.
- .7 Manually spread topsoil/planting soil around trees, shrubs and obstacles.
- .8 Remove debris which does not support growth or effort to return area to original condition including large clumps, excessive cobbles or boulders, or excessive woody debris.

3.4 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage away from buildings and roadways.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep footprinting.
- .3 Topsoiled areas are not to be seeded or sodded unless otherwise directed in writing by the Departmental Representative. In such case, Parks Canada will provide the seed.
- .4 Following the placement of topsoil, the contractor shall place by hand coarse woody debris to mimic the surrounding undisturbed areas and discourage foot or vehicle traffic through those areas.

3.5 ACCEPTANCE

- .1 Departmental Representative will inspect the topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.6 SURPLUS MATERIAL

- .1 Surplus topsoil material is not anticipated to be produced.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Equipment shall be thoroughly cleaned before moving from work areas with known non-native vegetation growth to areas with no known non-native vegetation growth. A map of those areas will be provided to the contractor during the start up meeting.

END OF SECTION