

Highway 5 WBNP Phase 2 km 136.4 to 169.6 Road Rehabilitation Drawings and Specifications

Drawings

000 Location Plan & Drawing Index
 100 Plan-Profile
 200 Replacement and Extension Culvert Cross Sections
 300 Required Ditching Cross Sections
 400 Typical Sections
 500 Pit Development Plan

Specifications

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END OF SECTION

Part 1 General**1.1 ORDER OF PRECEDENCE**

- .1 In addition to GC 1.2.2 – Order of Precedence, Division 01 takes precedence over any contradictory statements made within any of the technical specification sections.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises production of aggregate, culvert supply and installation, general roadway grading including notching and widening, and construction of a surfacing structure on Highway 5, in the Wood Buffalo National Park (WBNP), Northwest Territories.
- .2 The following are key locations relative to the project:
 - .1 Highway 5 Wood Buffalo National Park West Boundary km 96.0;
 - .2 Highway 5 km 113.5: Existing Pit, Culvert Stockpile;
 - .3 Highway 5 km 136.4: Start of the project;
 - .4 Highway 5 km 136.6: Existing Pit, Aggregate Stockpiles;
 - .5 Highway 5 km 162: Existing Pit, Aggregate Stockpiles;
 - .6 Highway 5 km 169.6: End of the project;
 - .7 Highway 5 Wood Buffalo National Park East Boundary: Km 211.0.

1.3 CONTRACT METHOD

- .1 Construct Work under combined price contract.

1.4 WORK BY OTHERS

- .1 Other Contractors may be working within WBNP. Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Departmental Representative. No claims for delays, lost profit or inconvenience will be entertained.
- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of Work.
- .3 Work of Project executed prior to start of the Work of this Contract, and which is specifically excluded from this Contract:
 - .1 Clearing at km 136.6 pit. See section 31 05 16 Aggregate Materials.
 - .2 Supply of some of the culvert material. See section 33 42 13 – Pipe Culverts.

1.5 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Owner's continued use of premises during construction and allow Owner/Departmental Representative unrestricted access to inspect all phases of the Work.
- .2 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities unless approved by the Departmental Representative.
- .3 Maintain fire and emergency access/control.
- .4 **Complete all Work on the road surface by September 30, 2017.**
- .5 **Complete all Works by November 30, 2017 (Contract Completion Date).**

1.6 CONTRACTOR USE OF PREMISES

- .1 Unrestricted use of site, subject to Section 01 14 00.
- .2 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy.
 - .2 Work by other contractors.
 - .3 Public usage.
- .3 Co-ordinate use of premises under direction of Department Representative.
- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Department Representative.
- .7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.7 EXISTING SERVICES

- .1 Notify Department Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Provide alternative routes for pedestrian and vehicular traffic.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify Department Representative of findings.
- .4 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .5 Where unknown services are encountered, immediately advise Department Representative and confirm findings in writing.

- .6 Protect or maintain existing active services.
- .7 Record locations of maintained, re-routed and abandoned service lines.
- .8 Establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. Co-operate with them at all times and in all places of Work. Keep the Departmental Representative informed of all communications with the Utility companies and authorities.
- .9 Notify the Departmental Representative and the Utility companies at least seven days in advance of any activities which may interfere with the operation of such Utilities.
- .10 Immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected, promptly undertake such remedial measures as are necessary at no additional cost to the Utility Owner.

1.8 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders.
 - .5 Other Modifications to Contract.
 - .6 Field Test Reports.
 - .7 Copy of Approved Work Schedule.
 - .8 Park Issued Business License(s).
 - .9 Restricted Activity Permit(s).
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Other documents as specified.

1.9 NATIONAL PARKS ACT

- .1 Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park.
- .2 The Contractor and any subcontractors will obtain a business license from the Parks Canada Administration Office in Fort Smith prior to commencement of the contract.
- .3 All Contractor's vehicles are required to display a vehicle work pass from Parks Canada. These permits may be obtained free of charge from the Departmental Representative, or Parks Canada.

1.10 LAWS TO BE OBSERVED

- .1 Perform Work in accordance with the latest edition of all Federal and Territorial Laws, all local bylaws, acts and regulations and all orders and degrees of bodies or tribunals having any jurisdiction or authority which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work.

1.11 LOCAL/NORTHERN LABOUR

- .1 Prior to performing any work on this contract, contact all respective communities and local First Nations in regards to local residents work force availability to work on the project.
- .2 The Departmental Representative may provide the Contractor with assistance to contact and/or meet with the respective communities and local First Nations.
- .3 The Contractor must make every effort to employ local/northern residents whenever possible to do so.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 USE OF SITE AND FACILITIES**

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

1.2 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.
- .2 No camping in the National Park is permitted. Parks Canada regulations prohibit anyone working within the Park from using public campground facilities.
- .3 Office-tool trailers as well as a Laydown area and Contractor vehicle parking will be permitted at pits km 136.6 pit or km 162, subject to environmental setbacks as described in the Basic Impact Analysis (BIA). No water is available in these pits either directly or through exposing the submerged water table. Water may be available from adjacent water holes, streams, creeks or at the Parks Canada compound in Fort Smith under the guidance of the Environmental Safety Officer (ESO) and the Departmental Representative. The Contractor will be required to obtain a Restricted Activity Permit (RAP) and to adhere to all conditions contained therein.
- .4 A recreational vehicle is allowed for security at the selected laydown pit provided a RAP is obtained and all conditions are adhered to.
- .5 Material other than stripping, clearing debris or park equipment is not allowed along the Right-of-way outside the normal hours of work.
- .6 Work is permitted on the road during daylight hours, from 05:00 to 22:00 hours, seven days per week, subject to the other restrictions.
- .7 A request can be made to the Departmental Representative for permission to work night time shifts. The Contractor must address and accommodate reasonable mitigations in regard to environmental disturbances, impact to wildlife, road users, worker safety, and other factors impacted by night work.
- .8 No hauling of material during inclement weather will be permitted.
- .9 No work is permitted on Civic Holidays or long weekends commencing Thursday evening at 22:00 hours until Tuesday morning at 05:00 hours at a minimum unless prior written approval is granted by the Departmental Representative.
- .10 Unless otherwise approved by the Departmental Representative, no work is permitted before the start of a high traffic event, during the event, or the day after the event. Ensure that two-way traffic is maintained during the work stoppage.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 PRIME COST SUM (CONTINGENCY ALLOWANCE)**

- .1 The Prime Cost Sum (Contingency Allowance) is not a sum due to the Contractor. Rather, it is the fixed amount specified under the **Lump Sum Price Item 3 – Prime Cost Sum** to cover unforeseen contingencies.
- .2 Expenditures under the Prime Cost Sum will be authorized in accordance with procedures provided in General Condition (GC) 6, “Delays and Changes in the Work”, and “Allowable Costs for Contract Changes Under General Condition (GC) 6.4.1”
- .3 Do not include in Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .4 In addition to GC 6, “Delays and Changes in the Work”, payment for Work under the **“Lump Sum Price Item 3 – Prime Cost Sum”** will be made using negotiated rates or by material, labour and equipment rates as follows:
 - .1 Hourly equipment rates will be as per the 2016 Alberta Road Builder and Heavy Construction Association (ARHCA) rates plus 10 %.
 - .2 Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.
 - .3 Transportation time to and from site will be reimbursed only for equipment used exclusively for additional work.
 - .4 Equipment paid on standby will be paid on 50% of the relevant Less Operator rates to a maximum of 10 hrs per day.
 - .5 The Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as approved by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
 - .6 A claim for additional payment will not be considered submitted until all required documentation has been received, reviewed, and approved by the Departmental Representative.
- .1 Work under the Prime Cost Sum may include, but not be limited to:
 - .1 Supply and installation of aggregates from outside the National Parks.
 - .2 Brushing, clearing and grubbing as directed by the Departmental Representative.
 - .3 Reclamation activities at km 162 pit.
 - .4 Supply and install shoulder gravels.
 - .5 Supply and installation of riprap.
 - .6 Supply and installation of beaver deceiver.
 - .7 Disposal of existing permanent roadway signs not to be re-used.
 - .8 Supply and installation of additional permanent signs (not construction signs).
 - .9 Supply and installation of permanent raised reflective road markers, barrier reflectors and / or guide posts.

- .10 Additional survey requested by Departmental Representative outside requirements of the Contract.
- .11 Additional remediation or removal and replacement of unsuitable or contaminated soils not described in the contract documents.
- .12 Utility relocations.
- .13 Miscellaneous work as directed by the Departmental Representative.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 QUALIFICATIONS OF SURVEYOR

- .1 Retain and utilize Professional Survey/Engineering Services to carry out all surveying requirements for quantity measurement. The Professional Survey/Engineering Services employed by the Contractor will have a Permit to Practice from the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists. The cost for the services provided to the Contractor will be considered incidental and will not be measured or paid for separately.
- .2 Follow survey requirements in Section 01 71 00 – Examination and Preparation

1.3 CONTRACTOR QUANTITY MEASUREMENT REQUIREMENTS

- .1 Stockpile Volume Measurement:
 - .1 Stockpile bases surveyed prior to stockpiling of produced aggregates.
 - .1 Surveyed perimeter points: 5 metre intervals on tangents and 3 metre intervals at rounded corners.
 - .2 Surveyed interior grid points: 10 metre intervals with additional points gathered at significant grade changes along the base plateau.
 - .2 Stockpiles surveyed for measurement for payment upon completion of production of the defined aggregate type.
 - .1 Surveyed perimeter points: 5 metre intervals on tangents and 3 metre intervals at rounded corners.
 - .2 Surveyed interior grid points: 5 metre intervals with additional points gathered at significant grade changes along the top plateau.
 - .3 Ignore unlevelled dumps on the top of the stockpile.
 - .3 Gather sufficient surveyed points over the full extent of the pile to clearly define the shape inclusive of irregular features such as loading ramps, secondary ridges that may be formed at levels between the base and the top of the stockpile and any undulations that may, if not defined, skew the true value of the volume quantity.
 - .4 Establish a minimum of 3 control/reference stations for each stockpile site. Clearly identify the field survey reference points with a marker.
- .2 In-place Volume Measurement:
 - .1 Perform, and provide to the Departmental Representative, as-built cross-section survey at every 20 m on station (example: 136+020, 136+040, etc.) along the roadway for the underlying surface prior to the placement of subsequent material. Provide a sufficient number of elevations and offsets and other information to

ensure the underlying surface has been constructed in accordance with the drawings and specifications.

- .2 Perform, and provide to the Departmental Representative, as-built cross-section survey at every 20 m on station (example: 136+020, 136+040, etc.) along the roadway for the completed overlying surface prior to the placement of subsequent material. Provide a sufficient number of elevations and offsets and other information to ensure the completed surface has been constructed in accordance with the drawings and specifications.
- .3 Volume Determinations:
 - .1 Choose the "Average End Area Method" for stockpile or in place measurement or the "Prismoidal Method" for stockpiles measurement to determine quantities for payment. The following conditions will apply:
 - .1 For "Average End Area Method": The volume determined for quantity payment will be accompanied with proof of computation as follows:
 - .1 Plan of survey of the stockpile showing a theoretic or physical baseline (horizontal alignment) to which the cross-sections refer by station and offset, the stockpile and base outlines and contour lines at 0.5 metre interval, the type of aggregate produced and the determined volume quantity.
 - .2 Generated cross-section plots at 10 m interval stations for stockpile and 20 m interval stations for in place materials that show the area of the section and accumulated volume. Additional stations at 3 to 5 metre intervals must be generated to clearly define the beginning and the ending toe of slope for the stockpile.
 - .3 Start station value for each stockpile baseline is 0+000 and falls on the stockpile base and before the toe of slope of the stockpile.
 - .4 End station falls on the stockpile base and beyond the toe of slope of the stockpile at its opposite end.
 - .5 There will be no payment for any material placed outside of the limits of the design cross section.
 - .2 For "Prismoidal Method": The volume determined for quantity payment will be accompanied with proof of computation as follows;
 - .1 Plan of survey of the stockpile showing the stockpile and base outlines and contour lines at 0.5 metre interval, the type of aggregate produced and the determined volume quantity.
 - .2 Design stockpile base of specified crushed aggregate to be calculated 300 mm above surveyed stockpile base surface for payment purposes. All work to produce 300 mm stockpile base is not included in payment of Work.
- .4 Area Measurements and Determination:
 - .1 Measure points around the boundary of the area at 100 m intervals or visible deflections along tangents and at 20 m intervals along curves.
 - .2 Draw closed path/line of area, linking the points.
- .5 Linear Measurements and Determination:
 - .1 Measure points at the start, end and at 100 m intervals or visible deflections along tangents and at 20 m intervals along curves.

- .2 Measure inverts of culverts before and after installation.
- .3 Draw a path/line linking the points.
- .4 Horizontal distances are used, except for measurement of culverts.

1.4 SUBMITTALS

- .1 Submit the following to the Departmental Representative to verify measured quantities:
 - .1 Electronic file format transferred by a secure method (electronic mail/file transfer) over the internet.
 - .2 Name files in accordance with the survey they are related to. Each file should only contain data from a single surface. (example: 20mmBaseDDMMYYYY.csv, 20mmStockpileDDMMYYYY.dxf , Basekm120to130DDMMYYYY.xml).
 - .3 Cogo Points - ASCII plain text comma-separated values (CSV) file in Point Number, Northing, Easting, Elevation, Description format.
 - .4 Breaklines/linework - Drawing eXchange Format (DXF) or approved equivalent.
 - .5 Surfaces - LandXML File Format or approved equivalent.
 - .6 Survey equipment proprietary raw data file, (example: Trimble dc file format).
- .2 Interim releases of Cogo points may be requested at any time by the Departmental Representative during construction to perform quantity assurance.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 ADMINISTRATIVE

- .1 Attend regularly scheduled project meetings throughout the progress of the work as requested by the Departmental Representative.
- .2 Provide physical space and make arrangements for meetings if requested.
- .3 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

- .1 Within 7 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Organizational Chart (including chain of command, subcontractors and engineering services information).
 - .3 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart (including work plan for each stage of construction).
 - .4 Traffic Accommodation Plan: in accordance with Section 01 35 00.06 - Special Procedures for Traffic Control.
 - .5 Health and Safety Plan: in accordance with Section 01 35 29.06 - Health and Safety Requirements (including emergency response plan and medical surveillance if required).
 - .6 Environmental Protection Plan: in accordance with Section 01 35 43 - Environmental Procedures (including sediment and erosion control plan).
 - .7 Quality Control Plan: in accordance with Section 01 45 00 - Quality Control.
 - .8 Product Data, samples and suppliers: in accordance with Section 01 33 00 - Submittal Procedures and Section 01 61 00 – Common Product Requirements.
 - .9 Owner-furnished materials.

- .10 Method of surveying during the project.
- .11 Obtaining business license from Parks Canada.
- .12 Requirements for temporary facilities, site signs, offices, utilities in accordance with Section 01 52 00 - Construction Facilities.
- .13 Site security.
- .14 Proposed changes, change orders, procedures, approvals required, time extensions, and administrative requirements.
- .15 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .16 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .17 Monthly progress claims, administrative procedures, photographs, and hold backs.
- .18 Appointment of survey/engineering services.
- .19 Insurances, transcript of policies.
- .20 Other business.

1.4 PROGRESS MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule monthly progress meetings.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum 5 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 7 days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Corrective measures and procedures to regain projected schedule.
 - .6 Revision to construction schedule.
 - .7 Review submittal schedules: expedite as required.
 - .8 Maintenance of quality standards.
 - .9 Review proposed changes for effect on construction schedule and on completion date.
 - .10 Other business.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Project No. 161-11147-01

Parks Canada Agency

Road Rehabilitation
Highway 5 km136.4 to km169.6
Wood Buffalo National Park

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PROJECT MEETINGS
Page 3

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): A 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: Monday to Sunday, inclusive, will provide seven day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. 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.

1.3 REQUIREMENTS

- .1 Ensure Schedule is practical and remains within specified Contract duration.
- .2 Ensure all Work required for Contract is identified in Project Schedule.

- .3 Include an allowance in Schedule for Work performed under Prime Cost Sum.
 - .4 Plan to complete Work in accordance with prescribed milestones and time frame.
- 1.4 SUBMITTALS**
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
 - .3 Submit Project Schedule to Departmental Representative within 10 working days of receipt of acceptance of Master Plan.
- 1.5 PROJECT MILESTONES**
- .1 Complete all Work on the road surface by September 30, 2017.
 - .2 Complete all Works by November 30, 2017 (Contract Completion Date).
- 1.6 MASTER PLAN**
- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
 - .2 Departmental Representative will review and return revised schedules within 5 working days.
 - .3 Revise impractical schedule and resubmit within 5 working days.
 - .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.
- 1.7 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 Award.
 - .2 Permits.
 - .3 Pre-Mobilization Submittals.
 - .4 Mobilization.
 - .5 Produce and Stockpile Aggregate.
 - .6 Culvert Replacement Works.
 - .7 Benching for Embankment Widening.
 - .8 Scarify and Prepare Subgrade.
 - .9 Ditch Excavation and Improvement.

- .10 Loading, Hauling, and Placing Granular Materials.
 - .11 Single Asphaltic Surface Treatment.
 - .12 Additional Work as Required.
 - .13 Substantial Performance.
 - .14 Remediation of any noted deficiencies.
 - .15 Site Clean-up / Demobilization.
 - .16 Final Completion.
- 1.8 PROJECT SCHEDULE REPORTING**
- .1 Update Project Schedule on weekly basis and when requested by the Departmental Representative 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, providing information on materials, equipment and manpower, providing progress photographs showing examples of work completed that week, defining problem areas, anticipated delays and impact with possible mitigation.
- 1.9 PROJECT MEETINGS**
- .1 Discuss Project Schedule at regular site meetings and monthly progress 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.
- Part 2 Products**
- 2.1 NOT USED**
- .1 Not used.
- Part 3 Execution**
- 3.1 NOT USED**
- .1 Not used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 ADMINISTRATIVE

- .1 Submit to 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 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with 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.
- .5 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Verify field measurements and affected adjacent Work are co-ordinated.
- .7 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .9 Keep one reviewed copy of each submission on site.

1.3 PRODUCT DATA

- .1 Indicate materials, methods of construction, explanatory notes and other information necessary for completion of Work.
- .2 Allow 7 days for Departmental Representative's review of each submission.
- .3 Accompany submissions with transmittal letter 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.

- .4 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
- .5 Submit product data sheets and brochures for requirements requested in specifications Sections and as requested by Department Representative.
- .6 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made and installation of Work may proceed.
- .7 Contractor's responsibility for errors and omissions in submission is not relieved by Department Representative's review of submittals.
- .8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Department Representative's review.
- .9 Keep one reviewed copy of each submission on Site.

1.4 SAMPLES

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

1.5 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of digital photography in jpg format, standard resolution weekly with progress reporting as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
 - .1 Viewpoints and their location.

- .3 Frequency of photographic documentation: weekly as directed Departmental Representative.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Payment for Traffic Accommodation and Special Procedures For Traffic Control will be under **Lump Sum Price Item 2 – Traffic Accommodation.**
- .2 Partial Payments for Traffic Accommodation will be made as follows:
 - .1 When 5% or more of Total Contract Amount (excluding Prime Cost Sum) is earned, 25% of amount bid under Traffic Accommodation will be paid.
 - .2 When 25% or more of Total Contract Amount (excluding Prime Cost Sum) is earned, an additional 25% of amount bid under Traffic Accommodation will be paid.
 - .3 When 50% or more of Total Contract Amount (excluding Prime Cost Sum) is earned, an additional 25% of amount bid under Traffic Accommodation will be paid.
 - .4 When 75% or more of Total Contract Amount (excluding Prime Cost Sum) is earned, an additional 15% of amount bid under Traffic Accommodation will be paid.
 - .5 When the Contract is complete, the balance of amount bid under Traffic Accommodation will be paid.
- .3 Payment of only 5% of the total price tendered (excluding Prime Cost Sum) will be scheduled as outlined above. If the amount bid for Traffic Accommodation is greater than 5% of the total price tendered, payment of the remainder of the amount will be authorized when the contract has been completed.
- .4 No separate payment will be made for additional work including but not limited to:
 - .1 Keeping all roads within construction limits (including haul roads) clean, passable and free from potholes.
 - .2 Snow removal for Contractor to perform the work. This excludes snow removal on Public roads.
 - .3 Supply, installation, maintenance, relocation and removal of the temporary signs and mounting posts.
 - .4 Temporary pavement marking and layout.

1.2 REFERENCES

- .1 Government of Northwest Territories – Department Of Transportation (GNWT-DOT)
 - .1 GNWT-DOT, Standard Drawings SD-200 and SD-1000 Series
- .2 Transportation Association of Canada (TAC)
 - .1 Manual of Uniform Traffic Control Devices for Canada (MUTCD) [2014].

1.3 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 2 – General Requirements, Section 2 – Signing.
- .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Traffic Accommodation Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Traffic Accommodation Plan must include:
 - .1 Placement of traffic signs and delineators.
 - .2 Usage of Flag persons and pilot vehicles.
 - .3 Procedure for Contractor's hauling trucks bypassing traffic control queues.
 - .4 Training requirements for Flag persons.
 - .5 Quality Control Plan to ensure proper procedures and signage are continually met.

1.5 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
 - .1 Place equipment in position to minimize interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .3 Close lanes of road only after receipt of written approval from Departmental Representative.
 - .1 Before re-routing traffic erect suitable signs and devices to GNWT-DOT, Division 2 – General Requirements, Section 2 – Signing [16 Jan 96].
- .4 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic. Provide 7 m wide minimum temporary roadway for traffic in two-way sections through Work and on detours.
 - .1 Provide 4 m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.
- .5 Provide gravelled detours or temporary roads as indicated by the Departmental Representative to facilitate passage of traffic around restricted construction area.

- .6 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.
 - .7 Minimize dust in the construction zone by means of cleaning and watering.
- 1.6 INFORMATIONAL AND WARNING DEVICES**
- .1 Supply, install and maintain two Changeable Message Signs (CMS) with minimum three lines with eight characters per line, for the duration of project. Installation locations, and message displayed to be determined onsite with Departmental Representative.
 - .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to GNWT-DOT, Division 2 – General Requirements, Section 2 – Signing and Government of GNWT-DOT Standard Drawings for Typical Signing.
 - .3 Place signs and other devices in locations recommended in GNWT-DOT, Division 2 – General Requirements, Section 2 – Signing [16 Jan 96].
 - .4 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. If bilingual signs are used, the English and French message shall be of equal letter size and at same elevation, with English on left and French on right. Assistance in translation of construction and warning signs to French may be obtained from Parks Canada.
 - .5 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
 - .6 If situation on site changes, revise Traffic Accommodation Plan to approval of Departmental Representative.
 - .7 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to conditions existing from day to day.
- 1.7 CONTROL OF PUBLIC TRAFFIC**
- .1 Provide competent flag personnel, trained, and properly equipped to GNWT-DOT, Division 2 – General Requirements, Section 2 – Signing [16 Jan 96] for situations as follows:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

- .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
- .5 For emergency protection when other traffic control devices are not readily available.
- .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
- .7 At each end of restricted sections where pilot cars are required.
- .2 Delays to public traffic due to contractor's operators: 20 minutes maximum.
- .3 Provide pilot cars at the discretion of the Contractor and approval of the Departmental Representative. Equip pilot cars with orange flashing lights and signs clearly designating vehicles as pilot cars.
- .4 Provide 2-way traffic during non-working hours.
- .5 The Departmental Representative will monitor traffic control measures and may require the Contractor to modify the Traffic Accommodation Plan when deficiencies or concerns are noted. The Contractor will bear the cost of implementing these requirements.
- .6 Provide all Flagpersons on site with the Northwest Territories Flagperson's Handbook.
- .7 Public Traffic shall be safely accommodated at all times, including times of inclement weather.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

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 Northwest Territories and Nunavut
 - .1 Safety Act, R.S.N.W.T. - Updated [2012].

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.
- .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.
- .7 Complete, sign and submit to Departmental Representative upon award of Contract "Attestation and Proof of Compliance with Occupational Health and Safety (OHS)" form.
 - .1 PCA recognizes that federal Occupational Health and Safety legislation places specific responsibilities upon PCA as owner of the work place. In order to meet those requirements, PCA has implemented a contractor safety regime to ensure roles and responsibilities assigned under Part II of the Canada Labour Code and the Canada Occupational Health and Safety Regulations are implemented and observed when involving Contractor(s) to undertake work in PCA work places, including on PCA property.
- .8 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as

- appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.
- .9 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.
- .10 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- 1.4 FILING OF NOTICE**
- .1 File Notice of Project with Territorial authorities prior to beginning of Work.
- 1.5 SAFETY ASSESSMENT**
- .1 Perform site specific safety hazard assessment related to project.
- 1.6 MEETINGS**
- .1 Schedule and administer Safety Start-up meeting with Departmental Representative prior to commencement of Work.
- 1.7 REGULATORY REQUIREMENTS**
- .1 Do Work in accordance with National Parks Act.
- .2 Work at site will involve contact with NWT Worker's Safety and Compensation Commission.
- 1.8 GENERAL REQUIREMENTS**
- .1 Act as the Prime Contractor in all matters relating to Occupational Health and Safety.
- .2 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .3 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 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with Safety Act, General Safety Regulations, R.R.N.W.T. [1990].
- .2 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 Territory having jurisdiction and advise 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 site-related working experience specific to activities associated with roadway 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 Be on site during execution of Work and report directly to and be under direction of the site supervisor.

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 Territory having jurisdiction, and in consultation with Departmental Representative.

1.14 CORRECTION OF NON-COMPLIANCE

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

1.15 BLASTING

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

1.16 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.17 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.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.
- .2 Work in this Section includes development and implementation of all site specific EPP plans; materials, equipment, and labour to carry out all commitments in those plans; and monitoring and maintenance required to continually meet those commitments through project completion.

1.2 REFERENCES STANDARDS

- .1 Canada National Parks Act and Regulations.
- .2 *Canadian Environmental Assessment Act* (CEAA) Guidelines Order of 2003 and subsequent amendments.
- .3 Parks Canada National Best Management Practices (BMPs).
- .4 Wood Buffalo National Park Highway 5 Roadway Rehabilitation, Basic Impact Analysis (BIA) [August 2016].

1.3 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .3 Qualified Environmental Professional (QEP): An applied scientist or technologist who is registered and in good standing with an appropriate provincial or territorial professional organization constituted under an Act. The QEP must be acting under that association's code of ethics, and subject to the organization's disciplinary action. A qualified environmental professional could be a professional Biologist, Agrologist, Forester, Geoscientist, Engineer, or Technologist.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing construction activities or delivery of materials to site, provide Environmental Protection Plan (EPP) prepared by Qualified Environmental Professional (QEP) for review by Departmental Representative in collaboration with the Parks Canada designated Environmental Safety Officer (ESO).

- .3 Allow a minimum 2 weeks for Departmental review of the EPP and address and respond to all comments raised during review.
- .4 Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
 - .1 Implementation of the most rigorous recommendations and mitigation measures outlined in the BIA and this section as a minimum.
 - .2 Names and qualifications of QEP who created Environmental Protection Plan.
 - .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 Names and qualifications of persons responsible for training site personnel.
 - .6 Descriptions of environmental protection personnel training program.
 - .7 Erosion and sediment control (ESC) plan with drawings identifying type and location of erosion and sediment controls to be provided for the components of this contract that are undertaken in proximity to watercourses, wetlands or riparian environments. ESC plan to include specific measures preventing sediment from entering any waterway or wetland in the vicinity of the construction site, controls for temporary excavations or embankments, stockpiles of excess or spoil materials, temporary roadbeds for construction traffic, and measures to secure site against erosion during any periods of construction inactivity or shutdown. Provide schedule for and name of QEP responsible for regular monitoring and maintenance of all erosion control measures for duration of project. Ensure that control measures are in compliance with erosion and sediment control plan, Mitigation measures listed in section 8 of the BIA, Federal, Provincial, and Municipal laws and regulations, and EPA 832/R-92-005, Chapter 3 requirements.
 - .8 In-streams work plan prepared and submitted by QEP prior to any culvert work in proximity to an active watercourse or wetland. Work plan to include erosion and sediment control measures, procedure for isolating work site and maintaining flows, procedure for completing turbidity monitoring and fish salvage if required. Contractor's designated QEP to be onsite during all in-stream work and ensure appropriate sediment and erosion control is in place prior to starting work. QEP to ensure all of Contractor's activities are in accordance with the EPP, BIA and the specifications.
 - .9 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
 - .10 Spill Control Plan including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .11 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

- .12 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .13 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .14 Waste Water Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .15 Pesticide treatment plan to be included and updated, as required.

1.5 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

- .1 Execution of the work is subject to the provisions within the *Canadian Environmental Assessment Act* (CEAA) Guidelines Order of 2003 and subsequent amendments.

1.6 START-UP AND ENVIRONMENTAL BRIEFING

- .1 All staff employed at the construction site will be subject to a briefing regarding their individual and collective responsibilities to ensure avoidable adverse environmental impact do not arise from their activities and personal choices. **Employees must attend this briefing before beginning their work at the site.** It is recognized new employees may join the Contractors' work force after the initial round of "environmental briefing". In that case and as required, subsequent "environmental briefings" can be presented as numbers warrant, by arrangement with the ESO through the Departmental Representative. Also, some sub-trades may be present at the site for a short time, to perform once-only duties. In these cases, the "environmental briefing" will be replaced by the Contractor explaining the environmental sensitivity of the work location to the sub-trade worker(s), and reviewing highlights of personal conduct expected, with reference to a one-page briefing summary to be provided to the Contractor by the ESO. A copy of this summary will be provided to each sub-trade worker joining the work force at the site.
- .2 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with these specifications. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.
- .3 **Prior to commencing any activity that contravenes the National Parks Act, the Contractor must first obtain a Restricted Activity Permit (RAP) in consultation with the ESO and Departmental Representative.**

1.7 FIRES

- .1 Fires on site are not permitted unless approved in writing by Departmental Representative.
- .2 Where fires or burning is permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved.
 - .1 Restore, clean and return to new condition stained or damaged work.
- .3 Provide supervision, attendance and fire protection measures as directed.
- .4 In case of fire, take immediate action to extinguish fire if safe to do so. Immediately notify Parks Dispatch, ESO and Departmental Representative of any fire.

1.8 DRAINAGE

- .1 Provide Erosion and Sediment Control Plan identifying type and location of erosion and sediment controls provided. Ensure plan includes monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Territorial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3 requirements.
- .2 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .3 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.9 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .3 Minimize stripping of topsoil and vegetation. All topsoil removed shall be preserved, stockpiled and re-used for reclamation purposes.
- .4 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.10 WORK ADJACENT TO WATERWAYS

- .1 Construction equipment to be operated on land only.
- .2 Do not use waterway beds for borrow material.
- .3 Waterways to be free of excavated fill, waste material and debris.
- .4 Design and construct temporary crossings to minimize erosion to waterways.

- .5 Do not skid logs or construction materials across waterways.
 - .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- 1.11 POLLUTION CONTROL**
- .1 Maintain temporary erosion and pollution control features installed under this Contract.
 - .2 Dispose of hazardous wastes in conformance with the Environmental Contaminants Act and applicable territorial regulations.
 - .3 Control emissions from equipment and plant to local authorities' emission requirements.
 - .4 Provide manual or electric fuel systems. Gravity fed fuel systems are not allowed onsite.
 - .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- 1.12 HISTORICAL/ARCHAEOLOGICAL CONTROL**
- .1 All historical or archaeological objects found in National Parks are protected under the National Parks Act and Regulations are the property of Parks Canada. Historical artifacts found on the work site shall be protected and immediately reported to the ESO and Departmental Representative. Contractor to wait for instruction before proceeding with work.
- 1.13 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.
 - .1 Do not take action until after receipt of written 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.
- Part 2 Products**
- 2.1 NOT USED**
- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Bury rubbish and waste materials after receipt of written approval from Departmental Representative.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .5 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .6 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .7 Remove waste products and debris caused by Owner or other Contractors.
- .8 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .9 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117 – [13], Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136 / C136M – [14], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698 – [12e2], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³)).
 - .4 ASTM D3665 – [12], Standard Practice for Random Sampling of Construction Materials
 - .5 ASTM D4318 – [10e1], Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - .6 ASTM D4791 – [10], Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
 - .7 ASTM D5821 – [13], Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.
 - .8 ASTM D6938 – [15], Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Quality Control Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Quality Control Plan must include:
 - .1 Contact information for retained Professional Engineering Services.
 - .2 Specific procedure for submitting daily/weekly test results.
 - .3 Testing standards and frequency for all Quality Control Testing.
- .3 All quality control tests and test results calculated, recorded and submitted to Departmental Representative on industry standard worksheets. Tests and test results certified for correctness by the Professional Engineering Services employed by the Contractor to perform the tests and to be signed by Contractor's representative. Original copies of all worksheets, including calculations, submitted to Departmental Representative daily.

1.4 CONTRACTOR QUALITY CONTROL AND QUALITY CONTROL TESTING

- .1 Contractor to retain and utilize Professional Engineering Services to carry out all quality control and quality control testing and to ensure work meets all specification requirements.

Professional Engineering Services employed by Contractor will have a Permit to Practice from the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists. Cost of such services will be borne by Contractor.

.2 Requirements for aggregate production material:

- .1 Carry out Quality Control Testing on a per lot basis; the lot size for the granular material as follows:

Material	Lot Size
Granular sub-base material	1,500 cu. metres

.2 Minimum Quality Control Testing Requirements

Test Item	Test Frequency
ASTM C136/C136M, Sieve Analysis	4 per Lot
ASTM C117, Percent Fines	4 per Lot
ASTM D4318, Plasticity Index	1 per 3 Lots

- .3 Perform a minimum of two (2) washed sieve analysis tests from the crusher belt and two (2) washed sieve analysis tests from the stockpile for every lot.
- .4 Determine and record the total quantity of crushed aggregate produced at the time of sampling and the test lot that the sample refers to.
- .5 Record the sieve analysis results on standard grain size curve sheets and work sheets which provide all of the test data, calculations, error checks, test results, and any additional information requested by Departmental Representative.
- .6 If more than 1 test result per lot from the Contractor's quality control testing reveals that the material is not within acceptable specification criteria, the following will apply:
- .1 The material will be rejected and the entire lot from the stockpile removed, **or:**
- .2 If in the opinion of the Departmental Representative, the material is only slightly out of specification and will not be detrimental to the usage of the material, the material, if requested by the Contractor in writing, may be accepted by the Engineer at a reduced payment of 75 % of the unit price bid for the applicable item.
- .7 Contractor must retain an untested portion of each sample until the engineer has accepted the test results. Minimum untested sample portion must be to ASTM C136/C136M. Upon request, contractor must make available to the Departmental Representative said portion for quality assurance testing.
- .8 Any acceptance of material will not relieve Contractor from any obligation to perform all work in accordance to requirements of the Contract.

.3 Minimum requirements for compaction and moisture testing:

Material	Test Item	Test Frequency ¹
Subgrade	Proof Roll	As required by the Departmental Representative
	Test Strip	1 per material, if required by the Departmental Representative
	ASTM D698, Standard Test Method for Laboratory Compaction	1 per material source or as directed by the Departmental Representative when soil characteristics change
	ASTM D6938, Density of Soil and Soil-Aggregate in Place by Nuclear Methods	1 test per 40 m for each lift randomly left and right of centreline or as directed by the Departmental Representative
Base and sub-base aggregates	ASTM D698, Standard Test Method for Laboratory Compaction	1 test per 25,000 m ³ of each type of material and whenever the accepted gradation curve is changed
	ASTM D6938, Density of Soil and Soil-Aggregate in Place by Nuclear Methods	1 test per 40 m for each lift randomly left and right of centreline or as directed by the Departmental Representative

¹ QC frequencies may be decreased subject to effectiveness of Contractor QC program and with written approval from Departmental Representative.

- .4 Perform all other quality control and quality control testing as per technical specification sections. Where frequencies are not specified in the technical specification sections, as mutually agreed between the Departmental Representative and the Contractor as necessary to ensure conformance with the specified quality requirements.

1.5 DEPARTMENTAL REPRESENTATIVE INSPECTION AND QUALITY ASSURANCE

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions.
- .3 Departmental Representative reserves the right to sample, test, inspect and monitor the quality of material being produced and incorporated into the work at any time and as often as deemed necessary.
- .4 The Departmental Representative is under no obligation to provide the Contractor with test results.
- .5 If the Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .6 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If upon examination such work is found

not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.6 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to all Work.
- .2 Co-operate to provide reasonable facilities for such access.

1.7 PROCEDURES

- .1 Notify appropriate agency and 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. 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.

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 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 Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.
- .4 All costs associated with rejected work to be borne by Contractor.

1.9 REPORTS

- .1 Submit an electronic copy of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

1.10 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.

Part 2 Products

1.11 NOT USED

- .1 Not Used.

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QUALITY CONTROL
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Part 3 Execution

1.12 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 REFERENCES

- .1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed staging area location(s), dimensions of area to be occupied and used by Contractor, number of trailers to be used, avenues of ingress/egress and other site specific details.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.4 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.

1.5 CONSTRUCTION SITE ACCESS AND PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work or public traffic.
- .2 Build and maintain temporary roads and provide snow removal during period of Work as required.

1.6 SECURITY

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

1.7 EQUIPMENT, TOOL AND MATERIALS STORAGE

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

1.8 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.

1.9 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Ensure dust control is adequate to provide safe operation at all times.
- .6 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .7 Verify adequacy of existing roads and allowable load limit on these roads. Contractor responsible for repair of damage to roads caused by construction operations.
- .8 Construct access and haul roads necessary.
- .9 Location, grade, width, and alignment of detour and haul roads are subject to approval by Departmental Representative.
- .10 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .11 Ensure lighting provides full and clear visibility for full width of haul road and work areas during night work operations.
- .12 Provide snow removal during period of Work.
- .13 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.10 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Neatly stack stored new or salvaged material not in construction facilities.

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 sediment and erosion control plan, specific to site, or requirements of authorities having jurisdiction, whichever is more stringent.
- .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 RELATED REQUIREMENTS**

- .1 Section 01 45 00 – Quality Control.

1.2 REFERENCE STANDARDS

- .1 Within text of each specifications 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 any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 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.

1.3 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 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.
- .3 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

1.4 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 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 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
 - .5 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.
- 1.6 TRANSPORTATION**
- .1 Pay costs of transportation of products required in performance of Work.
 - .2 Unload, handle and store such products supplied by Owner.
- 1.7 MANUFACTURER'S INSTRUCTIONS**
- .1 Unless otherwise indicated in 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 Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
 - .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.
- 1.8 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 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. Departmental Representative reserves 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 Departmental Representative whose decision is final.
- 1.9 CO-ORDINATION**
- .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.
- 1.10 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 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.

1.12 EXISTING UTILITIES

- .1 Protect and maintain existing active services. When services are encountered, immediately notify applicable utility company and Departmental Representative. Stake off and record location.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 REFERENCES

- .1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC).
 - .1 SACC-ID: R2865D, Title: General Condition (GC) 6 – Delays and Changes in the Work, In Effect as of: Jan 28, 2016.
- .2 Government of Northwest Territories – Department Of Transportation (GNWT-DOT)
 - .1 GNWT-DOT, Division 2 – General Requirements, Section 4 – Public Utilities [16 Jan 96].
- .3 Owner's identification of existing survey control points and property limits.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit name and address of Surveyor to Departmental Representative.
- .3 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .4 Submit certificate signed by surveyor certifying those elevations and locations of completed Work that conform with Contract Documents.
- .5 Provide stake-out report, slope stake notes, cut sheet reports and any other reporting required by the Departmental Representative for quality assurance purposes.
- .6 Record and submit locations with horizontal and vertical data for any additional control points installed.

1.4 QUALIFICATIONS OF SURVEYOR

- .1 Retain and utilize Professional Survey/Engineering Services to carry out all surveying requirements for staking, layout and quantity measurement. The Professional Survey/Engineering Services employed by the Contractor will be licensed to operate in the Northwest Territories. The cost of the services provided to the Contractor is considered incidental to the Work and will not be measured separately for payment.

1.5 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on drawings.

- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
 - .3 Make no changes or relocations without prior written notice to Departmental Representative.
 - .4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
 - .5 Require surveyor to replace control points in accordance with original survey control.
- 1.6 SURVEY REQUIREMENTS**
- .1 Department Representative will identify construction limits of the project.
 - .2 Prior to start of construction, Contractor may perform topographic surveys of the ROW to confirm original ground (OG) survey provided by Departmental Representative. Failure to perform OG survey will constitute Contractor's acceptance of OG survey provided by Departmental Representative.
 - .3 Electronic copy of design/data will be provided to the contractor if requested, after execution of Contract.
 - .4 Reproduce some or all of the data or control points to verify inconsistencies or run machine control software during execution of Contract.
 - .5 Perform all survey, layout and quantity measurement required to complete the work identified in the Contract documents including but not limited to:
 - .1 Establish additional Survey Control Points as required or if in danger of being damaged.
 - .2 Stake complete baseline displaying project stationing at 20 m intervals suitable for referencing test locations and for purposes of measurement for payment. Baseline to be placed outside of construction footprint and in a manner to be legible from roadway.
 - .3 Stake for excavation, embankment, grading, and soil stripping.
 - .4 Stake slopes.
 - .5 Stake for notching, sub-base course, and base course.
 - .6 Establish culvert locations, invert elevations and grade culvert bed to proper slope.
 - .7 Establish the start and finish of "No Passing Zones" and passing lanes as directed by the Departmental Representative.
 - .6 Survey Accuracy:
 - .1 All survey work tied into the existing Control Monument Network. Departmental Representative will provide information on existing Control Points.
 - .2 All traverses will be closed and balanced. All level loops and traverses will be tied into the Control Monument Network.
 - .3 Horizontal Accuracy: less than $r = 5 \times (d+0.2)$ where "r" is in mm and "d" is in km.

- .4 In bush areas, all elevations within 0.10 m of correct elevation.
- .5 In open ground, all elevations within 0.03 m of correct elevation.
- .6 On highway surface, all elevations within 0.01 m of correct elevation.
- .7 Departmental Representative will complete quality assurance survey as required to verify grades, alignments, and quantity measurements provided by Contractor.

1.7 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- .2 Comply with GNWT-DOT, Division 2 – General Requirements, Section 2.4.1 – Power and Telecommunication Poles and Cables.
- .3 Comply with GNWT-DOT, Division 2 – General Requirements, Section 2.4.2 – Railway Crossings.

1.8 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

1.9 SUBSURFACE CONDITIONS

- .1 A geotechnical investigation at the km 136.6 pit was performed. See attached Pit Development plan for test pit logs.
- .2 The information given is known only at the test pit locations. Actual soil composition and stratigraphy between test pits may vary.
- .3 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

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EXAMINATION AND
PREPARATION
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END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Payment for Mobilization and Demobilization will be under **Lump Sum Price Item 1 – Mobilization / Demobilization.**
- .2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
- .3 Remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.
- .4 Payment of only 5% of the total price tendered (excluding Prime Cost Sum) will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than 5% of the total price tendered, payment of the remainder of the amount will be authorized when the contract has been completed.

1.2 DESCRIPTION

- .1 Mobilization and Demobilization consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, buildings, shops, offices, supplies and incidentals to and from the project sites.
- .2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 PROJECT CLEANLINESS

- .1 No waste collection service will be provided by Parks Canada. Arrangements must be made to appropriately dispose of waste at waste facilities outside of Wood Buffalo National Park
- .2 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .3 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .4 Clear snow and ice from access to work areas during active construction periods and when access to environmental protection facilities required outside active construction times.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Provide any on-site bear proof containers required for collection of waste materials and debris.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 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 including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

- .7 Remove dirt and other disfiguration from exterior surfaces.
- .8 Sweep and wash clean paved areas.
- .9 Clean drainage systems.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling and reuse.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, Contractor, and Owner (if required).
 - .2 When Work incomplete according to Owner and Departmental Representative, complete outstanding items and request re-inspection.

1.3 FINAL CLEANING

- .1 Final Cleaning: clean in accordance with Section 01 74 11- Cleaning.
- .2 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

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CLOSEOUT PROCEDURES
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Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for 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.

1.3 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for 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.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 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.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.

- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.4 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings.
- .2 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .3 Legibly mark each item to record actual construction on the Contract Drawings and shop drawings including but not limited to:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not on original Contract Drawings.
 - .4 References to related shop drawings and modifications.
- .4 Legibly mark each item to record actual construction in the Specifications including but not limited to:
 - .1 Manufacturer and product number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .5 Provide digital photos, if requested, for site records.

1.5 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.
- .2 A final survey of the pit site complete with a plan drawing showing the development in its entirety is required as a conditional prerequisite for the final acceptance of the Work. The final site survey includes pre-pitting and post-pitting surveys with area and neat volume of the quarried material determined. Final stockpile outlines shown and labeled by material type and final volume determined.
- .3 The plan of survey for the pit site shall be submitted as a hardcopy drawing and in a digital format, Drawing Exchange Format (DXF). The final survey and site plan will be considered incidental to the Work and will not be measured separately for payment.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

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Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental and will not be measured or paid for separately.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C127-[04], Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
 - .2 ASTM D698-[00ae1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .3 ASTM D1557-[02e1], Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - .4 ASTM D4253-[00], Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.3 DEFINITIONS

- .1 Corrected maximum dry density is defined as:
 - .1 $D = (F1 \times D1) + (0.9 \times D2 \times F2)$
 - .2 Where: D = corrected maximum dry density kg/m³.
 - .1 F1 = fraction (decimal) of total field sample passing 19 mm sieve
 - .2 F2 = fraction (decimal) of total field sample retained on 19 mm sieve (equal to 1.00 - F1)
 - .3 D1 = maximum dry density, kg/m³ of material passing 19 mm sieve determined in accordance with Method of ASTM D1557.
 - .4 D2 = bulk density, kg/m³, of material retained on 19 mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.
 - .3 For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253 wet method when directed by Departmental Representative.
- .2 Corrected Optimum Moisture is defined as:
 - .1 $Mt = (F2 \times Ao) + (F1 \times Mc)$
 - .2 Where: Mt = corrected optimum moisture %.
 - .1 Mc = Optimum moisture for original proctor test, %
 - .2 F2 = fraction (decimal) of total field sample retained on 19 mm sieve (equal to 1.00 - F1)
 - .3 F1 = fraction (decimal) of total field sample passing 19 mm sieve
 - .4 Ao = Moisture absorbed by coarse or oversize particles, % to ASTM C127

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Payment for Clearing and Grubbing, if requested by the Departmental Representative, will be made under the **Prime Cost Sum** lump sum item in accordance to Section 01 21 00 - Allowances.

1.2 REFERENCES

- .1 Government of Northwest Territories – Department of Transportation (GNWT-DOT).
 - .1 GNWT-DOT Specifications, Division 3 – Grading, Section 1 – Clearing [16 Jan 96].
 - .2 GNWT-DOT Specifications, Division 3 – Grading, Section 2 – Grubbing [13 Dec 96].

1.3 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 3 – Grading, Section 1 – Clearing and Section 2 – Grubbing.
- .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.4 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of all not to be salvaged, including felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Shrubs and other vegetation that can be cut with a brush scythe or mowing machine will not be considered as clearing.
- .3 Grubbing consists of excavation and disposal of stumps and roots to not less than specified depth below existing ground surface.

1.5 STORAGE AND PROTECTION

- .1 Prevent damage to natural features, bench marks, utility lines, water courses which are to remain.
 - .1 Repair damaged items to approval of Departmental Representative.
 - .2 Replace trees designated to remain, if damaged, as directed by Departmental Representative.
- .2 Trees and brush to be kept separate from the topsoil.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.

- .2 Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuel wood can be produced as saleable timber.
 - .1 Trim limbs and tops, and saw into saleable lengths.
 - .2 Stockpile adjacent to site.

Part 2 Products

2.1 MATERIALS

- .1 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 sediment and erosion control plan, specific to site or requirements of authorities having jurisdiction, whichever is more stringent.
- .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 Departmental Representative, items designated to remain. Identify clearing limits with survey flagging.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
 - .1 Notify 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 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 CLEARING

- .1 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.
- .2 Clear as directed by Departmental Representative, by cutting at height of not more than 100 mm above ground.
- .3 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative.
- .4 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.

3.4 GRUBBING

- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 200 mm below ground surface.
- .3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m³.
- .4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

3.5 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials to disposal area designated by Departmental Representative.
- .2 Cut timber greater than 130 mm diameter. Stockpiled timber becomes property of Departmental Representative.
- .3 Dispose of cleared and grubbed materials by burying.
- .4 Bury to approval of Departmental Representative by:
 - .1 Consolidating.
 - .2 Covering with minimum 600 mm of mineral soil.
 - .3 Finishing surface.
- .5 Chip or mulch and spread cleared and grubbed vegetative material on site as directed by Departmental Representative.
- .6 Remove diseased trees identified by Departmental Representative and dispose of this material to approval of Departmental Representative.

3.6 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for stripping of topsoil to approval of Departmental Representative.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 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 MEASUREMENT AND PAYMENT**

- .1 Work in this Section will be considered incidental to the applicable Unit Price Items listed below and will not be measured or paid for separately:
 - .1 2a – Produce and Stockpile Aggregate at km 136.6 pit – Removal of Overburden**
 - .2 2b - Produce and Stockpile Aggregate at km 136.6 pit – 76mm Granular Sub-Base**
- .2 Work required to construct 300 mm stockpile base with specified aggregate will be considered incidental and will not be measured or paid for separately.
- .3 Work required to grub the stumps and roots from the area in the pit cleared by others will be considered incidental and will not be measured or paid for separately.

1.2 REFERENCE STANDARDS

- .1 Government of Northwest Territories – Department of Transportation (GNWT-DOT).
 - .1 GNWT-DOT Specifications, Division 5 – Granular Materials, Section 1 – Crushed Aggregate Production [13 Dec 96].

1.3 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 5 – Granular Materials, Section 1 – Crushed Aggregate Production.
- .2 This section takes precedence over contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Samples:
 - .1 Submit processed aggregate samples to Departmental Representative in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Allow continual sampling by Departmental Representative during production.
 - .3 Provide Departmental Representative with access to source and processed material for sampling.
 - .4 Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.
 - .5 Provide front end loader or other suitable equipment including trained operator for stockpile sampling as necessary. Move samples to storage place as directed by Departmental Representative.

- .6 Supply new or clean sample bags or containers appropriate to aggregate materials.
- .7 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.
- .8 Provide water and electric power to Departmental Representative laboratory trailer at production site.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.

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, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .2 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Natural sand.
 - .2 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .3 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.
- .4 Any pit or quarry provided, once entered and developed, shall be used to its full potential. For the production of all aggregates, the contractor shall provide equipment capable of utilizing all the material in the pit.
 - .1 Contractor to work deposit to pit floor prior to proceeding to new zones within the area to be worked.
- .5 Bleeding off of oversize materials or intermediate round material will not be allowed. All natural material must be utilized for processing purposes. No portion of the existing material in the Pit will be rejected or wasted. All material must be utilized in the product being produced.
- .6 Contractor may be required to obtain blending materials from sources other than the specified deposit and make other aggregate gradation adjustments and modifications to meet gradation requirements for material.
- .7 Reject and screening materials produced in the designated source are to be stockpiled neatly and separately from the crushed aggregate stockpiles. All reject and screened materials produced from the crushing operations and not incorporated into the Work under this Contract are the property of the Owner.

- .8 Surplus aggregates produced in the designated source which remain in stockpile after completion of the Contract are the property of the Owner.

2.2 SOURCE QUALITY CONTROL

- .1 The Contractor will be fully responsible and bear all costs for quality control testing in accordance with Section 01 45 00 - Quality Control.

Part 3 Execution

3.1 PREPARATION

- .1 Clearing at the designated aggregate source has been completed by others previously. If additional clearing is required, payment will be made under the **Prime Cost Sum** lump sum item in accordance to Section 01 21 00 - Allowances.
- .2 Grubbing is required and will be in accordance with Section 31 11 00 – Clearing and Grubbing and the following:
 - .1 Prior to excavating materials for aggregate production, grub area to be worked.
 - .2 Dispose of cleared and grubbed materials as directed by Departmental Representative.
 - .3 Where clearing is required, leave screen of trees between cleared area and roadways as directed.
 - .4 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
- .3 Removal of overburden including topsoil is required and will be in accordance with the following and as directed by the Departmental Representative:
 - .1 Prior to excavating materials for aggregate production remove topsoil and overburden from aggregate source.
 - .2 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush and grasses and removed from site.
 - .3 Strip topsoil to depths as directed by Departmental Representative.
 - .4 Separate topsoil from other subsoil overburden and avoid mixing topsoil with subsoil.
 - .5 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
 - .6 Stockpile topsoil in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.
 - .7 Stockpile subsoil overburden in locations as directed by Departmental Representative.
- .4 Aggregate source preparation:
 - .1 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
 - .2 Trim off and dress slopes of waste material piles and leave site in neat condition.

- .3 Provide silt fence or other means to prevent contamination of existing watercourse or natural wetland features.
- .5 Processing:
 - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation to conform to the specifications for the designations and classes called for in the Contract.
 - .2 Blend aggregates, as required, including reclaimed materials that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.
 - .1 Use methods and equipment approved in writing by Departmental Representative.
 - .3 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
 - .4 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.
 - .1 Use only equipment approved in writing by Departmental Representative.
- .6 Stockpiling:
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
 - .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 Provide compacted stockpile base, 300 mm in depth, of specified aggregate to prevent contamination of aggregate. Do not include stockpile base in measurement or payment of 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 Departmental Representative within 48 hours of rejection.
 - .7 Stockpile materials in uniform layers of thickness not exceeding 1.0 metre in depth.
 - .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 Radial Telescopic Conveyor/Super Stacker permitted for stockpiling granular materials except Chip Seal/Seal Coat Aggregate Class 16 mm Material.
 - .1 The height of the conveyor should be set as low as possible to minimize segregation and that layering should be evenly distributed.
 - .11 The final stockpile will be in conformance with requirements of the Occupational Health and Safety Act.

- .12 Ensure that no segregation of material takes place during the stockpiling operation.
- .13 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- .5 Waste Management: separate waste materials for reuse recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .6 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.
- .7 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to Departmental Representative.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Measure subgrade preparation in square metres of roadway subgrade prepared.
- .2 Payment for Subgrade Preparation will be under **Unit Price Item 3b - Subgrade Widening and Preparation, Scarify and Prepare Subgrade to 150 mm depth.**

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D698-[07e1], Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³) [600 kN-m/m³].
- .2 Government of Northwest Territories – Department of Transportation (GNWT-DOT).
 - .1 GNWT-DOT Specifications, Division 5 – Granular Materials, Section 4 – Subgrade Preparation

1.3 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 5 – Granular Materials, Section 4 – Subgrade Preparation.
- .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

Part 2 Products**2.1 NOT USED**

- .1 Not used.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of existing substrate are acceptable for subgrade preparation.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with subgrade reshaping only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 SCARIFYING AND RESHAPING

- .1 Scarify subgrade to full width as directed by Departmental Representative and to minimum depth of 150 mm.
- .2 Loosened material to be windrowed to the side and the exposed surface thoroughly compacted.
- .3 Material to be handled such that segregation does not occur.
- .4 Blade, mix, and trim material to elevation and cross section dimensions as directed by Departmental Representative

3.3 COMPACTING

- .1 Compact to density not less than 100% corrected maximum dry density in accordance with ASTM D698.
- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade surface.
- .3 Apply water as necessary during compaction to obtain specified density.
- .4 If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected to optimum value for compaction in accordance with ASTM D698.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

- .1 Protect and maintain reshaped surface in condition conforming to this Section until succeeding material is applied.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Common Excavation: measure in linear lane metres of notching and widening and linear meters of ditching.
- .2 No separate payment for:
 - .1 Stripping the existing embankment slopes of topsoil and stockpiling the material.
 - .2 Replacing topsoil on slopes upon completion of excavation and embankment.
 - .3 Rock Excavation.
 - .4 Haul of material.
 - .5 Excavating unnecessarily beyond lines established by Departmental Representative.
 - .6 Scarifying or benching existing slopes.
 - .7 Removing and disposing of roots, stumps and other materials excavated during waste operation.
 - .8 Removing unsuitable material from embankment attributable to negligence.
 - .9 Shattering rock to 300 mm below subgrade elevation.
 - .10 Scaling and removing loose rock from rock face.
 - .11 Watering, drying and compacting.
 - .12 Finishing.
- .3 Payment for Roadway Embankments will be under **Unit Price Item 3a - Subgrade Widening and Preparation, Benching for Embankment Widening** for notching and widening work.
- .4 Payment for Roadway Embankments will be under **Unit Price Item 3c - Subgrade Widening and Preparation, Ditch Excavation and Improvement** for ditching work.

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D698-[07ea1], Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft³) (600 kN-m/m³).
- .2 Government of Northwest Territories – Department of Transportation (GNWT-DOT).
 - .1 GNWT-DOT Specifications, Division 3 – Grading, Section 3 – Roadway Excavation.
 - .2 GNWT-DOT Specifications, Division 3 – Grading, Section 6 – Embankment Construction.
 - .3 GNWT-DOT Specifications, Division 3 – Grading, Section 8 – Right-Of-Way Grading and Clean-Up.
 - .4 GNWT-DOT Specifications, Division 3 – Grading, Section 9 – Watering on the Road.
 - .5 GNWT-DOT, Standard Drawings SD-300 Series.

1.3 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 3 – Grading, Sections 3, 6, 8 and 9.
- .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.4 DEFINITIONS

- .1 Rock Excavation: excavation of:
 - .1 Material from solid masses of igneous, sedimentary or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped with reasonable effort with a Caterpillar D9 crawler bulldozer or equivalent to be considered integral with parent mass.
 - .2 Boulder or rock fragments measuring in volume 2 cubic metre or more.
- .2 Common Excavation: excavation of materials that are not Rock Excavation or Stripping.
- .3 Stripping: excavation of organic material covering original ground.
- .4 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.
- .5 Waste Material: material unsuitable for embankment, embankment foundation or material surplus to requirements.
- .6 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

Part 2 Products**2.1 MATERIALS**

- .1 Embankment materials require approval by Departmental Representative.
- .2 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or other unsuitable material.

Part 3 Execution**3.1 COMPACTION EQUIPMENT**

- .1 Compaction equipment: vibratory rollers or vibrating plate compactors capable of obtaining required density in materials on project.
 - .1 Demonstrate compaction equipment effectiveness on specified material and lift thickness by documented performance of test-strip before start of Work.
 - .2 Replace or supplement equipment that does not achieve specified densities.
- .2 Operate compaction equipment continuously in each embankment when placing material.

3.2 WATER DISTRIBUTORS

- .1 Apply water with equipment capable of uniform distribution.

3.3 STRIPPING

- .1 Place top soil and finish grading in accordance with Section 32 91 19.13- Topsoil Placement and Grading.
- .2 Commence topsoil stripping of areas as directed by Departmental Representative after weeds, grasses, brush have been removed from these areas.
- .3 Strip topsoil to depths as directed by Departmental Representative. Do not mix topsoil with subsoil.
- .4 Stockpile in locations as directed by Departmental Representative.
 - .1 Stockpile height: not to exceed 2 m.
- .5 Remove clearing and grubbing debris from stripping.
- .6 Spread organic stripping, on completion of excavation and embankment construction, on slopes and trim or remove from site if quantity exceeds ability to grade on site.

3.4 EXCAVATING

- .1 General:
 - .1 Notify Departmental Representative when waste materials are encountered and remove to depth and extent directed.
 - .2 Sub-excavate below subgrade in cut sections if directed by Departmental Representative.
- .2 Drainage:
 - .1 Maintain profiles, crowns and cross slopes to provide good surface drainage.
 - .2 Provide ditches as work progresses to provide drainage.
 - .3 Construct interceptor ditches as indicated or as directed before excavating or placing embankment in adjacent area.
- .3 Notching and Widening:
 - .1 Notching and widening will be required as indicated.
 - .2 Depth of the notch: to height of existing surfacing structure, or depth required to balance cut and fill as directed by Departmental Representative.
 - .3 Benching may be required in areas with large embankments.
 - .4 The material from the notch shall be bladed to the toe of the existing sideslope and be incorporated into the widening.
 - .5 Construct and surface the notch in a manner to avoid an upward movement or a distortion of the existing surfacing structure.
 - .6 Top 150 mm of notch to be dried to within 3% of optimum moisture content.
 - .7 Windrowing embankment and surfacing materials on the existing surfacing structure will not be permitted unless authorized by Departmental Representative.
- .4 Ditching:
 - .1 Ditching will be required as indicated.
 - .2 Excavation required for permanent deepening, widening and relocating water channel as directed by Departmental Representative.

- .3 Mark necessary level using surveyor/equipment to make sure positive drainage.
- .4 All material excavated will be disposed of, level in low area making slope towards ditch as directed by Departmental Representative.
- .5 Water logging in ROW will not be accepted.
- .6 Off take ditch to be excavated as directed by Departmental Representative.

3.5 EMBANKMENTS

- .1 Scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces.
 - .1 Method used to be to be pre-approved in writing by Departmental Representative.
- .2 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized by Departmental Representative.
- .3 Maintain crowned surface during construction to ensure ready run-off of surface water.
- .4 Drain low areas before placing materials.
 - .1 Place and compact to full width in layers not exceeding 150 mm loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.
- .5 Where material consists of rock:
 - .1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 1 m.
 - .2 Distribute rock material to fill voids with smaller fragments to form compact mass.
 - .3 Fill surface voids at subgrade level with rock spalls or selected material to form earth-tight surface.
 - .4 Do not place boulders and rock fragments with dimensions exceeding 150 mm within 300 mm of subgrade elevation.
- .6 Deductions from excavation will be made for overbuild of embankments.

3.6 COMPACTION

- .1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.
- .2 Deposit, spread, and level, embankment material in layers 150 mm maximum thickness before compaction.
 - .1 Compact each layer of embankment until compaction equipment achieves no further significant consolidation.
 - .2 Ensure required compaction for each layer before placing any material for next layer.
- .3 Use specialized compaction equipment supplemented by routing, hauling, and leveling equipment over each layer of fill.

- .4 Obtain written approval from Departmental Representative before using specialized compaction equipment such as tamping rollers, vibratory rollers, or other alternate compaction equipment that produces the required results
 - .1 For tamping rollers, use equipment that exerts 1000 kPa minimum of pressure on tamping surface of each tamping foot in transverse row.
- .5 Compact each layer to minimum 98% maximum corrected dry density: ASTM D698 and dry to within 3% of optimum moisture content except top 300 mm of subgrade.
 - .1 Compact top 300 mm to 100% maximum corrected dry density and dry to at least the optimum moisture content.
- .6 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

3.7 FINISHING

- .1 Shape entire roadbed to within 30 mm of design elevations.
- .2 Finish slopes, ditch bottoms and borrow pits true to lines, grades and drawings where applicable. Scale slope by removing loose fragments, for cut slopes in bedrock steeper than 1:1.
- .3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.
- .4 Hand finish slopes that cannot be finished satisfactorily by machine.
- .5 Round top of backslope 1.5 m both sides of top of slope.
- .6 Run dozer tracks over slopes exceeding 3 m in height to leave tracks parallel to centreline of highway.
- .7 Trim between constructed slopes and edge of clearing to provide drainage and free of humps, sags and ruts.

3.8 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: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for recycling reuse.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.9 PROTECTION

- .1 Maintain finished surfaces in condition conforming to this section until succeeding material is applied.
- .2 Provide silt fences and erosion protection as required to mitigate and prevent impacts to adjacent properties.

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Parks Canada Agency

Road Rehabilitation
Highway 5 km136.4 to km169.6
Wood Buffalo National Park

Section 31 24 13
ROADWAY EMBANKMENTS

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END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Geotextile soil stabilization used for pipe culvert installation according to Section 33 42 13 – Pipe Culverts will be considered incidental and will not be measured or paid for separately.
- .2 Payment for Geotextile soil stabilization outside of pipe culvert installation, if requested by the Departmental Representative, will be made under the **Prime Cost Sum** lump sum item according to Section 01 21 00 - Allowances.

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A123/A123M-[09], Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM D4632 / D4632M-[15a], Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - .3 ASTM D4533 / D4533M-[15], Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 - .4 ASTM D6241-[14], Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-[2004], Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No.2-[M85], Methods of Testing Geosynthetics - Mass per Unit Area.
 - .2 No.3-[M85], Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .3 No.6.1-[93], Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
 - .4 No.7.3-[92], Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
 - .5 No. 10-[94], Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

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 geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Test and Evaluation Reports:
 - .1 Submit copies of mill test data and certificate at least 4 weeks prior to start of Work.
- 1.4 DELIVERY, STORAGE AND HANDLING**
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .2 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 geotextiles from direct sunlight and UV rays.
 - .3 Replace defective or damaged materials with new.
 - .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

Part 2 Products

2.1 MATERIAL

- .1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 3.8 m minimum.
 - .2 Length: 76 m minimum.
- .2 Physical properties:
 - .1 Minimum Grab Strength: to ASTM D4632, minimum 900 N
 - .2 Minimum Puncture Resistance: to ASTM D6241, minimum 2300 N
 - .3 Tear Strength: to ASTM D4533, minimum 350 N
- .3 Securing pins and washers: to CSA G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to ASTM A123/A123M.
- .4 Factory seams: sewn in accordance with manufacturer's recommendations.
- .5 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

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 geotextile material installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental 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 Departmental Representative.

3.2 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .4 Join successive strips of geotextile by pinning with securing pins at 500 mm intervals or by retaining overlap in place by placing of weights.
- .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .6 After installation, cover with overlying layer within 4 hours of placement.
- .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .8 Place and compact soil layers in accordance with Section 31 24 13- Roadway Embankments.

3.3 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: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for recycling and reuse.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.
- .2 Do not overload soil or aggregate covering on geotextile.

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Parks Canada Agency

Road Rehabilitation
Highway 5 km136.4 to km169.6
Wood Buffalo National Park

Section 31 32 19.16
GEOTEXTILE SOIL
STABILIZATION
Page 4

END OF SECTION

Part 1 General**1.1 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION**

- .1 Owner will supply:
 - .1 Seal coat aggregate stockpile of approximately 4,200 m³ at km 162 Pit.
- .2 Contractor will supply all other products required for the completion of the work under this section.

1.2 MEASUREMENT AND PAYMENT

- .1 Flexible Paving Surface Treatment – Single Application will be measured in square metres.
- .2 No payment will be made for any material used to replace, repair or overlay rejected work, and all corrective work performed entirely at the Contractor's expense.
- .3 Payment for Flexible Paving Surface Treatment – Single Application will be under **Unit Price Item 6a – Supply and Application of Asphaltic Surface Treatment, Single Asphaltic Surface Treatment**.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM C88-[05], Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
 - .2 ASTM C117-[04], Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .3 ASTM C131-[06], Standard Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .4 ASTM C136-[06], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .5 ASTM D140/D140M-[09], Standard Practice for Sampling Bituminous Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-[88], Sieves Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-[M88], Sieves Testing, Woven Wire, Metric.
 - .3 CAN/CGSB-16.5-[M84], Asphalt, Emulsified, High Float Type, for Road Purposes.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Government of Northwest Territories – Department of Transportation (GNWT-DOT).

- .1 GNWT-DOT Specifications, Division 6 – Bituminous Materials, Section 1 – Supply of Asphalt [13 Dec 96]
 - .2 GNWT-DOT Specifications, Division 6 – Bituminous Materials, Section 5 – Single Asphaltic Surface Treatment [16 Jan 96]
- 1.4 NORTHWEST TERRITORY - TRANSPORTATION STANDARD**
- .1 Comply with GNWT-DOT Specifications, Division 6 – Bituminous Materials, Section 1 – Supply of Asphalt and Section 5 – Single Asphaltic Surface Treatment.
 - .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.
- 1.5 ACTION AND INFORMATIONAL SUBMITTALS**
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for flexible paving surface treatment and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copy of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
 - .3 Samples:
 - .1 Submit two 4 L clean, sealed, plastic containers of asphalt material proposed for use to Departmental Representative at least 2 weeks prior to commencing work.
 - .1 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into work, in accordance with ASTM D140.
 - .4 Submit design of aggregate spreader for approval by Departmental Representative 2 weeks minimum before start of Work.
- 1.6 CLOSEOUT SUBMITTALS**
- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Operations and Maintenance Data: submit information on materials relative to work of this Section for inclusion in operations and maintenance manual
- 1.7 QUALITY ASSURANCE**
- .1 Upon request from Departmental Representative submit manufacturer's test data and certification that asphalt surface treatment material meets requirements of this Section.
- 1.8 DELIVERY, STORAGE AND HANDLING**
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

- .2 Storage: provide asphalt storage area where directed by Departmental Representative.

Part 2 Products

2.1 EQUIPMENT

- .1 Pressure distributor is:
 - .1 Designed, equipped, maintained, and operated so that asphalt material can be:
 - .1 Applied at even temperature between 50°C and 70°C.
 - .2 Applied uniformly on variable widths of surface up to 5 m.
 - .3 Applied at controlled rates from 0.2 to 5.4 L/m² and with allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distributed in uniform spray without atomization at rate specified and at temperature required.
 - .2 Equipped with meter registering metres of travel per minute, visibly located, to enable truck driver to maintain constant speed required for application at specified rate.
 - .3 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
 - .4 Equipped with an easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
 - .5 Equipped with accurate volume measuring devices or calibrated tank.
 - .6 Equipped with nozzles of same make and dimensions adjustable for fan width and orientation.
 - .7 Cleaned if previously used with incompatible asphalt material.
- .2 Mechanical Aggregate Spreader:
 - .1 Equip with positive controls to allow aggregate to be deposited uniformly over full width of asphalt material.
 - .2 Self-propelled unit of design approved by Departmental Representative.
 - .1 Proceed with Work only after receipt of written approval of aggregate spreader design from Departmental Representative.
 - .3 Supported by 4 minimum wheels with pneumatic tires on 2 axles.
- .3 Rollers:
 - .1 Self-propelled pneumatic tired rollers exerting force of at least 7 tonnes/m minimum of rolling width, equipped with not less than seven wheels staggered back and front, and tires inflated to 415 kPa.
 - .2 Tandem steel drum rollers or rubber-coated vibratory steel drum rollers may be approved by Departmental Representative if demonstrated that satisfactory coating of aggregate particles and minimal particle breakage occur.
 - .3 Minimum drum diameter: 1000 mm.
 - .4 Minimum static force: 4.3 tonnes/m of rolling width.

- .4 Power broom: self-propelled pneumatic tired unit, capable of vertical and horizontal angular adjustment.

2.2 MATERIALS

- .1 Asphalt material: to CAN/CGSB-16.5, grade HF250S.
- .2 Aggregate: material supplied by Owner is in accordance with Section 31 05 16 - Aggregate Materials and as follows:
- .1 Gradation to: GNWT-DOT Chip Seal/Seal Coat Aggregate Class 16 mm Material:

Sieve Designation	% Passing
125 mm	-
80 mm	-
63 mm	-
50 mm	-
40 mm	-
25 mm	-
20 mm	-
16 mm	100
12.5 mm	55-92
10.0 mm	15-80
5.0 mm	0-18
2.5 mm	-
2.0 mm	0-15
1.6 mm	-
1.25 mm	-
0.800 mm	-
0.630 mm	-
0.400 mm	-
0.315 mm	-
0.160 mm	-
0.080 mm	0-4
0.045 mm	-

- .2 Oversize material retained on the upper sieve will be permitted to a maximum of 3% of the sample, only if 100% of the oversize material passes the next larger standard sieve size.
- .3 Los Angeles Degradation: to ASTM C131, maximum percent loss by mass 30.
- .4 Plasticity Index: to ASTM D4318, Maximum 4.
- .5 Crushed particles: at least 60 % of particles by mass within the following sieve designation range to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C136.

Passing	Retained on
16.0 mm	to 5.0 mm

- .6 Flat and elongated particles, with length to thickness ratio greater than 5, maximum percent by mass: 8 %.

Part 3 Execution**3.1 PREPARATION**

- .1 Grade granular base to specified grade and cross-section. Blade smooth, and compact in accordance with Section 32 11 23 - Aggregate Base Courses.

3.2 TRAFFIC CONTROL

- .1 Direct traffic through project with warning signs, flag persons and pilot vehicle in accordance with Section 01 35 00.06 - Special Procedures for Traffic Control.
- .2 Keep traffic off freshly sprayed asphalt.
- .3 Rolling must be complete before traffic is permitted over newly treated areas.
- .4 Traffic to be convoyed by pilot vehicle at speeds not exceeding fifty (50) kilometres per hour from time rolling is complete until six (6) hours thereafter.

3.3 APPLICATION

- .1 Obtain approval from Departmental Representative, of base surface before applying asphalt surface treatment material.
- .2 **Apply treatment only when existing surface is dry, and when atmospheric temperature is above 10 degrees C and will be above 5 degrees C for a period of twenty-four hours after treatment as forecast by Environment Canada.**
- .3 Treatment will not be applied if precipitation is a threat for the construction area within twelve hours as forecast by Environment Canada.
- .4 Schedule work to approval of Departmental Representative.
- .5 Pressure distributor to follow string line parallel to centreline, or to follow path as directed by Departmental Representative.
- .6 Spread protective covering of building paper or other acceptable material over width of surface and for sufficient distance back in order that spraying nozzles are fully operative when surface to be treated is reached. Remove used protective covering and dispose of by means acceptable to Departmental Representative.
- .7 Apply asphalt material at spraying temperature between 50°C and 70°C.
- .8 Establish aggregate and asphalt application rates best suitable for the surface receiving the overlay, the asphalt oil and the aggregate provided. Rates will generally be in the following range:
 - .1 Asphalt application rate 1.8 to 2.3 L/m².
 - .2 Aggregate application rate 20 to 24 kg/m².

- .9 Apply aggregate, in unfrozen condition, immediately following application of asphalt material. Aggregate spreader to be no more than 30 m behind distributor. Apply no more material than can be thoroughly incorporated into or absorbed by asphalt material.
 - .10 Apply so that aggregate spreader tires avoid contact with uncovered and newly applied asphalt material.
 - .11 Immediately after aggregate is spread, cover deficient areas with additional aggregate.
 - .12 Adjust rate of application of asphalt and aggregate as required to provide acceptable finished product as determined by Departmental Representative.
 - .13 Compact immediately after aggregate is spread using minimum of 3 rollers. At least 2 rollers to be pneumatic tired type.
 - .14 Apply at least 3 roller passes to entire surface treated area.
 - .1 The aggregate rolled immediately after spreading. A minimum of 2 coverages by the rollers completed within 15 minutes after the aggregate has been spread.
 - .15 A minimum of ninety-nine percent (99%) aggregate coverage shall be obtained with no single bare area greater than 0.01 m² in any one square metre.
 - .16 Finished surface to have uniform, even texture and free from streaking, ravelling, over-rich or bleeding areas, and no loose aggregate shall be evident.
 - .17 Approaches to be surfaced to a minimum width of 4.3 metres from design centerline or as directed by Departmental Representative.
- 3.4 TRAFFIC MARKINGS**
- .1 Contractor to supply and install interim centerline marking.
 - .2 Centerline marking to be approved reflective foil tape, colour 5161 Yellow or equivalent.
 - .3 Centerline markings to be 100 mm wide and a minimum 150 mm long, applied lengthwise to road surface and exactly on centerline every 15 m on tangents and 10 m on curves.
 - .4 Centerline marking to be completed daily on all newly constructed asphaltic surface treatments.
- 3.5 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: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
 - .3 Sweep excess material from entire surface by means of power brooms at times directed by Departmental Representative and at end of maintenance period.

- .4 Waste Management: separate waste materials for reuse and recycling.
- 3.6 MAINTENANCE**
- .1 Maintain treated surface as directed by Departmental Representative, for period of 4 days minimum after rolling.
 - .1 Include distribution of aggregate material over surface to absorb free asphalt material.
 - .2 Include covering of areas deficient in aggregate material.
 - .2 Ensure embedded material remains stationary during maintenance.

END OF SECTION

Part 1 General**1.1 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION**

- .1 Owner will supply:
 - .1 Aggregate source for the production of the granular sub-base.
- .2 Contractor will supply all other products required for the completion of the work under this section.

1.2 MEASUREMENT AND PAYMENT

- .1 Measure production and stockpiling granular sub-base in cubic metres measured by the Contractor in the stockpile in the pit by cross section and calculated by average end area method or prismatic method of material and accepted in writing by Departmental Representative.
- .2 Measure loading, hauling, placing and compacting granular sub-base in cubic metres measured by the Contractor in place by cross section and calculated by average end area method of material incorporated into Work and accepted in writing by Departmental Representative.
- .3 Supply and application of water to achieve compaction will not be paid for separately.
- .4 Payments will not be made for any material used to repair failures caused by the Contractor's construction equipment or activities, or due to faulty workmanship. Any expense incurred in the production, hauling and placement of such material will be the responsibility of the Contractor.
- .5 There will be no payment for any material placed outside of the limits of the design cross-section.
- .6 Payment for production and stockpiling granular sub-base will be under **Unit Price Item 2b – Produce and Stockpile Aggregate at km 136.6 Pit, 76 mm Granular Sub-base.**
- .7 Payment for loading, hauling, placing and compacting granular sub-base will be under **Unit Price Item 4a – Load, Haul, Place & Compact Granular Sub-Base Course, 76 mm Granular Sub-base.**

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM C117-[04], Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-[06], Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-[06], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

- .4 ASTM D422-[63(2007)], Standard Test Method for Particle-Size Analysis of Soils.
- .5 ASTM D698-[07e1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft ;) (600kN-m/m ;).
- .6 ASTM D1883-[07e2], Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .7 ASTM D4318-[10], Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.
- .3 Government of Northwest Territories – Department of Transportation (GNWT-DOT).
 - .1 GNWT-DOT Specifications, Division 5 – Granular Materials, Section 2 – Granular Base and Subbase Course Construction [13 Dec 96]
 - .2 GNWT-DOT Specifications, Division 5 – Granular Materials, Section 3 – Hauling [16 Jan 96]

1.4 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 5 – Granular Materials, Section 2 – Granular Base and Subbase Course Construction and Section 3 – Hauling.
- .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 31 05 16 - Aggregate Materials.

Part 2 Products

2.1 MATERIALS

- .1 Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.
 - .3 Gradation to: GNWT-DOT Granular Sub-base Class 76 mm Material

Sieve Designation	% Passing
125 mm	-
80 mm	100

Sieve Designation	% Passing
63 mm	-
50 mm	80-100
40 mm	-
25 mm	60-100
20 mm	-
16 mm	-
12.5 mm	45-100
10.0 mm	-
5.0 mm	25-100
2.5 mm	-
2.0 mm	15-100
1.6 mm	-
1.25 mm	-
0.800 mm	-
0.630 mm	-
0.400 mm	5-95
0.315 mm	-
0.160 mm	3-65
0.080 mm	3-25
0.045 mm	-

- .4 Oversize material retained on the upper sieve will be permitted to a maximum of 3% of the sample, only if 100% of the oversize material passes the next larger standard sieve size.
- .5 Other properties as follows:
 - .1 Liquid Limit: to ASTM D4318, Maximum 25.
 - .2 Plasticity Index: to ASTM D4318, Maximum 6.
 - .3 Los Angeles degradation: to ASTM C131, Maximum loss by mass: 50%.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular sub-base installation.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental 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 Departmental Representative.

3.2 PREPARATION

- .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 sediment and erosion control plan, specific to site, or requirements of authorities having jurisdiction, whichever is more stringent.

- .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.

3.3 PLACEMENT AND INSTALLATION

- .1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.
- .2 Placing:
 - .1 Construct granular sub-base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow or ice.
 - .4 Place granular sub-base materials using methods which do not lead to segregation or degradation.
 - .5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
 - .1 Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
 - .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .7 Remove and replace portion of layer in which material has become segregated during spreading.
- .3 Compaction Equipment:
 - .1 Ensure compaction equipment is capable of obtaining required material densities.
- .4 Compacting:
 - .1 Compact each lift to density of not less than 100% corrected maximum dry density in accordance with ASTM D698 and dry to at least the optimum moisture content.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
 - .3 Apply water as necessary during compaction to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .5 Proof Rolling:
 - .1 Proof Roll as directed by Departmental Representative.
 - .2 For proof rolling use standard roller of 45 400 kg gross mass with four pneumatic tires each carrying 11 350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm maximum.

- .3 Obtain approval from Departmental Representative to use non-standard proof rolling equipment.
- .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, repair as directed by Departmental Representative.
- .6 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

3.4 SITE TOLERANCES

- .1 Finished sub-base surface to be within 30 mm of elevation as indicated but not uniformly high or low.

3.5 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: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed.

END OF SECTION

Part 1 General**1.1 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION**

- .1 Owner will supply:
 - .1 Base Course stockpiles:
 - .1 Approximately 41,050 m³ at km 136.6 Pit.
 - .2 Approximately 26,450 m³ at km 162 Pit.
- .2 Contractor will supply all other products required for the completion of the work under this section.

1.2 MEASUREMENT AND PAYMENT

- .1 Measure loading, hauling, placing and compacting granular base course in cubic metres measured by the Contractor in place by cross section and calculated by average end area method of material incorporated into Work and accepted in writing by Departmental Representative.
- .2 Supply and application of water to achieve compaction will not be measured and paid for separately.
- .3 Payments will not be made for any material used to repair failures caused by the Contractor's construction equipment or activities, or due to faulty workmanship. Any expense incurred in the production, hauling and placement of such material will be the responsibility of the Contractor.
- .4 There will be no payment for any material placed outside of the limits of the design cross-section.
- .5 Payment for loading, hauling, placing and compacting granular base course will be under **Unit Price Item 5a – Load, Haul, Place & Compact Granular Base Course, 20mm Granular Base.**

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM C117-[04], Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-[06], Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-[06], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698-[07e1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft ;) (600kN-m/m ;).
 - .5 ASTM D1883-[07e2], Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

- .6 ASTM D4318-[10], Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.
- .3 Government of Northwest Territories – Department of Transportation (GNWT-DOT).
 - .1 GNWT-DOT Specifications, Division 5 – Granular Materials, Section 2 – Granular Base and Subbase Course Construction [13 Dec 96]
 - .2 GNWT-DOT Specifications, Division 5 – Granular Materials, Section 3 – Hauling [16 Jan 96]

1.4 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 5 – Granular Materials, Section 2 – Granular Base and Subbase Course Construction and Section 3 – Hauling.
- .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 31 05 16 - Aggregate Materials.

Part 2 Products

2.1 MATERIALS

- .1 Granular base: material supplied by Owner is in accordance with Section 31 05 16 - Aggregate Materials and as follows:
 - .1 Gradation to: GNWT-DOT Gravel Surfacing Class 19 mm Material

Sieve Designation	% Passing
125 mm	-
80 mm	-
63 mm	-
50 mm	-
40 mm	-
25 mm	-
20 mm	100
16 mm	97-100
12.5 mm	70-95
10.0 mm	45-80
5.0 mm	25-50
2.5 mm	-

Sieve Designation	% Passing
2.0 mm	13-45
1.6 mm	-
1.25 mm	-
0.800 mm	10-37
0.630 mm	-
0.400 mm	7-37
0.315 mm	-
0.160 mm	6-18
0.080 mm	5-15
0.045 mm	-

- .1 Oversize material retained on the upper sieve will be permitted to a maximum of 3% of the sample, only if 100% of the oversize material passes the next larger standard sieve size.
- .2 Liquid limit: to ASTM D4318, maximum 25
- .3 Plasticity index: to ASTM D4318, maximum 8.
- .4 Crushed particles: at least 50% of particles by mass within each of following sieve designation ranges to have at least 2 freshly fractured face. Material to be divided into ranges using methods of ASTM C136.

Passing		Retained on
20 mm	to	5.0 mm

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular base course installation.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental 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 Departmental Representative.

3.2 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 PLACEMENT AND INSTALLATION

- .1 Place granular base after sub-base and subgrade surface is inspected and approved in writing by Departmental Representative.

- .2 Placing:
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
 - .1 Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
 - .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .7 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment:
 - .1 Ensure compaction equipment is capable of obtaining required material densities.
- .4 Compacting:
 - .1 Compact to density not less than 100 % corrected maximum dry density to ASTM D698.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by Departmental Representative.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .5 Proof rolling:
 - .1 Proof Roll as directed by Departmental Representative.
 - .2 For proof rolling use standard roller of 45 400 kg gross mass with four pneumatic tires each carrying 11 350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.
 - .3 Obtain written approval from Departmental Representative to use non-standard proof rolling equipment.
 - .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, repair as directed by Departmental Representative.
 - .6 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Departmental Representative and replace with new materials in accordance with Section 32 11 16.01 - Granular Sub-base and this section at no extra cost.

3.4 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 30 mm of established grade and cross section but not uniformly high or low.

3.5 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: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 35 00.06 – Special Procedures for Traffic Control.
- .2 Section 32 01 13.01 – Flexible Paving Surface Treatment – Single Application

1.2 MEASUREMENT AND PAYMENT

- .1 Pavement marking including reflective glass beads will be measured by line-kilometer. Directional dividing lines consisting of two lines will be considered as one line for measurement and payment purposes.
- .2 Supply of all materials, surveying for layout of barrier line limits and traffic control required for Pavement Markings will be considered incidental and will not be measured or paid for separately.
- .3 Payment for Pavement Markings will be under **Unit Price Item 6b – Pavement Marking**.

1.3 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.5 M99, Low Flash Petroleum Spirits Thinner.
 - .2 CGSB1 GP 12C 83, Standard Paint Colours.
 - .3 CGSB1 GP 71 83, Method, of Testing Paints and Pigments.
 - .4 CAN/CGSB 1.74-01, Alkyd Traffic Paint.
- .2 Green Seal (GS)
 - .1 GS-11-[2013], Standard for Paints and Coatings.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - [current edition].
 - .1 MPI #32 Traffic Markings Paint, Alkyd.
- .5 South Coast Air Quality Management District (SCAQMD)
 - .1 SCAQMD Rule 1113-[13], Architectural Coatings.
- .6 Government of Northwest Territories – Department of Transportation (GNWT-DOT).
 - .1 GNWT-DOT Specifications, Division 8 – Miscellaneous Construction, Section 1 – Supply and Application of Painted Roadway Markings [13 Dec 96]

1.4 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 8 – Miscellaneous Construction, Section 1 – Supply and Application of Painted Roadway Markings.

- .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit to Departmental Representative following material sample quantities at least 4 weeks prior to commencing work.
 - .1 Two 1L samples of each type of paint.
 - .2 One 1kg sample of glass beads.
 - .3 Sampling to MPI Painting Manual.
 - .2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, MPI specification number and formulation number and batch number.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00- Closeout Submittals.

1.7 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 indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Paint and Markings:
 - .1 To CGSB 1.74-2001-CAN/CGSB, alkyd traffic paint and MPI #32, Alkyd zone/traffic marking.
 - .2 Traffic Marking Coatings: maximum VOC limit [450]g/L to SOR/2009-264 Schedule 1[to GS-11 Standard] [to SCAQMD Rule 1113]

- .3 Paints: in accordance with MPI recommendation for surface conditions.
- .4 Colour: to MPI listed; yellow, white.
- .5 Upon request, Departmental Representative will supply qualified product list of paints applicable to work. Qualified paints may be used but Departmental Representative reserves right to perform further tests.
- .2 Thinner: to CAN/CGSB 1.4-2000 and MPI listed manufacturer.
- .3 Glass reflective beads: type suitable for application to wet paint surface for light reflectance to CGSB1 GP 74M.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation in accordance with MPI instructions prior to pavement markings installation.
 - .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions have been rectified.

3.2 EQUIPMENT REQUIREMENTS

- .1 Paint applicator: approved pressure type mobile with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.
- .2 Distributor: capable of applying reflective glass beads as overlay on freshly applied paint.

3.3 TRAFFIC CONTROL

- .1 In accordance with 01 35 00.06 and Contractor's Traffic Management Plan.

3.4 APPLICATION

- .1 Pavement markings: laid out by Contractor.
- .2 Marking Dimensions:
 - .1 All edge lines, lane lines, continuity lines and directional dividing lines to be 100mm in width.
 - .2 Directional dividing line for dashed lines to consist of 3 metre dashes and 6 metre gaps.
 - .3 Edge line markings to be 100mm from edge of pavement surface.
- .3 Unless otherwise approved by Departmental Representative, apply paint only when air temperature is above 10 degrees C, wind speed is less than 60 km/h and no rain is forecast within next 4 hours.

- .4 Apply traffic paint evenly at rate of 3 m²/L.
- .5 Do not thin paint unless approved by Departmental Representative.
- .6 Paint lines of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.
- .8 Apply glass beads at rate of 0.5kg/L of painted area immediately after application of paint.

3.5 TOLERANCE

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.
- .2 Remove incorrect markings as directed by Departmental Representative.

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.
 - .1 Remove insulation material spilled during installation and leave work area ready for application of wall board.
- .3 Waste Management: separate waste materials for recycling and reuse.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

END OF SECTION

Part 1 General**1.1 MATERIAL SUPPLIED BY DEPARTMENTAL REPRESENTATIVE**

- .1 Departmental Representative may supply additional topsoil for remediation available for pickup at km 113.5 pit and/or km 136.6 pit.

1.2 MEASUREMENT AND PAYMENT

- .1 Preparation of sub-grade for placing of topsoil will not be measured for payment.
- .2 Topsoil stripping and stockpiling will not be measured for payment.
- .3 Placing and spreading topsoil from topsoil stripped from the side slope and ditches will not be measured for payment.
- .4 Measurement and Payment of loading, hauling, placing and spreading of topsoil removed from stockpile at the pit, if requested by the Departmental Representative, will be made under the **Prime Cost Sum** lump sum item according to Section 01 21 00 - Allowances.

1.3 PAYMENT PROCEDURES

- .1 Testing of topsoil: Departmental Representative will pay for cost of any required tests.

1.4 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.

1.5 SUBMITTALS

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

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.
- .2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.
- .3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products**2.1 TOPSOIL**

- .1 Topsoil for seeded areas: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Contain no toxic elements or growth inhibiting materials.
 - .2 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .3 Consistence: friable when moist.

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 sediment and erosion control plan, specific to site, or requirements of authorities having jurisdiction, whichever is more stringent.
- .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 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush weeds and grasses.
- .2 Strip topsoil to depths as directed by Departmental Representative.
 - .1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
- .3 Stockpile in locations as directed by Departmental Representative.
 - .1 Stockpile height not to exceed 2 m.
- .4 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 75 mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.
- 3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL**
 - .1 Place topsoil after Departmental Representative has accepted subgrade.
 - .2 Spread topsoil in uniform layers not exceeding 150 mm.
 - .3 Replace and spread all removed topsoil on disturbed areas as directed by Departmental Representative.
- 3.5 FINISH GRADING**
 - .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .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.
- 3.6 ACCEPTANCE**
 - .1 Departmental Representative will inspect topsoil in place and determine acceptance of material, depth of topsoil and finish grading.
- 3.7 SURPLUS MATERIAL**
 - .1 Dispose of materials except topsoil not required where directed by Departmental Representative.
- 3.8 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: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General**1.1 MEASUREMENT AND PAYMENT**

- .1 Measure Mechanical Seeding per hectare of actual surface measurements taken and computed by Contractor and accepted in writing by Departmental Representative.
- .2 Payment for supply and install Mechanical Seeding will be under **Unit Price Item 3d – Subgrade Widening and Preparation – Seeding**.

1.2 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 seed.
- .3 Certificates: product certificates for review by Departmental Representative prior to purchase and signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.3 DELIVERY, STORAGE AND HANDLING

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

1.4 WARRANTY

- .1 For seeding, 12 months warranty period is extended to 1 full growing season.
- .2 End-of-warranty inspection will be conducted by Departmental Representative.

Part 2 Products**2.1 GRASS SEED**

- .1 Canada "Certified" seed, "Canada No. 2 Ground Cover Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
 - .1 Grass seed mixture.
 - .1 Mixture composition:
 - .1 35% Slender Wheatgrass (*Agropyron trachycaulum*).
 - .2 20% Rocky Mountain Fescue (*Festuca saximontana*).
 - .3 10% Tickle Grass (*Agrostis scabra*).
 - .4 10% Fringed Brome (*Bromus ciliatus*).
 - .5 10% Hairy Wildrye (*Elymus innovatus*).

- .6 10% Tufted Hairgrass (*Deschampsia cespitosa*).
- .7 5% Fowl Bluegrass (*Poa palustris*).
- .2 In packages individually label in accordance with "Seeds Regulations" and indicating name of supplier.
- .3 Free of impurities that would inhibit germination and growth.
- .4 Source seed from producers as close as possible.

Part 3 Execution

3.1 SEED BED PREPARATION

- .1 Do not perform work under adverse field conditions as determined by Departmental Representative.
- .2 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; in location as directed by Departmental Representative.
- .3 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and commence work when instructed by Departmental Representative.
- .4 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated to tolerance of plus or minus 25 mm, surface draining naturally.
- .5 Scarify and decompact fine graded surface approved by Departmental Representative to 25 mm depth immediately prior to seeding.
- .6 Where there is little or no topsoil and seeding is taking place on subsoil or silty clay soil with little organic matter, a manufactured topsoil product or a fertilizer may provide the necessary organic matter and growth factors to enable good seed germination and establishment. The Departmental Representative may request that the Contractor source and apply a manufactured topsoil product or fertilizer prior to seeding. Manufactured topsoil products typically consist of a blend of sterile plant fibres and peat moss with micronutrients, soil bacteria and fungi that adds organic matter to poor soils. They do not have any significant nutrients (N,P,K) so will not encourage weed growth but they do contain other constituents found in fertile soil to improve growth conditions. Work to supply and install a manufactured topsoil or fertilizer product, if required, will be paid under the Prime Cost Sum.

3.2 SEED PLACEMENT

- .1 For mechanical seeding:
 - .1 Mechanical landscape drill seeder ("Brillion" type or equivalent) which accurately places seed at specified depth and rate and rolls in single operation.
 - .2 Use equipment and method acceptable to Departmental Representative.
- .2 For manual seeding:
 - .1 Use manually operated drop seeder ("Cyclone" type or equivalent).

- .2 Use manually operated, water ballast, landscaping type, smooth steel drum roller. Ballast as directed by Departmental Representative.
- .3 Use equipment and method acceptable to Departmental Representative.
- .3 On cultivated surfaces, sow seed uniformly at rate of:
 - .1 7.0 kg/hectare for mechanical seeding.
 - .2 14.0 kg/hectare for manual seeding.
- .4 Blend applications 150 mm into adjacent grass areas to form uniform surfaces.
- .5 Sow half of required amount of seed in one direction and remainder at right angles as applicable.
- .6 Incorporate seed by light raking or harrowing in cross directions.
- .7 Consolidate mechanically seeded areas by rolling area if soil conditions warrant or if directed by Departmental Representative with equipment approved by Departmental Representative immediately after seeding.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Clean and reinstate areas affected by Work.
 - .2 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Repair and reseed dead or bare spots to allow establishment of seed from time of seed application until acceptance by Departmental Representative

3.5 FINAL ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
 - .1 Areas are uniformly established free of rutted, eroded, bare or dead spots and extent of weeds apparent in grass is acceptable.
- .2 Areas seeded in fall will be accepted in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.6 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period.

- .1 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 31 32 19.01 - Geotextile.

1.2 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- .1 Owner will supply material as follows available for pickup at km 113.5 pit:

- .1 600mm diameter:

- .1 2 x 5m with sloped end section
 - .2 2 x 6m with sloped end section
 - .3 5 x 7m with sloped end section
 - .4 1 x 8m with sloped end section
 - .5 1 x 5m standard end sections
 - .6 1 x 7m standard end sections
 - .7 7 couplers

- .2 800mm diameter:

- .1 4 x 6m with sloped end section
 - .2 19 x 7m with sloped end section
 - .3 1 x 8m with sloped end section
 - .4 2 x 6m standard end sections
 - .5 7 x 7m standard end sections
 - .6 1 x 8m standard end sections
 - .7 1 x 9m standard end sections
 - .8 26 couplers

- .3 900mm diameter:

- .1 5 x 7m with sloped end section
 - .2 1 x 6m standard end sections
 - .3 1 x 8m standard end sections
 - .4 6 couplers

- .4 1200mm diameter:

- .1 4 x 6m with sloped end section
 - .2 1 x 10m standard end sections
 - .3 4 couplers

- .2 Contractor to supply remaining culverts required under this Contract.

1.3 MEASUREMENT AND PAYMENT

- .1 Measure **supply** of pipe culvert in metres in place for each size, type and class of pipe. Measurement of pipe culverts to include prefabricated sloped end sections.

- .2 Measure **installation** of pipe culvert including excavation and backfill in metres in place for each size, type and class of pipe. Measurement of pipe culverts to include prefabricated sloped end sections.
- .3 Measure production and stockpiling of granular material for culvert bedding and backfill in cubic metres measured by the Contractor in the stockpile in the pit by cross section and calculated by average end area method or prismoidal method of material and accepted in writing by Departmental Representative.
- .4 No separate payment for:
 - .1 Any necessary dewatering prior to placing of bedding and construction maintenance and removal of any temporary bypass roads.
 - .2 Culvert excavation or additional sub-cut.
 - .3 Removal and disposal of existing culverts.
 - .4 Removal and disposal of existing culvert markers.
 - .5 Supply and install geotextile fabric in accordance with Section 31 32 19.01 - Geotextile.
 - .6 Loading, hauling, placing and compacting granular material for culvert bedding and backfill to excavation.
 - .7 Supply and Installation of new culvert markers.
 - .8 Repairing and removing damaged ends.
 - .9 Cutting existing culverts in preparation for extensions.
 - .10 Supply and installation of coating to repair culverts.
 - .11 Cutting new culverts to amend the length or performing field cuts for sloped end sections.
 - .12 Field cutting sloped end sections for all culverts to remain and ends to remain on culverts to be extended.
 - .13 Cleaning new and existing culverts.
- .5 Payment for production and stockpiling of granular material for culvert bedding and backfill will be under **Unit Price Item 2b – Produce and Stockpile Aggregate at km 136.6 Pit, 76 mm Granular Sub-base.**
- .6 Payment for Pipe Culverts will be under **Unit Price Item 1a – CSP Culverts, Supply CSP Culverts** for each size, type and class of pipe.
- .7 Payment for Pipe Culverts will be under **Unit Price Item 1b – CSP Culverts, Install CSP Culverts** for each size, type and class of pipe.

1.4 REFERENCES

- .1 ASTM International
 - .1 ASTM C117-[04], Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-[06], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698-[07e1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft²; (600 kN-m/m²)).

- .4 ASTM D1248-[05], Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable.
- .5 ASTM F667-[06], Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.
- .3 CSA International
 - .1 CAN/CSA G401-[07], Corrugated Steel Pipe Products.
- .4 Government of Northwest Territories – Department of Transportation (GNWT-DOT).
 - .1 GNWT-DOT Specifications, Division 4 – Structures, Section 1 – Supply and Installation of Corrugated Steel Pipe Culverts [13 Dec 96]
 - .2 GNWT-DOT Specifications, Division 4 – Structures, Section 3 – Culvert Removal [13 Dec 96]
 - .3 GNWT-DOT, Standard Drawings SD-400 Series.

1.5 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 4 – Structures, Section 1 – Supply and Installation of Corrugated Steel Pipe Culverts and Section 3 – Culvert Removal.
- .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.6 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 pipes and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certification: to be marked on pipe.
- .4 Test and Evaluation Reports:
 - .1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work.

1.7 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 in accordance with manufacturer's recommendations.
 - .2 Store and protect pipes from damage.

- .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

Part 2 Products

2.1 CORRUGATED STEEL PIPE

- .1 Corrugated steel pipe: to CAN/CSA-G401.
- .2 Corrugated steel pipe: helically corrugated and the ends recorrugated to provide annular corrugations for coupling purposes.
- .3 Minimum length of annular corrugated culvert ends 300 mm for culvert diameters 900 mm or less and 600 mm for culvert diameters greater than 900 mm.
- .4 Prefabricated sloped end sections supplied in accordance with GNWT-DOT Standard Drawings 'Standard Sloped End Sections'.
- .5 Minimum wall thickness to be 2.8 mm.
- .6 Corrugations to be 68 mm x 13 mm.
- .7 Annular corrugated coupler band type not less than 0.60 metres wide and have a minimum of 3 bolts per coupler for culvert diameters of 800mm or greater.
- .8 Prefabricated end sections: 3:1 mitred end sections will be required.

2.2 GRANULAR BEDDING

- .1 Granular bedding material to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
 - .3 Table:

Sieve Designation	% Passing
125 mm	-
80 mm	100
63 mm	-
50 mm	-
40 mm	-
25 mm	-
20 mm	-
16 mm	-

Sieve Designation	% Passing
12.5 mm	-
10.0 mm	-
5.0 mm	-
2.5 mm	-
2.0 mm	-
1.6 mm	-
1.25 mm	-
0.800 mm	-
0.630 mm	-
0.400 mm	-
0.315 mm	-
0.160 mm	-
0.080 mm	0-15
0.045 mm	-

- .4 Oversize material retained on the upper sieve will be permitted to a maximum of 3% of the sample, only if 100% of the oversize material passes the next larger standard sieve size.
- .5 Other properties as follows:
 - .1 Liquid Limit: to ASTM D4318, Maximum 25.
 - .2 Plasticity Index: to ASTM D4318, Maximum 6.

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 pipe culvert installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental 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 Departmental Representative.

3.2 PREPARATION

- .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 sediment and erosion control plan, specific to site, or requirements of authorities having jurisdiction, whichever is more stringent.
 - .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.

3.3 EXTENDED CULVERTS

- .1 Extend culverts as directed by the Engineer.
- .2 Remove 0.8 metres from the end of existing culverts prior to the installation of the culvert extensions or as directed by the Engineer.
- .3 Install prefabricated sloped end sections in accordance with the NWT-DOT Specifications and GNWT-DOT Standard Drawings 'Standard End Sections' for culvert extensions.

3.4 CUT ENDS

- .1 All exposed ends of existing CSP culverts to remain, to have sloped end sections conforming to roadside slope, by cutting culvert with mechanical saw.
- .2 Make smooth all cut edges by grinding so that all the burrs are removed.
- .3 Any damaged galvanizing shall be restored by zinc metallizing in accordance with CSA G401.
- .4 For culvert diameters of 1000 mm or greater, lock seams terminating at the cut edges of slopes or square ended sections to have a 50mm length fillet weld run along the lock seam at each cut edge.

3.5 BEDDING

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place 300 mm minimum thickness of approved granular material on bottom of excavation and compact to 100% of corrected maximum dry density to ASTM D698 and dry to at least the optimum moisture content.
- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.

3.6 LAYING CORRUGATED STEEL PIPE CULVERTS

- .1 Begin pipe placing at downstream end.
- .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
- .3 Lay pipe with outside circumferential laps facing upstream and longitudinal laps or seams at side or quarter points.
- .4 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.7 JOINTS: CORRUGATED STEEL CULVERTS

- .1 Corrugated steel pipe:
 - .1 Match corrugations or indentations of coupler with pipe sections before tightening.
 - .2 Tap couplers firmly as they are being tightened, to take up slack and ensure snug fit.
 - .3 Insert and tighten bolts.
 - .4 Repair spots where damage has occurred to spelter coating by applying two coats of asphalt paint approved in writing by Departmental Representative or two coats of zinc rich paint.

3.8 BACKFILLING

- .1 Backfill around and over culverts as indicated or as directed by Departmental Representative.
- .2 Place backfill material, approved in writing by Departmental Representative, in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
- .3 Compact each layer to 100% corrected maximum dry density to ASTM D698 taking special care to obtain required density under haunches.
- .4 Protect installed culvert with compacted fill before heavy equipment is permitted to cross.
 - .1 Remove and replace any culvert material damaged by Contractor's operations at no extra cost.
- .5 Place backfill in unfrozen condition.
- .6 No work (preparation of bedding and backfilling etc.) for the installation of culvert will be performed when the temperature in next 24 hours is expected to be below 0°C as forecasted by Canada Environment website <http://weather.gc.ca/> for Hay River and surrounding area.

3.9 CULVERT / STRUCTURE REMOVAL

- .1 Remove culverts and include dispose of sections to an approved location outside of the National Parks.
- .2 Accommodate traffic at all time during the removal of a culvert. Adequate control and traffic flow to be maintained.

3.10 CULVERT MARKERS

- .1 Supply and install new Ice Worm Advantage Culvert Savers or equivalent mounted culvert markers at each culvert end in accordance with the drawings.
- .2 Remove and dispose of existing culvert markers to an approved location outside of the National Parks.

3.11 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: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .4 The crushing and burying of existing culverts is not permitted within the project area. The Contractor shall remove and properly dispose of all culverts excavated during the execution of work.

END OF SECTION