

**SPECIFICATIONS  
CULVERT REPLACEMENTS AND MISC. WORK  
CAPE RACE ACCESS ROAD  
F6879-154001**



**OWNER/AGENT**

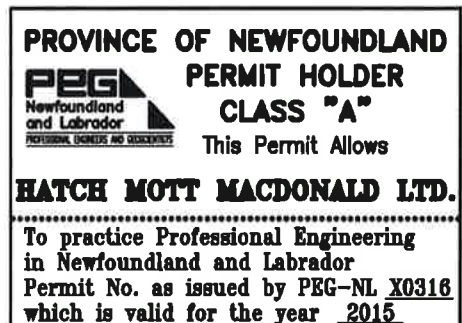
Fisheries & Oceans Canada  
Real Property Safety and Security

**PRIME CONSULTANT**

Hatch Mott MacDonald  
18-22 Balbo Drive  
Clarenville, NL  
A5A 1M5

**ISSUED FOR TENDER**

**DATE:** July, 2015



## TABLE OF CONTENTS

### No. of Pages

#### Division 01 – General Requirements

Section 01 10 00	Summary of Work.....	2
Section 01 11 00	General Instructions .....	4
Section 01 33 00	Submittal Procedures .....	2
Section 01 35 29.06	Health & Safety Requirements .....	10
Section 01 35 43	Environmental Procedures .....	4
Section 01 56 00	Temporary Barriers & Enclosures .....	2

#### Division 06 – Wood, Plastics & Composite

Section 06 08 99	Rough Carpentry for Minor Works .....	2
------------------	---------------------------------------	---

#### Division 31 – Earthwork

Section 31 22 16.13	Roadway Subgrade Reshaping .....	2
Section 31 23 33.01	Excavating, Trenching & Backfilling .....	5
Section 31 24 13	Roadway Embankment .....	4
Section 31 37 00	Rip Rap .....	2

#### Division 32 – Exterior Improvements

Section 32 11 23	Aggregate Base Coarse .....	3
------------------	-----------------------------	---

#### Division 33 – Utilities

Section 33 42 13	Pipe Culverts .....	3
------------------	---------------------	---

#### Division 34 – Transportation

Section 34 17 39	Guide Rail .....	3
------------------	------------------	---

## LIST OF APPENDICES

Appendix “A” – Fisheries and Oceans Canada – Culvert Installation Guideline

**Part 1 General**

**1.1 SCOPE**

- .1 The work covered under this contract consists of the furnishing of all plant, labour, equipment and material for the removal and disposal of existing road culverts, supply and installation of new culverts, removal and disposal of existing guide rails, supply and installation of new guide rails, upgrades to bridge wear surfaces, embankment stabilization with armour stone and rock backfill and upgrade road ditching. All works to take place on the Cape Race Access Road located near Portugal Cove South, NL. and all work to be done in strict accordance with the specifications and accompanying drawings and subject to all terms and conditions of contract..

**1.2 DESCRIPTION OF WORK**

- .1 Work of this contract comprises of, but not limited to, the following:
  - .1 Removal and disposal off site of all designated existing road culverts.
  - .2 Removal and disposal off site of all designated existing guide rail and post systems.
  - .3 Supply and installation of various size new HDPE road culverts complete with bedding, approved backfill and road topping as required.
  - .4 Removal of existing bridge wearing surfaces as designated and replacement with new.
  - .5 Embankment stabilization at location designated using armour stone placement along toe of slope and rock backfill.
  - .6 Widening and deepening of road side ditches at designated locations.

**1.3 SITE OF WORK**

- .1 Work will be carried out at the site of the Cape Race access road located north of Portugal Cove South, NL..

**1.4 FAMILIZRIZATION WITH SITE**

- .1 Before submitting a bid, it is recommended that bidders visit the site and its surroundings to review and verify the form, nature and extent of the work, materials needed for the completion of the work, the means of access to the site, severity, the exposure and the uncertainty of weather, soil conditions, any accommodations they may require, and in general shall obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. No allowance shall be made subsequently in this connection on account of error or negligence to properly observe and determine the conditions that will apply.
- .2 Contractors, bidders or those they invite to the site are to review specification Section 01 35 29 – Health and Safety Requirements before visiting the site. Take all appropriate safety measures for any visit to the site, either before or after acceptance of bid.
- .3 Obtain prior permission from the Department representative before carrying out such site inspection.

**PRODUCTS (NOT APPLICABLE)**

**EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**Part 1            General**

**1.1                WORK BY OTHERS**

- .1        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, in writing, any defects which may interfere with proper execution of Work.

**1.2                WORK SCHEDULE**

- .1        Immediately upon award of Contract, Contractor will submit a schedule of work to Departmental Representative. Each entry will show an intended start and completion date using a horizontal bar graph chart.
- .2        Should Contractor find that he cannot maintain schedule as he originally intended, he will immediately submit a revised schedule without being requested to do so by Departmental Representative.
- .3        All work on the project will be completed within the time indicated as shown on the Tender and Acceptance/Construction Tender Form.

**1.3                CONTRACTOR USE OF PREMISES**

- .1        The work site provides access to property occupied by The Federal and Provincial Governments agencies. Contractor is to utilize and occupy only designated work site portions of property.
- .2        Any use of property other than designated work site will have to be approved and co-ordinated through Departmental Representative.
- .3        Unrestricted use of designated work site until Substantial Performance.
- .4        Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

**1.4                OWNER OCCUPANCY**

- .1        Owner will require access through designated work area during construction. Contractor to limit access road shutdown time to 60 minutes and advise departmental representative of all scheduled shutdowns.

**1.5                DATUM**

- .1        Datum used for this project is as shown on drawing C1 of 3.

**1.6                TERMS**

- .1        Unless specifically stated otherwise, the term engineer where used in the Specifications and on the Drawings shall mean the Departmental Representative (DR) as defined in the General Conditions of the Contract.

**1.7 COST BREAKDOWN**

- .1 Before submitting first progress claim, submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price.
- .2 Provide cost breakdown in same format as the numerical and subject title system used in this specification and thereafter sub-divided into major work components as directed by Departmental Representative.
- .3 Upon approval by Departmental Representative, cost breakdown will be used as basis for progress payment.
- .4 All work items are to be included in the lump sum arrangement, as noted on the Bid and Acceptance Form.

**1.8 SITE OPERATIONS**

- .1 Arrange for sufficient space adjacent to project site for conduct of operations, storage of materials, etc. Exercise care so as not to obstruct or damage public or private property in area. Do not interfere with normal day-to-day operations in progress at the site. All arrangements for space and access will be made by Contractor.

Remove snow and ice as required to maintain safe access in a manner that does not damage existing structures or interfere with the operations of others.

**1.9 PROJECT MEETINGS**

- .1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording meetings
- .2 Project meetings will take place on site of work unless so directed by Departmental Representative.
- .3 Departmental Representative will assume responsibility for recording minutes of meetings and forwarding copies to all parties present at meetings.
- .4 Have a responsible member of firm present at all project meetings.

**1.10 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings.
  - .5 List of Outstanding Shop Drawings.
  - .6 Change Orders.
  - .7 Other Modifications to Contract.
  - .8 Field Test Reports.

- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

**1.11 PERMITS**

- .1 Obtain and pay all permits, certificates and licenses as required by Municipal, Provincial, Federal, and other authorities.
- .2 Provide appropriate notifications of project to Municipal and Provincial inspection authorities.
- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
- .4 Submit to Departmental Representative, copy of application submissions and approval documents received for above referenced authorities
- .5 Submit to Departmental Representative, copy of quarry permit, if applicable, prior to start of quarry operations.
- .6 Comply with all requirements, recommendations and advice by all regulatory authorities unless otherwise agreed in writing by Departmental Representative. Make requests for such deviations to these requirements sufficiently in advance of related work.

**1.12 WORK COMMENCEMENT**

- .1 Contractors are advised that mobilization is to commence immediately after award and the pre-construction meeting.
- .2 The weather conditions, short construction season and the remoteness of the work site may require the use of longer working hours and additional work force to complete the project within the specified completion time.
- .3 The contractor is to make every effort to ensure that sufficient materials and equipment is delivered to the site at the earliest possible date after award.

**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            Section Includes**

.1            Unless otherwise specified, this section outlines the requirements and procedures for the Contractor's submission of product data, samples, certificates, bonds and other pertinent pre-construction/construction documentation to the Departmental Representative for review.

**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 product data, samples and mock-ups in SI Metric units.

.4            Where items or information is not produced in SI Metric units converted values are acceptable.

.5            Review submittals prior to submission to Engineer. 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.

.6            Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7            Verify field measurements and affected adjacent work are co-ordinated.

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

.9            Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

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

**1.3            CERTIFICATES AND TRANSCRIPTS**

.1            Immediately after award of Contract, submit Letter of Good Standing, WHSCC.

.2            Submit transcription of insurance's immediately after award of Contract.

**Part 2            Products**

**2.1                NOT USED**

.1                Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1                Not Used.

**END OF SECTION**

**PART 1**      **GENERAL****1.1**      **REFERENCES**

- .1 Code and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
  - .1 FCC No. 301 Standard for Construction Operations.
- .3 Transportation of Dangerous Goods Act Regulations.
- .4 Newfoundland Occupational Health and Safety Act, Amended
- .5 Consolidated Newfoundland and Regulations 1149 WMIS Regulations Under the Occupational Health and Safety Act
- .6 Consolidated Newfoundland and Regulations 1165 Occupational Health and Safety Regulations under the Occupational Health and Safety Act.
- .7 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .8 National Building Code of Canada.

**1.2**      **RELATED SECTIONS**

- .1 Section 01 35 43 - Environmental Procedures

**1.3**      **SUBMITTALS**

- .1 Acceptance of the Project Health and Safety Risk Assessment and Management Plan and other submitted documents by the Departmental Representative shall only be viewed as acknowledgement that the contractor has submitted the required documentation under this specification section.
- .2 The Departmental Representative makes no representation and provides no warranty for the accuracy, completeness and legislative compliance of the Project Health and Safety Risk Management Plan and other submitted documents by this acceptance.
- .3 Responsibility for errors and omissions in the Project Health and Safety risk Assessment and Management Plan and other submitted documents is not relieved by acceptance by the Departmental Representative.

**1.4**      **OCCUPATIONAL HEALTH AND SAFETY (PROJECT HEALTH AND SAFETY RISK ASSESSMENT AND MANAGEMENT PLANS)**

- .1 Conduct operations in accordance with latest edition of the Newfoundland Occupational Health and Safety (OH&S) Act and Regulations.

- .2 Prepare a detailed Project Health and Safety Risk Assessment and Management Plan for the Departmental Representative. Assessment shall identify, evaluate and control job specific hazards and the necessary control measures to be implemented for managing hazards.
- .3 Provide a copy of the Project Health and Safety Risk Assessment and Management Plan to the Departmental Representative.
- .4 The written Health and Safety Risk Assessment and Management Plan shall incorporate the following:
  - .1 A site-specific health and safety plan, refer to clause 1.5 Site-Specific Health and Safety Risk Assessment and Management Plan of this section for requirements.
  - .2 An organizational structure which shall establish the specific chain of command and specify the overall responsibilities of contractors employees at the work site.
  - .3 A comprehensive workplan which shall:
    - .1 define work tasks and objectives of site activities/operations and the logistics and resources required to reach these tasks and objectives
    - .2 establish personnel requirements for implementing the plan, and
    - .3 establish site specific training and notification requirements and schedules.
  - .4 A personal protected equipment (PPE) Program which shall detail PPE:
    - .1 Selection criteria based on site hazards.
    - .2 Use, maintenance, inspection and storage requirements and procedures.
    - .3 Decontamination and disposal procedures.
    - .4 Inspection procedures prior to during and after use, and other appropriate medical considerations.
    - .5 Limitations during temperature extremes, heat stress and other appropriate medical consideration.
  - .5 An emergency response procedure, refer to Clause 1.6 Supervision and Emergency Response Procedure of this section fro requirements.
  - .6 A hazard communication program for informing workers, visitors and individuals outside of the work area as required.
  - .7 A health and safety training program.
  - .8 General safety rules.
- .5 Periodically review and modify as required each component of the Project Health and Safety Risk Assessment and Management Plan when a new hazard is identified during completion of work and when an error or omission is identified in any part of the Project Health and Safety Risk Assessment and Management Plan.
- .6 Implement all requirements of the Project Health and Safety Risk Assessment and Management Plan.
  - .1 Ensure that every person entering the project site is informed of requirements under the Project Health and Safety Risk Assessment and Management Plan.

- .2 Take all necessary measures to immediately implement any engineering controls, administrative controls, personal protective equipment required or termination of work procedures to ensure compliance with the Project Health and Safety Risk Assessment and Management Plan.

## 1.5 SITE SPECIFIC HEALTH AND SAFETY PLAN

- .1 Prepare a detailed site Specific Project Health and Safety Plan which shall:
  - .1 Contain certain hazard assessment results.
  - .2 Identify engineering and administrative demonstrative controls (work-practices and procedures) to be implemented for managing identified and potential hazards, and comply with applicable federal and provincial legislation and more stringent requirements that have been specified in these specifications.
- .2 Review for completeness the hazard assessment results immediately prior to commencing work, when a new hazard is identified during completion of work and when an error or omission is identified.
  - .1 Be solely responsible for investigating, evaluation and managing any report of actual or potential hazards.
  - .2 Retain copies of all completed hazard assessments at the project site and make available to the Engineer/Architect immediately upon request.

## 1.6 SUPERVISION AND EMERGENCY RESCUE PROCEDURE

- .1 Carry out work under the direct supervision of competent persons responsible for safety by ensuring the work complies with the appropriate section of OH&S Act and Regulations
- .2 Assign a sufficient number of supervisory personnel to the work site.
- .3 Provide a suitable means of communications for workers required to work alone.
- .4 Develop an emergency rescue plan for the job site and ensure that supervisors and workers are trained in the emergency rescue plan.
- .5 The emergency response plan shall address, as a minimum:
  - .1 Pre-emergency planning.
  - .2 Personnel roles, lines of authority and communication.
  - .3 Emergency recognition and prevention.
  - .4 Safe distances and places of refuge.
  - .5 Site security and control
  - .6 Evacuation routes and procedures
  - .7 Decontamination procedures which are not covered by the site specific safety and health plan.
  - .8 Emergency medical treatment and first aid.
  - .9 Emergency alarm, notification and response procedures including procedures for reporting incidents to local, provincial and federal government departments.

- .10 PPE and emergency equipment.
- .11 Procedures for handling emergency incidents.
- .12 Site specific emergency response training requirements and schedules.
- .6 The emergency response procedures shall be rehearsed regularly as part of the overall training program.
- .7 Provide adequate first aid facilities for the jobsite and ensure that a minimum number of workers are trained in first aid in accordance with the First Aid Regulations.

## **1.7 CONTRACTORS SAFETY OFFICER**

- .1 The contractor's Safety Officer will be solely responsible for the implementation and monitoring of the Project Health and Safety Risk Assessment and Management Plan, and will have the authority to implement health and safety changes as directed by the Departmental Representative. The Safety Officer shall have as a minimum:
  - .1 Completed training in hazardous occurrence management and response/protocols.
  - .2 Completed training in First Aid.
  - .3 Have working knowledge of occupational safety and health regulations.
  - .4 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.
  - .5 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .6 Be on site during execution of Work and report directly to and be under direction of site supervisor.

## **1.8 HEALTH AND SAFETY COMMITTEE**

- .1 Establish an Occupational Health and Safety Committee where ten or more workers are employed on the job site as per the OH&S Act and Regulations.
- .3 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.
- .4 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.

## **1.9 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 UNFORSEEN HAZARDS**

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction. Advise the Departmental Representative verbally and in writing.

#### **1.11 INSTRUCTION AND TRAINING**

- .1 Workers shall not participate in or supervise any activity on the work site until they have been trained to a level required by this job function and responsibility. Training shall as a minimum thoroughly cover the following:
  - .1 Federal and Provincial Health and Safety Legislation requirements including roles and responsibilities of workers and person(s) responsible for implementing, monitoring and enforcing health and safety requirements.
  - .2 Limitations, use, maintenance and care of engineering controls and equipment.
  - .3 Limitations and use of emergency notifications and response equipment including emergency response protocol.
  - .4 Work practices and procedures to minimize the risk of an accident and hazardous occurrence from exposure to a hazard.
- .2 Provide and maintain training of workers, as required, by Federal and Provincial legislation.
- .3 Provide copies of all training certificates to the Departmental Representative for review, before a worker is to enter the work site.
- .4 Authorized visitors shall not access the work site until they have been:
  - .1 Notified of the names of persons responsible for implementing, monitoring and enforcing the health and Safety Risk Assessment and Management Plan.
  - .2 Briefed on safety and health hazards present on the site.
  - .3 Instructed in the proper use and limitations of personal protective equipment.
  - .4 Briefed as the emergency response protocol including notification and evacuation process.
  - .5 Informed of practices and procedures to minimize risks from hazards and applicable to activities performed by visitors.

#### **1.12 CONSTRUCTION SAFETY MEASURES**

- .1 Observe construction safety measures of National Building Code, latest edition, Provincial Government, OH&S Act and Regulations, Workplace Health and Safety and Compensation Commission and Municipal Authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.

- .2 Administer the project in a manner that will ensure, at all times, full compliance with Federal and Provincial Acts, regulations and applicable safety codes and the site Health and Safety Risk Assessment and Management Plan.
- .3 Provide Departmental Representative with copies of all orders, directions and any other documentation, issued by the Provincial Department of Government Services, Occupational Health and Safety branch immediately after receipt.

### **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 Federal, Province and authority having jurisdiction, and in consultation with the Departmental Representative.

### **1.14 HEALTH AND SAFETY MONITORING**

- .1 Periodic inspections of the contractor's work may be carried out by the Departmental Representative to maintain compliance with the Health and Safety Program. Inspections will include visual inspections as well as testing and sampling as required.
- .2 The contractor shall be responsible for any and all costs associated with delays as a result of contractor's failure to comply with the requirements outlined in this section.

### **1.15 NOTIFICATION**

- .1 The contractor shall, prior to the commencement of work, notify in writing the Work Place Health and Safety Division, Department of Labour with the following information:
  - .1 Name and location of construction site.
  - .2 Company name and mailing address of contractor doing the work.
  - .3 The number of workers to be employed.
  - .4 A copy of the Health and Safety Risk Assessment and Management Plan if requested.

### **1.16 CORRECTION OF NON-COMPLIANCE**

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

### **1.17 WHMIS**

- .1 Ensure that all controlled products are in accordance with the Workplace Hazardous Materials Information System (WHMIS) Regulations and Chemical Substances of the



OH&S Act and Regulations regarding use, handling, labelling, storage, and disposal of hazardous materials.

- .2 Deliver copies of relevant Material Safety Data Sheets (MSDS) to job site and the Departmental Representative. The MSDS must be acceptable to Labour Canada and Health and Welfare Canada for all controlled products that will be used in the performance of this work.
- .3 Train workers required to use or work in close proximity to controlled products as per OH&S Act and Regulations.
- .4 Label controlled products at jobsite as per OH&S and Regulations.
- .5 Provide appropriate emergency facilities as specified in the MSDS where workers might be exposed to contact with chemicals, e.g. eye-wash facilities, emergency shower.
  - .1 Workers to be trained in use of such emergency equipment.
- .6 Contractor shall provide appropriate personal protective equipment as specified in the MSDS where workers are required to use controlled products.
  - .1 Properly fit workers for personal protective equipment
  - .2 Train workers in care, use and maintenance of personal protective equipment.
- .7 No controlled products are to be brought on-site without prior approved MSDS.
- .8 The MSDS are to remain on site at all times.

### **1.18 OVERLOADING**

- .1 Ensure no part of work or associated equipment is subjected to loading that will endanger its safety or will cause permanent deformation.

### **1.19 PERSONAL PROTECTIVE EQUIPMENT**

- .1 Ensure workers on the jobsite use personal protective equipment appropriate to the hazards identified in the Risk Assessment and Management Plan and those workers are trained in the proper care, use, and maintenance of such equipment.
- .2 PPE selections shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, task-specific conditions, duration and hazards and potential hazards identified on site.
- .3 Provide all workers and up to five (5) visitors to the site with proper hearing protection. Workers and visitors shall not be exposed to noise levels greater than 85 dB (A) over an eight hour shift without proper hearing protection.
- .4 Provide all workers and up to five (5) visitors to the site with CSA approved eye protection sufficient to act as a protective barrier between the eye and airborne contaminants, hazardous materials and physical hazard.

- .5 Provide workers and up to five (5) visitors to the site with CSA approved hard hats.

## 1.20 EXCAVATION SAFETY

- .1 Protect excavations more than 1.25 metres deep against cave-ins or wall collapse by side wall sloping to the appropriate angle of repose, an engineered shoring/sheathing system or an approved trench box.
- Provide a ladder which can extend from the bottom of the excavation to at least 0.91 metres above the top of the excavation.
- .2 Ensure that all excavations less than 1.25 metres deep are effectively protected when hazardous ground movement may be expected.
- .3 Design trench boxes, certified by a registered Professional Engineer, and fabricated by a reputable manufacturer. Provide the manufacturer's Depth Certificate Statement permanently affixed. Use trench boxes in strict accordance with manufacturer's instructions and depth certification data.
- .4 For excavations deeper than six (6) metres, provide a certificate from a registered Professional Engineer stating that the protection methods proposed have been properly designed in accordance with accepted engineering practice. The engineer's certificate shall verify that the trench boxes, if used, are properly designed and constructed to suit the depth and soil conditions.
- .5 Ensure that the superintendent and every crew chief, foreperson and lead hand engaged in trenching operations or working in trenches have in his/her possession a copy of the Department of Labour's "Trench Excavation Safety Guide".

## 1.21 CONFINED SPACE WORK

- .1 Comply with requirements of Canada Occupational Safety and Health Regulations, Part XI and Consolidated Regulations Newfoundland and Labrador (CRNL) OH&S 1165/96.
- .2 Provide approved air monitoring equipment where workers are working in confined spaces and ensure any test equipment to be used is calibrated, in good working order and used by trained persons.
- .3 Develop a confined space entry program specific to the nature of work performed and in accordance with OH&S Act and Regulations and ensure supervisors and workers are trained in the confined space entry program.
- .1 Ensure that personal protective equipment and emergency rescue equipment appropriate to the nature of the work being performed is provided and used.
- .4 Provide and maintain training of workers, as required by the Federal and Provincial Legislation.

- .5 Provide the Departmental Representative with a copy of an "Entry Permit" for each entry into the confined space to ensure compliance with Federal and Provincial Legislation.

## **1.22 HAZARDOUS MATERIALS**

- .1 Should material resembling hazardous materials (asbestos/mould) be encountered during the execution of work and notify the Departmental Representative. Do not proceed until written instructions have been received from the Departmental Representative.
- .2 Unless otherwise noted, for hazardous materials abatement and repair, employ the services of a recognized Environmental Consultant to provide all air monitoring and testing services for regulatory requirements.

## **1.23 HEAVY EQUIPMENT**

- .1 Ensure mobile equipment used on jobsite is of the type specified in OH&S Act and Regulations fitted with a Roll Over Protective (ROP) Structure.
- .2 Provide certificate of training in Power Line Hazards for operators of heavy equipment.
- .3 Obtain written clearance from the power utility where equipment is used in close proximity to (within 5.5 metres) overhead or underground power lines.
- .4 Equip cranes with:
  - .1 A mechanism which will effectively prevent the hook assembly from running into the top boom pulley.
  - .2 A legible load chart.
  - .3 A maintenance log book.

## **1.24 TREE AND BRUSH CLEARING**

- .1 Ensure workers using chain saws wear the following safety equipment:
  - .1 CSA safety hat.
  - .2 Hearing protection, e.g. ear muffs.
  - .3 CSA approved chain saw pants.
  - .4 CSA approved chain saw boots.
  - .5 Approved eye protection.
- .2 Ensure that all workers using brush saws wear the following safety equipment:
  - .1 CSA approved safety hat fitted with face screen or shield or approved safety glasses.
  - .2 Hearing protection, e.g. ear muffs.
  - .3 CSA approved safety footwear.
- .3 Equip chain saws with a safety chain break.

**1.25 WORK STOPPAGE**

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

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**Part 1 General****1.1 GENERAL REQUIREMENTS**

.1 This section specifies the requirements for environmental protection and general protection during the course of the work. No separate or direct payment will be made for work under this section, which will be considered incidental to work under this contract.

.2 All work is to be done in accordance with local, provincial and federal environmental regulations and any specific requirements for this contract are to be strictly adhered to by the Contractor.

**.3 RELATED SECTIONS**

.2 Section 01 33 00 – Submittal procedures.

**1.2 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. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

**1.3 SUBMITTALS**

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

.2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during construction.

.3 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.4 Environmental protection plan: include:

.1 Name of person responsible for ensuring adherence to Environmental Protection Plan.

.2 Name and qualifications of person responsible for manifesting hazardous waste to be removed from site.

.3 Name and qualifications of person responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to

- assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .6 Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
  - .7 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
  - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
  - .9 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
  - .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
  - .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
  - .12 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
  - .13 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities.
  - .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

#### **1.4 FIRES**

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

#### **1.5 DISPOSAL OF WASTES**

- .1 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

#### **1.6 DRAINAGE**

- .1 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan: include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

- .2 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .3 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

## **1.7 WORK ADJACENT TO WATERWAYS**

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material without Departmental Representative approval.
- .3 Do not dump excavated fill, waste material or debris in waterways.

## **1.8 POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

## **1.9 NOTIFICATION**

- .1 Departmental Representative will notify Contractor in writing of observed non compliance 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 Engineer.
- .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                NOT USED**

.1            Not Used.



**Part 1 General****1.1 SECTION INCLUDES**

- .1 Barriers.

**1.2 INSTALLATION AND REMOVAL**

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

**1.3 HOARDING**

- .1 Erect temporary site enclosure as required using new 1.2M high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 meters.

**1.4 GUARD RAILS AND BARRICADES**

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open edges of deck , etc.
- .2 Provide as required by governing Authorities.

**1.5 ACCESS TO SITE**

- .1 Provide and maintain road access to all facilities located along roadway. Ensure that temporary closure of road during installation of culverts is short term and not greater than 60 minutes in duration.

**1.6 FIRE ROUTES**

- .1 Maintain access to properties.

**1.7 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

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

**1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1                Not Used.

**END OF SECTION**

**Part 1 General****1.1 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA B111-1974(R1998), Wire Nails, Spikes and Staples.
  - .2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-O141-91(R1999), Softwood Lumber.
  - .4 CAN/CSA-O325.0-92(R1998), Construction Sheathing. National Lumber Grades Authority (NLGA)
  - .5 Standard Grading Rules for Canadian Lumber, 2000.

**1.2 QUALITY ASSURANCE**

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

**Part 2 Products****2.1 LUMBER MATERIAL**

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
  - .1 CAN/CSA-O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber

**2.2 ACCESSORIES**

- .1 Nails, spikes and staples: to CSA B111.

**2.3 FINISHES**

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

**Part 3 Execution****3.1 INSTALLATION**

- .1 Comply with requirements of NBC, supplemented by the following paragraphs.
- .2 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.

**3.2**

**ERECTION**

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink fasteners where necessary to provide clearance for other work.

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

- .1 This item will not be measured for payment. Reshaping of roadway as indicated on contract drawings will be considered incidental to work under this contract and all associated costs will be deemed to be included in the stipulated price quoted.

**1.2 DEFINITIONS**

- .1 Reshaping subgrade: scarifying, pulverizing, blading, reshaping and recompacting road backfill and road surface.

**1.3 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials.

**Part 2 Products****2.1 NOT USED**

- .1 Not used.

**Part 3 Execution****3.1 SCARIFYING AND RESHAPING**

- .1 Scarify subgrade to full width as indicated and to depth as directed by Departmental Representative.
- .2 Blade and trim road material to elevation and cross section dimensions as directed by Departmental Representative.
- .3 Where deficiency of material exists, add and blend additional subgrade material as directed by Departmental Representative.
- .4 Re-use excess material in areas of material deficiency as directed by Departmental Representative.

**3.2 COMPACTING**

- .1 Compact to density acceptable to Departmental Representative.
- .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 lowered to acceptable limit.

**3.3 PROTECTION**

- .1 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until Departmental Representative acceptance.

**3.4 CLEANING**

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

- .1 This item will not be measured for payment. All excavation and backfilling operations and supply of backfill materials as required on contract drawings will be considered incidental to work under this contract and all associated costs will be deemed to be included in the stipulated price quoted.
- .2 Cleaning and deepening of existing ditches and excavation of new ditching will not be measured for payment. All operations related to cleaning and deepening of ditches and excavation of new ditches as required on contract drawings will be considered incidental to work under this contract and all associated costs will be deemed to be included in the stipulated price quoted.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D422-63/2002, Standard Test Method for Particle-Size Analysis of Soils.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

**1.3 DEFINITIONS**

- .1 Common excavation: excavation of materials of whatever nature encountered.
- .2 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .3 Common backfill: material from excavations or other on site sources approved by Departmental Representative for use intended.
- .4 Bedding material: uniformly graded, clean granular material free from mud lumps, cinders, sods, refuse of other deleterious substances. The maximum particle size shall be 50mm and the gradation and fines content shall be such that the material can be well compacted and will not become unstable and lose its pipe bearing ability upon exposure to water or groundwater movement. Bedding material shall be selected whenever possible from excavated material at the same location of trench excavation or from other approved locations on site.
- .5 Unsuitable materials:
  - .1 Weak, chemically unstable, organic and compressible materials.

**1.4 SUBMITTALS**

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

**1.5 QUALITY ASSURANCE**

- .1 Do not re-use on site soil materials until approvals are obtained from Departmental Representative.
- .2 Health and Safety Requirements:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling.
- .2 Dispose of unsuitable soil materials on site as directed by Departmental Representative.

**1.7 EXISTING CONDITIONS**

- .1 Buried services:
  - .1 Before commencing work contractor is responsible to establish location of any buried services on and adjacent to site.
  - .2 Maintain and protect from damage, electric, telephone and other utilities and structures encountered.
  - .3 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing.
- .2 Existing buildings and surface features:
  - .1 Conduct, with Departmental Representative condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, survey bench marks and monuments which may be affected by Work.
  - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.
  - .3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

**Part 2 Products****2.1 MATERIALS**

- .1 Selected Backfill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 250 mm, cinders, refuse or other deleterious materials.
- .2 Rock Backfill: selected material from excavations or other sources, approved by Departmental Representative for use intended, containing rock particles not larger than 250mm and less than 8% of total mass finer than 0.075 mm
- .3 Bedding material: uniformly graded, clean granular material with maximum particle size of 50mm.



**Part 3 Execution****3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

**3.2 SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

**3.3 PREPARATION/PROTECTION**

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

**3.4 STOCKPILING**

- .1 Stockpile fill materials as required in areas designated by Departmental Representative.
  - .1 Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.
- .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

**3.5 COFFERDAMS, SHORING, BRACING AND UNDERPINNING**

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and Safety Act for the Province of Newfoundland and Labrador.
  - .1 Where conditions are unstable, Departmental Representative to verify and advise methods.
- .2 Obtain permit from authority having jurisdiction for temporary diversion of water course.

**3.6 DEWATERING AND HEAVE PREVENTION**

- .1 Keep excavations free of water while Work is in progress.

- .2 Protect open excavations against flooding and damage due to surface run-off.
- .3 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures, to approved runoff areas and in a manner not detrimental to public and private property, or portion of Work completed or under construction.
  - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

### **3.7 CLEANING AND DEEPENING OF DITCHES**

- .1 Excavate to design grades to allow water positive drainage to low points.
- .2 Deepening existing channels to design lines and grades indicated and clean channel bottom of debris and roots.
- .3 Do not place excavated materials adjacent to channel in a manner that will impede flow of surface water from adjacent land.
- .4 Upon completion of excavation, clean and trim site.
- .5 Excavated materials to be disposed of offsite unless approved by Departmental Representative. Contractor is responsible for sourcing a disposal area for the excavated material.

### **3.8 EXCAVATION**

- .1 Excavate to lines, grades, elevations and dimensions as directed by Departmental Representative.
- .2 Excavation must not interfere with bearing capacity of adjacent foundations.
- .3 Do not disturb soil within branch spread of trees or shrubs that are to remain.
- .4 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open excavations at end of day's operation.
- .5 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
- .6 Restrict vehicle operations directly adjacent to open trenches.
- .7 Dispose of surplus and unsuitable excavated material in approved location on site.
- .8 Do not obstruct flow of surface drainage or natural watercourses.
- .9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .10 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

- .11 Hand trim, make firm and remove loose material and debris from excavations.
  - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

### 3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material under all pipe installations.
- .2 Place bedding and surround material in unfrozen condition.

### 3.10 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
  - .1 Departmental Representative has inspected and approved installations.
  - .2 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations:
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Place layers simultaneously on both sides of installed Work to equalize loading.

### 3.11 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Clean and reinstate road top to acceptable driving surface as directed by Departmental Representative.
- .3 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

**END OF SECTION**

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Section 31 22 16.13 - Roadway Subgrade Reshaping.

**1.2 MEASUREMENT PROCEDURES**

- .1 This item will not be measured for payment. Supply and placement of all roadway fill material as required on contract drawings will be considered incidental to work under this contract and all associated costs will be deemed to be included in the stipulated price quoted.

**1.3 DEFINITIONS**

- .1 Common Excavation: excavation of materials that are not Rock Excavation or Stripping.
- .2 Unclassified Excavation: excavation of whatever character other than stripping encountered in the work.
- .3 Free Haul: distance that excavated material is hauled without compensation. Free haul distance to be 5 km.
- .4 Stripping: excavation of organic material covering original ground.
- .5 Over Haul: authorized hauling in excess of free haul distance that excavated material is moved.
- .6 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.
- .7 Waste Material: material unsuitable for embankment, embankment foundation or material surplus to requirements.
- .8 Borrow Material: material obtained from areas outside right-of-way and required for construction of embankments or for other portions of work.

**1.4 QUALITY ASSURANCE**

- .1 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials.

**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.
- .3 Borrow material:
  - .1 Obtain from sources as indicated on site or as designated by Departmental Representative.
  - .2 Road topping material to be obtained from on site sources as approved by Departmental Representative, and to be uniformly graded with a maximum particle size of 38mm diameter and a maximum fines content of 10%.

**Part 3 Execution****3.1 COMPACTION EQUIPMENT**

- .1 Compaction of embankment materials and road topping can be achieved using on site heavy equipment or as approved by on site Departmental Representative.

**3.2 EXCAVATING**

- .1 General:
  - .1 Notify Departmental Representative when waste materials are encountered and remove to depth and extent directed.
- .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 Rock excavation:
  - .1 There is no requirement for rock excavation. Notify Departmental Representative when rock is encountered and adjustments to grades will be made.
- .4 Borrow Excavation:
  - .1 Completely use in embankments, suitable materials removed from right-of-way excavations before taking material from borrow areas.
  - .2 Obtain embankment materials, in excess of what is available from cut areas, from designated borrow areas.
    - .1 Departmental Representative to designate extent of borrow areas and allowable depth of excavation.
    - .2 Remove waste and stripping material from borrow pits to designated locations.
  - .3 Slope edges of borrow areas to minimum 2:1 and provide drainage as directed.

- .4 Trim and leave borrow pits in condition acceptable to Departmental Representative.

### 3.3 EMBANKMENTS

- .1 Break up or scarify existing road surface prior to placing embankment material.
- .2 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized.
- .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 200 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 500 mm.
  - .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 150 mm of road topping material.

### 3.4 SUBGRADE COMPACTION

- .1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.
- .2 Add water or dry as required to bring moisture content of materials to level required to achieve adequate compaction.

### 3.5 FINISHING

- .1 Shape entire roadbed within designated work areas to a uniform surface elevation.
- .2 Hand finish slopes that cannot be finished satisfactorily by machine.
- .3 Round top of backslope 1.5 m both sides of top of slope.
- .4 Trim between constructed slopes and edge of clearing to provide drainage and free of humps, sags and ruts.

### 3.6 PROTECTION

- .1 Maintain finished surfaces in condition conforming to this section until acceptance by Departmental Representative.

END OF SECTION

**Part 1 General**

**1.1 MEASUREMENT PROCEDURES**

- .1 This item will not be measured for payment. Supply and placement of rip-rap as required on contract drawings will be considered incidental to work under this contract and all associated costs will be deemed to be included in the stipulated price quoted.

**1.2 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials.

**Part 2 Products**

**2.1 STONE**

- .1 Hard, dense rock with relative density (formally specific gravity) not less than 2.65, durable quarry stone, free from seams, cracks or other structural defects.
- .2 Rocks subject to marked deterioration by water or weather will not be accepted. Only those stones approved by the Departmental Representative and meet the following size distribution for use intended shall be used:
  - .1 Armour Rip-Rap: Stone to be angular shaped and interlocking with the following gradation;  
  
900mm Dia. – Minimum of 10% larger  
  
700mm Dia. – Minimum of 60% larger  
  
450mm Dia. – Minimum of 80% larger
  - .2 Hand placed Rip-Rap: The largest rocks procurable on site shall be used and in no case shall any fragment measure less than 0.0035 cubic meters in volume. In hand laid dry wall rip-rap, spalls shall be used to fill open joints.

**Part 3 Execution**

**3.1 PLACING**

- .1 Where rip-rap is to be placed on slopes, excavate trench at toe of slope.
- .2 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place rip-rap to thickness and details as indicated.
- .4 Place stones in manner approved by Departmental Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.

.5 Hand placing:

- .1 Use larger stones for lower courses and as headers for subsequent courses.
- .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
- .3 Finish surface evenly, free of large openings and neat in appearance.

**END OF SECTION**



**Part 1 General**

**1.1 SECTION INCLUDES**

- .1 Materials and installation for aggregate base coarse.

**1.2 RELATED SECTIONS**

- .1 Section 31 24 13 - Roadway Embankments

**1.3 MEASUREMENT PROCEDURES**

- .1 This item will not be measured for payment. Supply and placement for granular base as required on contract drawings will be considered incidental to work under this contract and all associated costs will be deemed to be included in the stipulated price quoted.

**1.4 REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM C117-[95], Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C131-[96], Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .3 ASTM C136-[96a], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4 ASTM D698-[00a], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).
  - .5 ASTM D1557-[00], Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft<sup>3</sup>) (2,700kN-m/m<sup>3</sup>).
  - .6 ASTM D1883-[99], Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
  - .7 ASTM D4318-[00], Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .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.

**Part 2 Products**

**2.1 MATERIALS**

.1 Granular base: material in accordance with the following requirements:

- .1 Crushed stone or gravel.
- .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

.1 Gradation Requirements:

Sieve Designation	% Passing
19 mm	100
15.9 mm	-
9.5 mm	50-80
4.75 mm	35-60
1.20 mm	15-35
0.30mm	5-20
0.075 mm	2-8

- .2 Liquid limit: to ASTM D4318, maximum 25
- .3 Plasticity index: to ASTM D4318, maximum 6
- .4 Los Angeles degradation: to ASTM C131. Max. % loss by weight: 45
- .5 Crushed particles: at least 6% of particles by mass within each of following sieve designation range to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C136.
- .6 Soaked CBR: to ASTM D1883, min 100, when compacted to 100% of ASTM D1557.

**Part 3 Execution**

**3.1 SEQUENCE OF OPERATION**

.1 Place granular base after subgrade surface is inspected and approved by Departmental Representative 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 Begin spreading base material on crown line or on high side of one-way slope.
- .5 Place material using methods which do not lead to segregation or degradation of aggregate.
- .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .7 Place material to full width in uniform layers not exceeding 100 mm compacted thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved.

- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .2 **Compaction Equipment**
  - .1 Compaction equipment to be capable of obtaining required material densities.
  - .2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Departmental Representative before use.
  - .3 Equipped with device that records hours of actual work, not motor running hours.
- .3 **Compacting**
  - .1 Compact to density not less than 100% corrected maximum dry density.
  - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
  - .3 Apply water as necessary during compacting to obtain specified density.
  - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by the Departmental Representative.
  - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

**3.2 SITE TOLERANCES**

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

**3.3 PROTECTION**

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1        Materials and installation for pipe culverts.

**1.2                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3        Section 31 24 13 - Roadway Embankments.

**1.3                MEASUREMENT PROCEDURES**

- .1        This item will not be measured for payment. Supply and placement of pipe culverts as required on contract drawings will be considered incidental to work under this contract and all associated costs will be deemed to be included in the stipulated price quoted.

**1.4                REFERENCES**

- .1        Canadian Standards Association (CSA International)
  - .1        CSA-G401-01, Corrugated Steel Pipe Products.

**1.5                SUBMITTALS**

- .1        Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Submit manufacturer's test data and certification at least 2 weeks prior to beginning Work.
- .3        Certification to be marked on pipe.

**1.6                WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate waste materials for reuse and recycling.
- .2        Remove from site and dispose of packaging materials at appropriate recycling facilities.

**Part 2            Products**

**2.1                HIGH DENSITY POLYETHYLENE PIPE (HDPE)**

- .1        HDPE PIPE TO 320 kPa. Couplers and HDPE pipe shall be of a type, size and strength acceptable to the Engineer and in compliance with AASHTO M294-07-UL, standard for corrugated polyethylene pipe 300 to 1500mm diameter, ASTM D 350, Standard Specification for polyethylene plastics pipe and fittings materials and CSA-B182.8-06, Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings.
- .2        Culverts daylighting to slopes of embankment may require fluming.

**2.2 GRANULAR BEDDING AND BACKFILL**

- .1 Granular bedding and backfill material: To contain no particles larger than 38mm and not more than 10% passing 0.075mm sieve, unless otherwise specified.

**Part 3 Execution**

**3.1 TRENCHING**

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

**3.2 BEDDING**

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place minimum thickness of 200 mm of approved granular material on bottom of excavation and compact.
- .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.

**3.3 LAYING HDPE 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.
- .4 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

**3.4 JOINTS: CORRUGATED HDPE CULVERTS**

- .1 HDPE 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.

**3.5 BACKFILLING**

- .1 Backfill around and over culverts as indicated or as directed by Departmental Representative.
- .2 Place backfill material, approved 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 taking special care to obtain required density under haunches.
- .4 Protect installed culvert with minimum 600 mm cover of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 1:2.
- .5 Place backfill in unfrozen condition.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.

**1.2 MEASUREMENT PROCEDURES**

- .1 This item will not be measured for payment. Supply and placement of guide rail as required on contract drawings will be considered incidental to work under this contract and all associated costs will be deemed to be included in the stipulated price quoted.

**1.3 REFERENCES**

- .1 American Association of State Highway and Transportation Officials (AASHTO)
  - .1 AASHTO M180-[2000], Corrugated Sheet Steel Beams for Highway Guardrails.
- .2 American Society for Testing and Materials (ASTM International)
  - .1 ASTM A307-[00], Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength .
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.28-[98], Exterior, Alkyd, House Paint.
  - .2 CAN/CGSB-1.40-[M97], Anti-corrosive, Structural Steel Alkyd Primer.
  - .3 CAN/CGSB-1.59-[97], Alkyd Exterior Gloss Enamel.
  - .4 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.
  - .5 CGSB 31-GP-107Ma-[90], Non-inhibited, Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .4 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-O80 Series-[97(February 2000)], Wood Preservation.
- .5 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.

**1.4 SAMPLES**

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

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Place materials defined as hazardous or toxic in designated containers.
- .2 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .3 Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Departmental Representative.
- .4 Fold up metal banding, flatten and place in designated area for recycling.

- .5 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in any other location where it will pose a health or environmental hazard.
- .6 Do not dispose of preservative treated wood through incineration.
- .7 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .8 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.
- .9 Dispose of unused preservative material at an official hazardous material collections site. Do not dispose of unused preservative material into the sewer system, streams, lakes, on ground or in any other location where they will pose a health or environmental hazard.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel W-beam guide rail as indicated and to following requirements:
  - .1 Steel rail and terminal sections: to AASHTO M180, class A Type 1 zinc coated.
  - .2 Bolts, nuts and washers: to ASTM A307, hot dip galvanized to CSA G164.
- .2 Organic zinc-rich coating: to CAN/CGSB-1.181.
- .3 Sawn timber posts.
  - .1 Type: Seasoned structural grade lumber pressure treated in accordance with CAN/CSA-O80 Series.
  - .2 Dimensions: 150 x 150 x 2000 mm.

## **Part 3 Execution**

### **3.1 ERECTION**

- .1 Set posts by instrument for alignment, and locations as indicated and as directed by Departmental Representative.
- .2 Excavate post holes to depths as indicated and to diameter of 360 mm plus or minus 20 mm. Compact bottom to provide firm foundation. Set post plumb and square in hole.
- .3 Backfill around posts using excavated material and compact in uniform layers not exceeding 150 mm compacted thickness.
- .4 Cut off tops of posts as indicated, with tops parallel to grade of pavement edge.
- .5 Worker protection: workers must wear approved PPE when handling, drilling, sawing, cutting or sanding preservative treated wood and applying preservative materials.
- .6 Treat cut tops with two coats of wood preservative.
- .7 Construct anchorages to details as indicated. Place and compact backfill for anchors as directed by Departmental Representative.



- .8 Erect steel W-beam components to details as indicated. Lap joints in direction of traffic. Tighten nuts to 100 N.m torque. Maximum protrusion of bolt 12 mm beyond nut.

**3.2 TOUCH UP**

- .1 Galvanized steel-touch up:
  - .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas in accordance Pre-treat damaged surfaces according to manufacturer's instructions for zinc-rich paint.

---

**END OF SECTION**

---

## **APPENDIX A**



## Culvert Installation

## Fisheries and Oceans Canada

Measures to Avoid Causing Harm to Fish and Fish Habitat

On November 25, 2013 the Fisheries Protection Provisions of the *Fisheries Act* came into force. The *Fisheries Act* requires that projects avoid causing serious harm to fish unless authorized by the Minister of Fisheries and Oceans. This applies to work being conducted in or near waterbodies that support fish that are part of or that support a commercial, recreational or Aboriginal fishery.

If you are conducting a project near water, it is your responsibility to ensure you avoid causing serious harm to fish in compliance with the *Fisheries Act*. The following advice will help you avoid causing harm and comply with the *Act*.

- a. *Culverts should be aligned parallel to the existing natural channel and located on a straight stream section of uniform gradient.*
- b. *The culvert slope should follow the existing stream gradient slope where possible.*
- c. *Culverts up to 2000 mm in diameter should be countersunk a depth of 300 mm below the streambed elevation.*
- d. *A minimum water depth of 200 mm should be provided throughout the culvert length.*
- e. *Culverts should be sufficiently sized and installed such that scouring of the outlet streambed does not occur as a result of increased water velocities in the culvert.*
- f. *Fish passage will be maintained during all phases of construction and post-construction.*
- g. *Water movement under or around a culvert installation should be prevented through the use of headwalls, or other means, as necessary.*
- h. *Sediment-laden water arising within work areas should be treated to remove sediment prior to release into a watercourse.*
- i. *All instream works should be carried out in the dry.*
- j. *Fill material should not be taken from stream beds, banks or riparian areas.*
- k. *Construction and fill material used should be free of substances that may be deleterious to fish or fish habitat.*
- l. *Flows should be maintained downstream of the construction site at all times.*
- m. *If disturbed, stream channel and/or banks should be restored to original conditions.*
- n. *When work has been completed, the stream channel, banks and approaches should be restored to original condition.*

Additional measures that may be required to protect fish and fish habitat can be found on the DFO national website (<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>) and in the *Guidelines for the Protection of Freshwater Fish Habitat in Newfoundland & Labrador* (<http://www.dfo-mpo.gc.ca/Library/240270.pdf>).

Should your plans change please contact the Fisheries Protection Program-Regulatory Review:

Fisheries Protection Program  
Fisheries and Ocean Canada  
80 East White Hills Road  
St. John's NL A1C 5X1  
Telephone: (709) 772-4140  
Fax: (709) 772-5562  
Email: FPP-NL@dfo-mpo.gc.ca

**Note:** This advice is only applicable to the project specified on the accompanying DFO letter.

