

# **ENVIRONMENTAL PROTECTION PLAN**

**October, 2004**

**Project 3-04 PHG:**

**PART "A" GRADING & CAUSEWAY CONSTRUCTION, KM  
550.0 TO KM 551.3, ROUTE 500, TRANS LABRADOR HIGHWAY**

**PART "B" CONSTRUCTION OF A 360 METER BRIDGE AT CHURCHILL RIVER,  
ROUTE 500, TRANS LABRADOR HIGHWAY**

## **SECTION 1 - INTRODUCTION**

This Environmental Protection Plan (EPP) has been produced by the Department of Transportation and Works (DTW) and represents commitments made in the Trans Labrador Highway (Goose Bay to Paradise River) Environmental Impact Statement (EIS) and Comprehensive Study Report (CSR), January 2003, and Addendum, October 2003 and Supplementary Addendum, March 29, 2004.

DTW registered the project with the Department of Environment and Labour on April 3, 2002 for review under the Environmental Protection Act and Regulations. Applicable permits, authorizations, and approvals are required for the project prior to the start of work.

This Environmental Protection Plan is a concise field usable document that describes detailed site specific environmental protection measures to be implemented during the preconstruction, construction, and post construction phases of the project. It has been prepared to assist DTW in the supervision of field activities and as a guide for decision making in the field. The EPP will also be of interest to federal, provincial and municipal government personnel, aboriginal groups, organizations, and members of the general public who wish to know how construction and operation activities will be managed to prevent or minimize potential negative environmental impacts.

**This EPP pertains to the construction of the section of two lane gravel surface highway extending from km 550.0 to 551.3 starting from Goose Bay. This section is also referred to as Station 0+000 to Station 1+700, respectively, within the contract documents.** The use of "Owner" in this document is synonymous with DTW as this facilitates the direct incorporation of specific environmental protection measures in contract documents.

## **SECTION 2 - GENERAL PROTECTION MEASURES FOR CONSTRUCTION**

### 2.1 Owner's (DTW) Policy

It is Owner's policy to protect the environment along the route of the project, in areas adjacent the route, and in associated work areas such as pit or quarry sites. DTW is committed to appropriate and cost effective environmental protection measures that will prevent serious or irreversible environmental damage through the planning and implementation phases of the project. DTW is committed to implementing best practices consistent with the Precautionary Principle (1992 Rio Declaration On Environment and Development), to avoid adverse effects where possible.

DTW uses various environmental planning elements which comprise an Environmental Management Plan (EMP). These elements provide the means for DTW and their Contractors to implement and monitor environmental protection measures. DTW will implement the elements of the EMP throughout the construction phase and will continue best practices throughout operations. The elements common to an EMP (pre-construction planning, contingency plans, environmental specifications, monitoring plans, rehabilitation plans, and Contractor environmental awareness and training) are incorporated into DTW-s Environmental Protection Plan.

To ensure protection of the environment, the work at all times shall be subject to inspection by the Owner and staff of relevant, provincial and federal agencies. Normally, all inspections other than by the Owner will be arranged in advance through the Owner. Any specific matters relating to environmental protection will be dealt with between Contractor

and Owner. The EPP will be included as a Supplementary General Condition (SGC) of the Owner's Tender Book. The Owner's Specification Book forms part of the Tender Book. **Where there is a difference in the requirement(s) of the EPP and the Specification Book of the Owner, the EPP shall override the Specification Book.**

Any violations of environmental permits or authorizations or any environmental related incidents which are observed by inspectors representing regulatory agencies or other environmental officials are to be reported by them prior to leaving the site to the Resident Engineer of the DTW. In the absence of the Resident Engineer the matter shall be reported to the Environmental Surveillance Officer (ESO) or in the absence of the ESO to a DTW official who is designated by the Resident Engineer.

Except in emergency situations, environmental protection measures required by other agencies must be approved by the Owner prior to implementation by the Contractor.

#### 2.1.1 Owner's Responsibilities

The Owner shall ensure that all environmental protection measures which are part of this contract are adhered to by the Contractor. The Owner shall ensure the Contractor obtains all necessary regulatory permits and approvals prior to specific work activities and that the terms and conditions of all regulatory permits and approvals are followed. Compliance will be ensured through regular inspections of construction sites by the ESO/Resident Engineer. Non compliance could result in legal action against the Contractor by regulatory agencies and/or hold back of payment owing by the Owner.

#### 2.2 Environmental Reporting

The DTW will have an Environmental Surveillance Officer (ESO) who will act as the liaison between DTW and regulatory bodies responsible for environmental protection. The ESO will liaise with the Resident Engineer of DTW to whom the contractor will report and also with the Innu Nation Environmental Monitor (see Environmental Management and

Reporting, Appendix A). The Resident Engineer represents the Owner and has complete authority over all aspects of project work.

The role of the DTW ESO will be to evaluate the environmental activities of DTW and the contractor, as well as to assess and interpret environmental protection measures as outlined in the EPP, regulations, guidelines, permits, approvals, letters of advice, and authorizations. The DTW ESO will advise construction management of environmental procedures and requirements, participate in project meetings, conduct environmental reviews of drawings and play a major role in the development and revision of the EPP. The DTW ESO will prepare monthly environmental monitoring reports for each construction contract, and as well a yearly monitoring summary report for each of the contracts. The Environmental Assessment Division, Department of Environment and Conservation, will be supplied with a copy of each report and will distribute as needed to other interested agencies.

The Labrador Innu Nation will also have an environmental monitor on site throughout the construction season. The role of the Innu Nation Environmental Monitor will be to interpret the EPP, monitor all sub-contractor activity to ensure conformance with the EPP, regulations, guidelines, permits, approvals, letters of advice, and authorizations, and to advise DTW engineering and environmental personnel. He/she will also be in possession of the EPP, environmental compliance and effects monitoring reports and incident reports (ie. hydrocarbon spill reports), participate in project meetings, conduct environmental reviews of drawings, and assist in the development and revision of the EPP. The Innu Nation Environmental Monitor will communicate with the DTW ESO and will take direction from his/her leadership. (See Appendix A)

DTW will meet with the Innu Nation representatives in advance of each construction season to facilitate a suitable liaison and develop appropriate mitigation measures pertaining to Innu resource use.

### 2.2.1 Compliance Monitoring

This is a process whereby DTW will conduct visual monitoring to ensure compliance with the EPP regulatory requirements, conditions of approvals, permits, letters of advice, authorizations, and environmental commitments through regular inspections of construction and operational activities.

The overall responsibility for DTW's compliance monitoring will rest with the Resident Engineer. The Resident Engineer will also be responsible for the day to day field monitoring and for ensuring that the EPP specifications are enforced and implemented by the Contractor. The ESO will assist the Resident Engineer in these areas.

The DTW Specification Manual (Transportation) will be used as a basis to monitor compliance in the area of engineering and management. In regard to Environmental Specifications the Contractor is referred to Division 8 of the Specification Manual, General Environmental Requirements. All other relevant divisions and sections will apply. (See Appendix B).

Through general effects monitoring DTW will determine if impacts occur and if so, do they occur at predicted levels. Effects monitoring will provide a measure of the validity of the predictions and provide a means of assessing and re-evaluating whether or not mitigation has achieved its purpose.

DTW will conduct periodic inspections of borrow sites and stream crossings. The Contractor's warranty for the rehabilitation of borrow sites will be in accordance with the tender book document.

During the full construction period of the project, DTW will monitor and record any incidents pertaining to wildlife, migratory birds, and fish and any incidents or matters pertaining to soil and water contamination.

### 2.3 Contractor Education

The DTW will conduct an Environmental Awareness Session for each Contractor and his employees including subcontractors prior to construction. The session shall include a review of the environmental protection measures outlined in the EIS and other related mitigation. Also, the session shall have information respecting Innu presence in the project area and their privacy as well as direction to not interfere with Innu fishing and hunting activities. Environmental training of the Contractor's and subcontractor's personnel coming on staff after the environmental awareness session will be the responsibility of the Contractor. The Resident Engineer/ESO will monitor this provision.

### 2.4 Contractor's Responsibilities

The Contractor shall ensure that its employees and Sub-contractors comply with the conditions of the contract and with all applicable environmental laws and regulations of the various government authorities. The Contractor shall also ensure that such other rules and regulations as the Owner may establish for all work pertaining to this project within or outside of the road right of way are followed.

The Contractor may be required to obtain all or some of the following permits where such are required. These are outlined in the following table:

Table 1; Major Regulatory Approvals

<b>MAJOR REGULATORY APPROVALS BY TYPE, AGENCY AND CONTACT PERSON</b>		
<b>TYPE OF PERMIT</b>	<b>AGENCY</b>	<b>CONTACT PERSON</b>
1. Stream Crossings Letter of Advice *	Dept. of Fisheries and Oceans	Mr. Boyd Collier 896-6151
2. Stream Crossings FA Section 35 Authorization	Dept. of Fisheries and Oceans	Mr. Boyd Collier 896-6151
3. Wood Cutting & Burning Permits	Forestry Division Dept. of Natural Resources	Ford Taylor 896-3405
4. Fuel Storage/Handling & Solid Waste Disposal	Government Services Centre	Mr. Rick Curran 637-2229
5. Water Supply, Solid Waste & Sewage Disposal	Government Services Centre	Ms. Sharon Metcalf 896-2661
6. Quarry or Pit Operations	Dept. Of Natural Resources Mineral Lands Division	Mr. Fred Kirby 729-6447
7. Navigable Waters Protection Act Approvals*	Canadian Coast Guard	Mr. Paul Nippard 772-2083
8. Contractor Designed Stream Crossings	Dept. of Environment and Conservation, Water Resources Management Division	Mr. Robert Picco 729-2563
9. Stream Crossings	Dept. of Environment and Conservation, Water Resources Management Division	Mr. Robert Picco 729-2563

\* Approvals obtained by DTW.

The Contractor shall obtain all other permits and approvals which may be necessary to comply with government laws and regulations. Prior to the commencement of specific work elements, the Contractor shall immediately provide the Resident Engineer with two copies of all permits as they are obtained.

The Contractor is referred to the following **Environmental Guidelines** regarding construction procedures at watercourses, copies of which may be obtained from the Department of Environment and Conservation, Water Resources Division:

<b>Chapter</b>	<b>Title</b>
3	Watercourse Crossings
4	Bridges
5	Culverts
6	Fording
7	Diversions, New Channels, and Major Alterations
9	Pipe Crossings
13	General Construction Practices

The Contractor is also referred to the Department of Fisheries and Oceans **Fact Sheets**, in Appendix C, regarding in-stream work and fish habitat protection.

## 2.5 Numeric Standards

In any instances where, in the EPP, specific numerical criteria are provided, the abbreviation NS for NUMERIC STANDARD (NS) will appear in the left hand margin of this EPP. This is provided to alert all readers that for those items specific numeric standards will form part of the contract documents between Owner and Contractor.



## 2.6 Contractor and Subcontractors' Personnel

The Contractor and Subcontractors= personnel shall not harass wildlife, migratory birds or fish. **Fishing, hunting and trapping is prohibited by contractor/employees and department staff on the route of Phase III.** Any contravention of environmental requirements or government regulations, including employee actions accidental or otherwise, resulting in environmental damage shall be reported to DTW and the appropriate regulatory authority without delay. The Contractor shall be responsible for all costs associated with clean-up, and/or restorative measures as may be directed by DTW, or by provincial or federal agencies through the Owner.

## 2.7 Storage, Handling and Transfer of Fuels and Other Hazardous Material

### (A) Special Procedures In the Event of a Hydrocarbon Spill

NS All spills are to be reported directly to the ESO/Resident Engineer and in the event of the detection of a fuel or hazardous material spill of **70** litres or more the Contractor and Subcontractors shall abide by the following measures:

- (i) make every effort to stop leakage and contain contaminant flow;
- (ii) **immediately** upon detection, report spill location and size to the Canadian Coast Guard spill report number **772-2083** or **1 800 563-2444** and the Resident Engineer/ESO, and to the Department of Fisheries and Oceans at **896-2661**; follow up with a full written report containing information on the cause of the spill, remedial action taken, damage or contamination estimate, and any further action to be taken;
- (iii) remove contaminant from spill site by absorbent, pumping, burning, or whatever method is appropriate and acceptable to Owner. Clean-up the affected area in accordance with the requirements of the Government Services Centre and then dispose of contaminated debris at an approved

waste disposal site.

- (iv) take all necessary action to ensure the incident does not recur.

It is required for all spills regardless of volume that may enter waters frequented by fish to be reported to the Spill Line 709 772-2083 or 1 800 563-9089.

Contractor shall apply the following criteria in reaching decisions on contaminant and clean-up procedures:

- (i) minimize danger to persons;
- (ii) minimize pollution to watercourses and wetlands;
- (iii) minimize the size of the area affected by a spill; and
- (iv) minimize the disturbance to the area and watercourses during clean-up.

The above procedures shall also be followed in the event of a spillage of less than 70 litres excepting that a spill of this magnitude is not required to be reported to the Canadian Coast Guard. Any spillage of hydrocarbon product must be reported immediately to the Resident Engineer or the ESO, and copied to the Innu Nation Environment Monitor.

(B) General Procedures for Storing and Handling Fuels

- (a) Bulk fuel storage and hazardous materials will not be permitted in the vicinity of any watercourse or water body [See Section (e)]. The Contractor shall consult with the ESO and Resident Engineer for approval of site locations for fuel storage. The Contractor, Subcontractors, and their personnel shall take all necessary precautions to prevent the spillage, misplacement, or loss of fuels and other hazardous material.
- NS (b) All storage tank systems must be registered under and in compliance with Newfoundland Regulation 58/03, The Storage and Handling of Gasoline and Associated Products Regulations, 2003 before commencing operation. Registration does not apply to storage tank systems of a capacity less than 2500 litres that are

connected to a heating appliance. Contractors shall supply verification of storage tank registration to the Owner prior to the commencement of work.

- (c) The Contractor shall ensure that fuels and hazardous materials are handled only by personnel who are trained and qualified in handling these materials in accordance with manufacturers' instructions and government regulations. The Contractor will be required to verify personnel qualifications as they pertain to this item and provide written confirmation of same to the Resident Engineer.
- (d) Refueling operations shall be supervised at all times. Under no circumstances shall any refueling procedure be left unattended by the operator.
- NS (e) Oils, greases, gasoline, diesel, hydraulic and transmission fluids or other fuels shall be stored at least **100 m** (horizontal distance) from any watercourse, water body, or wetland unless otherwise approved by the Owner.
- (f) Handling and fueling procedures shall be carried out to prevent the contamination of soil or water.
- NS (g) All above ground fuel containers, with the exception of those exempted under Newfoundland Regulation 258/82, shall be self dyked units that are in compliance with the terms and conditions of the approval of the Government Services Centre.
- (h) Fuel storage areas and non-portable transfer lines shall be clearly marked or barricaded to ensure that they are not damaged by moving vehicles. The markers shall be visible under all weather conditions.
- (i) **Waste oils and lubricants shall be retained in a tank or closed container, and disposed of by a company licensed by the Government Services Centre for the handling and disposal of waste oil products. Disposal of waste oil and lubricants in an unauthorized manner, such as at borrow sites, is strictly prohibited.**
- NS (j) Storage tank systems shall be inspected on a regular basis as per Section 20 of Newfoundland Regulation 258/82 Storage and Handling of Gasoline and Associated Products. This involves, but is not limited to, gauging or dipping, reconciliation of records and the proper maintenance of reconciliation records for a period of two years. Records shall be maintained for inspection by the Resident Engineer, ESO

and/or Government Service Centre Inspectors.

- NS (k) Any maintenance such as hydraulic line repairs or similar work shall be carried out by using suitable fluid collection equipment and in a manner which ensures all waste material is collected and suitably disposed of. The Contractor shall ensure that all equipment is mechanically sound to avoid leaks of grease, oil, diesel, gasoline, and hydraulic and transmission fluids. The Contractor shall ensure that no servicing or washing of heavy equipment occurs within **100 m** of a watercourse or wetland except within a refueling site approved by the Owner. Such a site will provide containment for accidentally spilled fuels and ensure proper disposal of all waste oil, filters, containers or other such debris in a manner approved by the Government Services Centre.
- NS (l) Smoking shall be prohibited within **10 m** of a fuel storage area or during refueling operations.
- NS (m) Fueling or servicing of mobile equipment shall not be allowed within **100 m** of a watercourse, water body, or wetlands.
- NS (n) The owner of a storage tank system shall, within **30 days** of known abandonment, empty the system of all product and vapors, remove the tank and associated piping from the ground, remove any contaminated soil, clean the area and restore the site to the satisfaction of the Owner and in accordance with the criteria of the Government Services Centre. The Contractor shall dispose of any soil contaminated by hydrocarbons or other chemicals in a manner approved by the Owner and in accordance with the criteria of the Government Services Centre.
- (o) The Contractor shall have on site suitable oil spill response equipment including a sufficient quantity of absorbent material, empty barrels, an oil boom, skimming equipment, and all other necessary items to effectively and quickly respond to any spillage of hydrocarbon product on water or land. The Contractor shall advise fuel handling staff of the location and application of the oil spill response equipment. The Contractor must advise the Resident Engineer and ESO of the location and quantity

of materials and response equipment available.

- (p) No pesticides or other toxic chemicals shall be used without prior approval of the Owner. Each chemical to be used, its application, restraint, and area of use shall be subject to regulations under Part IX of the Environmental Protection Act, and Newfoundland and Labrador Regulation 57/03, the Pesticide Control Regulations, 2003. A copy of the Material Safety Data Sheet (MSDS) shall be supplied to the Resident Engineer, and copied to the Innu Nation Environment Monitor **5 days** prior to any use by the Contractor. Two copies of any approval issued to the Contractor for chemical usage under these Regulations shall be provided to the Resident Engineer, and copied to the Innu Nation Environment Monitor.
- NS
- (q) Toxic construction material such as treated timber shall be stored at least **100 m** away from all areas where drainage is directed into any of the waterways or wetlands within this contract.
- NS

## 2.8 Waste Management

The Contractor shall collect and dispose of all waste produced by its employees and those of its Subcontractors in a manner approved by the Owner and the Government Services Centre and as outlined in Part IV of the Environmental Protection Act. All efforts must be made to utilize best waste management practices toward the reduction, reuse, and recycling of waste products and surplus material. No waste material shall be deposited in any watercourse or wetland. Rubbish and domestic garbage generated by the Contractor's employees shall be collected and temporarily stored in suitable containers which are not accessible to scavenging by bears. Such containers shall be emptied frequently and the contents transported and disposed at the Waste Disposal Site with the permission of the community of Happy Valley – Goose Bay. Any incident at the construction site involving wildlife such as bears or wolves shall be immediately reported to the Resident Engineer/ESO, Innu Nation Environment Monitor, and the Wildlife Division Office at Goose Bay (896-5107).

Unsuitable material (USM) which is not used on the project in fills shall be the Contractor's

responsibility for disposal. The material shall be placed and stabilized in a manner and at a location acceptable to the Resident Engineer and ESO.

#### 2.9 Dust Control

The Contractor shall ensure that dust does not become a problem for workers on the project or local residents. Water shall be used by the Contractor to control dust when necessary or as requested by the Resident Engineer/ESO.

#### 2.10 Water Quality Monitoring

The Resident Engineer and ESO will carry out visual monitoring of watercourse crossing sites and down stream areas when construction of watercourse crossings are underway to ensure that the Contractor's construction procedures and methods of operation are not resulting in pollution and/or siltation of adjacent or downstream areas.

#### 2.11 Marshaling Yards

NS Marshaling yards for equipment and material storage yards shall be located at least **100m** from any watercourse or wetland. The site should be of low value with respect to its potential for other uses when compared to other lands in the area. Abandoned gravel pits, non-forested areas, or other previously disturbed areas are preferred locations. Prior to the commencement of construction the Contractor will submit a list of candidate sites, which will be reviewed and approved by the Owner and any other relevant agency. Marshaling yards shall be rehabilitated and dealt with in a similar manner as described in Section 2.17 Borrow Areas, including hydroseeding.

#### 2.12 Protection of Historic Resources

DTW will hire an archaeological consultant prior to construction to survey the route. The detailed contract drawings will be used to determine the road right of way. The Contractor shall be aware that the Cultural Heritage Division of the Dept. of Tourism and Culture, requests that all parties involved with fieldwork be advised on the provisions of the Historic Resources Act (1985) protecting archaeological sites and artifacts, and procedures to be

followed in the event that either are found:

Section 10 (1) - A person who discovers an archaeological object in, on, or forming part of the land within the province shall report the discovery forthwith to the Minister stating the nature of the object, the location where it was discovered and the date of the discovery.

Section 10 (2) - No person, other than the one to whom a permit has been issued under this Act, who discovers an archaeological object shall move, destroy, damage, deface or obliterate, alter, add to, mark or in any other way interfere with, remove or cause to be removed from the province that object.

Section 11(1) - The property in all archaeological objects found in, on, or taken from the land within the province, whether or not these objects are in the possession of Her Majesty is vested in Her Majesty.

Should any archaeological remains be encountered, such as stone, bone or iron tools, concentrations of bone, fireplaces, house pits and/or foundations, all work in the area of the find shall cease immediately and contact shall be made with the Resource Archaeologist (729-2462) as soon as possible. Due to the interest of the Innu Nation in archaeological resources in the project area, the Innu Nation (497-8155) shall be contacted quickly and also informed of any discovery.

The Owner through the Resident Engineer/ESO shall be notified immediately upon discovery of any historic resources.

### 2.13 Temporary Work Camps

The Contractor is responsible for obtaining **all** appropriate permits from government agencies with legislation and regulations relevant to overnight lodging and camp facilities. These permits include but are not necessarily limited to those related to solid and liquid waste disposal, water supply, sewage treatment, development control and Crown Lands.

The area to be cleared for temporary construction camps shall be minimized and existing cleared areas shall be used whenever possible. Stripped surficial soils shall be stockpiled for later use in site rehabilitation.

NS Camps shall not be permitted within **100m** of any watercourse or designated wetland unless otherwise approved by Owner.

When camps are no longer required all trailers, materials, and debris shall be removed and rehabilitation of the site shall be carried out in a similar manner as detailed in Section 2.17 Borrow Areas. Monitoring of the sites to confirm satisfactory revegetation will be conducted.

Temporary construction camps which propose to utilize an adjacent watercourse as a source of potable water should design and install the freshwater intake in accordance with DFO's **Freshwater Intake End-of-Pipe Fish Screen Guidelines** dated March 1995, to prevent potential losses of fish due to impingement

#### 2.14 Clearing

The Contractor shall obtain all appropriate permits prior to the clearing or cutting of any trees. Cutting shall be restricted to areas designated by the Owner (see Section 3.6). The Contractor shall obtain a burning permit from the Forestry Division, Dept. of Natural Resources for the burning of timber slash. Burning shall be strictly controlled by the Contractor and carried out with all necessary precautions so as to contain burning and prevent forest fire. Also see Section 2.20 (Forest Fire Prevention).

Burning operations shall only be undertaken on days when the weather conditions are conducive, and in a manner as directed by the Forestry Division. The Resident Engineer shall have authority over burning operations. Burning operations may be suspended at any time by the Resident Engineer or the Forestry Officer.

The Contractor shall comply with the DTW Specification Book, Section 201 Clearing and Grubbing (see Appendix A) with the following exceptions:

- (i) Permanent buffer zones of a designated width, (See Section 3.1.2, Buffer Zones, and Appendix B), will be left on each side of the road at watercourse crossings and at adjacent water bodies in proximity to the road. These zones will be delineated in the field by the Owner and flagged with blue ribbon. **Trees and vegetation shall remain undisturbed at these locations up to the edge of the road embankment, or the**



**outlet pool of the crossing, or to the edge of the water body as indicated by the blue ribbon. And in no case shall the Contractor compromise the buffer zone regardless of blue ribbons whether placed or not.**

- (ii) Temporary buffer zones shall be marked in the field by the Owner at specified watercourse crossings wherein cutting and clearing shall only be permitted at the time of the installation of the crossing.
- (iii) The contractor shall comply with the Migratory Birds Convention Act and Regulations which states that, **No person shall disturb, destroy, or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird without a permit.** Where active nests of migratory birds or birds of prey are present or suspected within the R.O.W., vegetation clearing will not be conducted to the required limits until eggs have hatched and young are mobile (ie. after August 1). Should any nesting areas be encountered during the clearing operations, the area shall be immediately avoided by the labour forces. The ESO and Resident Engineer must be immediately notified, upon which time they will provide further direction to the Contractor. The Innu Nation Environment Monitor will also be notified and consulted on this matter.

#### 2.15 Grubbing

Grubbing will be carried out in accordance with the DTW Specification Book Section 203 - Grubbing (See Appendix A) with the following exceptions:

- NS (i) Grubbing limits will be established in the field by the Resident Engineer for portions of the project with regard to adjacent cut and fill zones. The contractor may be directed to salvage and store live plant material for use along exposed slopes or near stream crossings. Grubbing operations shall be confined to those portions of the route and scheduled immediately in advance of other road construction operations, the objective being to limit the exposure of large areas of erodible soils for long periods of time. **Grubbing shall not advance more than 2 km beyond fill operations.**
- (ii) Where directed by the Resident Engineer topsoil shall be stripped, stockpiled, secured, and surrounded by filter fabric to isolate and prevent any runoff from

entering an adjacent watercourse

- (iii) Filter fabric fencing constructed of a suitable woven geotextile shall be erected at the bottom of cuts and at the lower sections of grubbed areas to prevent the migration of soils, where directed by the Resident Engineer/ESO.
- (iv) Grubbing shall not be carried out in any stream or tributary to a stream or in any temporary buffer zone or in any location where water is flowing until such time as the crossing or culvert is to be installed. At this time, all flow shall be diverted around the construction area by such means as a plastic lined diversion channel or by pumping so that all grubbing and excavation operations will be carried out **in the dry**.

Where necessary, appropriate erosion or siltation control measures as outline in Section 3.5 and as directed by the Resident Engineer or ESO will be installed by the Contractor.

#### 2.16 Bog Excavation

All bog excavation will be carried out in accordance with the DTW Specification Book Section 212 (See Appendix B).

- (a) Excavated muskeg or bog material which will not be incorporated into the right-of-way adjacent to the excavated area will be hauled to a disposal area(s) designated by the Owner and treated as USM referenced in Section 2.8.
- NS (b) The bog excavation will be carried out with an excavator to minimize the disturbance to the surrounding area. Any silted water generated by bog excavation shall be confined, prevented from entering any watercourse or tributary, and released or pumped to a designated area for ground absorption. The Resident Engineer shall be advised of this operation at least **5 days** prior to work and will provide any necessary direction.
- (c) Bulldozers shall not be used to remove bog or in any work associated with bog removal.

## 2.17 Borrow Areas

- (a) Borrow materials will come primarily from proposed road cut areas or the widening of these areas within the R.O.W. If additional borrow material is required from a site outside the right-of-way, it shall be a site which is approved by the Mineral Lands Division, Department of Natural Resources.
  - (i) Existing borrow areas shall be used wherever possible.
  - (ii) The owner will designate all borrow areas for subgrade material.
  - (iii) Development of borrow areas will comply with Section 207, (Borrow), and Section 310 (Use of Pits and Quarries), and Division 8 (General Environmental Requirements) of the DTW Specification Book. See Appendix B.
- (b) The operations at new quarry areas used during construction shall also be carried out according to all relevant federal and provincial acts and regulations.
- (c) The development of borrow areas shall be controlled so as to minimize potential environmental damage. The following procedures shall be implemented by the Contractor when using borrow areas:
  - (i) The area to be excavated shall be clear cut of all vegetation prior to the removal of any borrow material;
  - NS (ii) All stumps, organic material and topsoil shall be stripped from the area to be excavated, segregated, and stockpiled at least **5m** from undisturbed areas ensuring it is not pushed onto the surrounding trees or vegetation; stockpiled strippings will be kept at least **5m** from the area of excavation;
  - NS (iii) Upon completion of excavation, the area disturbed shall be graded to slopes no steeper than 2:1.
  - (iv) Following sloping, the topsoil and any organic materials shall be re-spread over the disturbed area;
  - (v) Borrow areas no longer used shall be rehabilitated to permit rapid

revegetation and to prevent erosion and sedimentation. If necessary, hydroseeding shall be carried out as directed by the Resident Engineer using an approved seed mixture.

NS (vi) Borrow areas outside the road right-of-way require prior approval of the Mineral Lands Division, Dept. Of Natural Resources, and shall be located a minimum of 150m from any watercourse or designated wetland.

NS (vii) Borrow area rehabilitation must be completed once a site is not used for more than **6 months** or within **1 month** of abandonment. A site in use must have sediment control ponds and erosion protection measures in place if it remains in operation for more than 3 months.

(d) Information on the location and number of borrow pits will be made available after detailed design and construction planning are completed. Quarry access shall be permanently removed to prevent unauthorized usage unless site is used for maintenance purposes where the access shall be gated.

(e) Acid Bearing Rock

It is possible during the grading work that sulfide bearing rock may be encountered which is known to produce acid leachate through oxidation after new faces are exposed. DTW hired a geological consultant to examine areas of potential acid bearing rock prior to construction. No acid bearing rock was found during these surveys. The detailed contract drawings will be used to determine the road right of way in the field. If acid bearing rock is found within the road right of way during construction, consideration will be given to adjusting the road alignment. Where rock excavation is required in such areas the Contractor shall abide by the following:

(i) Excavating acid generating rock in grade cuts will first be attempted by digging and ripping. If these methods cannot remove the rock then blasting will be used.

(ii) Where blasting is carried out the amount of over break will be minimized and the blasted rock particle size will be maximized (e.g., through use of nitroglycerin rather than by an emulsion explosive, or using pre-shearing techniques.)

- (iii) Loose dig-able material exposed at subgrade will be removed, where practical, by excavators or small equipment to minimize the volume left in the subgrade.
- NS (iv) Excavation of the blasted material will be carried out within **three days** of blasting.
- (v) The material will be trucked to a predetermined disposal or interim storage site and placed as directed by the Resident Engineer and ESO.
- (vi) Where necessary sampling sites for acid generating rock will be identified and copies of sampling results included in the monthly environmental monitoring reports.
- (vi) Provisions for acid drainage will be identified and addressed in the field by the Resident Engineer and the ESO.

#### 2.18 Clean-up

The Contractor shall ensure that the accumulation of waste materials in areas it occupies and access to these areas is prevented. These areas shall be maintained in a neat, clean and safe condition as directed by the Resident Engineer/ESO.

On completion of any portion of the work, the Contractor shall promptly remove from the work area all equipment and surplus material to an approved storage area unless otherwise approved by the Resident Engineer.

Before the letter of Final Acceptance is issued the Contractor shall at their own expense and to the satisfaction of the Owner remove all equipment, unused materials and waste materials to ensure the site is left in a neat and clean condition. All borrow sites , USM disposal sites and sediment basins must be rehabilitated to the satisfaction of the Owner.

In the event of Contractor's failure to promptly comply with any of the foregoing, the same may be accomplished by the Owner at the Contractor's expense and the cost of the same may

be deducted from any money due or owing to the Contractor whether under this or any other contract.

2.19 Re-vegetation

Immediately following and during some construction activities, DTW may identify areas which require seeding/sodding or stabilization by a method to prevent erosion as directed by the Resident Engineer/ESO for rehabilitation purposes. Seeding and sodding work shall be carried out in accordance with the applicable sections of the DTW Specification Book. Seed mixtures shall consist of native species where possible and as approved by the Owner. Where directed by the Resident Engineer and ESO specific areas, such as at some stream crossings, may require special methods of stabilization involving the removal and relocation of clumps of the natural vegetation mat. At such locations the Contractor will be directed to set aside such clumps of vegetation during grubbing operations or at the start of the crossing installation. The owner will inspect all revegetated areas periodically to ensure that adequate results have been achieved. Additional revegetation work will be undertaken if the desired results are not achieved upon direction from the Resident Engineer.

2.20 Burning and Forest Fire Prevention

(a) The burning of brush and slash shall be permitted on this project, with the permission of the Regional Forestry Office and the Resident Engineer. **Such permission may be revoked at any time by the Forestry Officer or the Resident Engineer depending on the prevalence of dry hazardous conditions on site.** The use of rubber tires or waste oil or similar material to ignite slash or to maintain the burning operation is strictly prohibited.

(b) The Contractor shall take all precautions necessary to prevent fire hazards when working at the job-site and shall keep the job-site free of all flammable waste. Fires shall be located a minimum of **10m** from the existing tree line or adjacent piles of

slash, or as directed by a Forestry Officer.

- (c) The Contractor shall have available, in proper operating condition, sufficient fire fighting equipment, as recommended by the Dept. of Forest Resources & Agrifoods, to suit its location, labour force and construction plant. Such equipment shall comply with the standards of, and have approvals of, Underwriters Laboratories of Canada Limited and shall be maintained in accordance with National Fire Protection Association Codes.
- (d) The Contractor shall ensure that specific employees are assigned to and trained in the use of fire fighting equipment. A list of these personnel should be available on request by the Owner.
- (e) Due to the remoteness of some of the areas in which burning will be conducted the Contractor carrying out the burning operation shall have communication equipment such as a radio or mobile phone on hand which is capable of contacting the site base office immediately in the event of a fire or other emergency. The base office shall be equipped to contact the Forestry Division or other regional emergency personnel.

#### 2.21 Blasting Operations

All blasting activities shall be carried out in accordance with all applicable laws and regulations. Refer to DFO Factsheet #2 and “Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters” (Wright and Hopky, 1998). The Contractor shall submit a detailed blasting plan to the Resident Engineer. The Innu Nation will also be provided with 48 hour notice of any blasting activity.

NS The Contractor shall advise the Resident Engineer/ESO and the Area Habitat Coordinator of the Dept. of Fisheries and Oceans (phone 896-6151) of any anticipated blasting in the vicinity of watercourses or fish habitat and shall submit to DFO all necessary information regarding the work such as locations, methods, and related technical information as may be required for approval prior to commencing drilling and blasting operations. DFO is to be

notified a minimum of **5 working days** prior to the Contractor conducting such approved blasting activity. Ammonium nitrate based explosives must not be used in or near water due to the production of toxic by-products.

NS Where local residents are located within **1 km** of a blast site, the Contractor shall limit drilling and blasting activities to the hours between **8:00 am to 8:00 pm**. All local residents located within this area shall be given **48 hours** notice of any blasting activities.

NS The contractor shall control blasting operations to prevent fly rock from entering any watercourse, water body, or wetland, and from damaging any trees or surrounding vegetation. Any such damaging incidents shall be reported to the Resident Engineer and cleaned-up/rehabilitated within **48 hours**.

### **SECTION 3 - SPECIAL PROTECTION MEASURES FOR CONSTRUCTION**

#### 3.1 Bridge and Causeway Construction

Construction of a Bridge and Causeway across the Churchill River has the potential of causing some siltation within the water course. To mitigate this, DWST has consulted closely with DFO to determine the appropriate mitigative procedures to minimize environmental disturbance.

##### 3.1.1 Siltation Mitigation

To minimize siltation within the Churchill River during construction the contractor shall use the following mitigation:

- a) Blasted rock shall be used to construct the causeway.
- b) The contractor shall insure a minimal amount of silty material is released with this rock into the water.
- c) Construction shall be confined to one area of the crossing at a time.

#### 3.2 Watercourse Crossings

The contractor shall be aware that this area of the Churchill River is a migratory route for anadromous fish. The Churchill River sustains a run of Atlantic Salmon and based on



previous years information, the main runs of salmon migration occur between June 1 to July 30, the sea trout migration occurs around August 30. **There is a single stream crossing**

**scheduled for this project. A 2000mm culvert is assigned to this crossing (0+600). All other smaller culverts are for drainage; however, there is a possibility that these drainage culverts may be classed as actual stream crossings by the Resident Engineer, ESO, or DFO Area Habitat Biologist during construction. Due to the fact that drainage channels ultimately flow into streams, it is important that the following procedures are followed for drainage culverts as well as stream crossings. See table 2.**

### 3.2.1 General Instructions for Watercourse Crossings

The Contractor shall be aware that the work required in and around water crossings shall be performed with due care and caution so as to prevent pollution, sedimentation or any damage to the watercourses and downstream areas. All work associated with the installation of culverts or crossing structures throughout the project shall be undertaken to prevent any change(s) to the existing water quality. The Contractor shall carry out all work in and around watercourses in accordance with the environmental provision of the Tender Book and as shown on the contract plans. See Section 2.10. **The Contractor shall immediately notify the Resident Engineer, the ESO, and the Department of Fisheries and Oceans (896-6151) should any silt or sediment enter streams or any body of water.**

**The installation of all culverts including stream and drainage culverts shall be carried out in the dry by diverting or pumping water around the construction area.** Sedimentation basins shall be used to settle out sediment laden water where necessary or where so directed by the Resident Engineer/ESO. The sedimentation basins shall be constructed in accordance with the Tender Book, or instructions from the Resident Engineer. All work will be undertaken in accordance with the General Environmental Specifications of the DTW Specification Book, (Appendix B). The Contractor is also referred to the water quality standards set forth in the Environmental Control Water and Sewage Regulations, (Appendix B).

The Contractor shall note that fording watercourses or moving equipment through areas where significant surface drainage is encountered must be carried out in such a manner so as to prevent unnecessary disturbance of the channel bed or embankments or siltation of downstream areas as per the conditions outlined in WRMD's guidelines for fording.

Temporary culverts or temporary bridging are preferred at such locations where frequent fording would be required. For information concerning fording activities, the contractor is referred to conditions as outlined in DFO's Temporary Fording Sites, Factsheet No. 4 " dated 1994.

### 3.2.2 Buffer Zones

#### (a) Buffer Zones at Watercourse Crossings

##### (i) Permanent buffer zones

**Permanent buffer zones of undisturbed vegetation will be retained either side of the construction zone at designated watercourses up to the toe of fill.** (See Appendix B, Typical Buffer Zones). All work at water crossings including the construction of outlet pools shall be conducted in such a manner as to minimize or eliminate disturbance to remaining vegetation within the permanent buffer zone. On flat grades a minimum buffer zone width of **30 m (each side of the watercourse)** will be used; however, as grades increase the width of the buffer will be increased by using the following rule:

NS

**Width of Buffer Zone (m) will be 30m Plus  
1.5 Times Slope Gradient (%)**

*Or as specific site conditions dictate.*

(ii) Temporary Buffer Zones

NS **An ungrubbed temporary buffer zone of 30 m**, on each side of watercourses and wetlands (See Appendix B, Typical Buffer Zones), shall be maintained until such time that the crossing structure is ready for installation. The cutting and removal of trees and slash is not permitted in these buffer zones until such time as the Contractor is ready to install the crossing. Cutting, clearing, and grubbing out (if necessary) of the temporary buffer zones shall take place at the time of the permanent culvert installation, and shall be carried out with due care so as to prevent soils or silt from entering the watercourse. The Contractor is also referred to Section 2.14 (Clearing), and Section 2.15 (Grubbing).

The following locations have been identified for temporary and permanent buffer zones at stream crossing locations along the route:

TABLE 2  
STREAM CROSSINGS REQUIRING BUFFER ZONES

Crossing	Station	Pipe Size(mm)	Type	Length(m)	Habitat Type	Stream Width
01	0+600	2000	CSP	24		

**The temporary and permanent buffer zones at these stream crossing locations shall be clearly flagged with blue flagging tape in the field by DTW and the Contractor notified prior to the Contractor's operations proceeding into these areas.**

(b) Buffer Zones Between Road & Adjacent Water bodies

A permanent buffer zone of undisturbed vegetation shall be maintained between the highway cutting limits and the edge of adjacent water bodies wherever possible. In areas

NS where the side slope is greater than **30%** the buffer shall be **20m plus (1.5 X slope in %)** or as determined by specific site conditions. Where it is not possible to achieve this buffer, such as when the soil is highly erodible as in sandy conditions, efforts will be made to reduce clearing limits to maximize the buffer.

### 3.2.3 Scheduling of Work at Watercourse Crossings

Watercourses within the project area sustain various fish populations. In view of the sensitivity of the watercourses noted herein, the scheduling of construction activity at stream crossings will be generally restricted to the least sensitive period, i.e. work associated with watercourse crossings will be permitted from **June 30 to September 1**. Any deviation from this scheduled period for conducting the work will require the Contractor obtaining prior approval in writing from Fisheries and Oceans Canada.

### 3.2.4 Watercourse Crossings-General Installation Procedures

The Contractor shall adhere to the following general procedures for the installation of all pipes and watercourse crossings:

- NS (a) The Contractor shall apply for written authorization from the Department of Fisheries and Oceans to undertake work in and around the watercourse crossings listed in Table 2 no later than **14 days prior to scheduled construction**.
- NS (b) The Contractor shall present to the Owner for approval, a plan for the construction of cofferdams, diversion systems, and other associated works, no later than **3 days prior to scheduled construction**.
- (c) A pre-construction meeting shall be convened on site between the Contractor and the Owner to review the EPP and the associated contract details pertaining to the structures and culverts to be installed at watercourses.
- NS (d) Give DTW a minimum of **3 working days** notice prior to any in stream or near stream excavation so the Resident Engineer/ESO can consult with regulatory authorities as may be necessary.
- (e) Ensure that there is no unnecessary disturbance of stream side vegetation or destabilization of embankments.

- (f) Clearing and excavation limits shall be clearly shown in the field by flagging with blue ribbon for buffer zones and red ribbon for clearing limits.
- (g) Prior to diverting the stream flow into the diversion system, or discharging pumped water, the outlet area shall be stabilized to prevent erosion.
- (h) Prior to any work commencing at the watercourse crossing, the work areas shall be made dry by diverting all water, using cofferdams constructed of sand bags and sheet plastic, or other acceptable method using non-erodible materials, and unwatering the area in addition to other measures which may be necessary. Construct cofferdams with sufficient free board and have sufficient pumping equipment on site to protect the work area and to accommodate peak flows during unwatering operations. Diversion of the watercourse may include such methods as the construction of a plastic lined diversion channel or pumping.
- (i) Ensure that fish are not left stranded out of water in the stream channel work area. Ensure that any fish in the work area are returned to the watercourse unharmed as directed by the Department of Fisheries and Oceans.
- (j) Work should be carried out from the downstream section of the work area and progress to the upstream section.
- (k) Flow diversion methods shall be constructed as approved by the Resident Engineer/ESO to accommodate anticipated rain storm events and in such a manner as to maintain standard water quality objectives.
- (l) Unwatering of the work area for the watercourse crossings shall be carried out as required by the Resident Engineer/ESO. Any silted water from the unwatering operation shall be pumped to areas approved by the Resident Engineer/ESO, such as vegetated areas for ground absorption, or otherwise to sedimentation basins.
- (m) An impermeable cofferdam of non-erodible material, such as sandbags and sheet plastic, shall be constructed at the outlet area of the construction zone to prevent any silted water from entering downstream areas and to assist in unwatering operations.
- (n) The location, size, construction, and operation of sedimentation basins shall be carried out so as to achieve adequate settling parameters within the basins and

ensure that discharged water from the basins, which is entering any watercourse,

meets the water quality standards set forth in the Environmental Control Water and Sewage Regulations, (Appendix A, Section 815 ).

- (o) Operation of the sedimentation basins shall be continuously monitored and cleaned out by the Contractor.
- (p) Any excavated material shall be removed from the site and shall be stockpiled away from the watercourse.
- (q) Excavation shall be carried out to the limits marked (red ribbon) in the field by the Owner. All excavations shall be carried out using a tracked excavator which will operate between the limits of the work area or as directed by the Resident Engineer.
- (r) Outlet pools shall be constructed when required by DFO and/or the owner. These pools shall be excavated and stabilized with hydraulic rip-rap as directed by the Resident Engineer.
- (s) At the inlet area of the pipe, impervious material shall be placed under the invert of the pipe and around the haunches of the pipe so as to ensure that all flow is confined to within the pipe, particularly during low flow conditions, and not lost into the porous fill zones outside the pipe.
- (t) All sections of newly constructed channel shall be adequately stabilized so as to prevent destabilization, erosion, or scouring of the channel.
- (u) Inlet and outlet head walls and wing walls shall be constructed of stable non-erodible material such as concrete, fitted rock, rip-rap, or armor rock.
- (v) All disturbed areas adjacent to watercourses shall be rehabilitated and stabilized by such means as sodding or seeding, or as directed by the Resident Engineer within **48 hours** of the crossing being installed.
- (w) All construction related waste materials shall be removed from the work site(s). Sedimentation basins shall be pumped dry and backfilled with the original excavated material and compacted. Hand seeding, hydroseeding, and /or sodding of disturbed areas shall be carried out as directed by the Resident Engineer/ESO.

- (x) Where possible, drainage culverts should be installed as the road construction work progresses up to these locations. However, in areas where intermittent drainage courses or insignificant flow is present during times of low flow conditions, as often may be encountered at locations where small pipes are to be installed (500 mm to 1200 mm diameter CSP=s), and where road construction is progressing, the placement of grading material must not bar off natural surface drainage but permit movement of water through these areas. This can be accomplished with the placement of clean coarse blasted rock until such time as the permanent pipe

NS

installation takes place. **No more than 2 kilometers of road should be constructed at any time before all required permanent pipes are installed.**

- (y) The Contractor is referred to the conditions as outlined in DFO=s ACulvert Installations, Factsheet No. 26" dated 1999.
- (z) The Contractor shall comply with the terms and conditions of the permit(s) issued by the Department of Environment and Conservation, Water Resources Management Division.

### 3.3 Off Right-of-Way Travel

The Contractor will limit equipment travel to the surveyed right-of-way. To obtain approval for additional or new travel routes, the Contractor shall notify the Owner a minimum of **5 working days** in advance of such requirements and not commence work until written approval is given by the Owner. Areas disturbed outside of the right-of-way without the approval of the Owner shall be rehabilitated at the Contractors expense and as directed by the Resident Engineer.

### 3.4 Sensitive Areas

The right-of-way (ROW) of the road passes through sensitive habitats of many species of fish and wildlife. Waterfowl, raptors, caribou, furbearers, and fish are present throughout the environment of Labrador. Some points of concern are:

- i) Harassment of wildlife by project personnel will be prohibited
- ii) Fuel and other hazardous material spill contingency plans and emergency response measures will be in place and implemented in the case of an accident.
- iii) Construction vehicles will remain in the ROW and all-terrain vehicles will use designated routes.
- iv) Vegetation removal will be restricted to 30 m in the ROW, with removal of forest vegetation in areas where active nests are identified occurring outside of the nesting period in sensitive areas.
- v) Blasting activities will be coordinated to avoid sensitive areas such as incubation and early brood rearing areas.
- vi) All construction personnel will be required to follow all applicable legislation for hunting and using and storing firearms.
- vii) Instream activity will be reduced or avoided.
- viii) Walls of decommissioned borrow pits will be graded to slopes less than 2:1
- ix) Vehicles will be operated at appropriate speeds and yield to wildlife.

#### 3.4.1 Equipment Operation and Erosion

The potential for erosion as a result of vehicle activity has been identified in all OM (overburden material) cut areas, and USM (unsuitable material) which is to be excavated. Special instructions are provided in section 3.5 of this EPP. Vehicular activity will be minimized and restricted to one track within the right-of-way unless otherwise approved or directed by the Owner. Vehicular activity in these areas shall conform to good construction practices.

Vehicles transported to Labrador for construction work should be steam cleaned prior to transport to reduce the risk of introducing new or invasive species to the area.

#### 3.4.2 Wetlands/Bogs



Bogs are considered sensitive terrain because of their high disturbance potential. They will be marked with **blue flagging tape**. Travel by machinery across bogs shall be strictly

prohibited where soft wet bog conditions exist or where frequent travel is required. Bog excavation shall conform to good construction practices and be carried out in accordance with Sections 2.15 and 2.16 and applicable sections of the Specification Book. The Contractor will ensure that bog or wetland areas are not disturbed except for those sections of the right-of-way designated for excavation.

The contractor shall report all observations of wetland wildlife activity including sightings of beaver and muskrat lodges.

#### 3.4.3 Protection of Rare Plant Species

The number of uncommon and rare species found during the surveys and the frequency with which they were encountered is high in comparison to rare plant surveys conducted in other locations in Atlantic Canada. All but two of the sites surveyed supported populations of uncommon or rare vascular plant species based on Labrador rankings for these species in the ACCDC database. Of the 27 rare or uncommon species identified 16 were found at more than one site.

#### 3.4.4 Protection of Waterfowl and Raptors

The Canadian Wildlife Service and the Wildlife Division of the Department of Environment and Conservation have requested that DTW cooperate with them in ensuring that any areas adjacent to the road where waterfowl or Raptors (birds of prey such as eagles, ospreys, owls, etc.) may be present or nesting not be disturbed. No nests were found within the Right-Of-Way of this project. A ground nesting species of owl known as the short eared owl which is listed as Vulnerable by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) may be present in areas along the route. Further information regarding the identification of such species and required protection measures for any nesting sites will be provided to the Contractor and subcontractors during the Environmental Awareness Session. All of the Contractor's and subcontractors'

personnel are required to abide by all protective regulations concerning waterfowl and Raptors.

#### 3.4.5 Land Sensitivity - General Guidelines for Contractors

- (i) Drainage is to be maintained in its natural state wherever possible, with provision being made for spring flooding. Where existing drainage patterns cannot be maintained, alternate drainage will be installed to approximate normal conditions with the approval of the Resident Engineer/ESO.
- (ii) No use of machinery of any type is to be permitted outside the clearing limits of the road right-of-way. No equipment shall operate off the cleared ROW or public roads without the permission of the Resident Engineer.
- (iii) No unnecessary cutting of trees is to be conducted.
- (iv) The Contractor shall avoid the practice of using living trees as survey marks and shall not cut blazes or otherwise mark live trees except with removable surveyor's tape and/or tags.
- (v) Where cutting is necessitated, the Contractor shall stockpile and remove all merchantable timber. Other wood waste and slash remaining near the uncut zone may be disposed of by burning. See Section 2.14 (Clearing) and Section 2.20 (Burning and Forest Fire Prevention).
- (vi) The Contractor shall remove all evidence of surveying activity not essential to the continuing maintenance of the corridor following construction. This applies to survey markers and flags which are used prior to construction and subsequent surveying activity which may be necessary during the course of construction.

#### 3.5 Sanitary Facilities

The Contractor shall install and maintain sanitary systems on the work site which are approved by the Department of Government Services (GS). They shall be used by all construction workers. The Contractor shall arrange for the maintenance of these units, the disposal of waste, and final dismantling and removal as approved by GS.

#### 3.6 Erosion and Silt Control

The Contractor shall minimize terrain disturbance and erosion resulting from its activities. The Contractor shall, as part of its work, implement erosion and silt control measures

where its activities result in a blockage of natural drainage, the diversion of natural drainage, or the exposure of soil or subsoil to potential erosion. Particular measures may include:

- (i) isolation of disturbed areas through the use of filter fabrics, fencing, or some other equivalent method directed towards prevention and/or control of runoff associated with a disturbed area before it enters a watercourse.
- (ii) using an appropriate hydraulic mulch;
- (iii) spreading hay over exposed soils;
- (iv) spreading a thin layer of brush or slash over disturbed areas;
- (v) the installation of baffles or sediment traps at appropriate intervals within the area of disturbance;
- (vi) the installation of drainage collectors across the disturbed area to channel drainage into vegetated areas;
- (vii) the re-routing of disturbed drainage courses back into the natural course;
- (viii) the stabilization of exposed soils at drainage locations with appropriate rip-rap;
- NS (ix) where so directed by the Resident Engineer/ESO, hay or straw bales shall be used to construct check dams to confine mud or slurry at such locations as unsodded ditch lines, catch-basins and culvert inlets. The bales shall be dug into the earth approximately **10cm** and shall be anchored in place by means of wooden stakes or other acceptable means. Where bales are placed perpendicular to a ditch line flow, they shall extend far enough up either side so the bottoms of the end bales are higher than the top of the lowest center bale. The Contractor shall clean sediment out from around the check dams as required or at the discretion of the Resident Engineer/ESO. The bales and stakes shall be removed and disposed of, off the site, once the permanent cover is established.
- (x) The pumping of silted water to settling or designated vegetated areas;
- (xi) The installation of mud basins of adequate size at run-off locations from exposed areas to contain heavy silt and mud as directed by the Resident Engineer/ESO.

- (xii) All mitigation measures shall be inspected on a daily basis and repaired as needed to ensure that they function properly.
- (xiii) The use of extended weather forecasts to ensure that environmental protection measures are designed to withstand storm events.

### 3.7 Clearing and Timber Salvage

- (a) The clearing width will vary according to the extent of cuts and fills. Safety considerations will be balanced with the conservation of trees in determining the actual clearing limits. Limits will be marked with red ribbon and all cutting shall be restricted to areas within these limits.
- NS (b) Clearing for the corridor shall consist of the cutting of only those trees or areas delineated in the field by the Owner. All merchantable timber as defined by the Forestry Division (9 cm (3.5 inches) outside bark diameter at breast height) shall be salvaged and removed from the site. Timber that is temporarily stored within the Right of Way shall be stockpiled outside the fill limits. All portions of the tree must be harvested up to a 5 cm (2.5 inch) top diameter with stump height not exceeding 16 cm (6 inches). Merchantable timber shall be the property of the Contractor.
- NS (c) All material shall be cut to within **150mm** of the surface of the ground. All trees and brush shall be cut into lengths to ensure neat piling can be accomplished.
- NS (d) Slash shall be piled so that it will not damage vegetation outside the right-of-way. A **6.5m** break in slash piles will be made at least every **200m** (to allow for lateral drainage and animal access). Slash piles may be placed on alternating sides of the right-of-way.
- (e) Slash and other construction material or debris shall not be permitted within 30m of any water body or to enter any watercourse, water body or wetland and shall be piled such that seasonal flood waters cannot reach them.
- NS (f) At designated watercourses, the cleared right-of-way shall be reduced to a length to be determined in the field by the Owner. Restrictions on activity within these buffer zones are detailed in Special Protection Measures Section 3.1.

- (g) Trees outside the indicated clearing widths within a tree length and a half from the proposed highway and which are so designated and flagged (red and blue ribbon) by the Owner, shall be removed.