


**A REPORT TO  
THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES**

	Electrical
	Mechanical
	Civil
	Protection & Control
	Transmission & Distribution
	Telecontrol
	System Planning

## UPGRADE ACCESS ROAD

### At the Bay d'Espoir Hydroelectric Generating Station

August 2009

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## **1 INTRODUCTION**

Newfoundland and Labrador Hydro’s (Hydro) largest hydroelectric generating station on the Island Interconnected System is located at Bay d’Espoir. The Bay d’Espoir Hydroelectric Generating Station consists of seven generating units producing a total capacity of 604 MW, which is approximately 39 percent of the Island Interconnected System’s installed capacity. Stage 1 of the Bay d’Espoir hydroelectric development included the construction of the first three generating units, each rated at 75 MW. The construction started in the spring of 1965.

During the construction of Stage 1, a 3.5 kilometer gravel road was built to provide the main access to the Bay d’Espoir powerhouse. The road was paved in 1977 and has deteriorated since that time.

## **2 PROJECT DESCRIPTION**

This project is required to upgrade the 3.5 kilometers access road from the town of St. Veronica’s to the security gate at the Bay d’Espoir Hydroelectric Generating Station. A map of the area is attached as Appendix A. The work involves brush removal, roadside ditching, removal of existing asphalt, removal and replacement of 20 culverts, sub-grade repairs to the road bed, placement of new Class “A” road gravel and repaving. The work will be performed through external contract.

### **3 EXISTING SYSTEM**

The road has been in service for over 40 years and paved for over 30 years. There are numerous holes, depressions, bumps and frost heaves that make driving it extremely dangerous and difficult. The entire equipment maintenance fleet for Hydro Generation resides at the Bay d'Espoir facility. Hydro vehicles and equipment travel daily over this road to access other Hydro plants as well as other Bay d'Espoir assets in the area. Also, Hydro's approximately 90 Bay d'Espoir personnel drive their personal vehicles over this road every day to access the work site. While title rests with the Government of Newfoundland and Labrador (the province) Hydro built and paved the road. Hydro has requested that the province upgrade this road, but these requests have been denied. See Appendix B.

The road is in a deteriorated condition due to structural failure caused by trapped water within the road structure, beneath the asphalt. The photos below illustrate some of the damage caused to the road.



**Figure 1: Road Structural Failure due to Trapped Water**

Figure 1 shows extensive cracking of the pavement and holes in the asphalt topping. This has resulted from the trapped water underneath the road. Alternate freezing and thawing of the water wreak havoc on the road. Before any road repairs are carried out, some roadside clearing, ditching and culvert installations are also necessary in order to manage storm water and ground water. Good drainage must first be provided.



**Figure 2: Road Damage Caused by a Collapsed Cross-Culvert**

Figure 2 shows the results of a collapsed culvert. The culvert has weakened and deteriorated over time disabling it from being able to control water as it was originally designed. Figure 2 also illustrates erosion at the shoulder of the roadway where the culvert exits. Also, there is deep structural failure of the traveled lane.





**Figure 3: Erosion of the Shoulder of the Road**

Figure 3 illustrates erosion caused mainly by uncontrolled water run-off. Water gathers on the road because of poor ditching and collapsed or plugged culverts.

As this project is required to upgrade an existing access road, the following are not applicable to this project:

- Outage Statistics;
- Industry Experience;
- Maintenance or Support Arrangements
- Vendor Recommendations;
- Availability of Replacement Parts;
- Environmental Performance; and
- Operating Regime.

### **3.1 Age of Equipment or System**

The road was built in the mid 60’s and was paved in 1977.

### **3.2 Major Work and/or Upgrades**

There have been no major upgrades since construction and paving of the access road.

### **3.3 Anticipated Useful life**

This road has well surpassed its useful life of twenty years.

### **3.4 Maintenance History**

Maintenance, including snow clearing, was performed by the Department of Transportation and Works. There are no readily available maintenance records.

### **3.5 Safety Performance**

There are places on the road where there is no shoulder for pulling over and people often travel on the wrong side of the road to avoid hazards. Culverts have heaved so much in some places that driving over them at normal speeds could cause vehicles to become airborne. This road has been designed for a maximum speed of 50 km/hour, but is now only safely drivable at a speed of 30 km/hour. The vegetation on the sides of the road is quite heavy in areas. This raises safety concerns about moose and other wildlife running on to the road without notice.

Hydro Generation's Emergency Response Plan is structured around rapid response. This existing road is not in a suitable condition to quickly transport sick and/or injured people or to quickly mobilize emergency response equipment and materials. In addition, when the local fire department has to respond to the site, the fully loaded pumper truck would be at risk traveling



the road in its current condition and would not be able to respond as quickly as it should. This exposes the province's largest hydroelectric plant to unnecessary risk. For instance, in 2000 there was a fuel spill on site and in 2007 there was a grass fire to which emergency vehicles had to respond. There have also been times when ambulances had to travel in over the access road to reach personnel in need of medical attention. The state of the road delays these emergency vehicles from reaching the scene of the accident in a reasonably short amount of time.

## **4 JUSTIFICATION**

The main access road to the Bay d'Espoir Powerhouse was constructed during Stage 1 of the Hydroelectric Development in the mid 1960's. The asphalt surfacing is 30 years old and has exceeded its useful life of twenty years. The road condition provides unnecessary wear and tear on both company and personal vehicles using the road. There have been numerous complaints from the staff over the years about its condition.

This road is the main access road to the province's largest Island Interconnected Hydroelectric Generating Plant. In addition, this facility is the center for maintenance for all hydro generating plants and is used every day by approximately 90 Hydro employees as well as the general public. There are also up to 150 tourists that visit the plant annually. This road needs to be re-built to the provincial roadway Rural Lane Undivided 50 km (RLU50) standard which appears to be the original design. The road is not in compliance with the standard now because this standard means a speed of 50 km/h while the average driving speed now is 30 km/h.

### **4.1 *Net Present Value***

A Net Present Value calculation has not been performed for this project as only one viable alternative exists.

### **4.2 *Levelized Cost of Energy***

As no new generation source is considered, this project has no effect on the levelized cost of electricity.

#### **4.3 Cost Benefit Analysis**

A cost benefit analysis is not required for this project proposal as there are no quantifiable financial benefits.

#### **4.4 Legislative or Regulatory Requirements**

There are no legislative or regulatory requirements associated with this project.

#### **4.5 Historical Information**

There is no historical information related to this project.

#### **4.6 Forecast Customer Growth**

Customer load growth does not affect this project.

#### **4.7 Energy Efficiency Benefits**

There are no energy efficiency benefits that can be attributed to this project.

#### **4.8 Losses during Construction**

There will be no power outages required for this project.

#### **4.9 Status Quo**

The consequence of not completing this project is the continued dangerous driving conditions and wear and tear on both personal and company vehicles.

#### **4.10 Alternatives**

There is only one viable alternative and that is to complete the necessary upgrades.

Patching the road is not an option because the sub-grade would have to be fixed to provide proper control of storm and ground water before any new asphalt was placed which would prevent future frost heave of the asphalt.

## 5 CONCLUSION

The access road needs to be upgraded to provide safe and minimum wear and tear driving for employees and the general public when accessing the Bay d’Espoir Hydroelectric Generating Plant.

### 5.1 Budget Estimate

**Table 1: Budget Estimate**

<b><i>Project Cost: (\$ x1,000)</i></b>	<b><u>2010</u></b>
Material Supply	0.0
Labour	165.0
Consultant	0.0
Contract Work	1,100.0
Other Direct Costs	20
O/H, AFUDC & Escln.	130.7
Contingency	134.3
<b>TOTAL</b>	<b>1,550.0</b>

### 5.2 Project Schedule

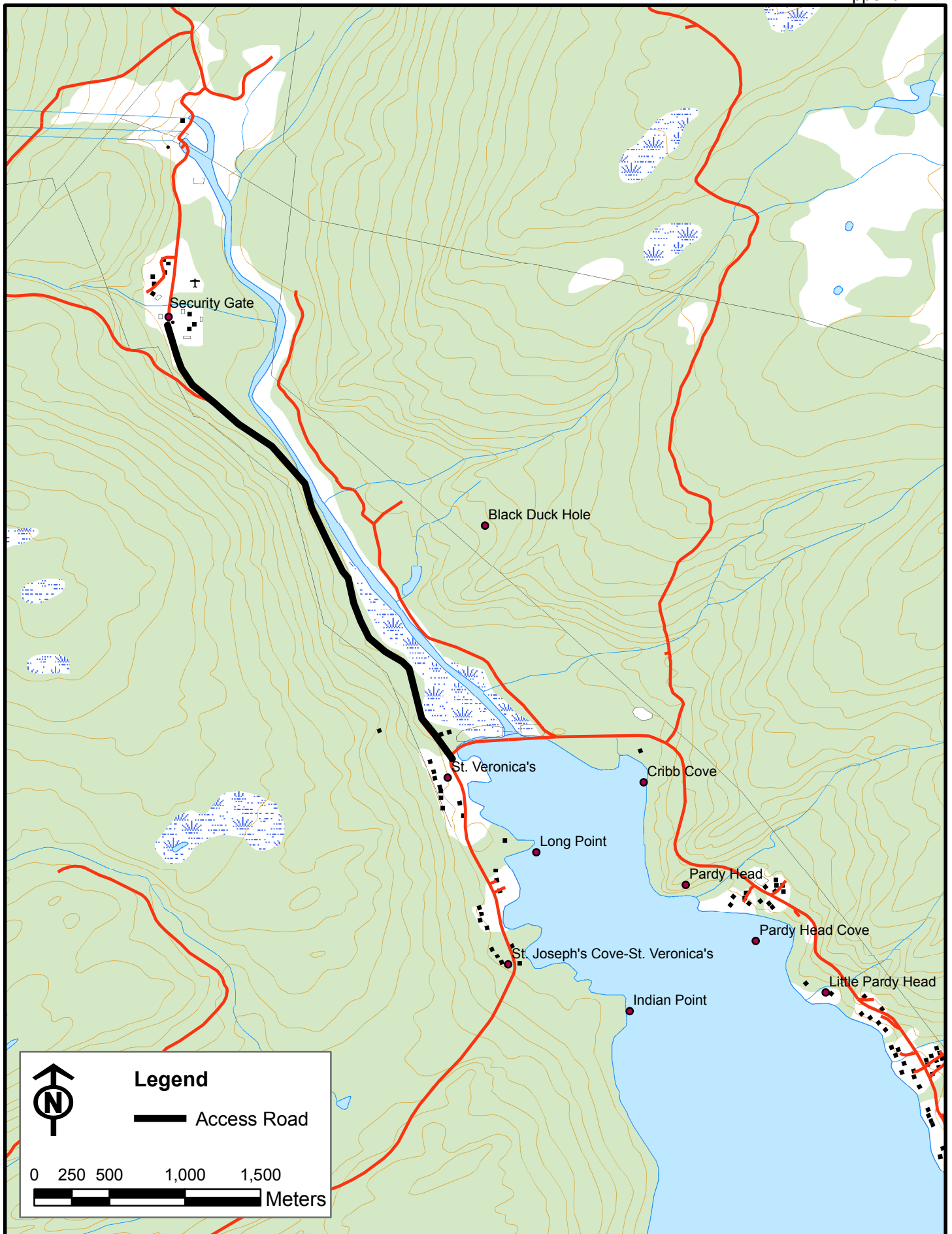
**Table 2: Budget Schedule**

<b>Activity</b>	<b>Milestone</b>
Design	April – May 2010
Tender	June 2010
Award Tender	July 2010
Contract	August – September 2010
Project Closed	October 2010

## ***APPENDIX A***

### ***Map of Bay d-Espoir Powerhouse Area***





## ***APPENDIX B***

### ***Government of Newfoundland and Labrador Letter***



Government of Newfoundland and Labrador  
Department of Transportation and Works  
Office of the Assistant Deputy Minister

RECEIVED

APR 30 2009

Mr. James R. Haynes, Vice President  
Newfoundland and Labrador Hydro  
Regulated Operations  
P.O. Box 12400  
St. John's, NL  
A1B 4K7

Dear Mr. Haynes:

**RE: Road to Bay D'Espoir Hydroelectric Generating Station and Holyrood Thermal Generating Station**

I write in response to your letter of April 8, 2009, and as a follow up to correspondence from my predecessor, regarding the upgrading of the roads leading to the Bay D'Espoir and Holyrood stations.

As noted in Mr. Mercer's response of last year, projects identified for consideration for funding in our Provincial Roads Improvement Program are considered based on their own merits. The roads identified above function solely as access to Hydro facilities. Given the demand on provincial funds to upgrade and rehabilitate trunk roads and bridges, as well as, local roads servicing communities, we are unable to place a high priority on the upgrading of the roads to these facilities.

I realize that we have been asked on many occasions to upgrade the road at Bay D'Espoir in particular; however, it would be very difficult for the Province to commit funding for the upgrading of this road when sections of Route 360 and others in the immediate area are in need of substantial upgrading.

I must advise that the Province will not be committing funding for upgrading of either of these roads this year.

We will provide approval, should Hydro decide to proceed with upgrading on its own.

Regards,

A handwritten signature in blue ink, appearing to read "Gary Gosse".

**GARY GOSSE P.ENG.**

*Assistant Deputy Minister – Transportation*

/dmh

- c. Mr. Wayne Ricks, P.Eng. – Regional Director  
Mr. Don Brennan, P.Eng. – Regional Director