



**Andrew Gamble & Associates**  
**14 Mitchell Drive, Yellowknife, NT, Canada X1A 2H5**

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Ms. Kimberley Cliffe-Phillips  
Environmental assessment Officer  
Mackenzie Valley Environmental Impact Review Board  
Yellowknife, NT

October 4, 2004

Dear Ms. Cliffe-Phillips;

**Deh Cho Bridge – Pre-Hearing Conference**

Attached, for distribution and discussion at the Pre-Hearing Conference, are DCBC responses on the Technical Reports submitted by Environment Canada and INAC.

Albert Lafferty, Jivko Jivkov and I will attend the pre-hearing.

We would hope to resolve most of the issues raised.

Yours truly,

Andrew Gamble

attachments

- c Mr. Greg Cousineau, GNWT Transportation
- Mr. Albert J. Lafferty, DCBC
- Mr. Jivko Jivkov, Jivko Engineering

# Deh Cho Bridge Corporation

## Response to Environment Canada Technical Report – Deh Cho Bridge Project

### General

Environment Canada makes six recommendations in its Technical report.

The Deh Cho Bridge Corporation (DCBC) has no issue with the five recommendations respecting migratory birds (3 recommendations), water quality and cumulative effects.

On Species at Risk, Environment Canada recommends:

*The proponent should examine the potential effects of the project on species listed as “sensitive” or “may be at risk” under the “general status ranks of wild species in the NWT”.*

The *NWT Species 2000 – General Status Ranks of Wild Species in the NWT* lists large numbers of species, including over 40 species of birds, as “sensitive” or “may be at risk”. DCBC would like to have more information from Environment Canada on the scope and detail of the examination they would recommend.

**Response to INAC**

**Technical Report – Deh Cho Bridge Project**

Indian and Northern Affairs Canada (INAC) Technical Report makes four recommendations and asks two additional questions. The issues are also noted in INAC's Pre-Hearing Conference Worksheet.

**DCBC Response to Recommendations**

**1. *Adequacy of Geotechnical Information***

INAC recommends *a more detailed geotechnical investigation and analysis prior to finalizing the pier construction plans and the commencement of pier construction, especially at pier sites #6 and #8.*

INAC further asserts that *there is inadequate information and additional drilling analysis is required to finalize the final pier foundation design, and that this could have impact on the bridges design, scheduling, site footprint and the final cost.*

The bridge designer, J.R. Spronken, is responsible for the design and the adequacy of the information required. Mr. Spronken is a competent licensed professional of unquestioned experience and expertise. The geotechnical report was prepared by EBA, a competent, licensed firm.

Previous testing has shown the soils to consist of a stiff glacial till. A program was established to confirm soils conditions at the centre of each of the proposed 8 piers and two abutments. Boreholes were taken in the spring and fall of 2003. Ice conditions (thin ice) prevented drilling at pier #6, while the hole for pier #8 was offset about 30m from centre.

The soils investigations confirm that the soil underlying the river is a stiff glacial till, with some sand layers. Both EBA and Spronken are confident that this represents the range of conditions expected – there is virtually no likelihood of rock, ice, organic or disturbed (soft) silt or clay, for example. (see attached letter from EBA).

The current foundation design is suitable for the range of conditions found and anticipated. In other words, it does not matter whether the soil at sites #6 and #8 are clay till or clay till with sand layers. While additional boreholes may satisfy our curiosity, they will not change the foundation design, scheduling, site footprint or final cost.

It is therefore our view that there is adequate information and additional drilling analysis is not required to finalize the final pier foundation design.

## **2. Project Lands**

DCBC is applying only for approval for those activities described in the project description and DAR. We recognize that any other facilities or purposes would require separate approvals.

As noted in the DAR and IR responses, the development of Toll Facilities by the GNWT may or may not require permits.

INAC notes that:

*This land administration issue can be dealt with outside the EA process and may delay further processing of the project.*

DCBC does not understand why or how this would delay further processing of the project and would ask for clarification of this point.

## **3. Waste Disposal**

The removal and disposal of waste is required for restoration of the existing causeways and ferry landings. Material from the North causeway is to be properly disposed of on Commissioner's Lands on the north side of the river. Material from the south landing, including granular material and concrete is to be properly disposed of on federal Crown lands on the south side of the river, in the borrow pit created for bridge construction.

INAC suggests disposing of this material on Commissioner's land.

We were not aware of any environmental or regulatory distinction between federal and territorial land, or any blanket prohibition on waste disposal on crown lands. However, DCBC is prepared to consider alternative disposal sites.

## **4. Fuel Spill Containment**

INAC states that it *"has concerns with the proposed design of the fuel spill containment system and the fact that this particular design has not been proven on other bridges in North America, or used in a Northern environment."*

INAC further recommends *"that the fuel spill contingency design be approved by the GNWT Peer Review Team and if approved, the containment ditch design must include an impermeable liner or other containment method, and snow ice removal must occur on a regular basis to prevent fuel overtopping the ditches"*.

INAC requests *"an engineered and approved design spill containment system for the Deh Cho Bridge structure which is fully functional..."*

To our knowledge, no bridges in the NWT or North America incorporate spill containment in their design. Bridges of this length typically include deck drains that direct rain and melt water (along with any spilled liquids or deicing chemicals) directly into the river.

To our knowledge, there are no codes, regulations or standards for incorporating spill containment on bridges.

To our knowledge, there are no designs *proven on other bridges*. The 'standard' is to drain directly into the river.

## Deh Cho Bridge Corporation

Throughout the NWT and other jurisdictions, rain and melt water from highways, along with any 'spills' are directed into drainage ditches that find their way into adjacent natural drainage courses. The necessity of shedding water and inability to segregate water from other liquids makes spill 'containment' impractical. These ditches are neither lined nor kept free of snow and water.

It is our observation that in highway fuel spills, snow helps to 'blot' and slow the dispersion of fuel. Cleanup generally includes removal of contaminated snow and/or soil.

In the case of the Deh Cho Bridge, we are proposing design modifications that eliminate deck drains. This is only possible because of the relatively low frequency and intensity of rainfall in the region and the narrow deck width. This modification would not be feasible on a wider bridge or in a wetter region.

This modification will direct water and any spilled fuel to either end of the bridge and into holding ditches, rather than directly into the river. This provides an opportunity to clean up the spill.

DCBC does not have concerns about loss of soil stability due to lubrication by spilled fuel. Nor does DCBC see any advantage to lining or cleaning snow from these ditches.

The current proposal by the DCBC exceeds current design standards and practices.

This requirement for a fully functional spill containment system exists nowhere else in the world. It is neither feasible nor reasonable.

### **Additional INAC Information Requests**

#### **1. Ice Formation on Bridge Deck**

Yes. As noted in DAR Section C.5 the bridge deck would be inspected daily. DCBC is also examining automated monitoring systems that would warn of conditions (e.g. a combination of air temperature, humidity and deck temperature) that could result in icing.

#### **2. De-Icing Methods**

See DAR Section C.5 (Routine Maintenance):

*The bridge deck will require snow removal and the use of sand or fine gravel when icing is present. The deck would be cleaned and broomed in the spring to remove accumulated sand and other debris. There are no plans to use chemical de-icers or cleaning agents, as these may accelerate bridge deterioration as well as raising environmental concerns.*

*Some of the sand or gravel for ice control and materials tracked onto the bridge, as well as any fluids deposited by vehicles may be washed by rain or melt water into the river or blown in the air. However, the quantities should be small and less than the amount currently deposited from the ferry and ice bridge.*

**Attachment:** Letter EBA Engineering, October 1, 2004 (2 pages)

# ***EBA Engineering Consultants Ltd.***

Creating and Delivering Better Solutions

October 1, 2004

EBA File: 1700063

VIA FAX: (867) 873-6090 (2 Pages)

Jivkov Engineering  
5610 – 50A Avenue  
Yellowknife, NT X1A 1G3

Attention: Mr. Jivko Jivkov, P.Eng.  
Principal

**Subject: Borehole Coverage for Proposed Deh Cho Bridge Foundation**

As requested, this letter presents EBA Engineering Consultants Ltd.'s (EBA's ) comments with respect to the quantity and adequacy of geotechnical information collected to-date for the project.

Boreholes have been drilled at each abutment location and at or near seven of eight proposed piers. For the most part, very stiff to hard clay till was encountered. This is similar to what was encountered in nearby holes drilled in the 1960's, and was therefore expected.

A zone of granular soil (gravel and sand) within the otherwise predominantly clay till was encountered near the south side of the river. This differed from previous observations. While somewhat unexpected, this occurrence is consistent with a clay till deposit, which is naturally heterogeneous. EBA has interpreted the granular soil to be very dense, based on our investigation. The bridge designer changed the foundation concept from caissons to footings, to account for the conditions encountered.

What was not found during this or previous site investigations in the area were soft soil or bedrock. These are not anticipated to be a factor in foundation design and construction at this site. Glacial till has been compressed by glaciers, giving it it's very stiff to hard consistency. If soft soil were to occur, it would be as a result of weathering or subsequent deposition at the surface. The erosive forces of the river ensure that soft soil will not remain at the site. The bedrock in the area of the proposed bridge is sedimentary and relatively flat-lying. Its surface should not undulate unexpectedly, as Canadian Shield rocks do. Therefore, shallow bedrock is not anticipated at the pier locations that have not been drilled.

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It is understood that a foundation design and construction approach has been developed to accommodate the range of conditions encountered, including the clay till and granular zone that has been encountered below a portion of the site. This approach will be employed throughout the project, so could accommodate further occurrences of granular soil. The construction approach involves drilling pilot holes for each sheet-pile in the cofferdams. Therefore, there will be an opportunity to confirm subsurface conditions at each location at the outset of foundation construction and adjust the construction methodology for individual footings as warranted.

For the reasons given above, it is EBA's opinion that the available information adequately characterizes the range of geotechnical conditions of the site. It should be recognized, however, that the judgment, with respect to the adequacy of this information for the purposes of foundation design and construction, is ultimately up to the bridge designer to make and be comfortable with.

We trust that this information will satisfy your present requirements. Please contact the undersigned if you have questions, or if additional information is required.

Yours truly,  
EBA ENGINEERING CONSULTANTS LTD.

T.E. Hoeve, P.Eng.,  
Principal Consultant, NT/NU

