

Deh Cho Bridge Project  
Review and Audit of Phase 1 Works

The LEVELTON REPORT

GNWT Action Plan - January 14, 2011  
in Response to The Levelton Report

## 1. Aim

The aim of this document is to present the GNWT action plan generated from the recommendations based on the findings of the Levelton Report.

## 2. Introduction- Summary

As of April 1, 2010 the GNWT-DOT assumed project control to complete delivery of the Deh Cho Bridge Project. Prior to this period, in accordance with the Concession Agreement between the parties, the Deh Cho Bridge Corporation (DCBC) had the responsibility to design, construction, finance and operate the structure for 35 years. Through a series of events the Concession Agreement was terminated and the GNWT assumed responsibility to deliver the project mid-construction.

We are defining all works completed prior to 31 March 2010 under the control of the DCBC as Phase 1 works, and Phase 2 as all works commencing 01 April 2010 under the control of the GNWT.

As with any transition, the GNWT had to quickly assume leadership in a number of important areas to include: on-site activities; project control (schedule/budget/risk management); all technical reviews; assumption of ongoing contracts; responses to questions from the contractors; QA and QC processes; monitoring the fabrication processes; and planning for the future (operations and maintenance). Due diligence by the GNWT required that a full independent assessment be completed on all Phase 1 works to ensure the GNWT was fully aware of all the technical, fabrication and construction issues related to the Project and assess any risks. The Levelton Report is a corner stone document with respect to these issues and will assist the GNWT in moving forward with confidence and knowledge on the design continuity, fabrication, construction and quality assurance for the Project

The first step taken during the transition period was to convene a major Project Kick Off Meeting in Yellowknife in March 2010 to include all the parties who had a role in Phase 2. The aim of the Kick Off Meeting was to commence Phase 2 from a position of knowledge and team strength. During the conference all issues with respect to the project were discussed; new team members were introduced; the vision for the delivery

of the project; the all protocols were described; and the risks were highlighted. Each team ranging from the designers and prime contractor to the environmental monitors, quality assurance teams and the regulators had an opportunity to introduce their team, present issues and present solutions.

Following the conference the GNWT chaired a meeting to determine the “state of the union” with respect to the project. Due diligence dictated the GNWT had to assess the work required to ensure Phase 2 could proceed. During the meeting which included: the Associated Engineering Limited Team; Levelton Consultants; BPTec-DNW; TYLin International and the GWNT Team- the GNWT directed the Project Control Team (Associated Engineering Ltd. (AEL)), to engage an experienced and qualified engineering quality assurance (QA) firm to carry out a complete technical review and audit of all Phase 1 activities to include but not limited to the design, fabrication, construction and quality management activities that took place prior to March 31, 2010.

The aim of the review was to give the GWNT full confidence in what had taken place prior to 31 March 2010. Associated Engineering selected Levelton Consultants Ltd. who began their audit in April/May 2010. No constraints or restraints were placed upon the Review Team. They had full authority to review and investigate where they felt needed in order to achieve the aim. The audit/review was to become known as “The Levelton Report”.

The Levelton Report stamped and sealed as of 30 November 2010 is the most recent document in a series of reviews and studies undertaken to ensure acceptance of the design, fabrication and construction of the Deh Cho Bridge. The Levelton Report is attached. Attention is drawn to the “Summary and Recommendations” in Section 6 of the subject report along with Associated Engineering’s letter dated 3 December 2010.

**The Levelton Report, coupled with Associated Engineering’s review, recommends that the Phase 1 works be accepted provided the recommendations as laid out in the Levelton Report are complied with and that the remedial work in Phase 2 is completed.**

The Levelton Report identified 6 areas of the Project which were not consistent with accepted practice or not consistent with the contract specifications and require action. The Report does not identify any issue related to safety or security of the structure. Although the Report was finalized in November 2010, Levelton had been providing regular and timely updates which allowed the GNWT and the Project Control Team to take action concurrently with the review/audit. This has resulted in a situation where a number of recommendations have already been met and some recommendations are well underway. This concurrent process allowed the GNWT to make maximum use of the time available, assets already in place at the project site, or access to the bridge.

**GNWT-DOT and their Territorial advisors accept the Levelton Report as provided and have put in place a detailed action plan to meet all the recommendations. The GNWT has sufficient funds and time to accomplish all the recommendations.**

### **3. Aim and Scope of the Review/Audit**

The attached Levelton Report summarizes the scope of the audit and the findings of Levelton Consultants Ltd. based on their review of documents, review of construction and interviews with project personnel. The intent of the audit was to:

1. Confirm continuity of design responsibility for Phase 1;
2. Confirm that design and technical issues had been satisfactorily addressed;
3. Confirm fabrication and construction quality control and quality assurance processes for Phase 1 were followed and certified;
4. Confirm general compliance with the contracts and specifications for Phase 1; and
5. Identify issues required to close off the Phase 1 works.

### **4. The Levelton Report Findings**

Generally the audit/review was divided into the following main categories;

1. Overall QA/QC for the Project
2. Engineer of Record and Design Issues
3. Erection and Construction
4. Fabrication
5. Scour Rock Protection
6. Earthworks

The summary in section 6 of the Levelton Report highlights the formal recommendations. The summary chart at the end of the report also provides further remarks. Levelton makes 14 formal recommendations.

### **5. The GNWT Action Plan**

The aim of the GNWT Action plan is to address all of the recommendations made in the Levelton Report. As mentioned above the review/audit production plan allowed the GNWT to take action concurrent to the work being done by Levelton. Where it made sense to take immediate action and address issues either because of weather, access to areas of the structure or equipment availability -the GNWT took this action. As a result, of the 14 findings/recommendations made by Levelton, 6 are already addressed and 8 are well underway.

A summary of the necessary actions to meet the recommendations to the Levelton Report is attached as Annex A. Sufficient funds have been identified and set aside in a

special account from the Phase 1 contractor's holdback and cash security to cover the costs to correct any deficiencies. Cost estimates to complete the items in the action plan have been established, but will not be published in this document due to the public tender process which will follow and may be influenced or contaminated by disclosure at this time. Initial estimates place the total costs for the Action Plan in the \$4-7m range. This is a very early initial estimate only and the final costs will depend on a number of factors to include further tests results, tender prices and availability of companies to take on the work.

The attached table summarizes the action plans to be followed by the GNWT in order to fully address all the recommendations as noted by the Levelton Report. The plans include:

- The aim of the work required;
- Who is to undertake the work; and
- The proposed timeline for completing the work.

## 6. Conclusion

During the audit the Levelton Team reviewed many items and did not find any safety or major structural issues that would put the project at risk. One of the main comments issued by Levelton in the Report was a deficiency in document control, quality control and quality assurance for Phase 1. This is a serious statement and the GNWT and the Project Control team have taken significant steps and efforts to ensure there is a proper and fully auditable program of quality control and quality assurance protocols established to ensure delivery of a structure in Phase 2 which will meet or exceed the project requirements and the design criteria specified by the Government of the Northwest Territories.

This enhanced focus on quality commenced at the Project Kick Off Meeting and will continue for the life of the Project. Every contractor, consultant and team member of the Project are fully aware of the requirement for high quality and safe work in order to deliver a successful project.

**Successful completion of this action plan will allow the GNWT to accept the Phase 1 works with the knowledge that it is fully integrated with all the Phase 2 design, fabrication and construction works and the structure meets or exceeds the desired specifications.**



Kevin McLeod, P.Eng.  
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## Attachments

Annex A GNWT Action Plan – Levelton Report Recommendations

Levelton Consultants Ltd- The Levelton Report 30 November 2010

Associated Engineering Limited letter dated 3 December 2010

### GNWT ACTION PLAN – RESPONSE TO THE LEVELTON REPORT

Serial	Main Element	Remarks	Recommendation	GNWT Actions	Current Status	Timeline for Completion
1	Overall Project QA/QC in Phase 1	Levelton found deficiencies in document control, quality control and quality assurance and no evidence of an overall Project QA program in Phase 1	Develop, implement, follow and monitor a comprehensive QA/QC program for Phase 2 and ensure overall control protocols are in place.	QC and QA protocols are now in place. Regular updates are provided. Inspections are taking place and QC is being closely monitored and documented. All documents are controlled and communications are seamless with a web based central system (Buzzsaw)	QA/QC protocol Completed  Ongoing monitoring continues	Ongoing to the end of project and into the O and M phase.
2a	Design	GNWT to review and ensure proper design responsibility established	A design continuity review to be completed involving the current designers.	GNWT has directed BPTEC-DNW along with AEL and TYLin International to undertake this global review. Infinity Engineering will assist as the EOR for Phase 2.	Started and ongoing	Draft report due end Jan. Final report due end Feb 11
2b	Design	Infinity to confirm all issues from the Phase 1 design addressed	Infinity Engineering has solved all the superstructure issues noted and is aware of this compatibility check with the sub structure.	Documentation of this will be part of the design continuity check. GNWT to monitor this study.	Started and Ongoing	Draft report due end Jan. Final report due end Feb 11.
2c	Design	Fracture critical and dimensional tolerances at certain splices	Infinity has addressed this issue with the modifications for Phase 2	Documentation of this step will be part of the design continuity check.	Completed	Completed Nov 2010
3a	Erection /Construction	Alignment of piers	Outstanding issues related to alignment and location be addressed	GNWT has completed an independent survey of all the piers in the XYZ axis in order to prepare for the launch	Completed	Completed summer 2010
3b	Erection /Construction	Top of Pier 3 repair	The top surface of pier 3S footing to be examined in the area of the suspected depression.	GNWT has commenced contacting firms who are expert in this work and to develop the procedures for: inspection and repair	Started and Ongoing	This can take place after the bridge is open. To be complete by summer 2012 but may be completed earlier if experts are available.

Serial	Main Element	Remarks	Recommendation	GNWT Actions	Current Status	Timeline for Completion
3c	Erection /Construction	Pier 2S elevation amendment/change	Levelton determined the issue resolved but recommends Infinity/EBA to ensure no impact on Phase 2	Will be part of the overall global design continuity review.	Started and Ongoing	Draft report due end Jan. Final report due end Feb 11.
3d	Erection /Construction	Concrete elements accepted	No further action	No further action	Completed	Completed Nov 2010
4a	Steel Fabrication	Investigate and complete any QC Gaps at the AIS plants	Turn over packages to be formally submitted and reviewed	GNWT will arrange for these packages to be part of the Project Review.	Started and Ongoing	Draft report due March 2011. Final report due end April 11.
4b	Steel Fabrication	PEng responsible for QC at AIS to be identified	Request Atcon for the PEng responsible for the fabrication at AIS (or their receiver)	GNWT will formally request this from the reps of AIS (or their receivers).	Started and Ongoing	Due by end Jan 2011
4c	Steel Fabrication	Review Geocon's reports produced on AIS QC	Sargent & Associates(S&A) to review these reports and determine their impact	Geocon and S&A to provide the necessary documents for review.	Started and Ongoing	Documents by end Jan 2011. Review completed April 2011
4d	Steel Fabrication	Further review and testing as required for items inspected by Geocon or S&A.	Scope for S&A to be expanded to conduct further review and testing to enable the GNWT to formally accept all components fabricated by AIS	GNWT will develop the contract and TOR to ensure the proper testing and reviews are completed by a qualified firm.	Started and Ongoing	Planning has commenced. Testing to take place Mar/April 2011 and completed by July 2011. Any remedial work to commence immediately and completed by Aug 2011.
5	Scour rock	Scour Rock quality with respect to specifications and placement	Scour protection rock materials and placement be reviewed by a qualified consultant	Qualified consultant has reviewed the latest surveys and has produced a detailed plan for remediation. The GNWT will follow this plan.	Review Completed Work ongoing	Can be completed after the Bridge is open. Work to commence now with a target completion by summer of 2012. May be completed sooner but will depend on experts available.
6	Earthworks	Continue with the proposed remediation works.	Continue with remediation works currently underway	GNWT has corrected Phase 1 works and will complete the earthworks once launch is completed	Completed for Launch Ongoing	Initial works completed for the launch in 2010. Final earthworks to be completed by fall 2011.