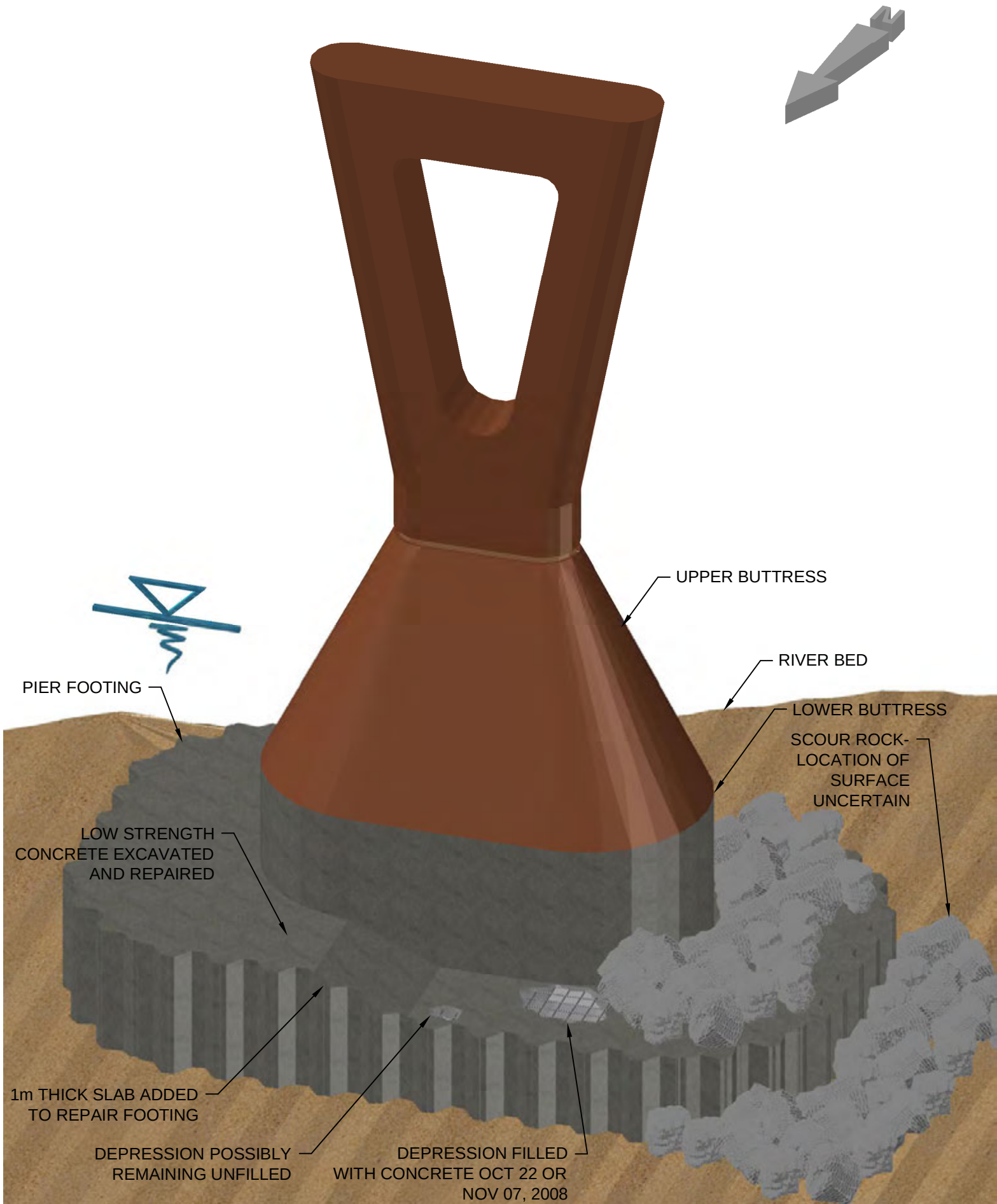


APPENDIX A

PIER DETAILS



DEH-CHO BRIDGE-PIER 3S-RENDERING
AS PER DETAILED DRAWINGS



**APPENDIX B
SUPPORTING DOCUMENTS**

TAB A

Neil Cumming

From: Kevin McLeod [Kevin_McLeod@gov.nt.ca]
Sent: Wednesday, August 11, 2010 9:07 AM
To: sdsmith1@telus.blackberry.net; Neil Cumming
Cc: Stuart Smith
Subject: RE: Deh Cho Bridge Phase 1 Audit

Neil.

We have copies of the letters we sent to the DCBC for:

- a. Conceptual design approval (2006);
- b. Design Review Reports #1-#2 and #3.
- c. Certificates for the Substructure Piers 1-4 (n) and 1-4 (s) with the qualification the construction must be done in accordance with all the standards and signed off by the Engineer;

kcm

From: Stuart Smith [mailto:sdsmith1@telus.blackberry.net]
Sent: Wednesday, August 11, 2010 9:59 AM
To: Neil Cumming
Cc: Stuart Smith; Kevin McLeod
Subject: Re: Deh Cho Bridge Phase 1 Audit

Neil

I do not believe we ever sent a letter saying we had reviewed the Spronken design and accepted it. We had reviewed the foundation design and provided check certificates for them. Whether Jivko received those, I do not know. We work for the GNWT and our correspondence was through the GNWT only as per specific directions from Gamble. There may possibly be some meeting minutes from around 2003 to 2005 that indicates the Spronken design was a suitable concept, but it was not a acceptance by review of the design through a design check.

Jivko and Gamble both like to say the design was accepted by the TA and GNWT but there had not been a full blown design check done at that time. There is a big difference in accepting a concept and accepting the design through a design check.

Stuart

Sent on the TELUS Mobility network with BlackBerry

From: Neil Cumming <ncumming@levelton.com>
Date: Wed, 11 Aug 2010 09:39:33 -0600
To: <sdsml1@telus.blackberry.net>; Stuart Smith<stuart.smith@bptec-dnw.com>
Cc: 'Leslie Mihalik'<mihalikl@ae.ca>; kevin_mcleod@gov.nt.ca<kevin_mcleod@gov.nt.ca>
Subject: Deh Cho Bridge Phase 1 Audit

Stuart:

During our telephone conversation of July 22, 2010 you confirmed that BC TEC had reviewed the Spronken design, were satisfied with it, and had so advised the GNWT. We have been unable to find documentation of that among Jivko's records. It would be helpful if you could provide me with copies of your final acceptance letter to the GNWT.

Thanks,

Neil A. Cumming, F.A.C.I., P.Eng.
Executive Vice President
Levelton Consultants Ltd.
150-12791 Clarke Place
Richmond, BC
V6V 2H9
Ph: 604-207-5100
Fax: 604-278-1042
ncumming@levelton.com
www.levelton.com



Please consider your environmental responsibility
before printing this e-mail - thank you!

**APPENDIX B
SUPPORTING DOCUMENTS**

TAB B

DRAFT

WP203

October 30, 2008

Y14101074

Jivkov Engineering
PO Box 143, Station Main
Yellowknife, NT X1A 2N1

Attention: Mr. Jivko Jivkov, P. Eng

Subject: Deh Cho Bridge – Canadian Bridge Code Item 6.4.6

EBA Engineering Consultants Ltd. (EBA) confirms by this letter that as the Geotechnical Engineer it has inspected the foundations during construction of Piers 1, 2, 3, and 4 South (all) of the Deh Cho Bridge. EBA's inspections found site conditions which were consistent with those encountered during site investigations and those used to develop geotechnical design recommendations. Furthermore, EBA confirms that these foundations have been constructed as intended by the design. Field reports documenting EBA's inspections and observations have been provided and a formal summary report is being prepared.

On the basis of the foregoing, EBA confirms that the requirements of Canadian Bridge Code Item # 6.4.6 have been satisfied.

Respectfully submitted,
EBA Engineering Consultants Ltd.


Neil R. MacLeod, P. Eng.
Principal Consultant, Engineering Division

cc Andrew Gamble

Jivko Engineering

ISSUED FOR USE

SOUTH PIER SOIL VERIFICATION
DEH CHO BRIDGE
FORT PROVIDENCE, NT

Y14101074

April 2010

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Appendix A General Conditions

Appendix B Borehole Logs

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1.0 INTRODUCTION

1.1 GENERAL

EBA Engineering Consultants Ltd. (EBA) was retained by Jivko Engineering to conduct an update geotechnical evaluation to confirm that the foundation conditions for the south four piers of the Deh Cho Bridge are consistent with findings during a prior geotechnical investigation. The objective of this evaluation was to conduct a drilling investigation on site in order to assess the subsurface soil conditions and to confirm that prior recommendations are still appropriate for the design and construction of the piers. This report presents the results of the follow-up geotechnical evaluation.

1.2 PROJECT DETAILS

The Deh Cho Bridge is presently under construction across the Mackenzie River, near Fort Providence, NT, at the current location of the ferry crossing. EBA has previously been retained by Jivko Engineering to conduct a geotechnical/materials evaluation. The findings were presented in a report entitled "Geotechnical/Materials Evaluation, Proposed Deh Cho Bridge, Fort Providence, NT", dated February 2004.

The follow-up investigation was commissioned in order to satisfy Clause 6.4.6 of the Canadian Highway Bridge Design Code, which requires verification of geotechnical conditions during foundation construction.

At the time the October 2008 follow-up investigation, footings had been cast for the four southern piers (hereafter referred to as Piers 1S, 2S, 3S, and 4S), and the lower buttresses were nearing completion. Therefore, access to the foundation soils required coring through the existing footings.

1.3 SCOPE OF WORK

EBA's described an approach to conducting the investigation in a letter dated September 28, 2008. A copy of this letter is presented in Appendix C, for reference. EBA's understanding of the required scope of work is summarized as:

- Investigate the soil conditions by drilling boreholes with a core drill;
- Endeavour to collect relatively undisturbed samples of the soils encountered;
- Conduct laboratory testing for the purposes of soil classification and determination of engineering properties; and
- Prepare a report presenting the findings from the investigation.

2.0 METHOD OF INVESTIGATION

2.1 SITE INVESTIGATION

The site investigation was carried out from October 10 to October 24, 2008, using a Talpa D3-250 EL electric, handheld drill machine, operated by Rocky Mountain Soil Sampling Inc., of Vancouver, British Columbia. Terry Jordan, of EBA, monitored the drilling. Select photographs of the site investigation are presented at the end of this report.

Twelve boreholes were drilled to depths ranging from 3.20 m to 4.95 m below the surface of the concrete footings. Borehole locations were selected and located in the field by Jivko Engineering and EBA, considering access in the work area. Borehole locations are shown in Figures 1 to 4.

Re-bar prevented the completion of the borehole at the original locations of Boreholes 1 and 8. These boreholes were abandoned and relocated within the vicinity of the original attempt.

Extensive surface flooding and the presence of re-bar mats in the footings cause frequent work delays.

The soils encountered were visually logged at the time of drilling. The soils proved to be too hard to permit advancement of Shelby tubes with the available equipments. Therefore, representative, disturbed samples of soil were collected from a split spoon sampler.

Pocket penetrometer and Torr vane measurements were occasionally taken during the site investigation, but the consistency of the soil encountered was generally higher than could be measured, so these measurements were discontinued early in the program. Borehole logs are presented in Appendix B.

Boreholes were dried and backfilled with grout at the completion of drilling.

2.2 LABORATORY TESTING

Laboratory testing included the determination of natural moisture content of all samples, measurement of the resistance to a pocket penetrometer on cohesive, clay samples and determination of the specific gravity of soil particles of selected clay samples.

Laboratory test results are summarized in Table 1 and are reported on the borehole logs in Appendix B.

3.0 SUBSURFACE CONDITIONS

Borehole logs of the encountered subsurface materials are presented in Appendix B. A general description of the stratigraphy is presented below:

CONCRETE: The concrete was cored only as a means of access to the underlying soil. Characterization of the concrete was not within the scope of the subject investigation, but the core was retained. Compressive strength of the concrete was subsequently determined, and this was reported separately.

The condition of the concrete at Borehole 10 was unusual, as indicated on the borehole log. The upper 0.35 m was broken/friable and was discarded. Below another 0.35 m of apparently normal concrete was a 0.4 m thick zone of what was identified in the field to be mortar (no gravel fraction). This occurrence became the subject of a separate investigation that is documented in a separate report.

The thickness of the concrete was found to range from 2.62 m, at Borehole 8, to 4.72 m, at Borehole 5, and averaged 3.18 m.

While workmanship was the responsibility of others, it was observed during the investigation that the contact between concrete and underlying soil was clean and distinct. There was no zone of slough or softened soil detected in any boreholes.

CLAY (TILL): The prevalent soil below the river and abutment areas is hard clay till. Till is naturally a variable material, so that the soil was occasionally also logged as gravel, silt, or sand till, or combinations thereof. This is treated as one unit for the purpose of this discussion. The soil has the following characteristics, based on visual classification and lab testing:

- The clay is low to medium plastic;
- The clay is stiff to hard;
- Moisture contents in the clay ranged from 5 percent to 12 percent, and averaged 9 percent. These are all below the plastic limit range of 12 percent to 15 percent determined during the original site investigation; and
- Samples of the till generally contained a trace of gravel. It is anticipated that cobbles and boulders are also present in the till, but these were not observed during the present investigation.

SAND AND GRAVEL: The sand is generally medium to coarse grained and contains some gravel and a trace to some fines (silt and clay-sized particles). Gravel content was occasionally higher, leading to the identification of sand and gravel.

Moisture contents of samples from the granular soils ranged from 6 percent to 13 percent and averaged 9 percent. However, this may not be representative, due to the potential for disturbance of the granular soils by drilling.

4.0 GEOTECHNICAL INTERPRETATION

Based on interpretation of the observations during drilling, the foundation soils were qualitatively assessed to be consistent with what was identified during the initial site investigation. This interpretation was provided to Jivko Engineering in a letter dated October 30, 2008. A copy of this letter is presented in Appendix C, for reference.

Laboratory testing was conducted to substantiate this interpretation. Since the samples were disturbed, no direct measurement of consistency (strength) was considered to be practical.

The specific gravities of the soil particles of seven samples of clay till and one sample of sand were determined. The specific gravity of the particles in the clay till samples was found to range from 2.697 to 2.717, and average 2.707. The specific gravity of the particles in the sand sample was determined to be 2.722.

Using these data, and assuming that the clay till samples were saturated, bulk densities could be interpreted. Calculated bulk densities ranged from 2292 kg/m³ to 2460 kg/m³, and averaged 2380 kg/m³. These values all exceed the comparable values measured at the time of the initial site investigation, where measured bulk densities ranged from 2279 kg/m³ to 2361 kg/m³, and averaged 2330 kg/m³. This supports the conclusion that the soils encountered at the base of the footings is comparable to that identified during the initial site investigation.

5.0 LIMITATIONS

This report and its contents are intended for the sole use of Jivko Engineering and their agents. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Jivko Engineering, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to EBA's General Conditions, which are provided in Appendix A of this report.

6.0 CLOSURE

We trust this report satisfies your present requirements. If you have any questions or comments please feel free to contact the undersigned.

Sincerely,
EBA Engineering Consultants Ltd.

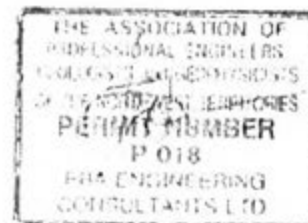
Prepared by:

Reviewed by:



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ehoeve@eba.ca

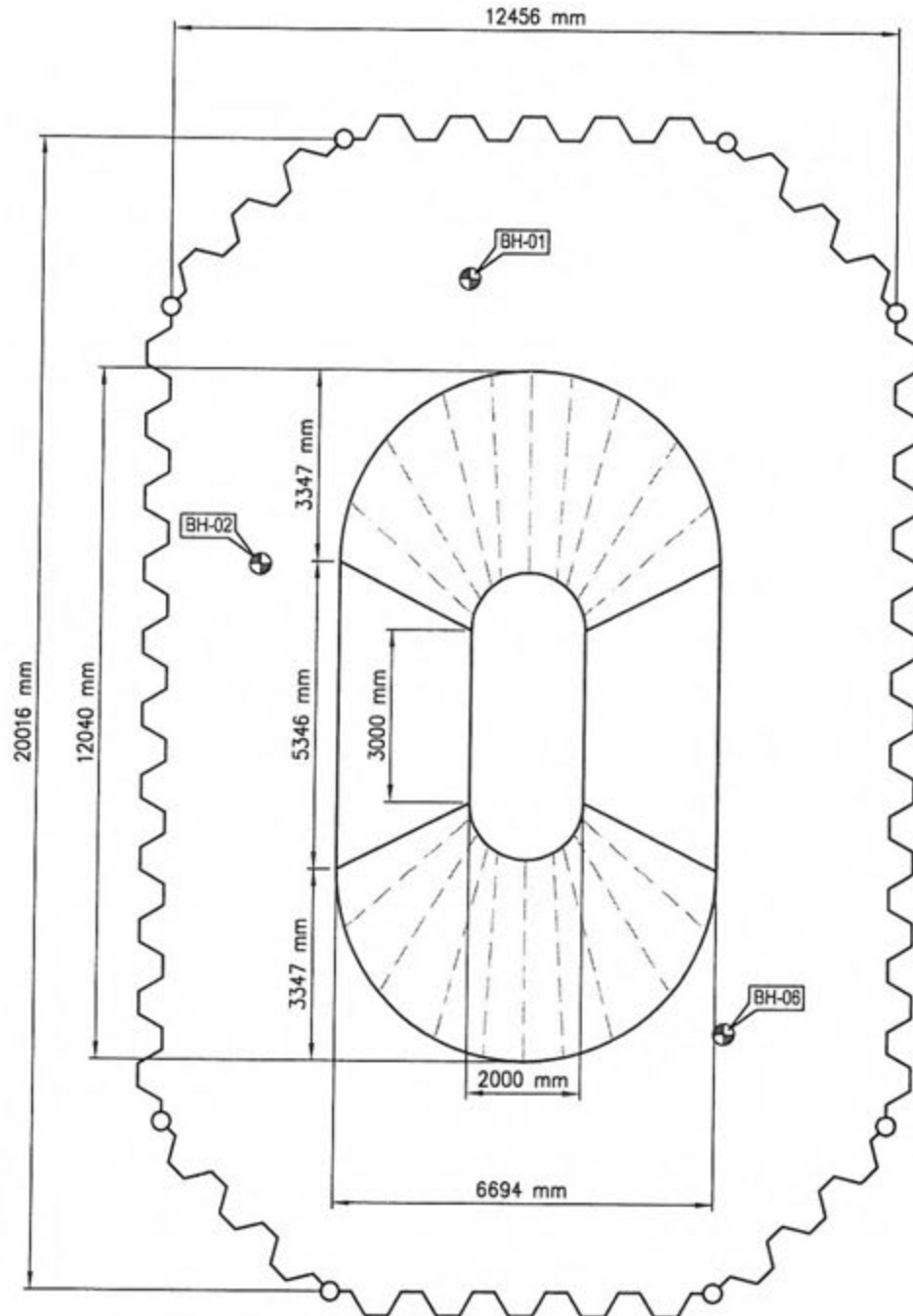


TABLE

**TABLE 1: DEH CHO BRIDGE SOUTH PIER SOIL VERIFICATION
LABORATORY TEST RESULT AND DATA INTERPRETATION SUMMARY**

Borehole	Sample Number	Soil Type	Lab Pocket Penetrometer Reading	Moisture Content (%)	Specific Gravity	Interpreted Bulk Density (kg/m3)
BH-1	1	Clayey Sand		11.4		
	2	Clay Till	4.5	11.8	2.704	2292
	3	Clay Till	3.75	6.7		2443
BH-2	1	Clay Till	>4.5	9.4		2361
	2	Clay Till	>4.5	11.2	2.717	2316
BH-3	1	Sand & Gravel		8.5		
	2	Clay Till		6.3		2457
BH-4	1-A	Sand & Gravel		7.8		
	1-B	Clayey Sand	>4.5	9.0		
	2	Clay Till	>4.5	9.0		2372
BH-5	1	Clay Till	>4.5	10.4	2.706	2330
BH-6	1	Clay Till	3.75	10.0		2342
	2	Clay Till	4.5	9.8	2.706	2348
BH-7	1	Clay Till	>4.5	9.6		2355
	2	Clay Till		7.9	2.702	2402
BH-8	1	Clay Till	4.3	9.7	2.697	2346
	2	Clay Till		9.7		2352
BH-9	1	Clay Till	4.5	9.1		2369
	2	Sandy Clay		10.0		
BH-10	1	Clay w/Gravel		6.8		2440
	2	Clay Till	>4.5	7.9	2.710	2409
BH-11	1	Sand		13.4	2.722	
	2	Sandy Clay	>4.5	5.2		
	3	Sand		6.1		
	4	Clay w/Gravel	3.3	6.9		2438
BH-12	1	Clay w/Gravel		8.2		2396
	2	Clay w/Gravel		6.2		2460

FIGURES



LEGEND:

⊕ - BOREHOLE LOCATION



Approximate Scale: 1: 125 (metres)

CLIENT

Jivko Engineering

EBA Engineering
Consultants Ltd.



Deh Cho Bridge, South Pier Soil Verification
Fort Providence, NT

Borehole Locations - Pier 1, South

PROJECT NO
Y14101074

OFFICE
EDM

DWN
RH

CHK
IF

REV
0

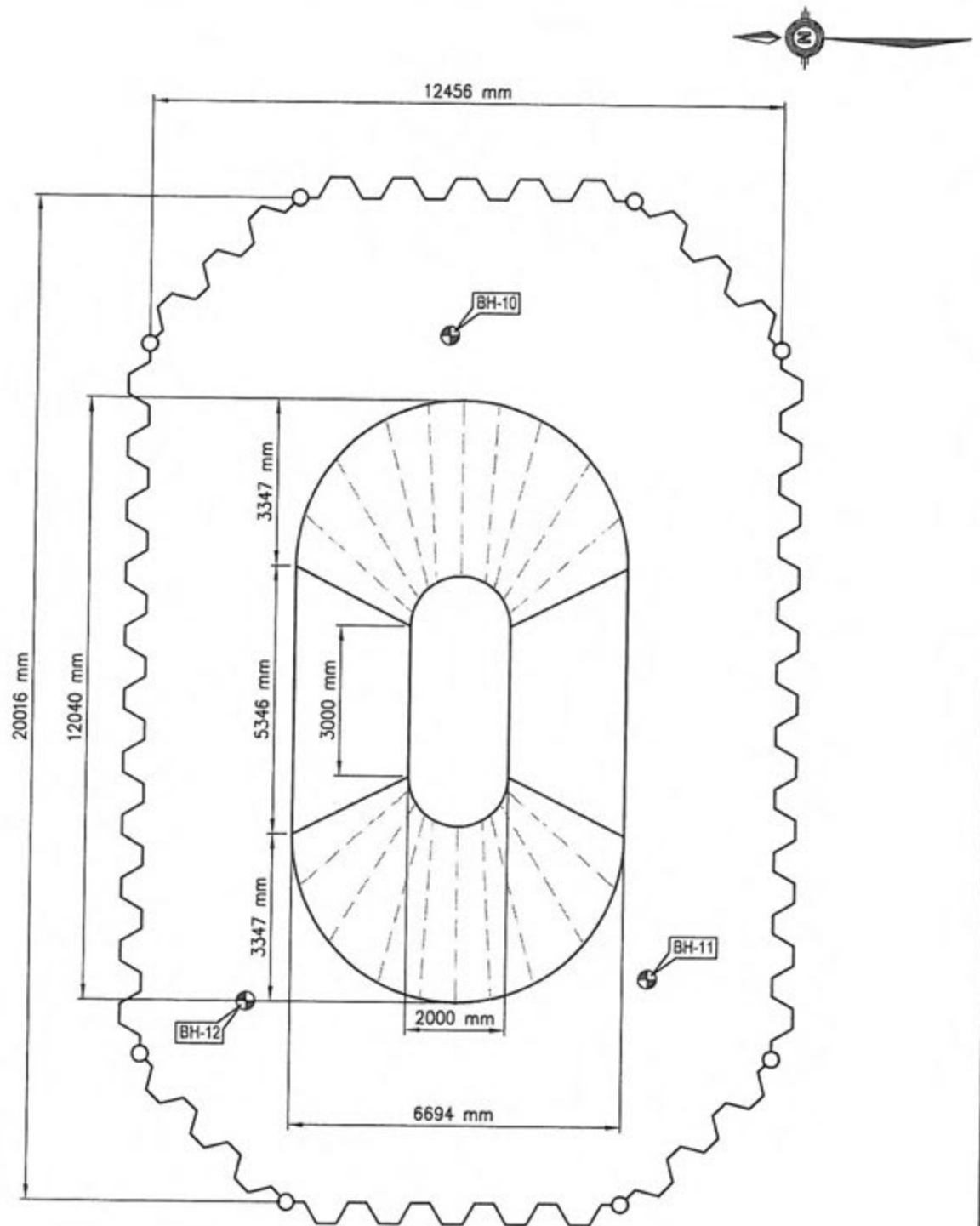
DATE
December 2008

Figure 1



Figure 2

Q:\E\motor\Drafting\DIVISIONS\2007\Other Offices\Y141074\101074AutoCAD\Y141074_FIG 1-4.dwg (FIGURE 3) April 23, 2010 - 11:29:28 am (BY: DON GAMMIE)



LEGEND:

⊕ - BOREHOLE LOCATION

0 5
Approximate Scale: 1: 125 (metres)

CLIENT

Jivko Engineering

EBA Engineering
Consultants Ltd.



Deh Cho Bridge, South Pier Soil Verification
Fort Providence, NT

Borehole Locations - Pier 3, South

PROJECT NO.
Y14101074

OFFICE
EDM

DWN
RH

CKD
IF

REV
0

DATE
December 2008

Figure 3

LEGEND:



Figure 4

PHOTOGRAPHS

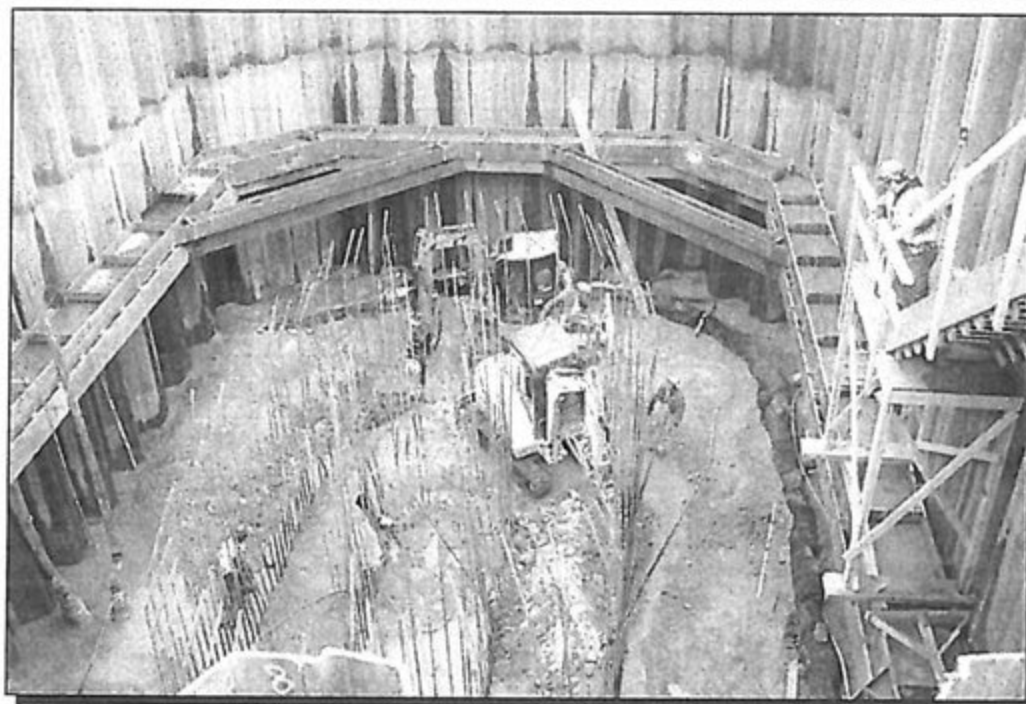


Photo 1
Pier 3 (preparing re-bar for lower buttress and cleaning footing)

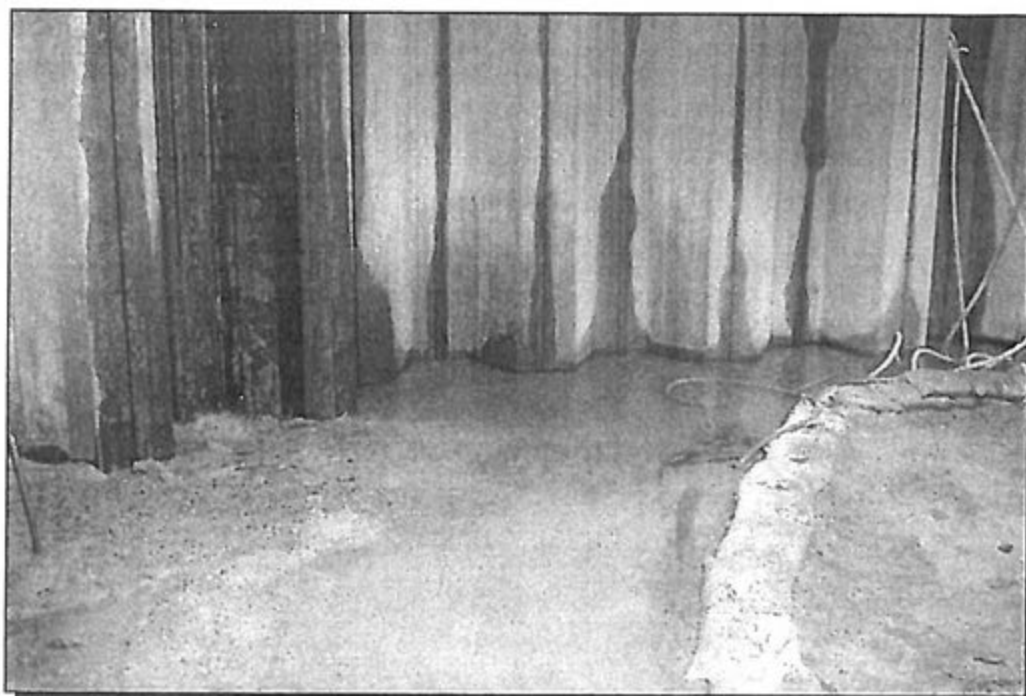


Photo 2
Pier 2 (view inside cofferdam)



Photo 3
Pier 1 (preparing footing for drilling)

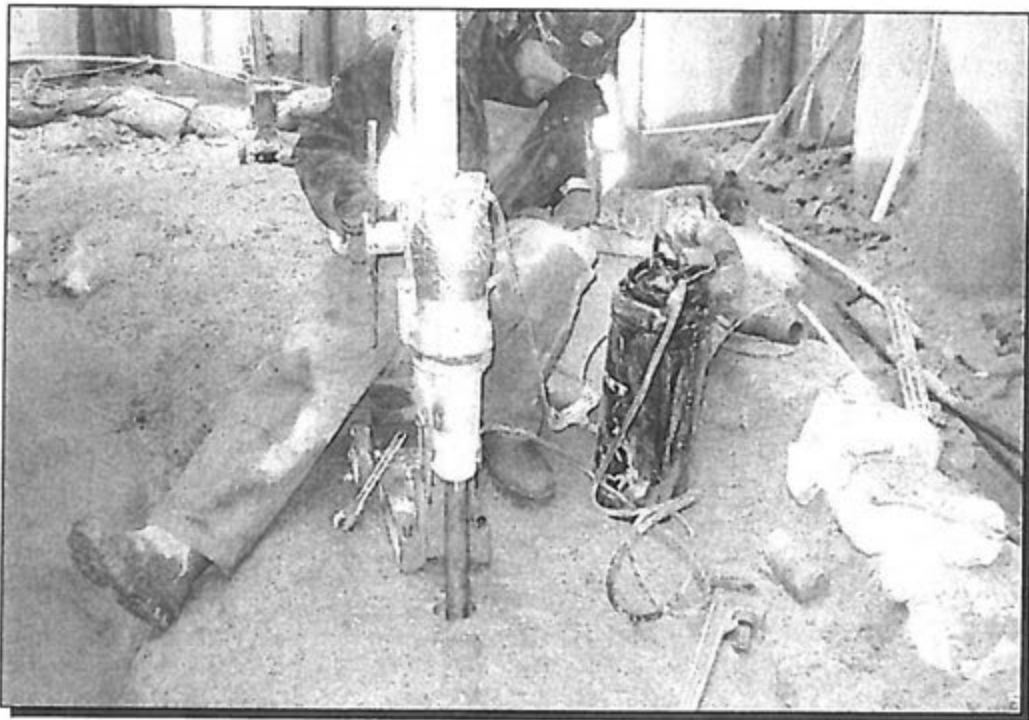


Photo 4
Pier 4 (drilling)

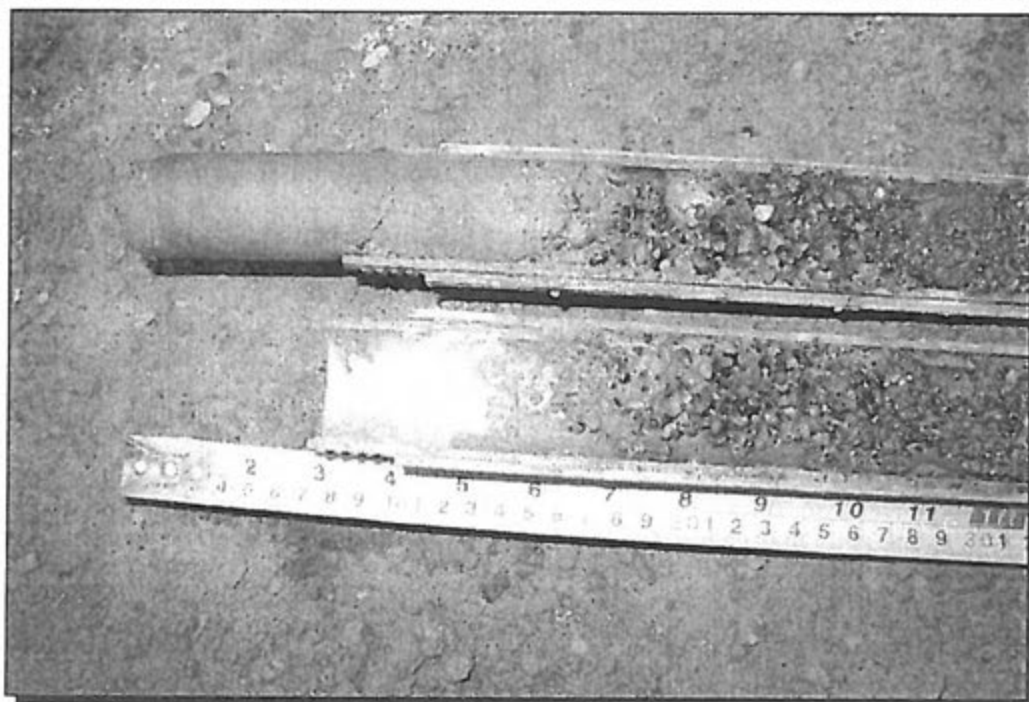


Photo 5
Pier 1, Borehole 1 (Split spoon sample, Pier 1)



Photo 6
Pushing out concrete core

APPENDIX A

APPENDIX A GENERAL CONDITIONS

GEOTECHNICAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's Client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. EBA's instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

7.0 SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgemental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

8.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

9.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

10.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

11.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

12.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

13.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

14.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

APPENDIX B

APPENDIX B BOREHOLE LOGS

TERMS USED ON BOREHOLE LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on 0.075mm sieve): includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as inferred from laboratory or in situ tests.

DESCRIPTIVE TERM	RELATIVE DENSITY	N (blows per 0.3m)
Very Loose	0 to 20%	0 to 4
Loose	20 to 40%	4 to 10
Compact	40 to 75%	10 to 30
Dense	75 to 90%	30 to 50
Very Dense	90 to 100%	greater than 50

The number of blows, N, on a 51mm O.D. split spoon sampler of a 63.5kg weight falling 0.76m, required to drive the sampler a distance of 0.3m from 0.15m to 0.45m.

FINE GRAINED SOILS (major portion passing 0.075mm sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as estimated from laboratory or in situ tests.

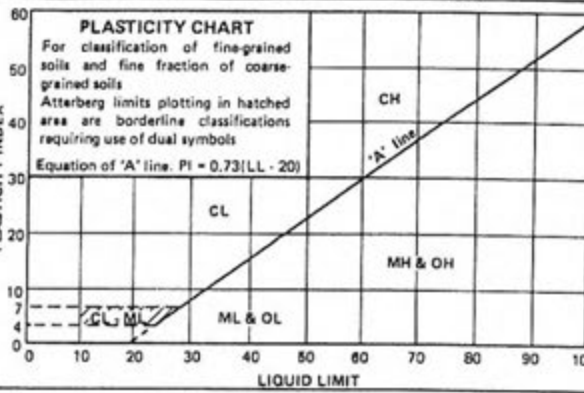
DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH (kPa)
Very Soft	Less Than 25
Soft	25 to 50
Firm	50 to 100
Stiff	100 to 200
Very Stiff	200 to 400
Hard	Greater Than 400

NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil.

GENERAL DESCRIPTIVE TERMS

Slickensided	- having inclined planes of weakness that are slick and glossy in appearance.
Fissured	- containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated	- composed of thin layers of varying colour and texture.
Interbedded	- composed of alternate layers of different soil types.
Calcareous	- containing appreciable quantities of calcium carbonate.
Well Graded	- having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly graded	- predominantly of one grain size, or having a range of sizes with some intermediate size missing.



UNIFIED SOIL CLASSIFICATION†								
MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	CLASSIFICATION CRITERIA			
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines GW, GP, SW, SP GM, GC, SM, SC Borderline classification requiring use of dual symbols	$C_u = D_{60}/D_{10}$ Greater than 4		
			GP	Poorly-graded gravels and gravel-sand mixtures, little or no fines		$C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3		
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures		Not meeting both criteria for GW	Atterberg limits plot below 'A' line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			GC	Clayey gravels, gravel-sand clay mixtures				
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines		$C_u = D_{60}/D_{10}$ Greater than 6		
			SP	Poorly-graded sands and gravelly sands, little or no fines		$C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3		
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures		Not meeting both criteria for SW	Atterberg limits plot below 'A' line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures				
		FINE-GRAINED SOILS 50% or more passes No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less	ML		Inorganic silts, very fine sands, rock flour, silty or clayey fine sands		
				CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
OL	Organic silts and organic silty clays of low plasticity							
SILTS AND CLAYS Liquid limit greater than 50%	MH		Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts	*Based on the material passing the 3 in. (75 mm) sieve †ASTM Designation D 2487, for identification procedure see D 2488				
	CH		Inorganic clay of high plasticity, fat clays					
	OH		Organic clays of medium to high plasticity					
HIGHLY ORGANIC SOILS			PT	Peat, muck and other highly organic soils				

GROUND ICE DESCRIPTION

ICE NOT VISIBLE

GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	
N	Nf	Poorly-bonded or friable	
	Nbn	No excess ice, well-bonded	
	Nbe	Excess ice, well-bonded	

NOTE:

- Dual symbols are used to indicate borderline or mixed ice classifications
- Visual estimates of ice contents indicated on borehole logs $\pm 5\%$
- This system of ground ice description has been modified from NRC Technical Memo 79, Guide to the Field Description of Permafrost for Engineering Purposes

LEGEND

Soil Ice

VISIBLE ICE LESS THAN 50% BY VOLUME

GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	
V	Vx	Individual ice crystals or inclusions	
	Vc	Ice coatings on particles	
	Vr	Random or irregularly oriented ice formations	
	Vs	Stratified or distinctly oriented ice formations	

VISIBLE ICE GREATER THAN 50% BY VOLUME

ICE	ICE + Soil Type	Ice with soil inclusions	
	ICE	Ice without soil inclusions (greater than 25 mm (1 in.) thick)	

PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 1 S Footing (East end)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-01	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE	☒ DISTURBED	☐ NO RECOVERY	☒ SPT	☐ A-CASING	☐ SHELBY TUBE
BACKFILL TYPE	☐ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
SOIL DESCRIPTION CONCRETE - re-bar at 0.71 m - re-bar at 2.26 m - re-bar at 2.57 m CLAY (TILL) - silty, some gravel (black, < 10 mm), low plastic, dark grey-brown, moist, dense - 0.075 m layer of sand, saturated - Bulk density = 2443 kg/m³ - Strength inferred from bulk density = 1640 kPa End of Hole (3.89 m) GROUND ICE DESCRIPTION					
Depth along axis (m)	SAMPLE TYPE	SAMPLE NUMBER	USC	SOIL SYMBOL	Depth (ft)
				STANDARD PENETRATION (N) 20 40 60 80 POCKET PEN. (kPa) 100 200 300 400 PLASTIC M.C. LIQUID 20 40 60 80	
0		C01	CONCRETE		0
1		C02	CONCRETE		
		C03	CONCRETE		
		C04	CONCRETE		
		C05	CONCRETE		5
2		C06	CONCRETE		
		C07	CONCRETE		
		C08	CONCRETE		
		C09	CONCRETE		
3		C10	CONCRETE		10
		S01	CL-ML		
		S02	SC		
4		S03	CL-ML		
5					15
5.5					18

LOGGED BY: TJ	COMPLETION DEPTH: 3.89 m
REVIEWED BY: TEH	COMPLETE: 10/12/2008
DRAWING NO: 1	Page 1 of 1

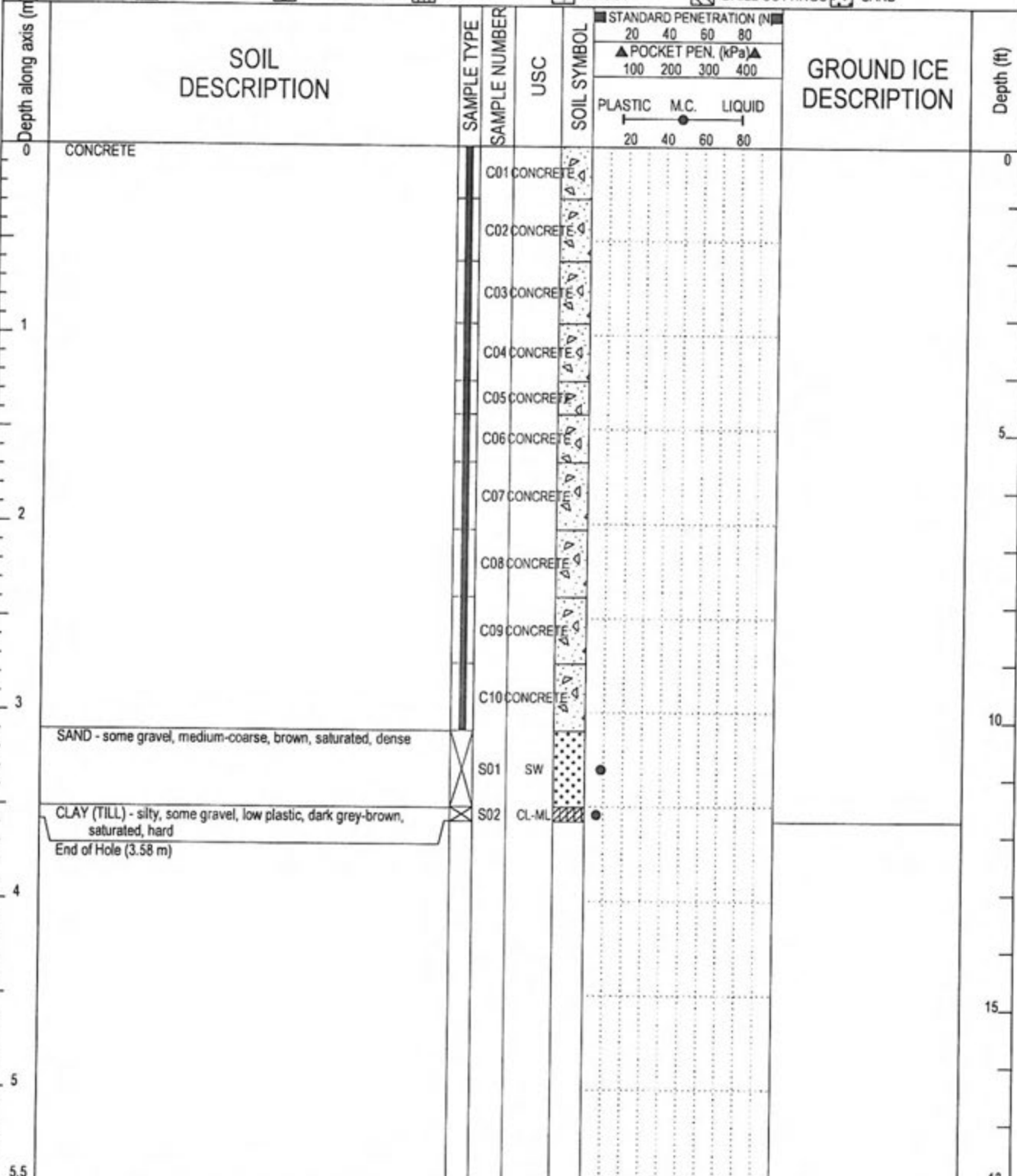
PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 1 S Footing (North side)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-02	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE		☒ DISTURBED ☐ NO RECOVERY ☒ SPT ☐ A-CASING ☐ SHELBY TUBE ☐ CORE			
BACKFILL TYPE		☐ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND			

Depth along axis (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	USC	SOIL SYMBOL	STANDARD PENETRATION (N)			GROUND ICE DESCRIPTION	Depth (ft)
						POCKET PEN. (kPa)				
						PLASTIC	M.C.	LIQUID		
0	CONCRETE					20	40	60		0
			C01	CONCRETE						
			C02	CONCRETE						
			C03	CONCRETE						
			C04	CONCRETE						
			C05	CONCRETE						5
			C06	CONCRETE						
			C07	CONCRETE						
			C08	CONCRETE						
			C09	CONCRETE						
3			C10	CONCRETE						10
	CLAY (TILL) - silty, some gravel (black, sub-angular, < 15 mm), low plastic, dark grey-brown, moist, stiff-hard		S01	CL-ML						
			S02	CL-ML						
4	End of Hole (3.96 m)									
										15
5										
5.5										18

	LOGGED BY: TJ	COMPLETION DEPTH: 3.96 m
	REVIEWED BY: TEH	COMPLETE: 10/11/2008
	DRAWING NO: 1	Page 1 of 1

PROJECT: Geotechnical Services	CLIENT: Jivkov Engineering	PROJECT NO. - BOREHOLE NO.
LOCATION: Pier 2 S Footing (South side)	DRILL: Electric Corer (Rocky Mountain)	Y14101074 - BH-03
DEH CHO BRIDGE, FORT PROVIDENCE, NT		

SAMPLE TYPE	☒ DISTURBED	☐ NO RECOVERY	☒ SPT	☐ A-CASING	☐ SHELBY TUBE	☐ CORE
BACKFILL TYPE	☐ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS	☐ SAND



	LOGGED BY: TJ	COMPLETION DEPTH: 3.58 m
	REVIEWED BY: TEH	COMPLETE: 10/13/2008
	DRAWING NO: 1	Page 1 of 1

PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 2 S Footing (West end)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-04	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE		☒ DISTURBED	☐ NO RECOVERY	☒ SPT	☐ A-CASING
BACKFILL TYPE		☐ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT
		☐ DRILL CUTTINGS	☐ SAND	☐ SHELBY TUBE	☐ CORE

Depth along axis (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	USC	SOIL SYMBOL	STANDARD PENETRATION (N)			GROUND ICE DESCRIPTION	Depth (ft)
						POCKET PEN. (kPa)	PLASTIC	M.C.		
0	CONCRETE									0
			C01	CONCRETE						
			C02	CONCRETE						
			C03	CONCRETE						
			C04	CONCRETE						
1			C05	CONCRETE						
			C06	CONCRETE						
			C07	CONCRETE						5
			C08	CONCRETE						
2			C09	CONCRETE						
			C10	CONCRETE						
			C11	CONCRETE						
3			C12	CONCRETE						10
	SAND - gravelly, medium-coarse, brown, saturated, dense		S01A	SP						
			S01B	SC						
	CLAY (TILL) - silty, some gravel (black, sub-angular to sub-rounded, < 20 mm), low plastic, dark grey-brown, damp, stiff-hard		S02	CL-MI						
4	End of Hole (3.81 m)									
										15
5										
5.5										18

	LOGGED BY: TJ	COMPLETION DEPTH: 3.81 m
	REVIEWED BY: TEH	COMPLETE: 10/14/2008
	DRAWING NO: 1	Page 1 of 1

PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 2 S Footing (East end)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-05	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE	☒ DISTURBED	☐ NO RECOVERY	☒ SPT	☐ A-CASING	☐ SHELBY TUBE
BACKFILL TYPE	☐ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
				☐ CORE	☐ SAND

Depth along axis (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	USC	SOIL SYMBOL	STANDARD PENETRATION (N)			GROUND ICE DESCRIPTION	Depth (ft)
0	CONCRETE									0
			C01 CONCRETE							
			C02 CONCRETE							
			C03 CONCRETE							
			C04 CONCRETE							
			C05 CONCRETE							5
			C06 CONCRETE							
			C07 CONCRETE							
			C08 CONCRETE							
			C09 CONCRETE							
			C10 CONCRETE							10
			C11 CONCRETE							
			C12 CONCRETE							
			C13 CONCRETE							
			C14 CONCRETE							
			C15 CONCRETE							15
5	CLAY (TILL) - silty, some gravel (< 20 mm), low plastic, dark grey-brown, damp, stiff-hard End of Hole (4.95 m)	☒	S01	CL-ML						
5.5										18

	LOGGED BY: TJ	COMPLETION DEPTH: 4.95 m
	REVIEWED BY: TEH	COMPLETE: 10/15/2008
	DRAWING NO: 1	Page 1 of 1

PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 1 S Footing (Southwest corner)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-06	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE ☒ DISTURBED ☒ NO RECOVERY ☒ SPT ☐ A-CASING ☐ SHELBY TUBE ☐ CORE					
BACKFILL TYPE ☐ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐ GROUT ☐ DRILL CUTTINGS ☐ SAND					

Depth along axis (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	USC	SOIL SYMBOL	STANDARD PENETRATION (N)			GROUND ICE DESCRIPTION	Depth (ft)
						POCKET PEN. (kPa)				
						20	40	60		
0	CONCRETE									0
			C01	CONCRETE						
			C02	CONCRETE						
			C03	CONCRETE						
			C04	CONCRETE						
			C05	CONCRETE						
			C06	CONCRETE						
			C07	CONCRETE						
			C08	CONCRETE						
			C09	CONCRETE						
			C10	CONCRETE						
			C11	CONCRETE						
	CLAY (TILL) - silty, gravelly (< 20 mm), low plastic, dark grey-brown, damp, stiff		S01	CL-MI						
	End of Hole (3.66 m)		S02	CL-MI						
4										
5										
5.5										18

	LOGGED BY: TJ	COMPLETION DEPTH: 3.66 m
	REVIEWED BY: TEH	COMPLETE: 10/16/2008
	DRAWING NO: 1	Page 1 of 1

PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 4 S Footing (South side)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-07	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE		DISTURBED ☐ NO RECOVERY ☐ SPT ☐		A-CASING ☐ SHELBY TUBE ☐ CORE ☐	
BACKFILL TYPE		BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐		GROUT ☐ DRILL CUTTINGS ☐ SAND ☐	

Depth along axis (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	USC	SOIL SYMBOL	STANDARD PENETRATION (N)			GROUND ICE DESCRIPTION	Depth (ft)
						POCKET PEN. (kPa)				
						PLASTIC	M.C.	LIQUID		
0	CONCRETE					20	40	60		0
			C01 CONCRETE							
			C02 CONCRETE							
			C03 CONCRETE							
			C04 CONCRETE							
			C05 CONCRETE							
			C05 CONCRETE							5
			C05 CONCRETE							
			C07 CONCRETE							
			C08 CONCRETE							
			C09 CONCRETE							
			C10 CONCRETE							
			C11 CONCRETE							
			C12 CONCRETE							10
			C13 CONCRETE							
	CLAY (TILL) - silty, gravelly (< 20 mm), low plastic, dark grey-brown, damp, stiff to hand		S01	CL-ML						
			S02	CL-ML						
	End of Hole (3.81 m)									
										15
										5
5.5										18

	LOGGED BY: TJ	COMPLETION DEPTH: 3.81 m
	REVIEWED BY: TEH	COMPLETE: 10/21/2008
	DRAWING NO: 1	Page 1 of 1

PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 4 S Footing (Northeast corner)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-08	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE		☐ DISTURBED ☐ NO RECOVERY ☒ SPT		☐ A-CASING ☐ SHELBY TUBE ☐ CORE	
BACKFILL TYPE		☐ BENTONITE ☐ PEA GRAVEL ☐ SLOUGH		☐ GROUT ☐ DRILL CUTTINGS ☐ SAND	

Depth along axis (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	USC	SOIL SYMBOL	STANDARD PENETRATION (N)			GROUND ICE DESCRIPTION	Depth (ft)
						POCKET PEN. (kPa)				
						PLASTIC M.C. LIQUID				
						20	40	60		
0	CONCRETE		C01	CONCRETE						0
			C02	CONCRETE						
			C03	CONCRETE						
1			C04	CONCRETE						
			C05	CONCRETE						5
			C06	CONCRETE						
2			C07	CONCRETE						
			C08	CONCRETE						
			C09	CONCRETE						
	CLAY (TILL) - silty, gravelly (< 20 mm), low plastic, medium grey-brown, dry, hard, nuggetted		S01	CL-ML						10
3			S02	CL-ML						
	End of Hole (3.3 m)									
4										15
5										
5.5										18

	LOGGED BY: TJ	COMPLETION DEPTH: 3.3 m
	REVIEWED BY: TEH	COMPLETE: 10/20/2008
	DRAWING NO: 1	Page 1 of 1

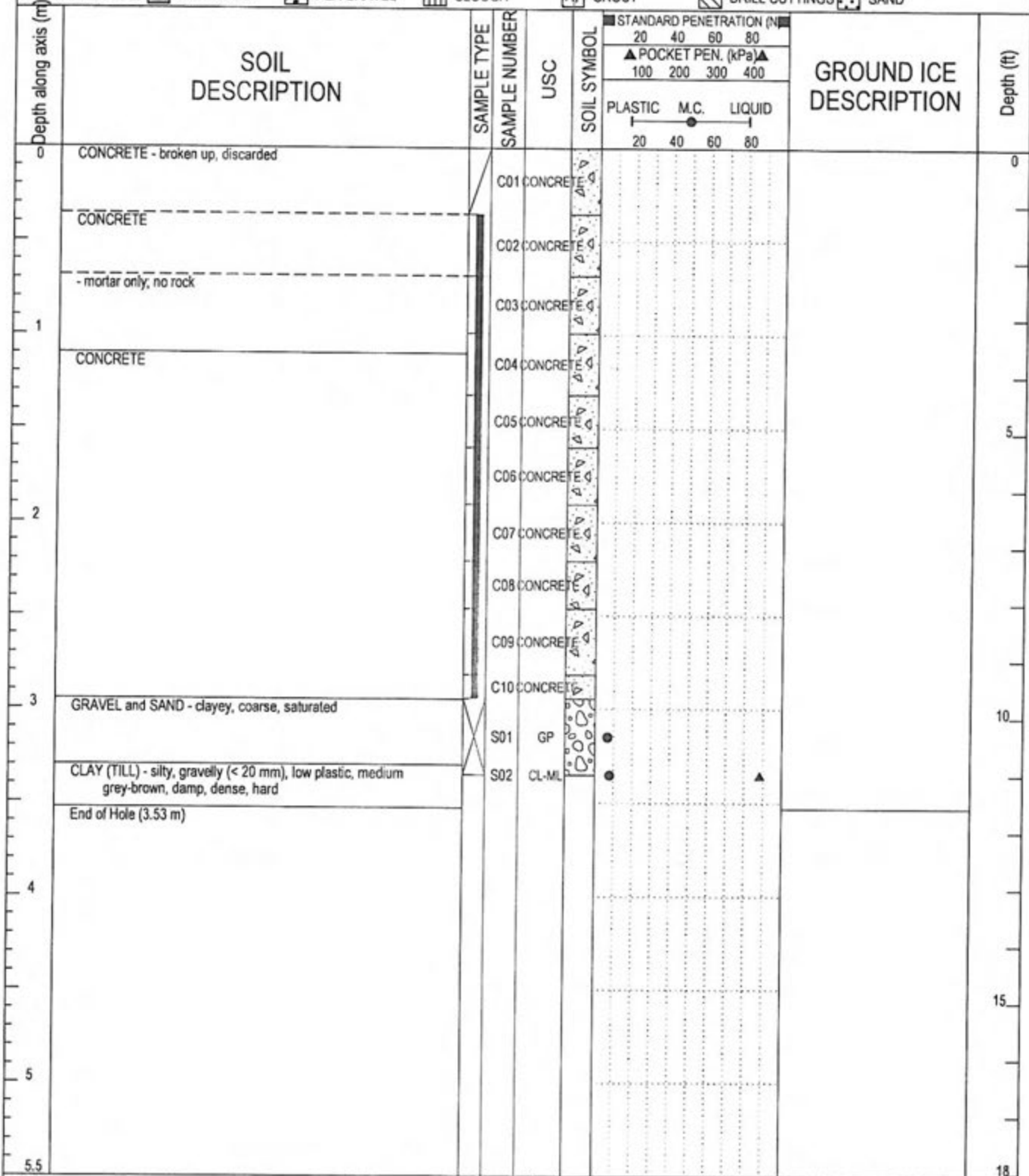
PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 4 S Footing (West end)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-09	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE		DISTURBED ☐ NO RECOVERY ☐ SPT ☒		A-CASING ☐ SHELBY TUBE ☐ CORE ☐	
BACKFILL TYPE		BENTONITE ☐ PEA GRAVEL ☐ SLOUGH ☐		GROUT ☐ DRILL CUTTINGS ☐ SAND ☐	

Depth along axis (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	USC	SOIL SYMBOL	STANDARD PENETRATION (N)			POCKET PEN. (kPa)	GROUND ICE DESCRIPTION	Depth (ft)
						20	40	60			
						100	200	300			
0	CONCRETE										0
			C01	CONCRETE							
			C02	CONCRETE							
			C03	CONCRETE							
			C04	CONCRETE							
			C05	CONCRETE							
			C06	CONCRETE							
			C07	CONCRETE							
			C08	CONCRETE							
			C09	CONCRETE							
3	CLAY - silty, gravelly (< 20 mm), low plastic, medium grey-brown, dry, hard, nuggetted		S01	CL-MI							10
			S02	CL-MI							
	End of Hole (3.20 m)										
4											
5											
5.5											18

	LOGGED BY: TJ	COMPLETION DEPTH: 3.2 m
	REVIEWED BY: TEH	COMPLETE: 10/20/2008
	DRAWING NO: 1	Page 1 of 1

PROJECT: Geotechnical Services	CLIENT: Jivkov Engineering	PROJECT NO. - BOREHOLE NO.
LOCATION: Pier 3 S Footing (East end)	DRILL: Electric Corer (Rocky Mountain)	Y14101074 - BH-10
DEH CHO BRIDGE, FORT PROVIDENCE, NT		

SAMPLE TYPE	☒ DISTURBED	☐ NO RECOVERY	☒ SPT	☐ A-CASING	☐ SHELBY TUBE	☐ CORE
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS	☐ SAND



LOGGED BY: TJ

REVIEWED BY: TEH

DRAWING NO: 1

COMPLETION DEPTH: 3.53 m

COMPLETE: 10/23/2008

Page 1 of 1

PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 3 S Footing (South side)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-11	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE	☒ DISTURBED	☐ NO RECOVERY	☒ SPT	☐ A-CASING	☐ SHELBY TUBE
BACKFILL TYPE	☐ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
		☐ CORE			
		☐ SAND			

Depth along axis (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	USC	SOIL SYMBOL	STANDARD PENETRATION (N)			GROUND ICE DESCRIPTION	Depth (ft)
						POCKET PEN. (kPa)				
						20	40	60		
0	CONCRETE									0
1	- re-bar at 0.86 m									
2										
3										
4	SAND - fine to medium, brown, saturated		S01	SW						
	CLAY (TILL) - silty, low plastic, medium grey-brown, moist, stiff		S02	CL						
	SAND and GRAVEL - (< 20 mm), brown, saturated		S03	CL-CL						
	CLAY (TILL) - silty, gravelly (< 20 mm), low plastic, medium grey-brown, stiff		S04	CL						
	End of Hole (4.04 m)									
5										
5.5										18

	LOGGED BY: TJ	COMPLETION DEPTH: 4.04 m
	REVIEWED BY: TEH	COMPLETE: 10/24/2008
	DRAWING NO: 1	Page 1 of 1

PROJECT: Geotechnical Services		CLIENT: Jivkov Engineering		PROJECT NO. - BOREHOLE NO.	
LOCATION: Pier 3 S Footing (Northwest corner)		DRILL: Electric Corer (Rocky Mountain)		Y14101074 - BH-12	
DEH CHO BRIDGE, FORT PROVIDENCE, NT					
SAMPLE TYPE	☒ DISTURBED	☐ NO RECOVERY	☒ SPT	☐ A-CASING	☐ SHELBY TUBE
BACKFILL TYPE	☐ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
SOIL DESCRIPTION SOIL SYMBOL GROUND ICE DESCRIPTION					
Depth along axis (m)	SAMPLE TYPE		SAMPLE NUMBER	USC	Depth (ft)
0	CONCRETE		C01	CONCRE	0
			C02	CONCRE	
			C03	CONCRE	
1			C04	CONCRE	
			C05	CONCRE	
			C06	CONCRE	5
			C07	CONCRE	
2			C08	CONCRE	
			C09	CONCRE	
			C10	CONCRE	10
3	CLAY - silty, some gravel (black, < 20 mm), low plastic, medium grey-brown, damp, dense, stiff-hard		S01	CL-MI	
	- Layers of sandy gravel		S02	CL-ML	
	End of Hole (3.76 m)				
4					
					15
5					
5.5					18

LOTTED BY: TJ

REVIEWED BY: TEH

DRAWING NO: 1

COMPLETION DEPTH: 3.76 m

COMPLETE: 10/24/2008

Page 1 of 1

APPENDIX C

APPENDIX C RELEVANT CORRESPONDENCE

September 29, 2008

EBA File: Y14101074

Jivko Engineering
P.O. Box 1341
Yellowknife, NT X1A 2N9

Via E-mail: Jivko@jivko.ca

Attention: Jivko Jivkov, P.Eng.,
Principal

**Subject: Testing Regime for Pier Foundation Verification
Deh Cho Bridge, Fort Providence Area, NT**

As requested, this letter describes an approach to assess the site conditions and the geotechnical aspects of the footings for the south four piers at the Deh Cho Bridge. These footings have been cast. It is understood that verification is required for compliance with Clause 6.4.6 of the Canadian Highway Bridge Design Code.

EBA Engineering Consultants Ltd. (EBA) was advised that our scope of services with respect to engineering/design was complete with the submission of our supplemental design report in May. As such, we had no representation on site during foundation excavation/preparation and have no documentation of observations at the site. It is understood that the contractor is preparing documentation of the quality control procedures and observations conducted in connection with footing base preparation. EBA can review these to assess if their observations were consistent with what was assumed to develop the design recommendations.

It is understood that Jivko Engineering (Jivko) wishes to have cores collected through the full depth of each footing. This will provide access to the base of the footing. EBA proposes to collect relatively undisturbed Shelby tube samples from the bottom of the core holes. The consistency of the soil collected will be compared to that determined at the time of the site investigation and that assumed for design.

From the site investigation, we know that although the silty clay till is hard, it is possible to collect Shelby tube samples. However, gravel/cobbles occasionally result in disturbed or incomplete samples being collected. Therefore, we propose to allow for four samples to be collected from below each pier, with the expectation that two or three samples will be successfully collected. A Shelby tube length is typically 0.45 m.

It should be noted that the contact between the concrete and the underlying soil may become disturbed by coring and be difficult to assess. But the extent of the disturbed zone will be recorded and considered in the interpreting the site conditions.

To summarize, site conditions will be assessed by sampling through core holes and geotechnical considerations will be assessed by a review of the quality control documentation. We trust that this

jivkoletter0929.doc

adequately responds to your request. Please contact the undersigned if you have questions or comments.

Yours truly,
EBA Engineering Consultants Ltd.



T.E. Hoeve, P.Eng.
Project Director, NT/NU
Direct Line: 867.766.3728 x114
choeve@eba.ca

Reviewed by:

Ali Azizian, P.Eng. (BC), Ph.D.
Senior Geotechnical Engineer
Direct Line: 604.685.0275 x243
aazizian@eba.ca

DRAFT

October 30, 2008

Y14101074

Jivkov Engineering
PO Box 143, Station Main
Yellowknife, NT X1A 2N1

Attention: Mr. Jivko Jivkov, P. Eng.

Subject: Del Cho Bridge – Canadian Bridge Code Item 6.4.6

EBA Engineering Consultants Ltd. (EBA) confirms by this letter that as the Geotechnical Engineer it has inspected the foundations during construction of Piers 1, 2, 3, and 4 South (all) of the Del Cho Bridge. EBA's inspections found site conditions which were consistent with those encountered during site investigations and those used to develop geotechnical design recommendations. Furthermore, EBA confirms that these foundations have been constructed as intended by the design. Field reports documenting EBA's inspections and observations have been provided and a formal summary report is being prepared.

On the basis of the foregoing, EBA confirms that the requirements of Canadian Bridge Code Item # 6.4.6 have been satisfied.

Respectfully submitted,
EBA Engineering Consultants Ltd.

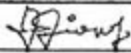
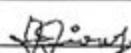
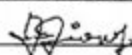
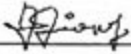


Neil R. MacLeod, P. Eng.
Principal Consultant, Engineering Division

cc Andrew Gamble

**APPENDIX B
SUPPORTING DOCUMENTS**

TAB C

NON CONFORMANCE REPORT (NCR)		No: 1
Part A: Notice of Non-Conformance		
Raised By: <i>J. Jivkov</i>	Signature: 	Date: <i>July 6, 2008</i>
Element of Works Affected: <i>Pier 2s – (excavation)</i>		
Reference Documents, if any: <i>IFC Drawing 02 152- 006 and 119</i>		
Description: <i>During pre-drilling of excavation for Pier 3s footing, the contractor over-drilled about 20% of the area on the upstream end by approximately 1.5 m. This was noted on July 6 and the remaining area was drilled to proper depth. See attached drawings.</i>		
Received by: <i>J. Jivkov</i>	Signature: 	Date: <i>October 28, 2008</i>
Part B: Proposed Remedial Action		
Immediate Remedial Action(s) Taken: <i>On July 6 Contractor was instructed to drill to proper depth and to provide Work Procedures for remedial work</i>		
Further Remedial Actions Proposed: <i>Contractor submitted Work Procedures including excavating the over-drilled area, airlifting of the small loose material and placing tremie concrete in the excavation to the elevation of the design excavation. Placing of the repair-concrete was in a separate pour, prior to installation of the rebar mats for footing.</i>		
By: <i>J. Jivkov</i>	Signature: 	Date: <i>October 28, 2008</i>
Part C: Approval of Remedial Action		
Approval Required: <i>Not required</i>		
	GNWT	Territorial Advisor
Forwarded for review to:	<i>K. McLeod</i>	<i>S. Smith</i>
Date:	<i>29 Oct 2008</i>	<i>29 Oct 2008</i>
Reviewed:		
Recommended:		
Approved:	<i>N/A</i>	<i>N/A</i>
Notes: <i>Provided for information only – no material change in design, performance or cost</i>		
Part D: Follow-up and Close-out		
Remedial Works Completed: <i>Remedial Work approved, completed, inspected and accepted</i>		
Verified by: <i>J. Jivkov</i>	Signature: 	Date: <i>October 28, 2008</i>
Part E: Financial implications?		
Yes ☐	No ☒	If yes, report attached.

Date: *October 29, 2008*

Page 1



DEH CHO BRIDGE

PIER 2S - COFFERDAM EXCAVATION AND REMEDIATION – Rev 1

Date: September 10, 2008

Pier 2S Remediation

The excavation for the pier 2S cofferdam on the Deh Cho bridge did not go as per the design drawings and subsequent changes to the design. The following outlines the background of the issues:

- The original design drawings reflected an underside of footing elevation for pier 2S of 141.0m.
- The pre-drilling of the cofferdam floor was started based on this elevation.
- A Field Change Notice (FCN001) was issued on July 6, 2008 outlining that the footing elevation for pier 2S had been raised 1.5m to elevation 142.5m.
- Prior to getting the Field Change Notice, approximately 25% of the cofferdam floor on the eastern, upstream end of the cofferdam, had been predrilled to the original design elevation of 141.0m (see sketch 1 showing the extent of the overdrilling).
- The remaining portion of the cofferdam floor was predrilled to the revised design as per FCN001 except for the area adjacent to the overdrilled area. This area was predrilled to the original design elevation of 141.0m so that a bench that goes from the north side to the south side of the cofferdam could be excavated (see sketches 1 and 2 showing this).
- Sheet piling was installed around the perimeter of the cofferdam. The sheet piles were driven down to elevation 139.7m on average around the shallower drilled area of the cofferdam (design sheet pile tip elevation in this area is 140.2m). The sheet piles were driven down to elevation 138.7m on average around the deeper drilled area of the cofferdam (design sheet pile tip elevation in this area is 138.7m) (see attached sheet pile as-built information).

The following outlines the proposed remediation:

- The cofferdam is to be excavated down to elevation 142.5m except for the overdrilled area which is to be excavated to elevation 141.0m. The excavation is to be conducted as per the Ruskin Cofferdam Excavation work procedure submitted previously. The nature of the excavation will create a 1.5m high bench between the two areas. The entire cofferdam floor is to be airlifted to remove any small or loose particles.
- The lower area of the excavation is to be filled with concrete using the Ruskin Tremie Work Procedure. This area is to be filled until it is level with the rest of the cofferdam excavation.
- The reinforcing cage is to be installed into the cofferdam as per the Ruskin Rebar Cage Installation Work Procedure.
- The footing concrete is to be placed as per the Ruskin Tremie Work Procedure.

I trust that this letter outlines the issues surrounding the pier 2S excavation and indicates the proposed remediation. Please feel free to contact our office if there are any questions or concerns.

Prepared by,

A handwritten signature of Don Williams in black ink, written over a circular professional seal.

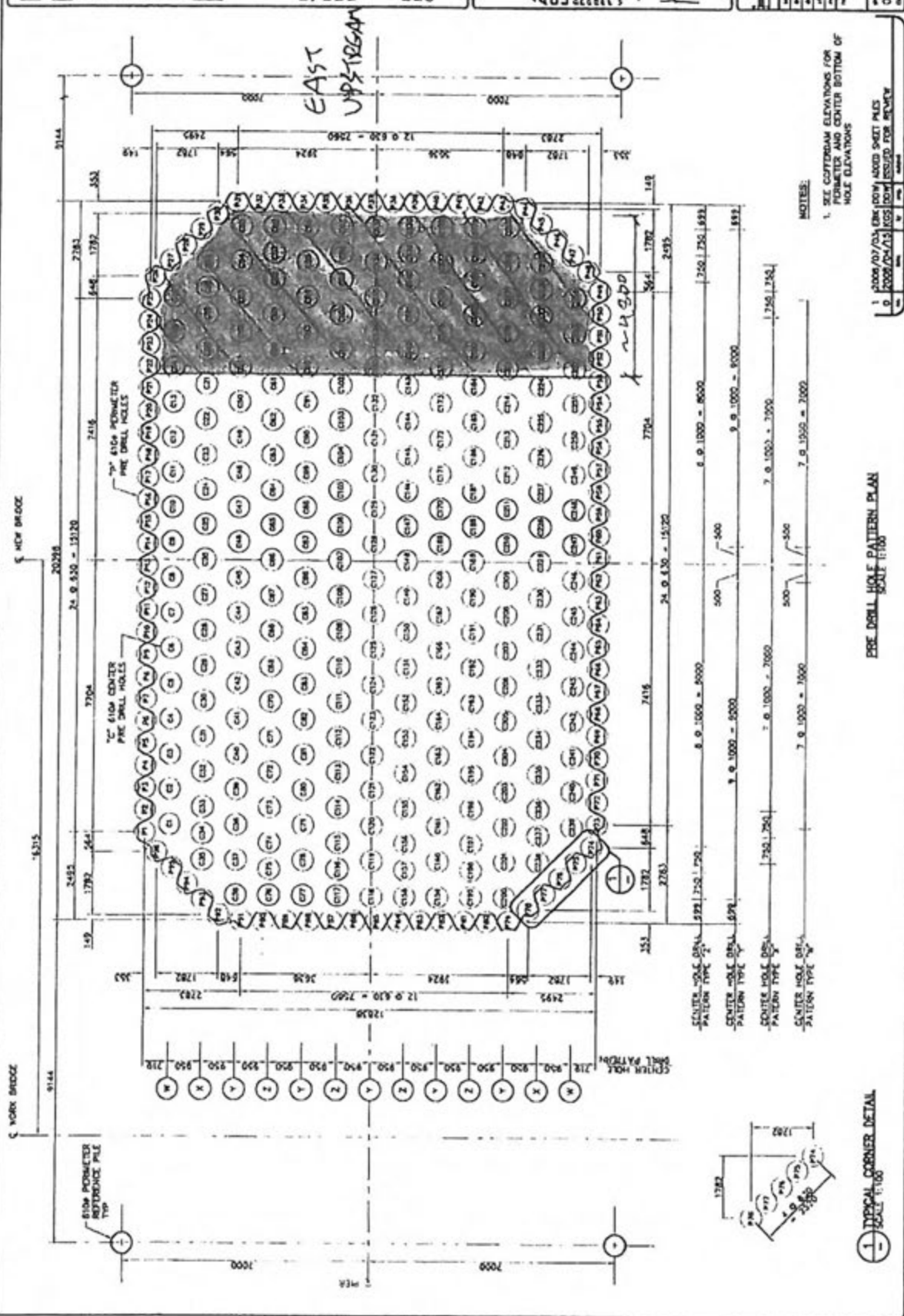
Don Williams PEng

Reviewed by,

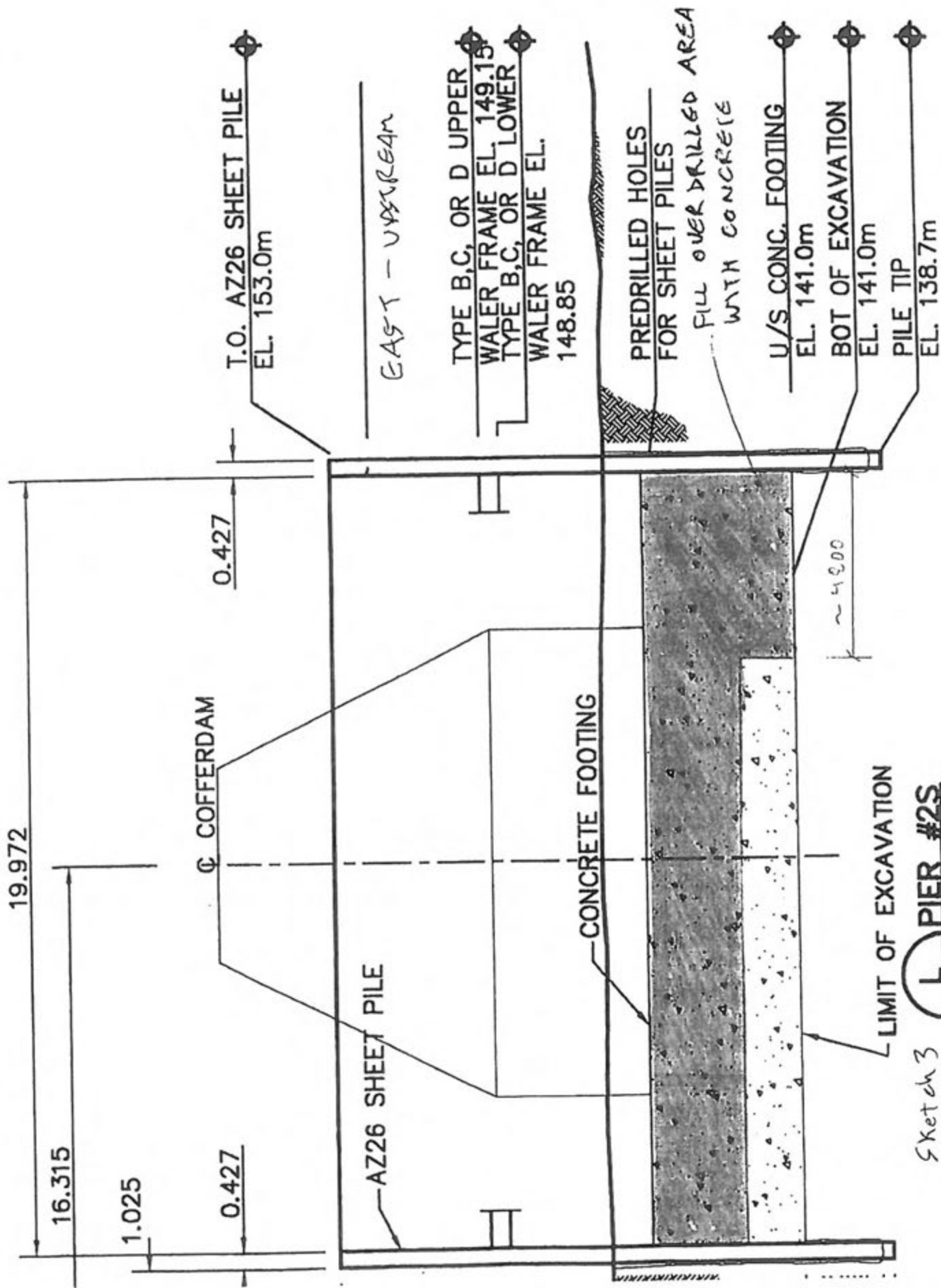
A handwritten signature of Darby Kreitz in black ink, written over a circular professional seal.

Darby Kreitz PEng





Sketch 2 Highlighted area drilled to elev 141.0m and excavated. The remaining area drilled and excavated to elev 142.5m.



Sketch 3
 L PIER #2S
 203 SCALE 1:250

B#82 P2S

drozell@jivko.ca

From: "Frank Flanagan" <f.flanagan@atcongroup.com>
To: "Jivko I. Jivkov" <jivko@jivko.ca>; "Scott Orr" <sorr@atcongroup.com>
Cc: "YK Thomas Lowe@Jivko" <thomaslowe@jivko.ca>; "Rod Cleave" <RCleave@rcl.bz>; "Andrew Purdey" <APurdey@rcl.bz>; "Mike Love" <mlove@atcongroup.com>; "Terry Whiteman" <TWhiteman@rcl.bz>; "Charlie Matchett" <cmatchett@atcongroup.com>; "Jeff Comeau" <jcomeau@atcongroup.com>; "YK A. Gamble" <agamble@theedge.ca>; <freddocctrl@atcongroup.com>
Sent: June-26-08 11:15 AM
Subject: RE: RFI 030 - Rebar Splice Length - Pier Footing

Jivko,

Does this also mean that reinforcing for Pier 2 South will be the same as Pier 2 North?

Please clarify.

Thanks

Frank Flanagan
 Atcon Construction Inc.
 626 Newcastle Blvd.
 Miramichi N. B.
 E1V 2L3
 Tel: 506 - 627 - 0527
 Cell: 506 - 624 - 7970
 Fax: 506 - 627 - 0775
 Email: f.flanagan@atcongroup.com

-----Original Message-----

From: Jivko I. Jivkov [mailto:jivko@jivko.ca]
Sent: Thursday, June 26, 2008 11:28 AM
To: Scott Orr
Cc: YK Thomas Lowe@Jivko; 'Rod Cleave'; 'Andrew Purdey'; 'Frank Flanagan'; 'Mike Love'; 'Terry Whiteman'; 'Charlie Matchett'; 'Jeff Comeau'; YK A. Gamble
Subject: Re: RFI 030 - Rebar Splice Length - Pier Footing

Folks,

With the memo below, dated June 20, I indicated that it is possible to eliminate the lower layer of concrete on the footing of Pier 2S (DRWG 120) depending of the results of the pre-drilling. Yesterday the geotechnical engineer confirmed the good news that since this footing will be poured in tremie the lower layer of concrete will not be needed and the base of the footing is to be set at el 142.5 same as the elevation of the footing of the pier 2N. Ruskin should take into account this elevation while pre-drilling for sheetpiles and base of the Pier 2S.

Regards,

Jivko

----- Original Message -----

From: "Jivko I. Jivkov" <jivko@jivko.ca>

To: "Scott Orr" <sorr@atcongroup.com>

Cc: "YK A. Gamble" <agamble@theedge.ca>; "Jeff Comeau"

<jcomeau@atcongroup.com>; "Charlie Matchett" <cmatchett@atcongroup.com>;

"Terry Whiteman" <TWhiteman@rcl.bz>; "Mike Love" <mlove@atcongroup.com>;

"Frank Flanagan" <f.flanagan@atcongroup.com>; "Andrew Purdey"

<APurdey@rcl.bz>; "Rod Cleave" <RCleave@rcl.bz>

Sent: Friday, June 20, 2008 3:24 PM

Subject: Re: RFI 030 - Rebar Splice Length - Pier Footing

> Reply to RFI 30

> Hello Scott,

> 1. I looked into the specified drawings 119, 120 and 121 and couldn't
> find

> confusion. Splices for the four layers M35 @ 400mm in the pier footings

> are to be in accordance to S6-00 clause 8.15.1.3. Same clause sets the

> minimum development length at the effective depth of the footing which is

> +/- 2.4m. So length of splices should be 2.4 m. If someone reads it

> different we can discuss...

>

> I would appreciate future questions of similar nature to be ran by

> Allnorth

> who we believe are RCL's Engineer, or through other qualified personnel

> familiar with the bridge code. Would be also much less labour intensive

> for

> all parties to pickup the phone and pose the question directly rather than

> to generate RFI distributed to more than a dozen people. In order to

> cleanup

> similar issues quickly I'd be happy to establish direct contact with Mr.

> Mike Ord of Prince George Steel Ltd.

>

> 2. It is possible to eliminate the lower layer of concrete on the footing

> of

> Pier 2S (DRWG 120) depending on results from test drilling. We need to

> discuss in detail the drilling process and the decision making with

> Allnorth, RCL personnel and our Geotechnical Engineer EBA. Setting a

> meeting to discuss the issue soon would be appreciated.

>

> Regards,

> Jivko

> ----- Original Message -----

> From: "Scott Orr" <sorr@atcongroup.com>

> To: "Jivko I. Jivkov" <jivko@jivko.ca>

> Cc: "Rod Cleave" <RCleave@rcl.bz>; "Andrew Purdey" <APurdey@rcl.bz>;

> "Frank Flanagan" <f.flanagan@atcongroup.com>; "Mike Love"

> <mlove@atcongroup.com>; "Terry Whiteman" <TWhiteman@rcl.bz>; "Charlie

**APPENDIX B
SUPPORTING DOCUMENTS**

TAB D

205

RESOLVING AND DELIVERING BETTER SOLUTIONS

September 24, 2009

EBA File: Y14101074.004

Jivko Engineering
PO Box 143, Station Main
Yellowknife, NT X1A 2N1

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

Subject: Deh Cho Bridge – Canadian Bridge Code Item 6.4.6

As per your email request dated September 22, 2009, this letter presents the results of EBA Engineering Consultants Ltd.'s (EBA's) examination of the foundation conditions for Piers 3N and 4N of the Deh Cho Bridge. We examined the type and consistency of the foundation soil and compared it with that encountered during previous site investigations and with what was used to develop the geotechnical design recommendations.

An EBA field engineer, Baoquan An, conducted an examination of the excavations for Piers 3N and 4N on September 11 and 15, 2009, respectively. The related field reports were submitted to Mr. Phil Munn.

During each site visit, samples were taken from various locations and shipped to our laboratory for moisture content and bulk density testing. At this time, only the moisture content tests have been completed on the samples from the base of the Pier 3N excavation. The results of further testing will be reported when they become available. The following summarizes the key findings based on visual inspection and the currently available laboratory results:

- The prevalent soil close to the designed depth is a hard clay till. This is similar to the material found in previous geotechnical investigations and in the foundation of the previously constructed piers. The unconfined compressive strength of the clay till at every sampling location in the base of both excavations was measured on disturbed samples using a Pocket Penetrometer. In all tests, the unconfined compressive strength was determined to be more than 400 kPa, which is almost the maximum range of the Pocket Penetrometer;
- The clay is low to medium plastic based on visual observations;
- Moisture contents in the clay till from Pier 3N ranged from 10% to 11.8% and averaged 11.2%. The moisture content of the till is generally below the plastic limit (which ranged from 12% to 15% according to our previous report: *Geotechnical/Materials Evaluation Proposed Deh Cho Bridge, Fort Providence, NT*, dated February 2004, EBA File: 1700063); and
- Samples of the till generally contained trace to some gravel. Rocks up to boulder size were found during excavation.

Deh Cho Bridge – Canadian Bridge Code Item 6.4.6.Dm



- Although laboratory test results are not yet available for the samples from Pier 4N, the materials appear to be very similar to those encountered in the base of the excavation for Pier 3N.

As required by the Canadian Bridge Code S6.00, Clause 6.4.6, and based on the above information, EBA confirms by this letter that, as the Geotechnical Engineer, it has examined the foundation excavations for Piers 3N and 4N. EBA's examinations found soil conditions were consistent with those encountered during the original site investigations and those used to develop the geotechnical design recommendations, although more laboratory testing has yet to further confirm this statement. The results of the additional laboratory testing will be provided when they become available.

Yours truly,
EBA Engineering Consultants Ltd.

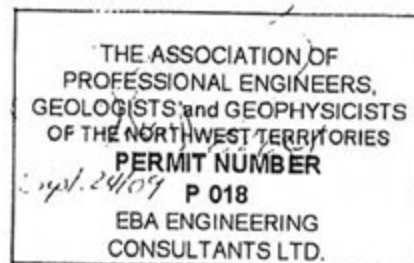


Baoquan An, P.Eng. (AB)
Geotechnical Engineer
Direct Line: 867.766.3728 x113
ban@eba.ca



Review by:
Kevin Jones, P.Eng.
Senior Project Director, Arctic Region
Direct Line: 780.451.2125
kjones@eba.ca

/jnc



203

Fasting inspection EBA

October 6, 2009

EBA File: Y14101074.004

Jivko Engineering
PO Box 143, Station Main
Yellowknife, NT X1A 2N1

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

Subject: Deh Cho Bridge – Canadian Bridge Code Item 6.4.6

As per your request, this letter presents the results of EBA Engineering Consultants Ltd.'s (EBA's) examination of the foundation conditions for Piers 1N and 2N of the Deh Cho Bridge. We examined the type and consistency of the foundation soil and compared it with that encountered during previous site investigations and with what was used to develop the geotechnical design recommendations.

An EBA field engineer, Baoquan An, conducted an examination of the excavations for Piers 1N and 2N on September 28 and 23, 2009, respectively. The related field reports were submitted to Mr. Phil Munn.

During each site visit, samples were taken from various locations and shipped to our laboratory for moisture content and bulk density testing. At this time, we have not completed laboratory testing. The results of lab testing will be reported when they become available. The following summarizes the key findings based on visual inspection:

- The prevalent soil close to the designed depth is a hard clay till. This is similar to the material found in previous geotechnical investigations and in the foundation of the previously constructed piers. The unconfined compressive strength of the clay till at every sampling location in the base of both excavations was measured on disturbed samples using a Pocket Penetrometer. In all tests, the unconfined compressive strength was determined to be more than 450 kPa, which is the maximum range of the Pocket Penetrometer;
- The clay is low to medium plastic based on visual observations;
- Samples of the till generally contained trace to some gravel. Rocks up to boulder size were found during excavation.

As required by the Canadian Bridge Code S6.00, Clause 6.4.6, and based on the above information, EBA confirms by this letter that, as the Geotechnical Engineer, it has examined the foundation excavations for Piers 1N and 2N. EBA's examinations found soil conditions were consistent with those encountered during the original site investigations and those used to develop the geotechnical design recommendations, although laboratory testing has yet to further confirm this statement. The results of the additional laboratory testing will be provided when they become available.

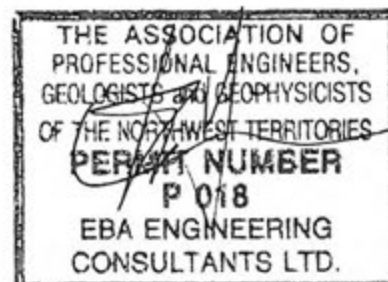
Yours truly,
EBA Engineering Consultants Ltd.



Baoquan An, P.Eng. (AB)
Geotechnical Engineer
Direct Line: 867.766.3728 x113
ban@eba.ca



Reviewed by:
Ed Hoeve, P.Eng.
Project Director, NT/NU Region
Direct Line: 867.766.3728 x114
ehoeve@eba.ca



APPENDIX B

TAB E



DEH CHO BRIDGE - PIER FOOTING - CERTIFICATION

Certification for Pier Footing - Pier 15

Date: Sep 19, 2008

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Drilling			
1.1	Drilling Inspection Test Plan filled out/signed off	Y	DDW	
1.2	As-built location and elevation of holes	Y	DDW	
2.0	Sheet Pile Installation			
2.1	Sheet Pile Inspection Test Plan filled out/signed off	Y	DDW	
2.2	As-built location and elevation of sheet piles	Y	DDW	
3.0	Cofferdam Excavation			
3.1	Cofferdam Excavation Inspection Test Plan filled out and signed off	Y	DDW	
3.2	Excavation survey drawing showing surface Topography	Y	DDW	Air lift record attached
3.3	Record of excavation surface "soft thickness" Measurements	N/A	DDW	This requirement came into effect at a later date.
4.0	Pier Footing Rebar Cage Installation			
4.1	Pier Footing Rebar Cage Assembly Inspection Test Plan - Option 1 or 2 filled out and signed off	Y	DDW	
4.2	Pier Footing Rebar Cage Installation Inspection Test Plan - Option 1 or 2 filled out and signed off	Y	DDW	
4.3	Reinforcing Mill Certificates	Y	DDW	
4.4	Cage inspection notes c/w proof of measurements	N	DDW	INVO INSPECTED CAGE AND APPROVED IT
4.5	As-built location and elevation of reinforcing cage	Y	DDW	
5.0	Tremie Pour			
5.1	Pier Footing Tremie Pour Inspection Test Plan filled out and signed off	Y	DDW	
5.2	Approved concrete mix design	Y	DDW	
5.3	Record of upper elevation of concrete surface	Y	DDW	
5.4	Require concrete strength prior to dewatering document	Y	DDW	
6.0	Water Installation and Dewatering			
6.1	Water Installation and Dewatering Inspection Test Plan filled out and signed off	Y	DDW	
7.0	Footing Concrete			
7.1	Require design concrete strength document	N	DDW	Interim signoff only

I certify that Pier Footing Pier 15 has been constructed in accordance with the applicable CSA Standards and with the Plans and Specifications. Please see the attached supporting documentation (as listed above) that supports this certification.

Prepared by:

Certified by:

Don Williams PEng - QC Manager

Darby Kreitz PEng - Certifying Engineer

DEH CHO BRIDGE - LOWER PIER BUTTRESS - CERTIFICATION

Certification for Lower Pier Buttress - Pier #1 South

Date: February 26, 2010

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Lower Pier Buttress			
✓ 1.1	Lower Pier Buttress Inspection Test Plan filled out and signed off <i>- accepted by Jivko 25 Oct 10/08</i>	Y	PDW	<i>no mix design (breaks in file)</i>
✓ 1.2	Material Audit inspection test plans filled out and signed off <i>- accepted by Jivko JJ's 2nd 25/08</i>	Y	PDW	Reinforcing modifications verbally Approved by owner representatives
✓ 1.3	Pre pour inspection test plans filled out and signed off <i>- accepted by Jivko Oct 2/08</i>	Y	PDW	<i>no concrete breaks</i>
✓ 1.4	Cast in place concrete inspection test plans filled out and signed off	Y	PDW	Plastic concrete testing provided by EBA Directed by ATCON
✓ 1.5	Post pour inspection test plans filled out and signed off <i>- accepted by Jivko Oct 2/08 breaks attached</i>	Y	PDW	ITP signed off without concrete break Information as it was not made Available by ATCON
1.6	Concrete mix design <i>mix design by EBA</i>	N/A	DBL	Concrete mix design and supply by ATCON
1.7	As-built location of lower pier buttress	N	PDW	Formwork As-built location completed

I certify that Pier #1 South Lower Buttress has been constructed in accordance with the applicable CSA Standards, Plans and Specifications. Certification doesn't include concrete quality or strength, as concrete supply was the responsibility of ATCON. Supporting documentation originally provided to ATCON is available upon request.

Certified by:



Don Williams Peng - QC Manager



DEH CHO BRIDGE – UPPER PIER BUTTRESS – CERTIFICATION

Certification for Upper Pier Buttress – Pier #1 South

Date: February 26, 2010

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Upper Pier Buttress			
✓ 1.1	Upper Pier Buttress Inspection Test Plan filled out and signed off	Y	DDW	
✓ 1.2	Material Audit inspection test plans filled out and signed off	Y	DDW	Reinforcing modifications verbally Approved by owner representatives. Atcon supplied materials not certified.
✓ 1.3	Pre pour inspection test plans filled out and signed off	Y	DDW	
✓ 1.4	Cast in place concrete inspection test plans filled out and signed off	Y	DDW	Plastic concrete testing provided by EBA Directed by ATCON
✓ 1.5 NCR	Post pour inspection test plans filled out and signed off	Y	DDW	ITP signed off without concrete break Information as it was not made Available by ATCON
1.6	Concrete mix design	N/A	DDW	Concrete mix design and supply by ATCON
✓ 1.7	As-built location of Upper pier buttress	N	DDW	Construction surveying completed No records available

I certify that Pier #1 South Upper Buttress has been constructed in accordance with the applicable CSA Standards, Plans and Specifications. Certification doesn't include concrete quality, strength, and or any ATCON supplied materials. Certification supporting documentation originally provided to ATCON is available upon request.

Certified by:

Don Williams P.Eng - QC Manager

P25



DEH CHO BRIDGE - PIER FOOTING - CERTIFICATION

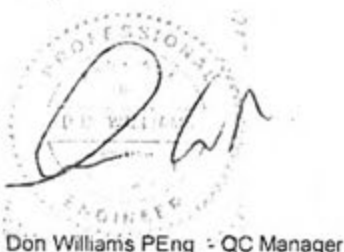
Certification for Pier Footing - Pier 25

Date: Sept 19, 2008

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Drilling			
1.1	Drilling Inspection Test Plan filled out/signed off	Y	DSW	East end drilled deeper than Reg'd
1.2	As-built location and elevation of holes	Y	DSW	- PCH 001 attached
2.0	Sheet Pile Installation			
2.1	Sheet Pile Inspection Test Plan filled out/signed off	Y	DSW	
2.2	As-built location and elevation of sheet piles	Y	DSW	
3.0	Cofferdam Excavation			
3.1	Cofferdam Excavation Inspection Test Plan filled out and signed off	Y	DSW	- See remediation letter
3.2	Excavation survey drawing showing surface Topography	Y	DSW	
3.3	Record of excavation surface "soft thickness" Measurements	Y	DSW	
4.0	Pier Footing Rebar Cage Installation			
4.1	Pier Footing Rebar Cage Assembly Inspection Test Plan - Option 1 or 2 filled out and signed off	Y	DSW	
4.2	Pier Footing Rebar Cage Installation Inspection Test Plan - Option 1 or 2 filled out and signed off	Y	DSW	
4.3	Reinforcing Mill Certificates	Y	DSW	
4.4	Cage inspection notes c/w proof of measurements	Y N	DSW	Owners Rep did inspection.
4.5	As-built location and elevation of reinforcing cage	Y	DSW	
5.0	Tremie Pour			
5.1	Pier Footing Tremie Pour Inspection Test Plan filled out and signed off	Y	DSW	
5.2	Approved concrete mix design	Y	DSW	
5.3	Record of upper elevation of concrete surface	Y	DSW	
5.4	Require concrete strength prior to dewatering document	Y	DSW	
6.0	Waler Installation and Dewatering			
6.1	Waler Installation and Dewatering Inspection Test Plan filled out and signed off	Y	DSW	
7.0	Footing Concrete			
7.1	Require design concrete strength document	N	DSW	Interim sign off only

I certify that Pier Footing Pier 25 has been constructed in accordance with the applicable CSA Standards and with the Plans and Specifications. Please see the attached supporting documentation (as listed above) that supports this certification.

Prepared by:


Don Williams PEng - QC Manager

Certified by:


Darby Kreitz PEng - Certifying Engineer

except for proof of final design concrete strength. Interim sign off only



DEH CHO BRIDGE – LOWER PIER BUTTRESS – CERTIFICATION

Certification for Lower Pier Buttress – Pier #2 South

Date: February 26, 2010

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Lower Pier Buttress			
1.1	Lower Pier Buttress Inspection Test Plan filled out and signed off	Y	DDW	
1.2	Material Audit inspection test plans filled out and signed off	Y	DDW	Reinforcing modifications verbally Approved by owner representatives
1.3	Pre pour inspection test plans filled out and signed off	Y	DDW	
1.4	Cast in place concrete inspection test plans filled out and signed off	Y	DDW	Plastic concrete testing provided by EBA Directed by ATCON
1.5	Post pour inspection test plans filled out and signed off	Y	DDW	ITP signed off without concrete break Information as it was not made Available by ATCON
1.6	Concrete mix design	N/A	DDW	Concrete mix design and supply by ATCON
1.7	As-built location of lower pier buttress	N	DDW	Formwork As-built location completed

I certify that Pier #2 South Lower Buttress has been constructed in accordance with the applicable CSA Standards, Plans and Specifications. Certification doesn't include concrete quality or strength, as concrete supply was the responsibility of ATCON. Supporting documentation originally provided to ATCON is available upon request.

Certified by:

Don Williams PEng - QC Manager



DEH CHO BRIDGE – UPPER PIER BUTTRESS – CERTIFICATION

Certification for Upper Pier Buttress – Pier #2 South

Date: February 26, 2010

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Upper Pier Buttress			
1.1	Upper Pier Buttress Inspection Test Plan filled out and signed off	Y	DBW	
1.2	Material Audit inspection test plans filled out and signed off	Y	DBW	Reinforcing modifications verbally Approved by owner representatives. Atcon supplied materials not certified.
1.3	Pre pour inspection test plans filled out and signed off	Y	DBW	
1.4	Cast in place concrete inspection test plans filled out and signed off	Y	DBW	Plastic concrete testing provided by EBA Directed by ATCON
1.5	Post pour inspection test plans filled out and signed off	Y	DBW	ITP signed off without concrete break Information as it was not made Available by ATCON
1.6	Concrete mix design	N/A	DBW	Concrete mix design and supply by ATCON
1.7	As-built location of Upper pier buttress	N	DBW	Construction surveying completed No records available

I certify that Pier #2 South Upper Buttress has been constructed in accordance with the applicable CSA Standards, Plans and Specifications. Certification doesn't include concrete quality, strength, and or any ATCON supplied materials. Certification supporting documentation originally provided to ATCON is available upon request.

Certified by:



Don Williams PEng - QC Manager

P35



DEH CHO BRIDGE - PIER FOOTING - CERTIFICATION

 Certification for Pier Footing - 35

 Date: Oct 27, 2008

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Drilling			
✓ 1.1	Drilling Inspection Test Plan filled out/signed off	Y	DDW	boulders
✓ 1.2	As-built location and elevation of holes	Y	DDW	
2.0	Sheet Pile Installation			
✓ 2.1	Sheet Pile Inspection Test Plan filled out/signed off	Y	DDW	
✓ 2.2	As-built location and elevation of sheet piles	Y	DDW	
3.0	Cofferdam Excavation			
✓ 3.1	Cofferdam Excavation Inspection Test Plan filled out and signed off	Y	DDW	boulders - req'd variation from work plan.
✓ 3.2	Excavation survey drawing showing surface Topography	Y	DDW	
✓ 3.3	Record of excavation surface "soft thickness" Measurements	Y	DDW	
4.0	Pier Footing Rebar Cage Installation			
✓ 4.1	Pier Footing Rebar Cage Assembly Inspection Test Plan - Option 1 or 2 filled out and signed off	Y	DDW	✓
✓ 4.2	Pier Footing Rebar Cage Installation Inspection Test Plan - Option 1 or 2 filled out and signed off	Y	DDW	
✓ 4.3	Reinforcing Mill Certificates	Y	DDW	
✓ 4.4	Cage inspection notes c/w proof of measurements	N	DDW	inspected by owner's eng.
✓ 4.5	As-built location and elevation of reinforcing cage	Y	DDW	
5.0	Tremie Pour			
✓ 5.1	Pier Footing Tremie Pour Inspection Test Plan filled out and signed off	Y	DDW	flowable, etc. problems
✓ 5.2	Approved concrete mix design	Y	DDW	
✓ 5.3	Record of upper elevation of concrete surface	Y	DDW	
✓ 5.4	Require concrete strength prior to dewatering document	Y	DDW	3 breaks
6.0	Waler Installation and Dewatering			
✓ 6.1	Waler Installation and Dewatering Inspection Test Plan filled out and signed off	Y	DDW	
7.0	Footing Concrete			
✓ 7.1	Require design concrete strength document	N	DDW	1 break. Interim sign-off only.

I certify that Pier Footing 35 has been constructed in accordance with the applicable CSA Standards and with the Plans and Specifications. Please see the attached supporting documentation (as listed above) that supports this certification.

except for part of final design concrete strength. Interim sign-off only

Prepared by:

 Scar protection
NC documents

Certified by:

Don Williams PEng - QC Manager

Darby Kreitz PEng - Certifying Engineer



DEK CHO BRIDGE - LOWER PIER BUTTRESS - CERTIFICATION

Certification for Lower Pier Buttress - Pier #3 South

Date: February 26, 2010

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Lower Pier Buttress			
NCR ✓ 1.1	Lower Pier Buttress Inspection Test Plan filled out and signed off <i>procedures accepted by JVKO</i>	Y	DDW	NCR no design approval - ok JVKO
NCR ✓ 1.2	Material Audit inspection test plans filled out and signed off <i>Accepted by JVKO Oct 21/08</i>	Y	DDW	Reinforcing modifications verbally Approved by owner representatives — signed
NCR ✓ 1.3	Pre pour inspection test plans filled out and signed off <i>acceptance not signed by JVKO</i>	Y	DDW	ET&C LETTER IN FILE
✓ 1.4	Cast in place concrete inspection test plans filled out and signed off <i>QA - accepted by JVKO</i>	Y	DDW	Plastic concrete testing provided by EBA Directed by ATCON
✓ 1.5	Post pour inspection test plans filled out and signed off <i>accepted by JVKO Oct 21/08</i>	Y	DDW	ITP signed off without concrete break Information as it was not made Available by ATCON
✓ 1.6	Concrete mix design <i>6 breaks in attached</i>	N/A	DDW	Concrete mix design and supply by ATCON
✓ 1.7	As-built location of lower pier buttress	N	DDW	Formwork As-built location completed

I certify that Pier #3 South Lower Buttress has been constructed in accordance with the applicable CSA Standards, Plans and Specifications. Certification doesn't include concrete quality or strength, as concrete supply was the responsibility of ATCON. Supporting documentation originally provided to ATCON is available upon request.

Certified by:

Don Williams PEng - QC Manager



DEK CHO BRIDGE - UPPER PIER BUTTRESS - CERTIFICATION

Certification for Upper Pier Buttress - Pier #3 South

Date: February 26, 2010

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Upper Pier Buttress			
NCR ✓ 1.1	Upper Pier Buttress Inspection Test Plan filled out and signed off	Y	DDW	
✓ 1.2	Material Audit inspection test plans filled out and signed off	Y	DDW	Reinforcing modifications verbally Approved by owner representatives. Atcon supplied materials not certified.
NCR ✓ 1.3	Pre pour inspection test plans filled out and signed off	Y	DDW	
✓ 1.4	Cast in place concrete inspection test plans filled out and signed off	Y	DDW	Plastic concrete testing provided by EBA Directed by ATCON
✓ 1.5	Post pour inspection test plans filled out and signed off	Y	DDW	ITP signed off without concrete break Information as it was not made Available by ATCON
1.6	Concrete mix design <i>9 breaks attached</i>	N/A	DDW	Concrete mix design and supply by ATCON <i>9 breaks attached</i>
✓ 1.7	As-built location of Upper pier buttress <i>elevations attached</i>	N	DDW	Construction surveying completed No records available

I certify that Pier #3 South Upper Buttress has been constructed in accordance with the applicable CSA Standards, Plans and Specifications. Certification doesn't include concrete quality, strength, and or any ATCON supplied materials. Certification supporting documentation originally provided to ATCON is available upon request.

Certified by:

Don Williams PEng - QC Manager

DEH CHO BRIDGE - PIER FOOTING - CERTIFICATION

Certification for Pier Footing - 45

Date: _____

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Drilling			
✓ 1.1	Drilling Inspection Test Plan filled out/signed off	Y	DDW	boulders
✓ 1.2	As-built location and elevation of holes	Y	DDW	
2.0	Sheet Pile Installation			
✓ 2.1	Sheet Pile Inspection Test Plan filled out/signed off	Y	DDW	
✓ 2.2	As-built location and elevation of sheet piles	Y	DDW	
3.0	Cofferdam Excavation			
✓ 3.1	Cofferdam Excavation Inspection Test Plan filled out and signed off	Y	DDW	
✓ 3.2	Excavation survey drawing showing surface Topography <i>not to balance - boulder removed</i>	Y	DDW	<i>in boulder removal to meet design</i>
✓ 3.3	Record of excavation surface "soft thickness" Measurements	Y	DDW	<i>max 0.1m soft</i>
4.0	Pier Footing Rebar Cage Installation			
✓ 4.1	Pier Footing Rebar Cage Assembly Inspection Test Plan - Option 1 or 2 filled out and signed off	Y	DDW	<i>verbal approval by Jirko</i>
✓ 4.2	Pier Footing Rebar Cage Installation Inspection Test Plan - Option 1 or 2 filled out and signed off	Y	DDW	<i>verbal approval by Jirko no documentation</i>
4.3	Reinforcing Mill Certificates	Y	DDW	
4.4	Cage inspection notes c/w proof of measurements	N	DDW	<i>owner Rep inspected cage</i>
✓ 4.5	As-built location and elevation of reinforcing cage	Y	DDW	
5.0	Tremie Pour			
✓ 5.1	Pier Footing Tremie Pour Inspection Test Plan filled out and signed off	Y	DDW	
5.2	Approved concrete mix design	Y	DDW	
5.3	Record of upper elevation of concrete surface	Y	DDW	
✓ 5.4	Require concrete strength prior to dewatering document <i>mail - D Williams</i>	Y	DDW	
6.0	Water Installation and Dewatering			
✓ 6.1	Water Installation and Dewatering Inspection Test Plan filled out and signed off	Y	DDW	<i>Test in file 6 bag 27m</i>
7.0	Footing Concrete			
✓ 7.1	Require design concrete strength document	N	DDW	<i>Interim Sign off only</i>

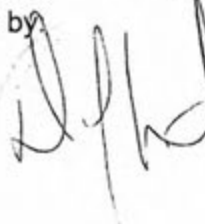
I certify that Pier Footing 45 has been constructed in accordance with the applicable CSA Standards and with the Plans and Specifications. Please see the attached supporting documentation (as listed above) that supports this certification. *Except for proof of final design concrete strength. Interim sign off only.*

Prepared by:

Certified by:



Don Williams PEng - QC Manager



Darby Kreitz PEng - Certifying Engineer



DEH CHO BRIDGE - LOWER PIER BUTTRESS - CERTIFICATION

Certification for Lower Pier Buttress - Pier #4 South

Date: February 26, 2010

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Lower Pier Buttress			
✓ 1.1	Lower Pier Buttress Inspection Test Plan filled out and signed off <i>Signed off by Juko</i>	Y	DDW	
✓ 1.2	Material Audit inspection test plans filled out and signed off <i>Signed off by Juko</i>	Y	DDW	Reinforcing modifications verbally Approved by owner representatives
✓ 1.3	Pre pour inspection test plans filled out and signed off <i>Signed off by Juko</i>	Y	DDW	
✓ 1.4	Cast in place concrete inspection test plans filled out and signed off <i>Signed off by Juko</i>	Y	DDW	Plastic concrete testing provided by EBA Directed by ATCON
✓ 1.5	Post pour inspection test plans filled out and signed off <i>9 breaks attached</i>	Y	DDW	ITP signed off without concrete break Information as it was not made Available by ATCON
1.6	Concrete mix design	N/A	DDW	Concrete mix design and supply by ATCON
1.7	As-built location of lower pier buttress	N	DDW	Formwork As-built location completed

I certify that Pier #4 South Lower Buttress has been constructed in accordance with the applicable CSA Standards, Plans and Specifications. Certification doesn't include concrete quality or strength, as concrete supply was the responsibility of ATCON. Supporting documentation originally provided to ATCON is available upon request.

Certified by:

Don Williams PEng - QC Manager

DEH CHO BRIDGE - UPPER PIER BUTTRESS - CERTIFICATION

Certification for Upper Pier Buttress - Pier #4 South

Date: February 26, 2010

Item No.	Description	Y, N or N/A	QC Manager	Comments
1.0	Upper Pier Buttress			
✓ 1.1	Upper Pier Buttress Inspection Test Plan filled out and signed off	Y	DBW	
✓ 1.2	Material Audit inspection test plans filled out and signed off <i>Atcon responsible for audit</i>	Y	DBW	Reinforcing modifications verbally Approved by owner representatives. Atcon supplied materials not certified.
✓ 1.3	Pre pour inspection test plans filled out and signed off <i>Survey by allnorth</i>	Y	DBW	
✓ 1.4	Cast in place concrete inspection test plans filled out and signed off <i>Slump not provided NCIR</i>	Y	DBW	Plastic concrete testing provided by EBA Directed by ATCON
✓ 1.5	Post pour inspection test plans filled out and signed off <i>EBA letter re concrete</i>	Y	DBW	ITP signed off without concrete break Information as it was not made Available by ATCON
✓ 1.6	Concrete mix design <i>6 breaks attached</i>	N/A	DBW	Concrete mix design and supply by ATCON
✓ 1.7	As-built location of Upper pier buttress	N	DBW	Construction surveying completed No records available

I certify that Pier #4 South Upper Buttress has been constructed in accordance with the applicable CSA Standards, Plans and Specifications. Certification doesn't include concrete quality, strength, and or any ATCON supplied materials. Certification supporting documentation originally provided to ATCON is available upon request.

Certified by:

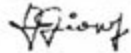


Don Williams PEng - QC Manager

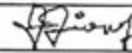
**APPENDIX B
SUPPORTING DOCUMENTS**

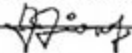
TAB F

NON CONFORMANCE REPORT (NCR)	No: 2
-------------------------------------	--------------

Part A: Notice of Non-Conformance		
Raised By:	Signature:	Date:
Element of Works Affected: <i>Pier 3s footing tremie pour Sep 21-22</i>		
Reference Documents, if any: <i>Field Report with description and pictures provided by Contractor</i>		
Description: <i>Following removal of the latency on top of the pier footing it was found that top mat of rebar was not covered with concrete over an area of 1.5 sq m, adjacent to the limit of the lower buttress. Sound concrete was found +/- 3" below the mat. The lower top mat is covered with 5" sound concrete.</i>		
Received by: <i>Jivko Jivkov</i>	Signature: 	Date: <i>Oct 12, 2008</i>

Part B: Proposed Remedial Action		
Immediate Remedial Action(s) Taken: <i>None</i>		
Further Remedial Actions Proposed: <i>Contractor presented acceptable work procedure for the repair including thorough all latency from the area and covering the rebar with at least 10" concrete mixed with bonding agent. EOR considers the repair as minor extension of the cold joint under the lower buttress.</i>		
By:	Signature:	Date:

Part C: Approval of Remedial Action			
Approval Required:			
	GNWT	Territorial Advisor	Other - Engineer
Forwarded for review to:	<i>K. McLeod</i>	<i>S. Smith</i>	<i>J. Jivkov</i>
Date:	<i>29 Oct 2008</i>	<i>29 Oct 2008</i>	
Reviewed:			
Recommended:			
Approved:	<i>Not required</i>	<i>Not required</i>	
Notes: <i>Provided for information only - no material change in design, performance or cost</i>			

Part D: Follow-up and Close-out		
Remedial Works Completed: <i>Remedial work was completed with the pour of the lower buttress. The repaired is considered integrated to the buttress.</i>		
Verified by: <i>J. Jivkov</i>	Signature: 	Date: <i>29 October 2008</i>

Part E: Financial Implications?		
Yes _____	No <u><i>X</i></u>	If yes, report attached.

Date: October 28, 2008

Page 1

drozell@jivko.ca

From: "Jivko I. Jivkov" <jivko@jivko.ca>
To: "MIR Frank Flanagan@Atcon" <f.flanagan@atcongroup.com>
Cc: "YK John* Hopf" <hopfmeister@gmail.com>; "HR Jack Rowe" <jrowe@ssimicro.com>; "MIR 'Mike Love@Atcon" <mlove@atcongroup.com>; "PR G Corey Ross@Ruskin" <cross@rcl.bz>; "PR G Terry Whiteman" <TWhiteman@rcl.bz>; "Andrew Gamble" <agamble@theedge.ca>; "ED Stuart D. Smith" <stuart.smith@bptec-dnw.com>; "YK Kevin McLeod" <KEVIN_MCLEOD@gov.nt.ca>; "ID John Hinman" <john.hinman@ch2m.com>
Sent: December-17-08 7:42 PM
Subject: Re: 3S design for footing repair:Two Drawings

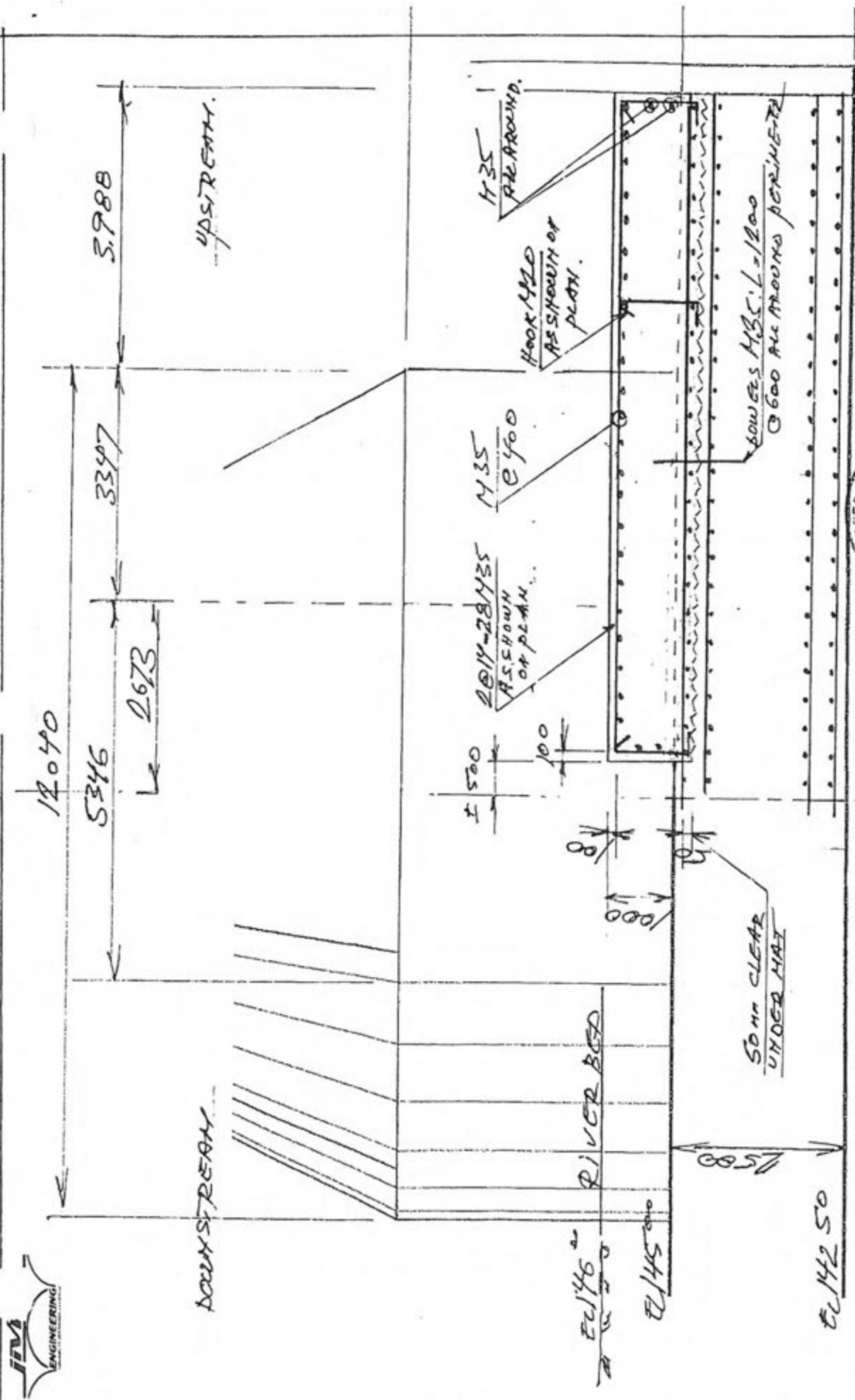
Frank,
 Enclosed are drawings for the footing repair. I will be reviewing submissions on Work Procedures tonight.
 Please advise when site would be ready for pre-pour inspection.
 Regards
 Jivko

----- Original Message -----

From: Jivko I. Jivkov
To: MIR Frank Flanagan@Atcon
Cc: YK John* Hopf ; HR Jack Rowe ; MIR 'Mike Love@Atcon ; PR G Corey Ross@Ruskin ; PR G Terry Whiteman ; Andrew Gamble ; ED Stuart D. Smith ; YK Kevin McLeod ; ID John Hinman
Sent: Wednesday, December 17, 2008 12:10 PM
Subject: 3S design for footing repair: dwg 1/2

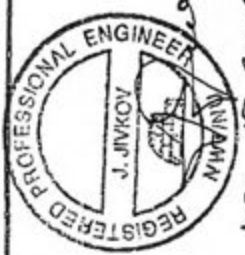
Frank,
 Enclosed is design dwg 1 of 2 for the footing repair.
 The GNWT design checker was unavailable to reply my comments so I decided to go for the more conservative option including M35 dowels on buttress wall and top of footing all around the perimeter of the area subject to repair.
 Dwg 2 of 2, Plan has no substantial difference from the Prelim Design. I am working on it and will forward later in the afternoon.
 With the enclosed drawing I hope you'll be able to start drilling holes and installing dowels. As agreed placing concrete shall not start before we have the Work Procedures accepted.

On another note, this afternoon I'll be meeting with DFO on the Scour Protection issue.
 Regards,
 Jivko



Notes:

1. Concrete to be 35 MPa
2. Dowels to be M35; L=1,200, installed @600 on buttress wall and top of footing all around the perimeter of the repaired area.
3. Epoxy for dowels and bonding agent on the interface old/fresh concrete to be approved by the Engineer
4. Install 2" Styrofoam insulation covered with plastic sheet on the interface between sheet piling and fresh concrete



DEC 17, 2008

Deh Cho Bridge
Footing, 3 South - Repair
Section

1/2



**APPENDIX B
SUPPORTING DOCUMENTS**

TAB G



DEH CHO BRIDGE

PIER #1 NORTH FOOTING - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #1 North footing was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 202 Sheet Pile Installation	ITP 202-1	Completed and submitted to owner	DBW
WP 203 Cofferdam Excavation	ITP 203-1	Completed and submitted to owner	DBW
WP 209 Scour Protection	ITP 209-1	Completed and submitted to owner	DBW
WP 204 Pier Footing Rebar Cage Installation	ITP 204-2	Completed and submitted to owner	DBW
WP 205 Pier Footing Temle Pour	ITP 205-1	Completed and submitted to owner	DBW
WP 101 Concrete Aggregate Production	ITP 101-1	Completed and submitted to owner	DBW
WP 102 Concrete Batch Plant Setup	ITP 102-1	Completed and submitted to owner	DBW
WP 121 Scour Rock Production	ITP 121-1	Completed and submitted to owner	DBW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #1 North Footing:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
Nil	-	DBW

I certify that the Pier #1 North Footing has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:

Don Williams PEng.

Feb 25, 2010

ALLNORTH CONSULTANTS LIMITED



DEH CHO BRIDGE

PIER #1 NORTH LOWER BUTTRESS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #1 North lower buttress was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 206 Wailer installation and Dewatering	ITP 206-2	Completed and submitted to owner	DDW
WP 207 Lower pier buttress	ITP 207-1	Completed and submitted to owner	DDW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #1 North lower buttress:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
Nil	-	DDW

I certify that the Pier #1 North lower buttress has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:



Don Williams PEng.

Feb 25, 2010



DEH CHO BRIDGE

PIER #1 NORTH UPPER BUTTRESS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #1 North upper buttress was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 208 Upper pier buttress	ITP 208-1	Completed and submitted to owner	YpW
WP 209 Scour protection	ITP 209-2 Final volume	Completed and submitted to owner	YpW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #1 North upper buttress:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #07	Owner provided approval to proceed with installation of Deficient material. Corrective action to be applied during Installation of pier steel sections. Shimming	YpW
NCR #11	Corrective action completed and accepted by owners rep	YpW
NCR #12	Owner provided approval to proceed with installation of Deficient material. Corrective action to be applied during Installation of pier steel sections. Shimming	YpW
NCR #15	Corrective action completed and accepted by owners rep	YpW

I certify that the Pier #1 North Upper buttress has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:

Don Williams PEng.

Feb 25, 2016



DEH CHO BRIDGE - NON CONFORMANCE REPORT - 007

Report No. 007

Date: October 28, 2009

Non-Conformance Item Description & Location:

Pier armor bearing plate templates provided by the owner have varying thicknesses which will prevent a flat mating surface between the bearing plate and the base sections for the steel piers. Please see attached bearing plate thickness field surveys for reference

Actions to Correct Non-Conformance:

To Come

Follow-up Required to Prevent Re-Occurrence:

Steve Pereira / Oct 28, 2009

QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature



DEH CHO BRIDGE - NON CONFORMANCE REPORT - 011

Report No. 011

Date: November 9, 2009

Non-Conformance Item Description & Location:
Pier armour for Pier 1 North has been bolted together and is not to specification. The top is 2.3 degrees out of alignment with the base. The attached drawing shows the steel as surveyed and photos showing the match marks.
Actions to Correct Non-Conformance:
- Actions taken as per attached email from Jivko Jivkov, with some additional procedures written by AllNorth (See attached) to assist fitting pier armor sheet sections to correct geometry. - Removing the connecting bolts and fitting the sheets as close as possible to the design geometry (Maximum 15mm bearing template overhanging the pier armor) has caused an overlap in pier armor sheets M2-1 and M2-2 see attached photos and sketch for details. It has also caused the pier base to lift in the same locations as the overlaps see attached photos
• As the amount of overlap will require more than minimal grinding as mentioned in the email we request owner's approval to trim the plates as required and weld out the pier armor in its current location. • Additional shimming to suit lifted base locations will be placed when pier armor is placed on lower buttress. • The proposed method of trimming the steel is to flame cut and grind smooth leaving a 6mm gap for grout placement
<i>Reviewed by Don Williams, QC Engineer</i>
Follow-up Required to Prevent Re-Occurrence:
None
Steve Pereira/ November 17-2009 QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:

QC Inspector Signature

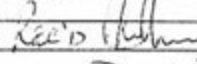
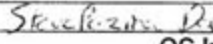
General Contractor Signature

QA Inspector Signature

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 012

Report No. 012

Date: November 9, 2009

Non-Conformance Item Description & Location:	
Pier 1 north – The template was aligned with the bent and the gaps measured between the bent and the template. The attached sheet shows the gaps measured around the template. Also attached is survey of the thickness of the template.	
 Dec 3/09	
Actions to Correct Non-Conformance:	
Follow-up Required to Prevent Re-Occurrence:	
 QC Inspector / Date	

Owners Acceptance of Corrective Action or Recommended Corrective Action

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 015

Report No. 015

Date: November 23, 2009

Non-Conformance Item Description & Location:

The pier armor for pier 1 North has been set to best fit to the bearing plate in its correct location. This orientation causes the armor to overhang the concrete surface of the lower buttress in multiple locations. Please see attached field surveys which measure steel overhanging from the concrete surface. Also Attached is the survey of the pier armor as it was assembled in the yard prior to placing. Note Pier #2 armor is being used for pier #1 buttress with Pier #1 bearing plate

Actions to Correct Non-Conformance:

The base of the Pier armor does not exceed 120mm overhang on the concrete lower buttress therefore no corrective action required as per attached Sketch from Jivko dated Nov 3, 2009

The bearing plate to pier armor under/overhangs will be repaired as per the attached sketches from Jivko dated Nov 3, 2009 And Nov 16, 2009

Follow-up Required to Prevent Re-Occurrence:

None

Steve Pereira / Nov 23, 2009

QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Pier armor was situated to best fit the armor to required design location of the bearing template. No areas exceeded 120 mm overhang on the lower buttress. The bearing template was welded to the armor as per Jivko's sketches see attached as built's

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

DEH CHO BRIDGE

PIER #2 NORTH FOOTING - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #2 North footing was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 202 Sheet Pile Installation	ITP 202-1	Completed and submitted to owner	DPW
WP 203 Cofferdam Excavation	ITP 203-1	Completed and submitted to owner	DPW
WP 209 Scour Protection	ITP 209-1	Completed and submitted to owner	DPW
WP 204 Pier Footing Rebar Cage Installation	ITP 204-2	Completed and submitted to owner	DPW
WP 205 Pier Footing Temie Pour	ITP 205-1	Completed and submitted to owner	DPW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #2 North Footing:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #04	Corrective action completed and accepted by owners rep	DPW
NCR #06	Corrective action completed and accepted by owners rep	DPW

I certify that the Pier #2 North Footing has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners' satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:



Don Williams PEng.

Feb 25, 2010

DEM CHO BRIDGE - NON CONFORMANCE REPORT - 004

Report No. 004

Date: Sept 29, 2009

Non-Conformance Item Description & Location:
Reinforcing cage at the downstream side of cofferdam Pier #2 North raised during tremie placement of concrete. Approximate locations matching tremie pipes 1, 2, 3, 4, 5, 6, and 7
Steve Pereira / Sep 29, 2009 QC Inspector / Date
Actions to Correct Non-Conformance:
Assessment of footing for possible remedial work due to the non conformance will be conducted once the cofferdam is dewatered.
Steve Pereira/ Sep 29, 2009 QC Inspector / Date
Correction of Non-Conformance Item & Acceptance:
QC Inspector / Date
Follow-up Required to Prevent Re-Occurrence:
A combination of increased rate of pour (approximately 50m ³ /hr) and not raising the tremie pipes to match concrete elevations are attributed to the cage lifting via concrete hydraulics. To correct this item for proceeding tremie pours the volume of concrete placed in any individual tremie pipe will be decreased to bring the concrete up more uniformly. Along with the increased probing of concrete elevation as it rises so the pipe can be raised to match, maintaining just the minimum of 0.9m of concrete above the discharge elevation of the pipe as noted in work procedure 205. In addition to the modified placement procedure physical hold down columns with plates on the bottom bearing on the top mat of reinforcing steel will be fixed to cage support frame, which will be welded to the sheet pile header beam to resist the concrete uplift forces. Column number and spacing to be determined on site. Hold down columns would be removed once concrete elevation has reached between the top 2 layers of reinforcing steel.
Steve Pereira / Sep 29, 2009 QC Inspector / Date

Sign Off:

QC Inspector Signature

General Contractor Signature

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 006

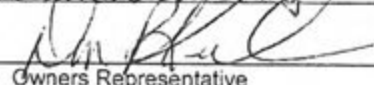
Report No. 006

Date: October 23, 2009

Non-Conformance Item Description & Location:
Exposed reinforcing steel visible in the South East corner of Pier #2 North Footing. See attached sketch for extents
Actions to Correct Non-Conformance:
Exposed reinforcing steel to be repaired as per attached Concrete Surface Repair Procedure
Follow-up Required to Prevent Re-Occurrence:
All pier footings have been placed no follow up required
Steve Pereira / Oct 23, 2009 QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action
#3 Avertment bonding surface between new & existing concrete is mandatory
#2 Where the mini excavator is used, follow up with hand held breakers is required to ensure there is no concrete left with micro cracking

Approval to proceed with Corrective Action:


Owners Representative

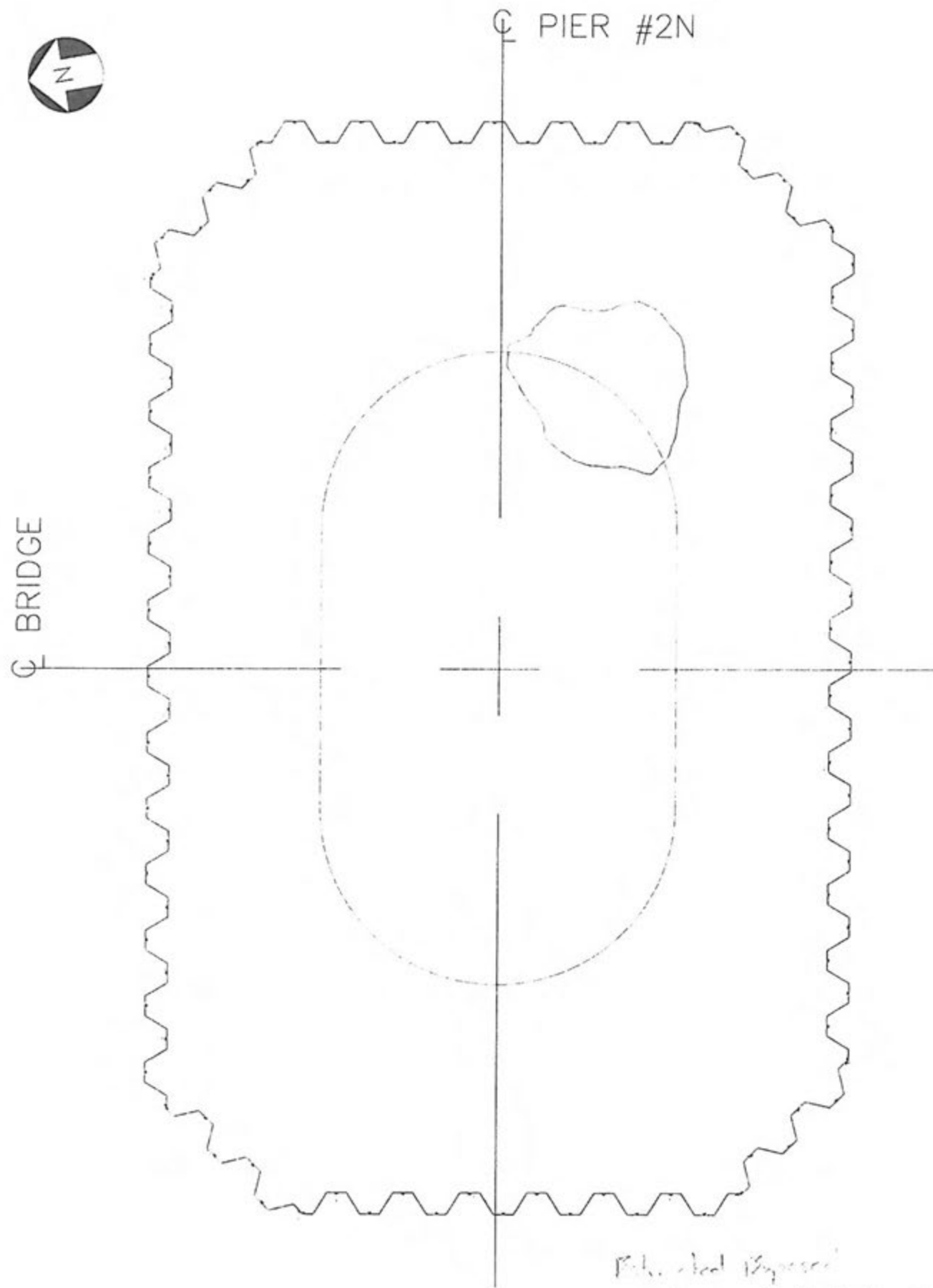
Correction of Non-Conformance Item & Acceptance:
- Reinforced Reinforcing Steel was prepared as per the repair procedure and inspected by QC and QA prior to concrete placement
- Surface was clean and vacuum prior to concrete placement
- Concrete was placed utilizing pump truck (Note: Tremie mix concrete utilized for repair as was originally requested by the owners re: previous repairs)
- Heating and Hacerline utilized to protect concrete during curing

Sign Off:


QC Inspector Signature


General Contractor Signature


QA Inspector Signature



Revised Design
Permit No. 100-10-10-1
100-10-10-1
100-10-10-1



Concrete Surface Repair Procedure

The following procedure shall be used to repair concrete surface deficiency.

1. Identify areas of deficiency.
2. Remove all laitance in area to expose sound concrete. Required for top of footing repairs only.
3. If reinforcing steel is partially exposed remove concrete to:
 - (a) a minimum 20mm behind the exposed reinforcing steel
 - (b) Maintain a vertical edge at the extents of the repair.
4. Thoroughly clean the surface of the concrete by:
 - (a) removing all loose debris,
 - (b) power wash concrete surface areas,
5. Prior to concrete placement the surface is to be saturated with water and have any free standing water removed.
6. Concrete used for the repairs shall be Class C (t1) mix design provided by EBA Consultants.
7. All repaired surfaces will be made to match IFC drawing dimensions including concrete cover requirements.
8. All repairs are to be completed in compliance with the applicable hot or cold weather concrete placement procedures

Reviewed by,

Don Williams P.Eng.
Quality Control Manager

DEH CHO BRIDGE

PIER #2 NORTH LOWER BUTTRESS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #2 North lower buttress was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 206 Waller installation and Dewatering	ITP 206-2	Completed and submitted to owner	DDW
WP 207 Lower pier buttress	ITP 207-1	Completed and submitted to owner	DDW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #2 North lower buttress:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #05	Corrective action completed and accepted by owners rep	DDW
NCR #09	Corrective action completed and accepted by owners rep	DDW
NCR #16	Corrective action completed and accepted by owners rep	DDW

I certify that the Pier #2 North lower buttress has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:



Don Williams PEng.

Feb 25, 2010

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 005

Report No. 005

Date: October 22, 2009

Non-Conformance Item Description & Location:

Reinforcing steel set within Pier #2N footing had shifted as a result of "floating reinforcing cage" indicated on NCR #4. The altered cage position doesn't allow for sufficient concrete cover in the North East corner of the buttress

Actions to Correct Non-Conformance:

2-part corrective action.

1.0 Reinforcing steel will be pulled over to obtain sufficient cover

2.0 Where sufficient cover is not achieved by pulling the reinforcing steel, the form geometry will be modified as required in the localized areas. Note: Any adjustment to the concrete forms will be subject to approval by the form design engineer prior to placement of concrete.

Concrete cover has been confirmed sufficient at the top of the form; therefore no changes to form geometry will be required at the mating surface of the pier armor.

Follow-up Required to Prevent Re-Occurrence:

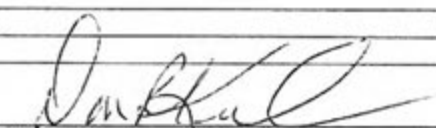
All pier footings have been placed no follow up required

Steve Pereira / Oct 22, 2009

QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

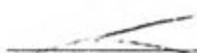
Approval to proceed with Corrective Action:

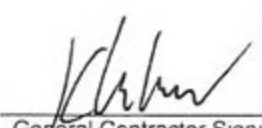

Owners Representative

Correction of Non-Conformance Item & Acceptance:

- Formwork was modified and steel pulled over to obtain minimum clearance of 150mm. See Attached photograph.

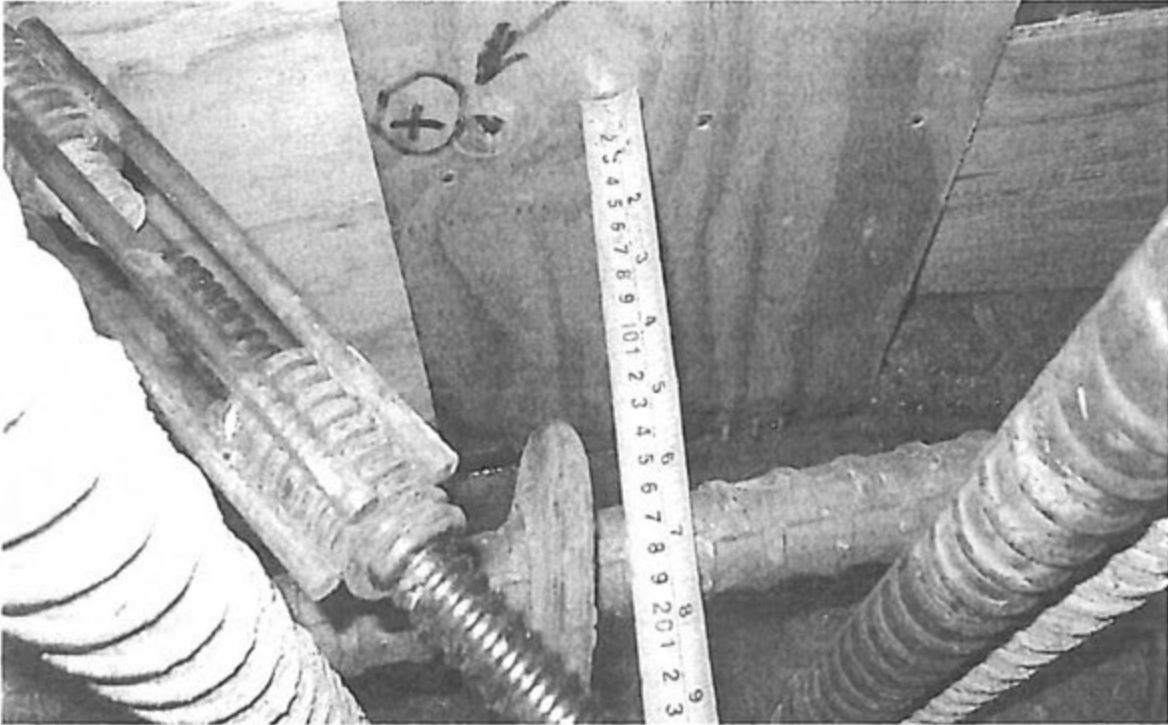
Sign Off:


QC Inspector Signature

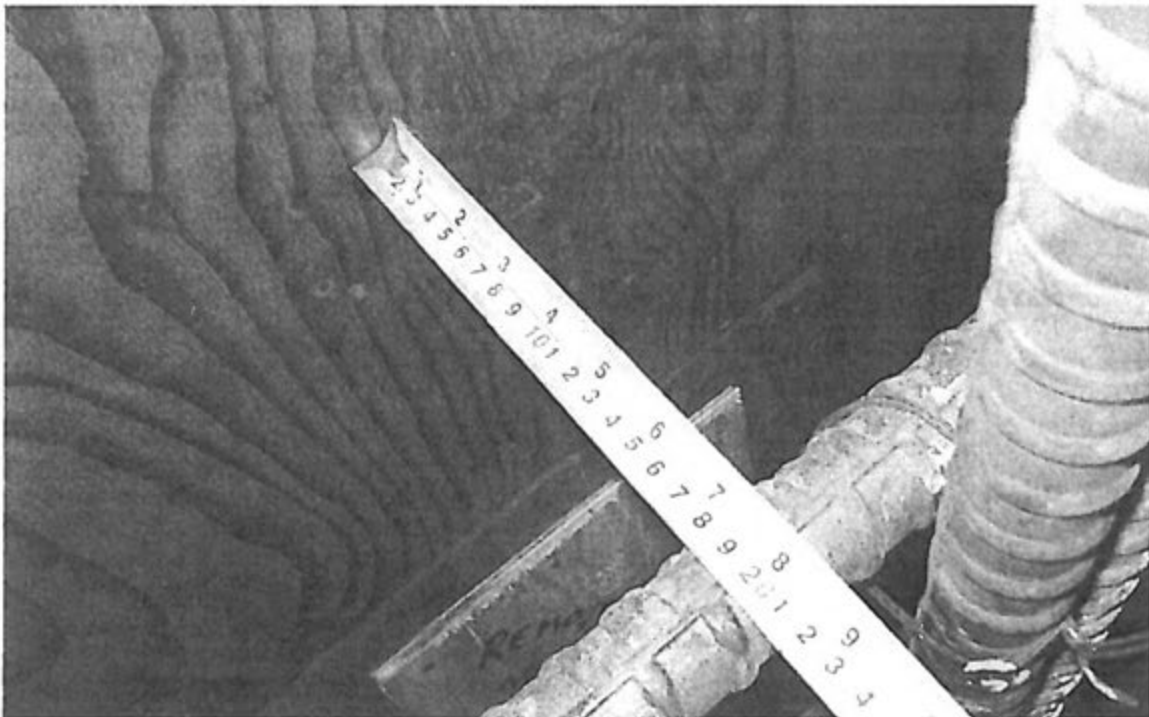

General Contractor Signature


QA Inspector Signature

PIER #2 NORTH LOWER BUTTRESS
NORTH EAST CORNER PROOF OF MINIMUM CONCRETE COVER TO FORMS
CLOSEST POINT OF REINFORCING STEEL TO FORMWORK



NEXT HORIZONTAL REINFORCING STEEL ABOVE CLOSEST POINT





DEH CHO BRIDGE - NON CONFORMANCE REPORT - 009

Report No. 009

Date: October 31, 2009

Non-Conformance Item Description & Location:

Pier #2 North lower buttress has a discolored 1-1.5m thick layer of concrete approximately half way up which appears to have less strength than the grey concrete above and below. (Strength variance noted by dragging pick hammer over the two adjacent material and noting the difference in gouging) See attached photos

Steve Pereira / Oct 31, 2009

QC Inspector / Date

Actions to Correct Non-Conformance:

Cylinder breaks confirmed that discolored concrete does not have sufficient strength (see attached break information) It was discovered that flyash was loaded into the cement silo and vice versa during concrete production.

The discolored concrete and concrete above (which contains no flyash to mitigate alkali reactivity in the aggregates) will be removed and replaced as per the following procedure:

- Core samples will be taken to determine the extent of concrete to be removed and detail survey of core locations will be logged as reference to depth of sound concrete.
- Access portals will be made in the upper buttress vertical reinforcing steel for equipment access
- Utilizing a combination of jack hammer equipped mini excavator, hand held jack hammers, and high pressure washers, the non conformance concrete will be demolished down to sound concrete as indicated from core samples. Note: Areas where the jack hammer equipped mini excavator is utilized will be re-hammered with smaller hand held jack hammers to remove micro cracked material.
- A surface inspection along with reference to core sample depths will confirm that all non conformance concrete has been removed.
- Reinforcing steel damaged or removed during concrete demolition will be repaired and/or replaced as required. (Extents and repair methods to be determined upon inspection of reinforcing steel after demolition is completed)
- Concrete surface to be cleaned
- Core samples will be taken to determine the strength of the remaining concrete
- Lower buttress form work installed as per original formwork design with coil tie spacing adjusted to suit remaining concrete base.
- Concrete surface to receive a (owner approved) bonding agent prior to concrete placement
- New concrete to be placed to 50mm below U/S of pier armor as per Work Procedure 207 and cold weather concrete placement procedures.

Approved by: Don Williams P.Eng. QC Engineer - Nov 9, 2009

Nov 10, 2009

The demolition of the concrete will require the following proposed reinforcing steel repairs.

- All horizontal reinforcing will have to be replaced as there is no way to demolish the concrete without damaging them
- All vertical bars have to be bent out of the way in order to allow for the concrete to be demolished. We propose to cut the bars off at alternating heights (0.3m and 0.6m) above the good concrete layer and then splice new vertical bars in place using rebar bar couplers. The specification for the BAR-LOCK rebar bar couplers is attached for the owner's review and approval. Bar cutting to be flame cut.

Reviewed by Don Williams P.Eng. QC Engineer Nov 10, 2009

Follow-up Required to Prevent Re-Occurrence:

Visual inspection to confirm which restocking truck trailers contain flyash and which contains cement powder prior to placing product in batch plant silos.

Steve Pereira / Nov 5, 2009

QC Inspector / Date

Rev 2 July 16, 2009

ALLNORTH CONSULTANTS LIMITED

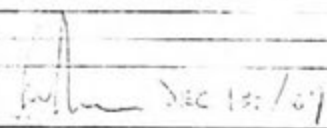


DEH CHO BRIDGE - NON CONFORMANCE REPORT - 009

Owners Acceptance of Corrective Action or Recommended Corrective Action

A report advising that the batch plant cleanup and recharging has been completed is required prior to concrete placement. The above repair procedure must be signed off by Allnorth's QC engineer. - as per Danny Keeler

Approval to proceed with Corrective Action:

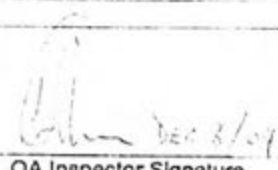
 DEC 13/07
Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:


QC Inspector Signature
Dec 8, 07


General Contractor Signature

 DEC 8/07
QA Inspector Signature

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 016

Report No. 016

Date: November 25, 2009

Non-Conformance Item Description & Location:
A core sample taken from pier #2 lower buttress to confirm concrete strength for NCR #9 (Flyash concrete) found a pocket of poor quality material. Additional core samples and probing will be conducted as per Dave Robsons' recommendations attached.
<i>[Signature]</i> Received Nov 25/09
Actions to Correct Non-Conformance:
Proposed corrective actions will be dependent on the results of additional core sampling and probing. To come.
Follow-up Required to Prevent Re-Occurrence:
None
Steve Pereira / Nov 25, 2009
QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

DEH CHO BRIDGE

PIER #2 NORTH UPPER BUTTRESS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #2 North upper buttress was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 208 Upper pier buttress	ITP 208-1	Completed and submitted to owner	DBW
WP 209 Scour protection	ITP 209-2 Final volume	Completed and submitted to owner	DBW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #2 North upper buttress:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #07	Owner provided approval to proceed with installation of Deficient material. Corrective action to be applied during Installation of pier steel sections. Shimming	DBW
NCR #14	Corrective action completed and accepted by owners rep	DBW

I certify that the Pier #2 North Upper buttress has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:



Don Williams PEng.

Feb 25, 2010



DEH CHO BRIDGE - NON CONFORMANCE REPORT - 007

Report No. 007

Date: October 28, 2009

Non-Conformance Item Description & Location:
Pier armor bearing plate templates provided by the owner have varying thicknesses which will prevent a flat mating surface between the bearing plate and the base sections for the steel piers. Please see attached bearing plate thickness field surveys for reference
Actions to Correct Non-Conformance:
To Come
Follow-up Required to Prevent Re-Occurrence:
Steve Pereira / Oct 28, 2009 QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

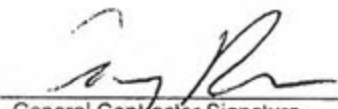
Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:


QC Inspector Signature


General Contractor Signature

QA Inspector Signature

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 014

Report No. 014

Date: November 23, 2009

Non-Conformance Item Description & Location:
Pier 2 north – The bearing template was aligned with the Pier Bent base section and the gaps measured between the bent and the template. The attached sheet shows the gaps measured around the template. Refer to NCR #7 for bearing template thickness survey
<i>Steve Pereira</i>
Actions to Correct Non-Conformance:
Gaps between the bearing template and Pier bent base section will be shimmed as per owners' instructions
Follow-up Required to Prevent Re-Occurrence:
None
Steve Pereira / November 23, 2009
QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

Client: _____

Job # _____ File # _____

Project: _____

Date: NOV 7 1991 Rev: _____

Subject: PICK - TAIL - NECTED

Prep by: RM Checked by: _____

Page _____ of _____

(Handwritten notes, mostly illegible due to rotation and bleed-through)

... 1mm ... 2mm ... 3mm ... 4mm ... 5mm ... 6mm ... 7mm ... 8mm ... 9mm ... 10mm ... 11mm ... 12mm ... 13mm ... 14mm ... 15mm ... 16mm ... 17mm ... 18mm ... 19mm ... 20mm ... 21mm ... 22mm ... 23mm ... 24mm ... 25mm ... 26mm ... 27mm ... 28mm ... 29mm ... 30mm ... 31mm ... 32mm ... 33mm ... 34mm ... 35mm ... 36mm ... 37mm ... 38mm ... 39mm ... 40mm ... 41mm ... 42mm ... 43mm ... 44mm ... 45mm ... 46mm ... 47mm ... 48mm ... 49mm ... 50mm ... 51mm ... 52mm ... 53mm ... 54mm ... 55mm ... 56mm ... 57mm ... 58mm ... 59mm ... 60mm ... 61mm ... 62mm ... 63mm ... 64mm ... 65mm ... 66mm ... 67mm ... 68mm ... 69mm ... 70mm ... 71mm ... 72mm ... 73mm ... 74mm ... 75mm ... 76mm ... 77mm ... 78mm ... 79mm ... 80mm ... 81mm ... 82mm ... 83mm ... 84mm ... 85mm ... 86mm ... 87mm ... 88mm ... 89mm ... 90mm ... 91mm ... 92mm ... 93mm ... 94mm ... 95mm ... 96mm ... 97mm ... 98mm ... 99mm ... 100mm ...

N

S

DEH CHO BRIDGE

PIER #3 NORTH FOOTING - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #3 North footing was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 202 Sheet Pile Installation	ITP 202-1	Completed and submitted to owner	D.W.
WP 203 Cofferdam Excavation	ITP 203-1	Completed and submitted to owner	D.W.
WP 209 Scour Protection	ITP 209-1	Completed and submitted to owner	D.W.
WP 204 Pier Footing Rebar Cage Installation	ITP 204-2	Completed and submitted to owner	D.W.
WP 205 Pier Footing Temie Pour	ITP 205-1	Completed and submitted to owner	D.W.

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #3 North Footing:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #01 WP 204	Corrective action completed and accepted by owners rep	D.W.
NCR #02 WP 205	Corrective action completed and accepted by owners rep	D.W.
NCR #03 WP 205	Corrective action completed and accepted by owners rep	D.W.

I certify that the Pier #3 North Footing has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners' satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:



Don Williams PEng.

Feb 25, 2010

Report No. 001

Date: Sept 19, 2009

Non-Conformance Item Description & Location:

The Pier 3N footing reinforcing cage was installed 200mm higher than the design drawings specified (ie design top of cage was 144.4m). Measured top of cage was 144.6m (measured using probes through the water). This error was caused through a series of items:

1. The line length between the lifting frame and the underside of cage was calculated and double checked. The length agreed upon was incorrect as the distance from underside of lifting frame to top of the line (ie lug size) was not included in the calculation. The distance to the underside of the cage was incorrect as the thickness of the bundle of three 35M bars used for lifting was not included in the calculation. These dimensions are shown on Allnorth drawing 08-PC-0126-275. This error would only have resulted in a net error of 4mm as the two errors cancel each other.
2. The lifting frame was installed with the line lengths as per the above calculations. An additional calculation was done which provided the distance between the underside of lifting frame and the top of the cage. This calculation was then used to fabricate lines which were attached to the four corners of the frame. These lines were then used to do a final adjustment of the rest of the real lifting lines. The calculation for the four corner lines was not double checked and was incorrect. This resulted in the distance between the underside of the lifting frame and the top of reinforcing cage being incorrect. Normally all calculations are double checked. In this instance it was not (due to decisions being made during night shift with no QC support and pressure to get the footing ready to receive concrete).
3. Prior to the cage being lowered into the water, the distance between the underside of frame and top of cage was not physically checked with a tape measure to ensure that everything was correct.

Don Williams PEng / Sep 19, 2009

QC Inspector / Date

Actions to Correct Non-Conformance:

There are two corrections that are required as a result of the nonconformance. The first is to correct the quality control process to ensure that an error of this kind does not happen again. The second is to propose the remedial action required due to the reinforcing cage being 200mm higher than the design elevation.

1) Quality Control Process Corrections

1. Work Procedure WP204 requires that the Allnorth lift drawings are reviewed. Drawing 08-PC-0126-275 clearly shows the length of lines and the adjustments required for the lifting lug and rebar bundle. If the work procedure specifies that the drawings are reviewed than they need to be reviewed.
2. All calculations for critical dimensional items are to be double checked (whether they are done by QC personnel or by Ruskin personnel)
3. The distance between the underside of frame and top of cage is to be double checked prior to the cage being lowered into the water. ITP 204-2B requires that the reinforcing cage elevation is checked. It doesn't specify that it is required prior to lifting. This is to be done prior to lifting on all future lifts.

Remedial action

1. The impact of the reinforcing cage being 200mm too high was discussed with Ruskin, Allnorth QC and Phil Munn. The theoretical impact was found to be that the bends on the outer core vertical bars would encroach into the cover between the reinforcing and the pier armor. The cover is supposed to be 300mm. It would theoretically be reduced to 211mm. Two proposed repairs were discussed. One was to rebend the bars in the field using a suitable portable rebar bending machine. The second was to cut off the bars at the correct bend elevation. The splice bars would then be supplied with enough vertical length before the bend to provide the required 2.4m lap length. Both methods were discussed with Phil Munn who subsequently discussed it with Jivko Jivkov. They agreed that the proposed remedial actions were reasonable and that we could proceed with the pour. The final remedial action would be decided upon once the cofferdam was dewatered and the exact geometrical impact was determined.
2. The other impact was that there would be less room for the horizontal lower buttress reinforcing rings. The fix is to simply tighten up the lower rings to account for the difference.

Don Williams PEng / Sep 19, 2009

QC Inspector / Date

Report No. 002

Date: Sept 19, 2009

Non-Conformance Item Description & Location:

The Pier 3N footing tremie pour was conducted and several of the PVC guide tubes (last two two rows on the upstream end of the cofferdam) were left in place till late in the pour (hour 17 of the 28 hour pour). These PVC guide tubes are used to allow for the installation of the steel tremie pipes through the reinforcing cage once the cage is in under water. Work procedure WP 205 requires that the guide tubes be raised prior to placing concrete into the tremie pipes. The pipes were raised after some of the tremie concrete had flowed around them (1m to 1.5m of concrete). The impact of this is that water may have entered the concrete mass when the PVC guides were removed.

Don Williams PEng / Sep 19, 2009

QC Inspector / Date

Actions to Correct Non-Conformance:

The impact of the PVC guides being left in place till late in the pour is believed to be minimal. There are no recommended actions proposed for the concrete that was placed. The correction required as a result of the nonconformance is to correct the quality control process to ensure that an error of this kind does not happen again.

1) Quality Control Process Corrections

1. Work Procedure WP205 requires that the PVC guide tubes be lifted prior to placing concrete. Both Allnorth QC personnel (Don Williams and Rich McAlpine) observed that the near side PVC guide tubes were raised prior to placing concrete. The far side (upstream) tremie pipes had not been installed at the beginning of the pour so the PVC guides were still in place. This was not an issue at the time as the concrete was going to take several hours before it was near the upstream PVC pipe guides. The fact that the PVC guides were not raised until late in the pour was missed by the QC personnel mainly because they were on the far side away from the main concrete insertion points and were not easily visible (without physically walking over and checking the far side area). The correction for this is to ensure that all PVC guides are raised prior to the concrete reaching them. Also that the QC personnel double check periodically that all guide tubes are raised.

Don Williams PEng / Sep 19, 2009

QC Inspector / Date

Correction of Non-Conformance Item & Acceptance:

All QC and Ruskin foremen will be briefed on this issue and will ensure it does not occur again.

Don Williams PEng / Sep 19, 2009

QC Inspector / Date

Follow-up Required to Prevent Re-Occurrence:

None

Don Williams PEng / Sep 19, 2009

QC Inspector / Date

Sign Off:

QC Inspector Signature

General Contractor Signature



DEH CHO BRIDGE - NON CONFORMANCE REPORT - 003

Report No. 003

Date: Sept 29, 2009

Non-Conformance Item Description & Location:	
Exposed reinforcing steel is visible on Pier #3 North footing, see attached diagram for extent	
	Steve Pereira / Sep 29, 2009
	QC Inspector / Date
Actions to Correct Non-Conformance:	
Areas of exposed reinforcing steel are to be repairs as per attached "Concrete surface repair for exposed reinforcing" repair procedure attached	
	Steve Pereira / Sep 29, 2009
	QC Inspector / Date
Correction of Non-Conformance Item & Acceptance:	
Correction of exposed rebar will be completed in conjunction with lower Buttress construction and documented when completed	
	Steve Pereira / Sep 29, 2009
	QC Inspector / Date
Follow-up Required to Prevent Re-Occurrence:	
Increased concrete elevation sounding will be performed on the next tremie pours as well as sounding the steel prior and noting any irregularities in the steel elevation. If the steel elevation is higher than design it will be noted to ensure the concrete elevation is raised to suit in that area.	
	Steve Pereira / Sep 29, 2009
	QC Inspector / Date

Sign Off:

QC Inspector Signature

General Contractor Signature

Concrete Surface Repair Procedure

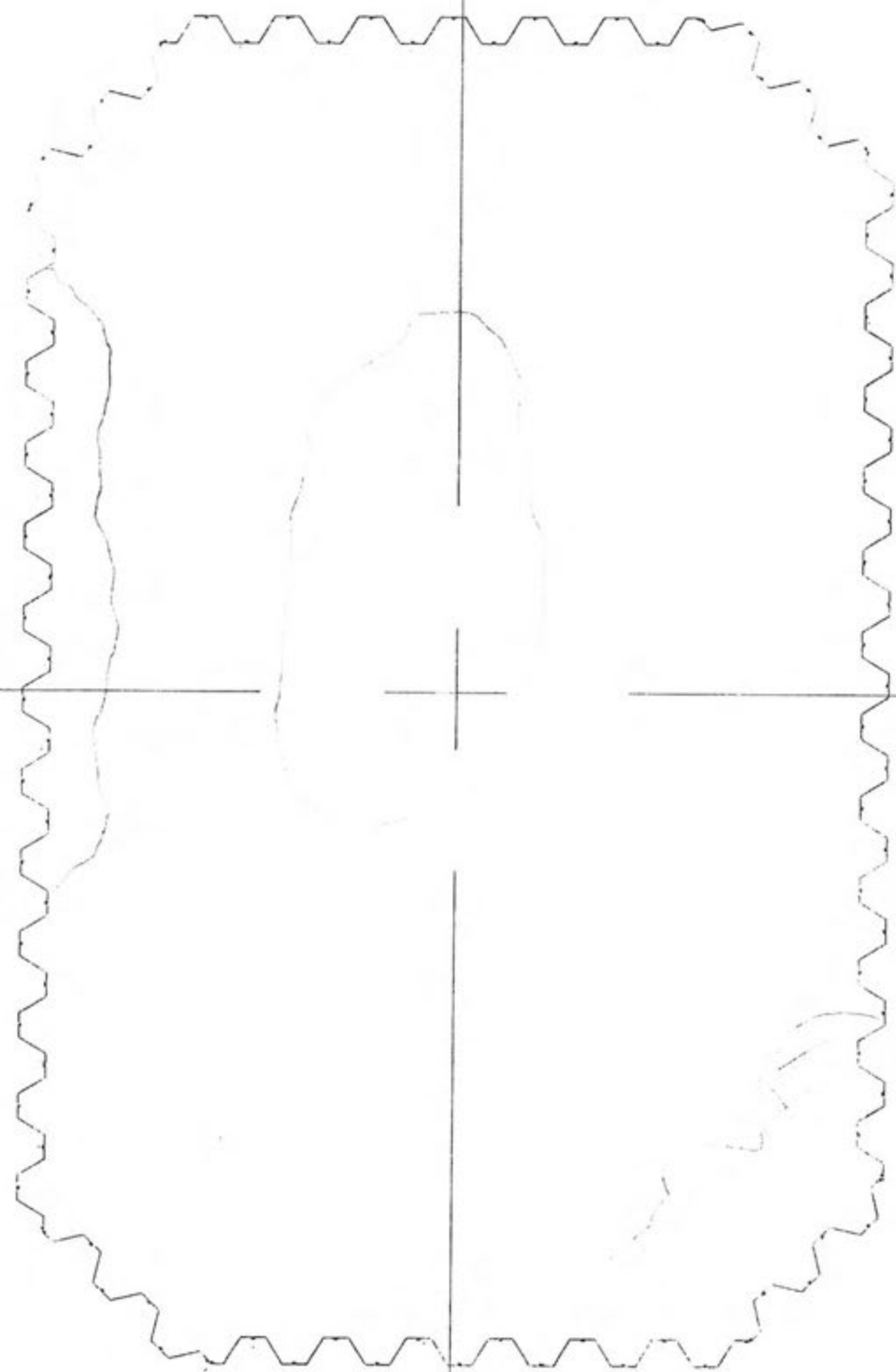
The following procedure shall be used to repair concrete surface deficiency.

1. Identify areas of deficiency.
2. Remove all laitance in area to expose sound concrete. Required for top of footing repairs only.
3. If reinforcing steel is partially exposed remove concrete to:
 - (a) a minimum 20mm behind the exposed reinforcing steel
 - (b) Maintain a vertical edge at the extents of the repair.
4. Thoroughly clean the surface of the concrete by:
 - (a) removing all loose debris,
 - (b) power wash concrete surface areas,
5. Prior to concrete placement the surface is to be saturated with water and have any free standing water removed.
6. Concrete used for the repairs shall be Class C (t1) mix design provided by EBA Consultants.
7. All repaired surfaces will be made to match IFC drawing dimensions including concrete cover requirements.
8. All repairs are to be completed in compliance with the applicable hot or cold weather concrete placement procedures



Q PIER #3N

Q BRIDGE



Ref. to Proposed
Pier #3N and Pier #3N
Footings

— See Notes Sheet 10/17



DEH CHO BRIDGE

PIER #3 NORTH LOWER BUTTRESS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #3 North lower buttress was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 206 Wailer installation and Dewatering	ITP 206-2	Completed and submitted to owner	DDW
WP 207 Lower pier buttress	ITP 207-1	Completed and submitted to owner	DDW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #3 North lower buttress:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
Nil		

I certify that the Pier #3 North lower buttress has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:

Don Williams PEng.

Feb 25, 2010

DEH CHO BRIDGE

PIER #3 NORTH UPPER BUTTRESS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #3 North upper buttress was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 208 Upper pier buttress	ITP 208-1	Completed and submitted to owner	DDW
WP 209 Scour protection	ITP 209-2 Final volume	Completed and submitted to owner	DDW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #3 North upper buttress:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #07	Owner provided approval to proceed with installation of Deficient material. Corrective action to be applied during Installation of pier steel sections. Shimming	DDW
NCR #08	Corrective action completed and accepted by owners rep	DDW
NCR #18	Corrective action completed and accepted by owners rep	DDW

I certify that the Pier #3 North Upper buttress has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:



Don Williams PEng.

Feb 25, 2010



DEH CHO BRIDGE - NON CONFORMANCE REPORT - 007

Report No. 007

Date: October 28, 2009

Non-Conformance Item Description & Location:
Pier armor bearing plate templates provided by the owner have varying thicknesses which will prevent a flat mating surface between the bearing plate and the base sections for the steel piers. Please see attached bearing plate thickness field surveys for reference
Actions to Correct Non-Conformance:
To Come
Follow-up Required to Prevent Re-Occurrence:
Steve Pereira / Oct 28, 2009
QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:


QC Inspector Signature


General Contractor Signature

QA Inspector Signature

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 008

Report No. 008

Date: October 29, 2009

Non-Conformance Item Description & Location:
The pier armor for pier 3 north have been set to correctly locate the bearing plate on the armor. With the bearing plate in the right location the base section of the armor overhangs the concrete surface of the lower buttress in multiple locations. Please see attached field surveys which measure steel overhanging from the concrete as "steel out" or Concrete past the base of the steel noted as "conc out".
Lower buttress as built location surveys also attached for reference.
Actions to Correct Non-Conformance:
- The pier armor is to be disconnected from the lower buttress, lifted and repositioned so that there are no overhangs (ie make the lower portion of the armor fit on to the lower buttress concrete) - The twist in the pier armor will be accommodated by adjusting the upper template to suit - Any over or under hangs between the template and the pier armor vertical collar ring will be dealt with as per the conceptual sketch attached by Dr. Schueller of Infinity Engineering. The final details of this "reinforcing" will be determined once the actual extent of over or under hang is known (ie once we set the template ring in the correct location).
Follow-up Required to Prevent Re-Occurrence:
Pier #2N Cone has been welded out already and will be subject to modification similar to piers #3N and #4N. Pier #1 Cone is currently under erection and reasonable actions will be taken in attempt to "straighten" the cone if it is twisted. If "straightening" is not possible Pier #1N will also be modified to suit as per the corrective action above.
Steve Pereira / Oct 29, 2009
QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action
From the conference call Sun Nov 1 with Schueller, Jivkov, Sargent, Don Williams, Corey, Kirk, Gord, Danny and Ove an alternate repair procedure was suggested by Shueller that was accepted by all and is underway. We are expecting this procedure to be submitted for formal acceptance in writing from Ruskin. Note provided by Danny Keller

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:
Pier Armor was related to Best fit the design bearing template location without exceeding 120mm steel overhang on lower buttress. See Attached Turbo sketch with overhang centers and as built sketch.
The bearing plate was related to the pier armor as per the attached sketch. Accept for as noted areas in the North East corner where the pier armor extended beyond the edge of bearing template.
Cont →

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 008

Correction of Non-Conformance Item & Acceptance:

This area did not receive stiffeners as per vendor's attached sketch and will be addressed in a separate NCR to follow.

Sign Off:

QC Inspector Signature

November 26, 2009

General Contractor Signature

Nov 26/09

QA Inspector Signature

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 018

Report No. 018

Date: December 01, 2009

Non-Conformance Item Description & Location:
Pier #3 North has a section of bearing plate to pier armor where the pier armor extends beyond the bearing plate and did not receive internal stiffeners. Please see attached as built drawing for location as well as jivko sketch, and photos
<i>[Signature]</i> Dec 01, 2009
Actions to Correct Non-Conformance:
No repairs recommended.
Follow-up Required to Prevent Re-Occurrence:
Closer review of bearing plate overhangs in regard to required stiffeners as provided in Jivko's sketch dated Nov 3, 2009
Note: Bearing plate to pier armor connection details on the Nov 3, 2009 sketch were superseded by Jivko sketch dated Nov, 16 2009.
Steve Pereira / Dec 01, 2009
QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

DEH CHO BRIDGE

PIER #4 NORTH FOOTING - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #4 North footing was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 202 Sheet Pile Installation	ITP 202-1	Completed and submitted to owner	DBW
WP 203 Cofferdam Excavation	ITP 203-1	Completed and submitted to owner	DBW
WP 209 Scour Protection	ITP 209-1	Completed and submitted to owner	DBW
WP 204 Pier Footing Rebar Cage Installation	ITP 204-2	Completed and submitted to owner	DBW
WP 205 Pier Footing Temie Pour	ITP 205-1	Completed and submitted to owner	DBW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #4 North Footing:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
Nil		DBW

I certify that the Pier #4 North Footing has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners' satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:



Don Williams PEng.

Feb 25, 2010

DEH CHO BRIDGE

PIER #4 NORTH LOWER BUTTRESS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #4 North lower buttress was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 206 Wailer installation and Dewatering	ITP 206-2	Completed and submitted to owner	DDW
WP 207 Lower pier buttress	ITP 207-1	Completed and submitted to owner	DDW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #4 North lower buttress:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
Nil		DDW

I certify that the Pier #4 North lower buttress has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:



Don Williams PEng.

Feb 25, 2010



DEH CHO BRIDGE

PIER #4 NORTH UPPER BUTTRESS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #4 North upper buttress was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 208 Upper pier buttress	ITP 208-1	Completed and submitted to owner	DW
WP 209 Scour protection	ITP 209-2 Final volume	Completed and submitted to owner	DW

Any Items found to be in non conformance during construction where identified, suitable corrective actions proposed and accepted by owners representative, corrective actions implemented, and final repair inspected and accepted by contractor and owner representatives. The following were NCR items found on Pier #4 North upper buttress:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #07	Owner provided approval to proceed with installation of Deficient material. Corrective action to be applied during Installation of pier steel sections. Shimming	DW
NCR #10	Corrective action completed and accepted by owners rep	DW

I certify that the Pier # North Upper buttress has been constructed in accordance with the contract plans, specifications and applicable CSA standards and that any non conformance items have been addressed and corrected to the owners satisfaction. Please see previously submitted documentation noted above to support this certification.

Certified By:



Don Williams PEng.

Feb 25, 2010



DEH CHO BRIDGE - NON CONFORMANCE REPORT - 007

Report No. 007

Date: October 28, 2009

Non-Conformance Item Description & Location:
Pier armor bearing plate templates provided by the owner have varying thicknesses which will prevent a flat mating surface between the bearing plate and the base sections for the steel piers. Please see attached bearing plate thickness field surveys for reference
Actions to Correct Non-Conformance:
To Come
Follow-up Required to Prevent Re-Occurrence:
Steve Pereira / Oct 28, 2009 QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

Sign Off:


QC Inspector Signature


General Contractor Signature

QA Inspector Signature

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 010

Report No. 010

Date: November 5, 2009

Non-Conformance Item Description & Location:

The pier armor for pier 4 north has been set to correctly locate the bearing plate on the armor. With the bearing plate in the right location the base section of the armor overhangs the concrete surface of the lower buttress in multiple locations. Please see attached field surveys which measure steel overhanging from the concrete.

Attached is the survey of the pier armor as it was assembled in the yard prior to placing.

Lower buttress as built location surveys also attached for reference.

Actions to Correct Non-Conformance:

- The pier armor is to be disconnected from the lower buttress, lifted and repositioned so that there are no overhangs greater than 120mm.
- The twist in the pier armor will be accommodated by adjusting the upper template to suit
- Any over or under hangs between the template and the pier armor vertical collar ring will be dealt with as per the attached sketch from Jivko dated Nov 3rd. The final details of this "reinforcing" will be determined once the actual extent of over or under hang is known (ie once we set the template ring in the correct location).

Follow-up Required to Prevent Re-Occurrence:

Pier #2N Cone has been welded out already and will be subject to modification similar to piers #3N and #4N. Pier #1 Cone is currently under erection and reasonable actions will be taken in attempt to "straighten" the cone if it is twisted. If "straightening" is not possible Pier #1N will also be modified to suit as per the corrective action above.

Steve Pereira / Oct 29, 2009

QC Inspector / Date

Owners Acceptance of Corrective Action or Recommended Corrective Action

From the conference call Sun Nov 1 with Schueller, Jivkov, Sargent, Don Williams, Corey, Kirk, Gord, Danny and Ove an alternate repair procedure was suggested by Shueller that was accepted by all and is underway. We are expecting this procedure to be submitted for formal acceptance in writing from Ruskin. Note provided by Danny Keller

Approval to proceed with Corrective Action:

Owners Representative

Correction of Non-Conformance Item & Acceptance:

- Pier Cone was checked to best fit based on the above Criteria.
- There was an area of cone base that extended beyond 120mm max over the concrete. This area was reinforced as per Jivko sketch dated Nov 08-2009 (Attached) Note Horizontal Reinforcing was modified from 20m @ 200 c/c, to a 15m bar @ 140 plus 3 additional bars to equal 20m x-section area.

DEH CHO BRIDGE - NON CONFORMANCE REPORT - 010

Correction of Non-Conformance Item & Acceptance:

- All under/over Hinges on the bearing template were corrected as per Jirko's attached sketches
- See attached As built over/under hang survey.

Sign Off:

QC Inspector Signature

Mr. [Signature]

General Contractor Signature

QA Inspector Signature

**APPENDIX B
SUPPORTING DOCUMENTS**

TAB H

DEH CHO BRIDGE – QUALITY CONTROL MEMO #12

Date: February 25, 2010

Attn: Corey Ross
Project Manager
Ruskin Construction Ltd.

Re: Thermal Cracking

Due to large temperature differentials recorded between the core and surface of various North pier buttress elements the owner has raised concerns of possible thermal induced cracking.

To address these concerns Ruskin and Allnorth conducted the following investigations:

1. Consultation with specialists in the field of concrete thermal cracking.
 - a) In discussions with the specialists it was determined that there is a possibility that thermal cracking was induced.
 - b) If thermal cracking had occurred it was expected to be limited to the outer portion of the buttresses between reinforcing steel and face.
 - c) However in their opinion the methods to investigate and repair potential thermal cracks may be more detrimental to the structure then the cracks themselves.
2. Inspection of the North pier upper buttresses exposed concrete bearing areas.
 - a) Inspection did not show any evidence of thermal cracking.
 - b) There was some cracking noted to match the stiffener layout of the bearing templates which were left in place during concrete placement and sit approximately 20mm below the surface of the concrete.
 - c) The remainder of the upper buttress is confined within steel armor effectively protecting the concrete from the elements.
3. Inspection of North pier lower buttresses exposed concrete.
 - a) Inspection did show signs of visible thermal cracking an example of which was noted within the Levelton report prepared for north pier #2 lower buttress repairs on behalf of the owner.
 - b) The report states "Considering that the cracks are narrow and located below the water level, the durability of the pier concrete should not be compromised".

Based on the investigation it is my opinion that thermal cracking may have occurred in both the lower and upper north buttresses, and if cracking does exists it should have a minimal effect on the piers.



Don Williams, P.Eng
Quality Control Manager
Deh Cho Bridge Project



DEH CHO BRIDGE – QUALITY CONTROL MEMO #12

Date: February 25, 2010

Attn: Corey Ross
Project Manager
Ruskin Construction Ltd.

Re: Thermal Cracking

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 - a) In discussions with the specialists it was determined that there is a possibility that thermal cracking was induced.
 - b) If thermal cracking had occurred it was expected to be limited to the outer portion of the buttresses between reinforcing steel and face.
 - c) However in their opinion the methods to investigate and repair potential thermal cracks may be more detrimental to the structure then the cracks themselves.
2. Inspection of the North pier upper buttresses exposed concrete bearing areas.
 - a) Inspection did not show any evidence of thermal cracking.
 - b) There was some cracking noted to match the stiffener layout of the bearing templates which were left in place during concrete placement and sit approximately 20mm below the surface of the concrete.
 - c) The remainder of the upper buttress is confined within steel armor effectively protecting the concrete from the elements.
3. Inspection of North pier lower buttresses exposed concrete.
 - a) Inspection did show signs of visible thermal cracking an example of which was noted within the Levelton report prepared for north pier #2 lower buttress repairs on behalf of the owner.
 - b) The report states "Considering that the cracks are narrow and located below the water level, the durability of the pier concrete should not be compromised".

Based on the investigation it is my opinion that thermal cracking may have occurred in both the lower and upper north buttresses, and if cracking does exists it should have a minimal effect on the piers.



Don Williams, P.Eng
Quality Control Manager
Deh Cho Bridge Project

Ruskin Construction Ltd.

PO Box 1050
Prince George, BC V2L 4V2
Ph: (250)563-2800

B# 59

Meeting Minutes

Job: 09-058 DCBC - Deh Cho Bridge Season 2
Location: Ruskin Site Office
Highway 3
Fort Providence, NWT

Meeting: Field # 28
Date: 3/3/10
Start Time: 2:00:00PM

Attendees

Attended

☒ Kirk VandenBoogaard (Ruskin Construction)	☒ Corey Ross (Ruskin Construction Ltd)
☐ Steve Pereira (Allnorth Consultants Limited)	☐ Cliff Marcil (Ruskin Construction Ltd.)
☒ Danny Keeler (JIVKO ENGINEERING)	☒ Richard Fairservice (All North Consultant)
☒ Hanna Quinn (Ruskin Construction Ltd)	☒ Adrian Winter (Ruskin Construction Ltd)
☒ Don Williams (Allnorth Consultants Limited)	☐ Phoebe Parent (JIVKO ENGINEERING)
☒ Lorne Semenovich (JIVKO ENGINEERING)	

Item	Description	Responsible	Due Date	Closed
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Old Business

22-3-3 ENGINEERING AND DOCUMENT CONTROL - Corey Ross ☒

Potential for Thermal Cracking

In reference to the thermal crack, don't want to make it worse. On a risk management perspective, what are you going to do to analyze this with (Terry)? Well we analyze 8 piers now (Corey). The north side data, seems to be some damage there, should we worry about this? If there is a problem identified and proposed, it may be a mirror to the south side. Need to make a decision and then Ruskin can make a proposal. Is Ruskin looking at a proposal regarding the potential for damage and anything to be done (Danny)? We are talking with engineers and experts in the field (Corey). Just look at the data, talk to the experts and have a proposal (Don). If it's a big deal or not, there are not many experts out there (Don).

-----January 14 2010-----

Is there a proposal? No, not after the information we have found on the piers(Corey). We have consulted with numerous experts, even the fellow that wrote the book on cold weather curing of mass concrete (Corey). We are not moving forward with it. Are you going to put a summary letter together (Terry)? Not today (Corey).

-----February 4 2010-----

Corey stated the summary is forthcoming

-----February 10 2010-----

Corey is going to check to see if there is a summary report being produced or not

----- February 17 2010-----

There is correspondence from November until present, can you clarify what you are looking for (Corey). Danny stated that specifically the drop in temperature at pier 4 that was outside of the parameters; whether Ruskin believes there is any damage due to the abrupt temperature swings. Don stated that there is no way to asses if there was any damage but does not expect any issues. The damage to the pier to test for the cracking would be worse than anything that is presently there. Danny requested a statement from Don to that effect.

----- February 25 2010-----

Ruskin did an examination of the concrete surface. We are unable to drill. Have consulted with

Meeting Minutes

Job: 09-058 DCBC - Deh Cho Bridge Season 2

Meeting: Field # 28

Item	Description	Responsible	Due Date	Closed
	multiple experts. If thermal cracking exists they are covered by the pier armor. No action will be taken unless we are directed by the owner. Danny stated that a statement in an email should put closure to this. Cliff stated that Corey will address this and do up a memo once he returns (Cliff).			
	----- March 3, 2010----- The QC package has been received and being submitted with the final certification package for the concrete portion of the work (Corey).			
22-3-4	ENGINEERING AND DOCUMENT CONTROL - Pier Shimming Change Order Change order for pier shimming required. The issue is if we don't get a change order then we don't get paid for it, it's a change order (Corey). Terry states he understands. -----January 14 2010----- Change orders for shims that were sent to Andrew, Corey now has it. The email was sent to Andrew, Don, Cliff (Terry). It was forwarded to Corey. This is when we have a communication problem with the entire project (Corey). Andrew is the president, not the Project Manager (Corey). The CC list is for information purposes (Corey). This is unacceptable to the contractor. The PO that was distributed is unacceptable as there are too many items that are wishy washy (Corey). Can you compile a list of items that are unacceptable (Terry). The email doesn't have explanations in it. Subject to's, further concerns, qualifications, we cant do either. Pier 1,2,3 can proceed subject to. Pier 4 shall not commence until further instructions (Corey). Why cant we have all labor, equipment, and materials signed off and submitted for payment (Corey)? Its quite simple. Installation shall not commence until these items are addressed. The change came in today and there will be a response on it (Corey). -----February 4 2010----- Pier Shimming Change Order: have received a change order but it is not signed yet by Ruskin (Change Oder #5). LEM's for shimming are being produced and signed off daily. -----February 10 2010----- The LEM's are still being produced daily (Kirk). Haven't gotten any signatures on the change order. (Corey) Negotiations continue above the site management level. -----February 17 2010----- Awaiting -----February 25 2010----- Cliff states we will be completing the change order negotiation and we will complete the work to the piers with no diffincies recording the hours and the comercial aspect will be dealt with next week. -----March 3, 2010----- Change Order is done and signed off (Corey). It is part of the billing package for Progress Billing #8 (Corey). Shimming is done, all the LEM's for the package have been resolved.	Corey Ross		✓
23-3-3	ENGINEERING AND DOCUMENT CONTROL- Scour Rock Change Order Change order for extra scour rock (Corey)? We don't have the information yet but is was discussed today (Terry).	Corey Ross		✓

**APPENDIX B
SUPPORTING DOCUMENTS**

TAB I

Footing repair
WP 205 +

10/28/09
10:53 AM
CONFIDENTIAL

DEH CHO BRIDGE - QUALITY CONTROL MEMO #6

Date: October 28, 2009

Attn: Corey Ross
Project Manager
Ruskin Construction Ltd.

Re: Pier #3 and #4 North exposed footing reinforcing steel repairs

The exposed footing reinforcing steel in the areas noted below has been repaired as per Ruskin's concrete repair procedure. The repair areas were inspected by both Allnorth quality control and Jivko quality assurances representative prior to concrete placement. Concrete cylinders were cast and break results will be forwarded when received.

Repair areas include:

Pier #3 North footing areas indicated within NCR #3.

Pier #4 North top approximately 2m² on the North West side of the buttress.

Regards,



Steve Pereira
Quality Control
Deh Cho Bridge Project

**APPENDIX B
SUPPORTING DOCUMENTS**

TAB J



P.O. Box 299 Fort Providence, NT X0E 0L0

By email

Mr. Andrew Purdey
Ruskin Construction Ltd.
608 Algoma Crescent
Prince George, BC
V2N 5S9

APurdey@rcl.bz

January 18, 2010

Dear Mr. Purdey;

Deh Cho Bridge Construction - Erection of the North Pier Bents

This is to confirm that all sections of the Pier Bents North fabricated in the Atcon's shop in Miramichi, NB meet the quality requirements specified in the contract and the established geometric tolerances. Survey results of the fully pre-assembled bents, assembly pictures and other documentation relevant to the installation of the bents have been provided.

This will further confirm that the Engineer is fully satisfied with number, quality, specification, sizes and condition of the owner supplied nuts and bolts. This includes the inventory provided to Ruskin per Kirks email of December 9 plus the material supplied per attached inventory taken by Danny (please see attached). The 22 bolts @ 7.25 inches should not be used. Please advise if there are any concerns or additional information required.

To clarify our understanding, Ruskin may proceed with installation of the pier bents, subject to the following;

- Ruskin and DCBC to review the detailed survey provided by DCBC. Ruskin may, at its option, accept these survey results or undertake its own survey.
- Ruskin to hold a pre-erection meeting, as discussed.
- It is not certain whether and to what extent shimming will be required. This will become clearer with the detailed survey and certain only when the base sections are being installed. The DCBC Engineer and Ruskin QC Engineer should discuss the procedure for shimming of base sections, to ensure that adequate preparations are made in advance of installation. As discussed Ruskin should proceed to obtain shims. The DCBC Engineer and Ruskin QC Engineer should also be represented on site at the time of installation of each pier base section, so that timely direction can be given on any required shimming.

- To the extent required, shimming, will be considered extra to Ruskin's contract, per the terms of change order #5.
- Ruskin will continue with heating and hoarding of pier 2N for not less than 35 days from the placing of the concrete and approval by the Engineer to discontinue the heating. Once heating has been discontinued, installation of pier bents may proceed prior to completion of cooling, in accordance with the procedure provided by AllNorth and accepted by the Engineer.
- The Engineer has confirmed that the six shims under the Pier 4N template are adequate to support the full pier bent. Any shimming, if required for pier 4N bent base section, should be placed on top of the template, in the same location as the 6 shims. Intermediate shims, as required, can be installed at the same time or after the template has been grouted.
- We confirm that in addition to the modifications already made to Pier 4N procedures, we are expecting Infinity to detail the addition of 'floor beams' which will be connected across the top of the pier base section and bolted to internal stiffeners. It may not be possible to provide details this for a couple of weeks. This should be a fairly straightforward modification and will be dealt with by separate change order. Access to the base section for this modification would be much easier either before or after the base section of Pier bent 4N is installed, but before the remaining pier bent sections are erected. To the extent that it does not cause any delay or cost to Ruskin, DCBC would appreciate Ruskin proceeding with pier bent erection in a sequence that provides the most time possible prior to erecting Pier 4N legs, in the hope that we can make the changes before upper sections are erected. We would appreciate your advice on this.
- We note that any misalignment due to pier bent geometry is not an issue, as pier bent geometry meets required tolerances. While it may be possible to make a small shimming adjustment, this will be decided at the time of shimming the base sections and must not be allowed to hold up installation. Pier template misalignment (rotation), if any, will be assessed from the detailed survey.

With your cooperation, we will continue to work towards resolution of any other outstanding issues and questions, including open NCRs and lifting lug procedures.

Sincerely,



Jivko Jivkov
Engineer



Andrew Gamble
Developer

c Mr. Bob Milburn, GNWT
Bob_Milburn@gov.nt.ca

Date: October 7, 2009

To: Corey Ross
Project Manager
Ruskin Construction Ltd.

Re: Certification of Pier Components Fabricated by Outside Agencies

Please accept this letter as verification that the following components, fabricated and delivered to the Deh Cho Bridge Site by AIS/Atcon, have been inspected and found to be within specification.

- Pier armour component segments for piers 1 through 4 North received June 21, 2009.
- Base Plate Templates for piers 1 through 4, received Sept. 30, 2009.
- Pier 1, Lower Bents Section received Sept. 30, 2009.

You are hereby authorized to incorporate these components within your work.

Regards,



Phil Munn
Bridge Project Supervisor
Jivko Engineering

Neil Cumming

From: Jivko Jivkov [jivko@jivko.ca]
Sent: Wednesday, September 23, 2009 11:27 AM
To: dennis.sargent@sargentengineering.com
Cc: MIR James Mather@atcon; MIR Bill Macleod; George Crocker; MIR Frank Flanagan@Atcon; MIR Scott Orr@atcon; Andrew Gamble; YK Phil Munn; Danny Keeler; YK Lloyd Dayagbil; VIC Christian Copp
Subject: Releasing 4 Templates N amd base Section 1N

Dennis,

Further to our teleconference of yesterday I confirm:

1. We are accepting the geometric fit of the four template rings for the piers north as presented in George's QC/QA reports. It is understood that no further welding will be done on the Templates or near the Bent Base Plates connecting to them.
2. We are accepting the geometric pre-fit of the lower section of the bent 1N with the geometric tolerances of the fully assembled bent 1N as indicated in George's QC/QA submission. It is understood that no further welding will be done on:
 - any parts of the 1N lower section
 - the top section of the 1N on material located near the field splice.
3. You can proceed with completion of certification of the above specified material and release for shipping, subject to your satisfaction with the welding aspects of the fabrication.

Frank,

Reports prepared and signed by George Crocker including detailed geometric measurements (mapping) on the gaps of the splices between Template and Lower Section 1N and Lower and Top section of 1N should be submitted with your progress billing by the end of the current month.

I confirm, we accept the geometric tolerances on the splices as presented by George, but we need a formal submission of the geometry just to be able to compare if any further deformation will occur during filed welding and assembly.

I presume with your monthly billing you will be submitting fabrication progress on other bent parts too. Please make sure that the submission has proper backup documentation commented and signed by George.

Regards,
Jivko

**APPENDIX B
SUPPORTING DOCUMENTS**

TAB K



DEH CHO BRIDGE

PIER #1 NORTH STEEL SECTIONS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #1 Steel Sections were completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 311 Pier 2 Lower Steel Section	ITP 311-1	Completed and submitted to owner	DDW
WP 312 Pier 2 Upper Steel Section	ITP 312-1	Conditional sign off submitted to owner. Final sign off subject to completion of outstanding work.	DDW

The following were NCR items found on Pier #1 Steel Section:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #19	Owner provided approval to proceed with installation of Deficient material.	DDW
NCR #26	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW
NCR #27	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW

I certify that the Pier #1 Steel Sections have been erected in accordance with the contract plans, specifications and applicable CSA standards except as noted within ITP 312-1 and NCR #'s 19, 26 and 27. Please see previously submitted documentation noted above to support this certification.

Pier steel is not ready for installation of superstructure.

Certified By:



Don Williams P.Eng.

Mar 11, 2010

ITP 312-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 1 UPPER STEEL SECTION

Inspected By: Steve Pereira

Date: Feb

Location: Pier #1 North

B#59

PIN
Steel

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	SP	
B	Design Drawings reviewed	Y	SP	
C	Allnorth Lift Procedure drawings reviewed	Y	SP	
D	Shop Drawings reviewed	Y	SP	
E	Required equipment and operators available and on site	Y	SP	
F	Lifts reviewed and crane charts checked	Y	SP	See Note 1
G	DCBC certification letter for upper pier steel section received	Y	SP	
2	Construction - Reorientation Phase			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	SP	
B	Dwydag Bars installed in upper pier section			
C	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	SP	
D	Crane pads are in place as per Allnorth drawings	Y	SP	
E	Cranes positioned as per Allnorth Lift Procedure drawings	N	SP	See Note 2
F	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	SP	See Note 3
G	Lifting assemblies installed as per Allnorth drawings	Y	SP	
H	Steel section lifted and reoriented (from upside down to on its side)	Y	SP	
I	Steel section lowered back onto truck	N	SP	See Note 4
J	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	SP	
K	Cranes positioned as per Allnorth Lift Procedure drawings	N	SP	See Note 2
L	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	SP	See Note 3
M	Lifting assemblies installed as per Allnorth drawings	Y	SP	
N	Steel section lifted and reoriented (from on its side to right side up)	Y	SP	
O	Steel section lowered back onto truck	N	SP	See Note 5
P	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	SP	
3	Construction - Installation Phase			
A	Cranes positioned as per Allnorth Lift Procedure drawings	Y	SP	
B	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	N	SP	See Note 6
C	Lifting assemblies installed as per Allnorth drawings	Y	SP	
D	Steel section lifted and rotated into position as per drawings	Y	RM	
E	Steel section lowered into position and installed as per drawings	Y	RM	
F	Upper and lower sections bolted together and Inspection Test Plan ITP 303-1 Pier Section Bolting completed	Y	RP	
G	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RP	
4	Construction - Pier Completion Phase			
A	Pier Alignment Checked	Y	RP	See Note 7
B	Pier alignment is adjusted (if not within dimensional tolerances) and Inspection Test Plan ITP 305-1 Pier Jacking completed		RP	Note 8
C	Lower section anchor bolts installation completed and Inspection Test Plan ITP 306-1 Anchor Bolts completed			Note 9
D	Upper section Dwydag bars installation completed and Inspection Test Plan ITP 307-1 Dwydag Bars completed	Y	RP	
3	Post Construction			
A	Submit documentation of steel section elevation/ location checks	Y		

ITP 312-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 1 UPPER STEEL SECTION

Comments:

- 1 - Crane checks checked by crane operators.
 - 2 - Crane operator modified final frame positions as they seem fit for safety conduct the lift.
 - 3 - Dushin installed lifting lugs.
 - 4 - Section placed on bridge deck.
 - 5 - Section lowered into Deck and cribbing as per lift logs.
 - 6 - Lifting lugs installed on site.
 - 7 - Area inspection as of Feb 21 2010. No issues to report. NIT 76 generated.
- R - ITP 305 and 306 to be completed in Phase 2 work.

Sign Off:

QC Inspector Signature

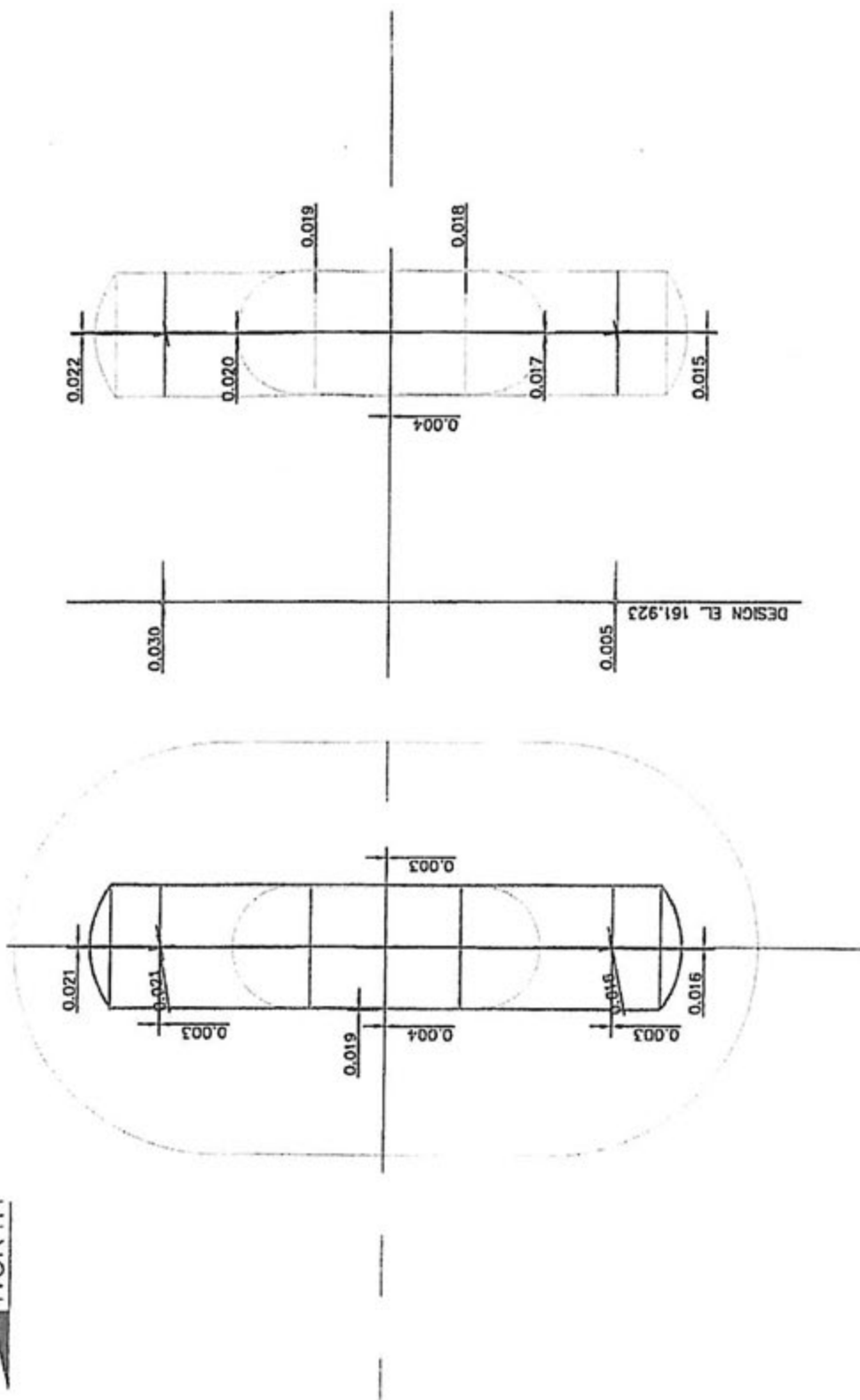
General Contractor Signature

QA Inspector Signature

March 2/2010

MARCH 2, 2010

NORTH



TOP LOCATION VS. BASE

ELEVATION VARIANCE

BEARING LOCATIONS VS. DESIGN LOCATIONS

PIER 1
 LOCATIONS OF BASE AND TOP SECTION
 INTERPOLATED FROM AS BUILD CENTER LINES IN
 NORTH SOUTH AND EAST WEST DIRECTION



ITP 301-1 - INSPECTION TEST PLAN DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: S. Perera

Date: Feb 11-2010

Location: Pier #1 N. Upper Section Reorientation Lugs

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	SP	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	SP	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	SP	

Comments:

- Lifting Lugs for the two phases of Pier #1 upper reorientation have been removed and left ground smooth

Sign Off:

QC Inspector Signature

Feb 11-2010

General Contractor Signature

March 2/2010

QA Inspector Signature

MARCH 2, 2010

ITP 303-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - PIER SECTION BOLTING

Inspected By: S. P. / R. M. Alpine

Date: Feb 18 - 2010

Location: Pier #1 N upper section to Deck Section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	SP	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	SP	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)	Y	SP	
C	Remaining holes filled with connection bolts and tightened to snug tight	Y	SP	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	Y	SP	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	Y	SP / HOS	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	Y	HOS	

Comments:

- Bolts tightened using turn of the Nut Method

- Bolts were visually inspected

Sign Off:

S. P. / R. M. Alpine
QC Inspector Signature

[Signature]
General Contractor Signature
Feb 20/2010

[Signature]
QA Inspector Signature
FEB 20, 2010



ITP 305-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - PIER JACKING

Inspected By: _____ Date: _____

Location: Pier 1 N

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Jacking procedure reviewed			
B	Access drawings reviewed			
C	Appropriate personnel and equipment are on site and available			
D	Jacking frames are on site			
2	Construction - Jacking			
A	Jacking frames installed as per Jacking procedure			
B	Dywidag anchor bolt nuts loosened			
C	Pier jacked up to the required height.			
D	Pier is level			
E	Jacks locked off			
3	Construction - Lowering			
A	Jacks unlocked			
B	Pier lowered down			
C	Anchor bolts tightened to snug tight			

Comments:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature



ITP 306-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - ANCHOR BOLTS**

Inspected By: _____ Date: _____

Location: Pier 1 N

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Tensioning and grouting procedure reviewed			
B	Access drawings reviewed			
C	Appropriate personnel and equipment are on site and available			
D	Tensioning and grouting equipment are on site			
E	Grout is on site and mill certificates are obtained			
2	Construction			
A	Anchorbolts tensioned as per the tensioning sequence			
B	Anchorbolts tensioned up to 70% Fpu (1245.3kN)			
C	Anchor bolt tensions recorded			
D	Heating and hoarding provided (if the ambient temperature is below 10 degrees Celsius) for 24 hours prior to grouting			
E	Grout mixed as per the manufacturer's specification			
F	Grout installed into all of the anchor bolts			
G	Any grout that gets between the base plates is removed			
H	Four grout samples taken			
3	Post Construction			
A	Heating and Hoarding (if required) maintained for 72 hours after grouting			
B	Anchor bolt tensioning records provided			
C	Grout mill certificates are provided			
D	Grout test results provided			

Comments:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

ITP 307-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - FCM DYWIDAG INSTALLATION

Inspected By: [Signature]

Date: 1/10/2010

Location: [Signature]

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Work procedure 307 reviewed	✓	✓	
B	Shop Drawings reviewed	✓	✓	
C	Threadbar material certification letter received from owner	✓	✓	
2	Construction			
A	Threadbars installed in upper pier section as per shop drawings	✓	✓	
B	Threadbars stressed to lock off as specified in work procedure	✓	✓	
C	Lift off test conducted on stressed threadbars and is within 5% of Required lock off load	✓	✓	
D	If No to C then end anchorage reset and re test of lift off performed until stress is within 5% of required lock off load	✓	✓	
E	Upon completion of stressing threadbar covers are installed	✓	✓	

Comments:

Dywidag's are covered, capped
- Reinforcing bars on attached pages left standing etc.
at least 1 inch from edge
- attached is into the base of concrete at
top of pier.

Sign Off:

QC Inspector Signature

1/10/2010

General Contractor Signature

March 2/2010

QA Inspector Signature

MARCH 2, 2010



Client: Kushin

Job # 08-PC-0126 File # _____

Project: Del Cha Bridge

Date: Feb 15, 2010 Rev: _____

Subject: Load Requirements for tensioning
FCM Threadbars.

Prep by: S. Pereira Checked by: KV.

Page 1 of 2

10% Yield for Horizontal dywidg Reels : 175 KN (LL)

5 loads during stressing 1kn = 0.224 809 kips

Alignment load = $0.1 \cdot LL = 17.5 \text{ KN} = 3.934 \text{ kips}$
= 100 PSI

0.25 LL = 43.75 KN = 9.835 kips = 300 PSI

0.5 LL = 87.5 KN = 19.67 kips = 630 PSI

0.75 LL = 131.25 KN = 29.506 kips = 1000 PSI

1.0 LL = 175 KN = 39.342 kips = 1300 PSI

Gauge Readings on Tensioning pressure gauge for equivalent
Forces Required.



ITP 303-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER SECTION BOLTING**

Inspected By: S. Pereira / R. McAlpine Date: Feb 15 - 2010

Location: Pier #1 N upper section to Base Section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	SP	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	SP	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)	Y	SP	
C	Remaining holes filled with connection bolts and tightened to snug tight			
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	Y	RF	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	Y	RF/RM	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	Y	RM	

Comments:

- Bolts tightened using turn of the Nut Method.
 - Bolts were visually inspected

Sign Off:

R. McAlpine
 QC Inspector Signature
 Feb 17, 2010

[Signature]
 General Contractor Signature
 Feb 20/2010

[Signature]
 QA Inspector Signature
 FEB 20, 2010



ITP 311-1 INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER 1 LOWER STEEL SECTION**

Inspected By: Steve Reardon

Date: Feb 05 2010

Location: Pier 1 North

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	SP	
B	Design Drawings reviewed	Y	SP	
C	Allnorth Lift Procedure drawings reviewed	Y	SP	
D	Shop Drawings reviewed	Y	SP	
E	Steel section in proper position on truck trailer	Y	SP	
F	Required equipment and operators available and on site	Y	SP	
G	Lifts reviewed and crane charts checked	Y	SP	See Note
H	DCBC certification letter for lower pier steel section received	Y	SP	
2	Construction			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	SP	
B	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	SP	
C	Crane pads are in place as per Allnorth drawings	Y	SP	
D	Cranes positioned as per Allnorth Lift Procedure drawings	Y	SP	
E	Lifting lugs bolted on and Inspection Test Plan ITP 302-1 Lifting Lug bolting completed	Y	SP	
F	Lifting assemblies installed as per Allnorth drawings	Y	SP	
G	Requirement for installing shims between the base and upper buttress assessed	Y	SP	
H	Shims installed (if required) and Inspection Test Plan ITP 304-1 Pier Base Shimming partially completed	Y	SP	
H	Steel section lifted and rotated into position as per drawings	Y	SP	
I	Steel section lowered into position and installed as per drawings	Y	SP	
J	Base steel section aligned	Y	SP	
K	Shim installation (if required) completed and Inspection Test Plan ITP 304-1 Pier Base Shimming completed	Y	SP	
L	Dwydags anchors snug tightened	Y	SP	
M	Lifting assembly removed	Y	SP	
N	Lifting lugs removed	Y	SP	
3	Post Construction			
A	Submit documentation of steel section elevation/ Location checks and required shimming.	Y	SP	See Note



ITP 311-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 1 LOWER STEEL SECTION

Comments:

- Concrete checks checked by crane operators
- Review of internal temperatures and surface temperatures with Danny Kraker showed that concrete surface temp was already within 10°C of Ambient temperature. It was agreed that Insulation would be placed on pier as per Rushin Pier Deck insulation work procedure. However no further that no temperature monitoring would be required.
- Final elevation or levelness of pier base section complete within 21P 501N

Sign Off:

QC Inspector Signature

Feb 18/2010

General Contractor Signature

Feb 18/2010

QC Inspector Signature

FEB 18/2010

ITP 302-1 - INSPECTION TEST PLAN DEH CHO BRIDGE - LIFTING LUG BOLTING

Inspected By: Steve Reizen

Date: Feb 08 2010

Location: Pier #1 North Base Section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	SP	
2	Construction			
A	Lifting Lug is bolted on. New bolts are used. Bolts tightened by one of the approved methods.	Y	SP	
3	Post Construction			
A	Connection is inspected to ensure it is attached as per the design drawings.	Y	SP	

Comments:

Note: Lug installed when Piece arrived on site for offloading. Hole miss match prevented installing all 4 Bolts - per log 3 bolts per lug were installed this was reviewed and accepted by the lifting engineer Delvilliers.

Sign Off:

QC Inspector Signature

Feb 08 2010

General Contractor Signature

Feb 18/2010

QA Inspector Signature

FEB 18, 2010

ITP 304N-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - NORTH PIER BASE SHIMMING**

Inspected By: Steve Pereira

Date: Feb 08, 2010

Location: Pier #1 North

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Review Allnorth base shimming procedure and drawings	Y	SP	
B	Ensure shim material is available	Y	SP	
C	Ensure shim material mill certificates received and reviewed			
D	Ensure appropriate personnel and equipment are on site and available	Y	SP	
2	Construction			
A	Install shims as per Base Shim plan	Y	SP	
B	After pier base is installed, adjust shims and add/remove as required to ensure base is in the correct location	Y	SP	
C	Final location of pier base section surveyed and within tolerances	Y	SP/RM	
D	Ensure shims are welded/secured to stop them from sliding.	Y	SP	
E	Anchor bolts tightened to snug tight	Y	SP	

Comments:

- Shimming procedure modified: Set Base section on buttress
- marked 3 main Contact Points
- lifted Base section and placed shims min 4mm @ 3 contact points
- lowered section back down and shot 3 level points on pier cap that were agreed upon by Boston/Allnorth and owner Reps.
- Adjusted shims to level pier then added 1/16" shims and set base section down
- Set remaining shims in to place
- After all shims placed pier section lifted and 4mm additional shims removed from 3 critical shim points to ensure remaining shims are levelled
- All shim points installed to within 2.05 mm of base
- Final Survey indicated pier base has been levelled within tolerance. See Attached
- Survey level points witnessed and Accepted by owners Rep. *[Signature]*

Sign Off:

QC Inspector Signature

[Signature]
Feb 18, 2010

General Contractor Signature

[Signature]
Feb 18, 2010

QA Inspector Signature

[Signature]
FEB 18, 2010



BS TOP OF
WIND RAIL

NORTH SIDE		NORTH SIDE		SOUTH SIDE	
BS	A	BS	B	BS	C
FS		FS		FS	
0.574		0.574		0.574	
	0.017		0.017		0.017
ELEV. 0.557		ELEV. 0.557		ELEV. 0.557	

- Surveyed locations marked in yellow point pen on pier Base.

[Handwritten signature]



DEH CHO BRIDGE

PIER #2 NORTH STEEL SECTIONS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #2 Steel Section was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 321 Pier 2 Lower Steel Section	ITP 321-1	Completed and submitted to owner	DDW
WP 322 Pier 2 Side Steel Section	ITP 322-1	Completed and submitted to owner	DDW
WP 323 Pier 2 Upper Steel Section	ITP 323-1	Conditional sign off submitted to owner. Final sign off subject to completion of outstanding work.	DDW

The following were NCR items found on Pier #2 Steel Section:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #14	Owner provided approval to proceed with installation of Deficient material. Corrective action to be completed at later date	DDW
NCR #20	Owner provided approval to proceed with installation of Deficient material.	DDW
NCR #27	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW
NCR #31	Corrective action completed and accepted by owners rep	DDW
NCR #32	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW

I certify that the Pier #2 Steel Sections have been erected in accordance with the contract plans, specifications and applicable CSA standards except as noted within ITP 323-1 and NCR #s 14, 20, 27, 31, and 32. Please see previously submitted documentation noted above to support this certification.

Pier steel is not ready for installation of superstructure.

Certified By:



Don Williams PEng.

Mar 11, 2010

B*6

ITP 301-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL**

P2N
Steel

Inspected By: _____ Date: _____

Location: _____

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available			
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out			
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material			

Comments:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

March 5/2010

March 5/10

ITP 301-1 - INSPECTION TEST PLAN DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: [Signature] Date: March 3/2018

Location: Deh Cho Bridge, Yellowknife, NT

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available			
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out			
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material			

Comments:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

March 3/2018

March 4/18



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: David J. Henderson Date: March 26, 2010

Location: Pier 10 - Deck 1 - Deck 2

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	Y	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	Y	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	Y	

Comments:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA-Inspector Signature

March 3/2010

March 4/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard Lawrence Date: Mar 01 2010

Location: Pier 1 North End and South End

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available			
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent Structure). Remaining weld ground out			
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material			

Comments:

Sign Off:

Richard Lawrence
QC Inspector Signature

[Signature]
General Contractor Signature

[Signature]
QA Inspector Signature

March 5/2010

March 5/10



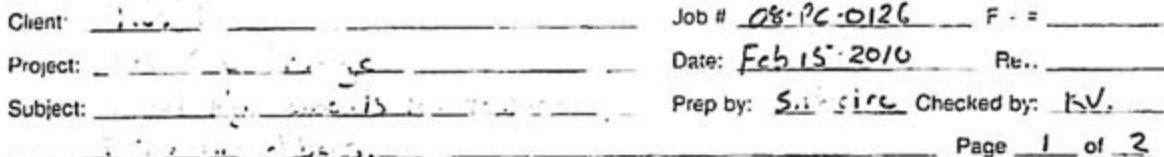
Date: _____

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Work procedure 307 reviewed			
B	Shop Drawings reviewed			
C	Threadbar material certification letter received from owner			
2	Construction			
A	Threadbars installed in upper pier section as per shop drawings			
B	Threadbars stressed to lock off as specified in work procedure			
C	Lift off test conducted on stressed threadbars and is within 5% of Required lock off load			
D	If No to C then end anchorage reset and re test of lift off performed until stress is within 5% of required lock off load			
E	Upon completion of stressing threadbar covers are installed			

Sign Off:

General Contractor Signature

QA Inspector Signature _____



10. $\gamma_{12}(d) = \frac{1}{2} \left(\frac{1}{d} + \frac{1}{d} \right) = \frac{1}{d}$ (LL)

5 loads down, 1 km = 0.5 x 9'

alignment load = $0.1 \cdot LL = 17.5 \text{ kN} = 3.93 \text{ kN}$

$$C_{12} LL = 413.75 \quad N = 9.85 \quad P_{12} = 30.10$$
$$P_{\text{max}} = 19.67 \text{ kN/m}^2 = 196.7 \text{ kPa}$$

0.75 Lb = 131.75 Km = 29.506 Kips = 1 * 10

1.0 L = 175 lbs : 39.342 kgs = 150: 155.

[illegible]



Date: Nov. 22 2010

Location: 22. 811

Comments:

QA Inspector Signature

March 4/10



ITP 308-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - STEEL PIER SECTION REORIENTATION

Inspected By: Richard Lawrence Date: March 22, 2010

Location: Pier 2 North East and West Legs

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure Allnorth lift procedure drawings are reviewed	Y	HC	
B	Ensure lifting slings, lifting assembly, and tag lines are on site	Y	HC	
C	Ensure steel pier section c/w appropriate lifting lugs are on site	Y	HC	
D	Ensure appropriate personnel and equipment are on site and available	Y	HC	
E	Ensure appropriate support/dunnage is available	Y	HC	
2	Construction			
A	Reorientation lift conducted as per Allnorth lift procedure drawings	Y	HC	
3	Post Construction			
A	Ensure steel pier section is left in a stable condition	Y	HC	

Comments:

Sign Off:

Richard Lawrence
QC Inspector Signature

March 3/2010
General Contractor Signature

March 4/10
QA Inspector Signature



Date: 11-28-2011

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available			
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)			
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)			
C	Remaining holes filled with connection bolts and tightened to snug tight			
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.			
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)			
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.			

ALLNORTH CONSULTANTS LIMITED



ITP 303-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER SECTION BOLTING**

Inspected By: Michael J. Smith Date: March 4, 2010

Location: Deh Cho Bridge, Highway 101, Yellowknife, N.W.T.

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	OK	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	OK	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)		OK	
C	Remaining holes filled with connection bolts and tightened to snug tight	Y	OK	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	Y	OK	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	Y	OK	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	Y	OK	

Comments:

Sign Off:

Michael J. Smith
QC Inspector Signature

[Signature]
General Contractor Signature

[Signature]
QA Inspector Signature

March 5/2010

March 4/10



ITP 302-1 – INSPECTION TEST PLAN **DEH CHO BRIDGE – LIFTING LUG BOLTING**

Inspected By: Michael J. [Signature] Date: March 3/2010

Location: Route 2 North East and West 1-4

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	Y	
2	Construction			
A	Lifting Lug is bolted on. New bolts are used. Bolts tightened by one of the approved methods.	Y	Y	
3	Post Construction			
A	Connection is inspected to ensure it is attached as per the design drawings.	Y	Y	

Comments:

Sign Off:

[Signature]
 QC Inspector Signature
 March 3/2010

[Signature]
 General Contractor Signature
 March 3/2010

[Signature]
 QA Inspector Signature
 March 4/10

ITP 322-1 INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER 2 SIDE STEEL SECTION**

Inspected By: Richard [Signature]

Date: Dec 16, 2010

Location: Pier 2 East and West Legs

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	RC	
B	Design Drawings reviewed	Y	RC	
C	Allnorth Lift Procedure drawings reviewed	Y	RC	
D	Shop Drawings reviewed	Y	RC	
E	Required equipment and operators available and on site	Y	RC	
F	Lifts reviewed and crane charts checked	Y	RC	
G	DCBC certification letter for side pier steel section received	Y	RC	
2	Construction - Reorientation Phase			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	RC	
B	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	RC	
C	Crane pads are in place as per Allnorth drawings	Y	RC	
D	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RC	
E	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
F	Lifting assemblies installed as per Allnorth drawings	Y	RC	
G	Steel section lifted and reoriented (from upside down to on its side)	Y	RC	
H	Steel section lowered back onto truck	Y	RC	
I	Bolt on lifting lugs removed	Y	RC	
J	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RC	
K	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
L	Lifting assemblies installed as per Allnorth drawings	Y	RC	
M	Steel section lifted and reoriented (from on its side to round side down)	Y	RC	
N	Steel section lowered back onto truck	Y	RC	
3	Construction - Installation Phase			
A	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RC	
B	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
C	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
D	Lifting assemblies installed as per Allnorth drawings	Y	RC	
E	Steel section lifted just off of the truck <i>Re-Load deck</i>	Y	RC	
F	Bolted on stabilizing legs removed	Y	RC	
G	Steel section lifted and rotated into position as per drawings	Y	RC	
H	Steel section lowered into position and installed as per drawings	Y	RC	
I	Side and lower sections bolted together and Inspection Test Plan ITP 303-1 Pier Section Bolting completed	Y	RC	
J	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RC	
K	Bolted on lifting lugs removed	Y	RC	



ITP 322-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 2 SIDE STEEL SECTION

Comments:

*Section reconnection done as bridge deck
not on route*

Sign Off:

[Signature]
QC Inspector Signature

[Signature]
General Contractor Signature

[Signature]
QA Inspector Signature

March 4/10

March 3/2010

March 4/10

ITP 323-1 INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER 2 UPPER STEEL SECTION**

Comments:

1. The inspection was conducted on the upper steel section of Pier 2 of the Deh Cho Bridge. The inspection was performed by the QA Inspector and the General Contractor. The inspection was conducted on the upper steel section of Pier 2 of the Deh Cho Bridge. The inspection was performed by the QA Inspector and the General Contractor. The inspection was conducted on the upper steel section of Pier 2 of the Deh Cho Bridge. The inspection was performed by the QA Inspector and the General Contractor.

2. The inspection was conducted on the upper steel section of Pier 2 of the Deh Cho Bridge. The inspection was performed by the QA Inspector and the General Contractor. The inspection was conducted on the upper steel section of Pier 2 of the Deh Cho Bridge. The inspection was performed by the QA Inspector and the General Contractor. The inspection was conducted on the upper steel section of Pier 2 of the Deh Cho Bridge. The inspection was performed by the QA Inspector and the General Contractor.

Sign Off:

QC Inspector Signature

General Contractor Signature

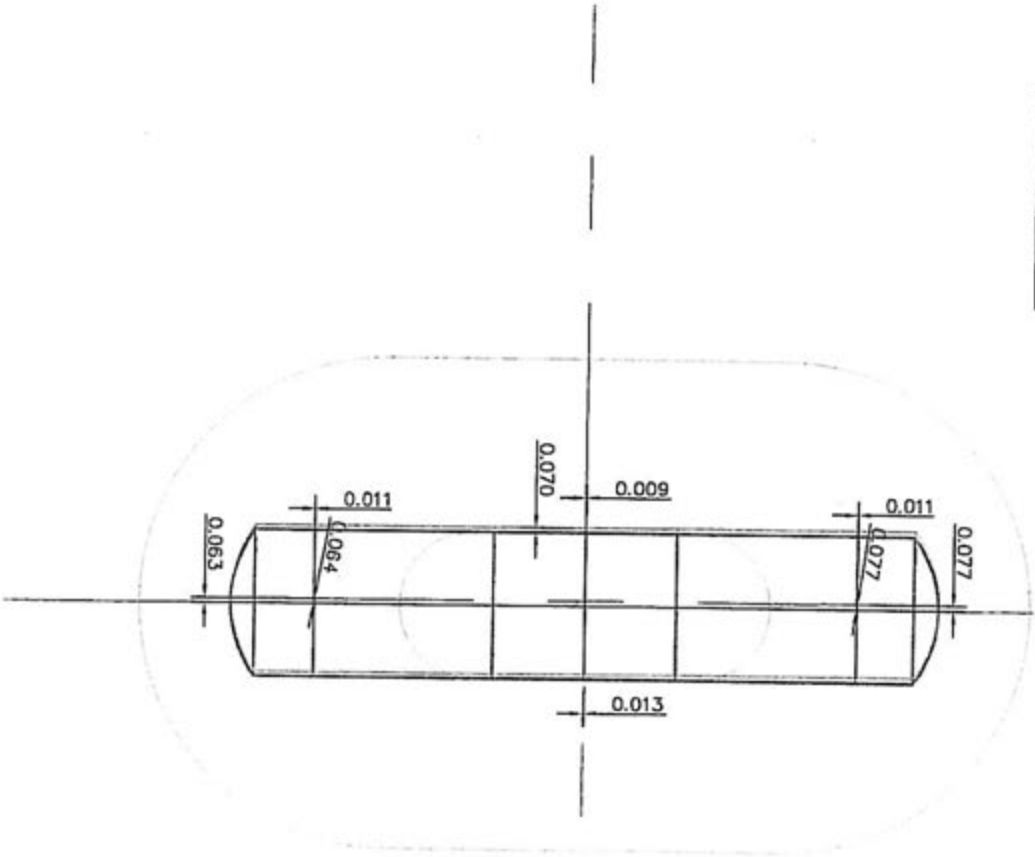
QA Inspector Signature

March 3/2010

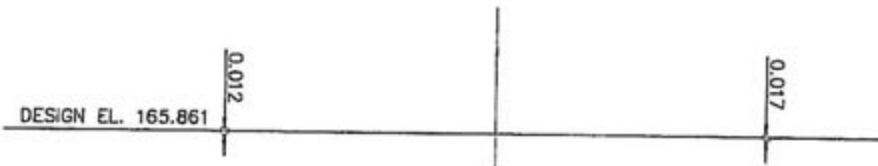
March 4/10

NORTH

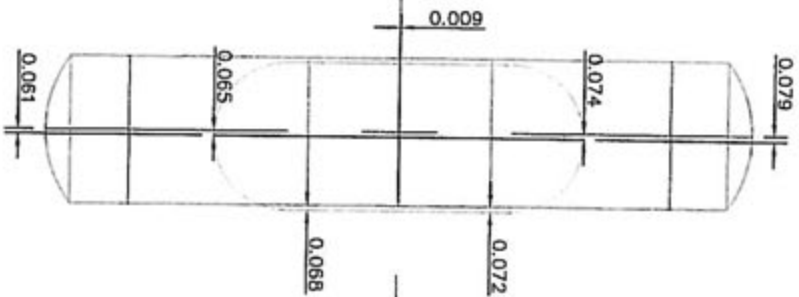
BEARING LOCATIONS VS.
DESIGN LOCATIONS



ELEVATION VARIANCE



TOP LOCATION VS. BASE



PIER 2
LOCATIONS OF BASE AND TOP SECTION
INTERPOLATED FROM AS BUILD CENTER LINES IN
NORTH SOUTH AND EAST WEST DIRECTION



DEH CHO BRIDGE

PIER #3 NORTH STEEL SECTIONS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #3 Steel Section was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 331 Pier 3 Lower Steel Section	ITP 331-1	Completed and submitted to owner	DDW
WP 332 Pier 3 Side Steel Section	ITP 332-1	Completed and submitted to owner	DDW
WP 333 Pier 3 Upper Steel Section	ITP 333-1	Conditional sign off submitted to owner. Final sign off subject to completion of outstanding work.	DDW

The following were NCR items found on Pier #3 Steel Section:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #21	Owner provided approval to proceed with installation of Deficient material.	DDW
NCR #24	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW
NCR #25	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW
NCR #27	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW

I certify that the Pier #3 Steel Sections have been erected in accordance with the contract plans, specifications and applicable CSA standards except as noted within ITP 333-1 and NCR #s 21, 24, 25, and 27. Please see previously submitted documentation noted above to support this certification.

Pier steel is not ready for installation of superstructure.



Don Williams PEng.

Mar 11, 2010

ITP 333-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 3 UPPER STEEL SECTION

P3N
steel

Inspected By: Richard Fournier

Date: Feb 11

Location: Pier 3

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	RC	
B	Design Drawings reviewed	Y	RC	
C	Allnorth Lift Procedure drawings reviewed	Y	RC	
D	Shop Drawings reviewed	Y	RC	
E	Required equipment and operators available and on site	Y	RC	
F	Lifts reviewed and crane charts checked	Y	RC	
G	DCBC certification letter for upper pier steel section received	Y	RC	
2	Construction - Reorientation Phase			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	RC	
B	Dwydag Bars installed in upper pier section ITP 301-1	Y	RC	
C	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	RC	
D	Crane pads are in place as per Allnorth drawings	Y	RC	
E	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RC	
F	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
G	Lifting assemblies installed as per Allnorth drawings	Y	RC	
H	Steel section lifted and reoriented (from upside down to on its side)	Y	RC	
I	Steel section lowered back onto truck bridge	Y	RC	
J	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RC	
3	Construction - Installation Phase			
A	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RC	
B	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
C	Lifting assemblies installed as per Allnorth drawings	Y	RC	
D	Steel section lifted and rotated into position as per drawings	Y	RC	
E	Steel section lowered into position and installed as per drawings	Y	RC	
F	Upper and side sections bolted together and Inspection Test Plan ITP 303-1 Pier Section Bolting completed	Y	RC	
G	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	SP	
4	Construction - Pier Completion Phase			
A	Pier Alignment Checked	Y	SP/RM	
B	Pier alignment is adjusted (if not within dimensional tolerances) and Inspection Test Plan ITP 305-1 Pier Jacking completed	Y	RC	see note 4
C	Lower section anchor bolts installation completed and Inspection Test Plan ITP 306-1 Anchor Bolts completed	Y	RC	see note 4
D	Upper section Dwydag bars installation completed and Inspection Test Plan ITP 307-1 Dwydag Bars completed	Y	RC	
3	Post Construction			
A	Submit documentation of steel section elevation/ location checks	Y	RC	



ITP 333-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 3 UPPER STEEL SECTION

Comments:

- 1 - Pier reinforcement done on bridge deck
not on beams
- 2 - Lifting legs were removed in field not shop
- 3 - QC owner's acceptance letter is in ITP 333-1
- 4 - ITP 303 and 306 to be completed in
Phase 2 work

Sign Off:

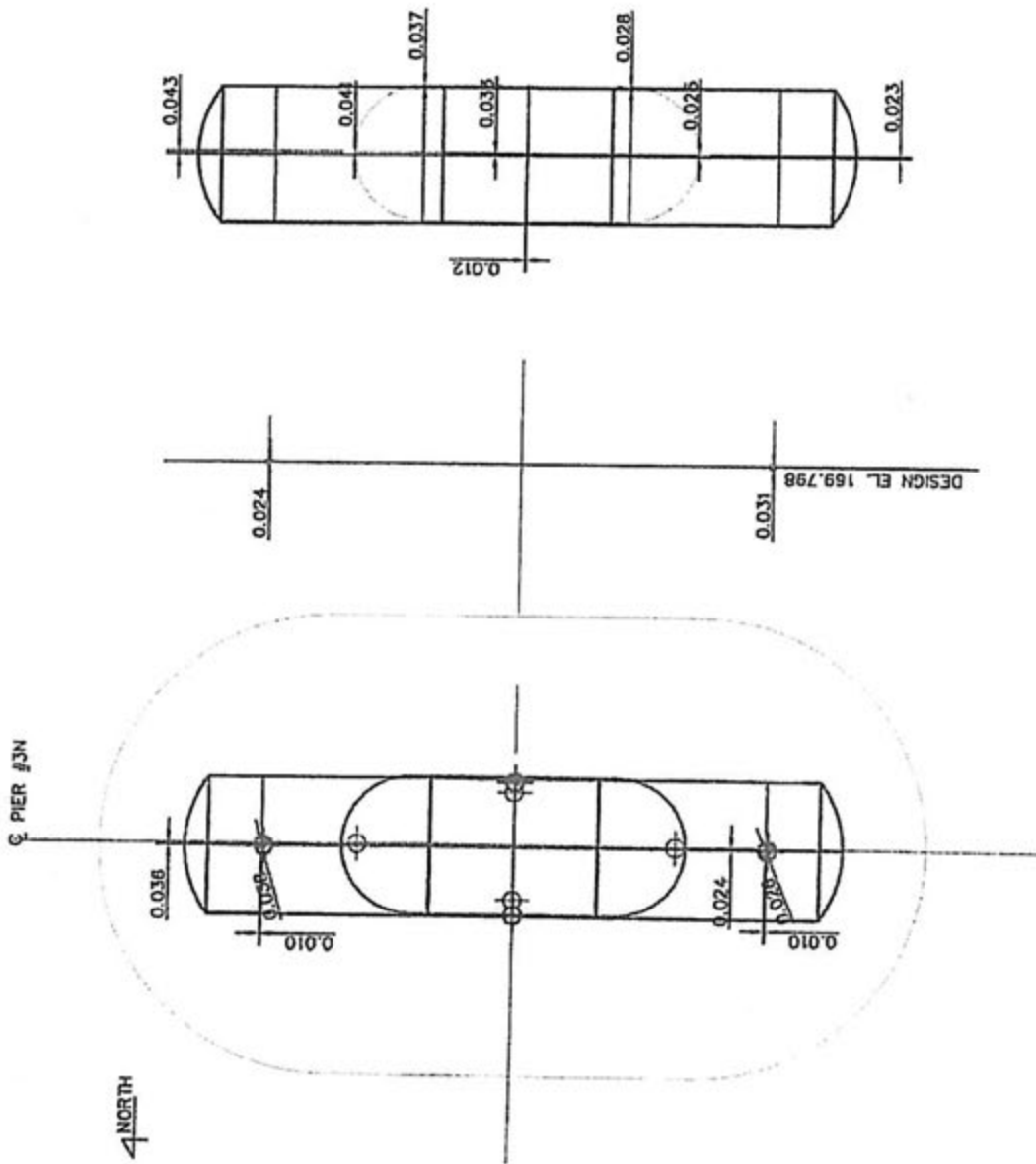
QC Inspector Signature

General Contractor Signature

QA Inspector Signature

March 2/2010

MARCH 2, 2010



TOP LOCATION VS BASE

ELEVATION VARIANCE

BEARING LOCATIONS VS
DESIGN LOCATIONS

LOCATIONS OF BASE AND TOP SECTION
INTERPOLATED FROM AS BUILT CENTER LINES IN
NORTH SOUTH AND EAST WEST DIRECTION

FILE 12.2010



ITP 308-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - STEEL PIER SECTION REORIENTATION

Inspected By: Richard Fausch

Date: Feb 7, 2010

Location: Pier 3

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure Allnorth lift procedure drawings are reviewed	✓	RF	
B	Ensure lifting slings, lifting assembly, and tag lines are on site	✓	RF	
C	Ensure steel pier section c/w appropriate lifting lugs are on site	✓	RF	
D	Ensure appropriate personnel and equipment are on site and available	✓	RF	
E	Ensure appropriate support/dunnage is available	✓	RF	
2	Construction			
A	Reorientation lift conducted as per Allnorth lift procedure drawings	✓	RF	
3	Post Construction			
A	Ensure steel pier section is left in a stable condition	✓	RF	

Comments:

- Section reorientation done on bridge deck

Sign Off:

Richard Fausch
QC Inspector Signature

[Signature]
General Contractor Signature

[Signature]
QA Inspector Signature

Feb 12/2010

March 1/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard Lawrence Date: 10th Feb 2010

Location: Pier 3 W. reconstruction phase

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	<u>Y</u>	<u>RL</u>	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	<u>Y</u>	<u>RL</u>	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	<u>Y</u>	<u>RL</u>	

Comments:

All reconstruction lifting lugs were removed

Sign Off:

Richard Lawrence
QC Inspector Signature
Feb 11/10

[Signature]
General Contractor Signature
Feb 12/2010

[Signature]
QA Inspector Signature
March 1/10



ITP 303-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER SECTION BOLTING**

Inspected By: R. Fairclough / S. Perin

Date: Feb 3 - 11 2010

Location: Pier 3 & 4 Construction phase upper section to East West legs.

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RP	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	RP	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)			
C	Remaining holes filled with connection bolts and tightened to snug tight	Y	RP	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.			
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (Inner perimeter first then outer perimeter)	Y	SIP	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	Y	RP	

Comments:

All bolts were tightened using turn of Nut method

Bolts visually inspected and Random Bolts were Re-tightened with similar conditions of original tightening procedure to see if Nut would Rotate.

Nut did not rotate indicating bolts did not loose tension during Bolting Procedure.

Visual and Re-tightening procedure witnessed by Owner Representative Denny Foster.

Sign Off:

QC Inspector Signature

Feb 2 2010

General Contractor Signature

March 2/2010

QA Inspector Signature

March 1/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Steve B. B. B.

Date: Feb 10, 2010

Location: Pier # 3 North Upper Section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	SP	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	SP	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	SP	

Comments:

Sign Off:

QC Inspector Signature

Feb 10, 2010

General Contractor Signature

Feb 12/2010

QA Inspector Signature

March 1/10



P.O. Box 299 Fort Providence, NT X0E 0L0

By email

Mr. Andrew Purdey
Ruskin Construction Ltd.
608 Algoma Crescent
Prince George, BC
V2N 5S9

APurdey@rcl.bz

January 18, 2010

Dear Mr. Purdey;

Deh Cho Bridge Construction - Erection of the North Pier Bents

This is to confirm that all sections of the Pier Bents North fabricated in the Atcon's shop in Miramichi, NB meet the quality requirements specified in the contract and the established geometric tolerances. Survey results of the fully pre-assembled bents, assembly pictures and other documentation relevant to the installation of the bents have been provided.

This will further confirm that the Engineer is fully satisfied with number, quality, specification, sizes and condition of the owner supplied nuts and bolts. This includes the inventory provided to Ruskin per Kirks email of December 9 plus the material supplied per attached inventory taken by Danny (please see attached). The 22 bolts @ 7.25 inches should not be used. Please advise if there are any concerns or additional information required.

To clarify our understanding, Ruskin may proceed with installation of the pier bents, subject to the following;

- Ruskin and DCBC to review the detailed survey provided by DCBC. Ruskin may, at its option, accept these survey results or undertake its own survey.
- Ruskin to hold a pre-erection meeting, as discussed.
- It is not certain whether and to what extent shimming will be required. This will become clearer with the detailed survey and certain only when the base sections are being installed. The DCBC Engineer and Ruskin QC Engineer should discuss the procedure for shimming of base sections, to ensure that adequate preparations are made in advance of installation. As discussed Ruskin should proceed to obtain shims. The DCBC Engineer and Ruskin QC Engineer should also be represented on site at the time of installation of each pier base section, so that timely direction can be given on any required shimming.

- To the extent required, shimming, will be considered extra to Ruskin's contract, per the terms of change order #5.
- Ruskin will continue with heating and hoarding of pier 2N for not less than 35 days from the placing of the concrete and approval by the Engineer to discontinue the heating. Once heating has been discontinued, installation of pier bents may proceed prior to completion of cooling, in accordance with the procedure provided by AllNorth and accepted by the Engineer.
- The Engineer has confirmed that the six shims under the Pier 4N template are adequate to support the full pier bent. Any shimming, if required for pier 4N bent base section, should be placed on top of the template, in the same location as the 6 shims. Intermediate shims, as required, can be installed at the same time or after the template has been grouted.
- We confirm that in addition to the modifications already made to Pier 4N procedures, we are expecting Infinity to detail the addition of 'floor beams' which will be connected across the top of the pier base section and bolted to internal stiffeners. It may not be possible to provide details this for a couple of weeks. This should be a fairly straightforward modification and will be dealt with by separate change order. Access to the base section for this modification would be much easier either before or after the base section of Pier bent 4N is installed, but before the remaining pier bent sections are erected. To the extent that it does not cause any delay or cost to Ruskin, DCBC would appreciate Ruskin proceeding with pier bent erection in a sequence that provides the most time possible prior to erecting Pier 4N legs, in the hope that we can make the changes before upper sections are erected. We would appreciate your advice on this.
- We note that any misalignment due to pier bent geometry is not an issue, as pier bent geometry meets required tolerances. While it may be possible to make a small shimming adjustment, this will be decided at the time of shimming the base sections and must not be allowed to hold up installation. Pier template misalignment (rotation), if any, will be assessed from the detailed survey.

With your cooperation, we will continue to work towards resolution of any other outstanding issues and questions, including open NCRs and lifting lug procedures.

Sincerely,



Jivko Jivkov
Engineer



Andrew Gamble
Developer

c Mr. Bob Milburn, GNWT
Bob_Milburn@gov.nt.ca

ITP 332-1 INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER 3 SIDE STEEL SECTION**

Inspected By: Richard Farnsworth

Date: 1 Feb 2009

Location: Pier 3 South East and West side

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	RF	
B	Design Drawings reviewed	Y	RF	
C	Allnorth Lift Procedure drawings reviewed	Y	RF	
D	Shop Drawings reviewed	Y	RF	
E	Required equipment and operators available and on site	Y	RF	
F	Lifts reviewed and crane charts checked	Y	RF	
G	DCBC certification letter for side pier steel section received	Y	RF	
2	Construction - Reorientation Phase			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	RF	
B	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	RF	
C	Crane pads are in place as per Allnorth drawings	Y	RF	
D	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RF	
E	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RF	
F	Lifting assemblies installed as per Allnorth drawings	Y	RF	
G	Steel section lifted and reoriented (from upside down to on its side)	Y	RF	
H	Steel section lowered back onto truck	Y	RF	
I	Bolted on lifting lugs removed	Y	RF	
J	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RF	
K	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RF	
L	Lifting assemblies installed as per Allnorth drawings	Y	RF	
M	Steel section lifted and reoriented (from on its side to round side down)	Y	RF	
N	Steel section lowered back onto truck	Y	RF	
3	Construction - Installation Phase			
A	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RF	
B	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RF	
C	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RF	
D	Lifting assemblies installed as per Allnorth drawings	Y	RF	
E	Steel section lifted just off of the truck	Y	RF	
F	Bolted on stabilizing legs removed	Y	RF	
G	Steel section lifted and rotated into position as per drawings	Y	RF	
H	Steel section lowered into position and installed as per drawings	Y	RF	
I	Side and lower sections bolted together and Inspection Test Plan ITP 303-1 Pier Section Bolting completed	Y	RF/S.P	
J	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	SP	
K	Bolted on lifting lugs removed	Y	RF	



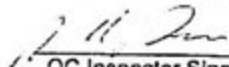
ITP 332-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 3 SIDE STEEL SECTION

Comments:

re-orientation was done on bridge deck
not on truck.

- QC owner acceptance letter is in ITP 332-1

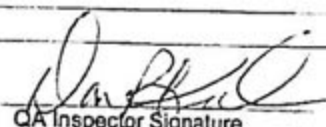
Sign Off:


QC Inspector Signature

1.6.22.2010


General Contractor Signature

March 1/2018


QA Inspector Signature

March 1/10.



ITP 308-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - STEEL PIER SECTION REORIENTATION

Inspected By: Richard [Signature] Date: Feb 12 2010

Location: Pier 3 N East end wall

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure Allnorth lift procedure drawings are reviewed	✓	[Signature]	
B	Ensure lifting slings, lifting assembly, and tag lines are on site	✓	[Signature]	
C	Ensure steel pier section c/w appropriate lifting lugs are on site	✓	[Signature]	
D	Ensure appropriate personnel and equipment are on site and available	✓	[Signature]	
E	Ensure appropriate support/dunnage is available	✓	[Signature]	
2	Construction			
A	Reorientation lift conducted as per Allnorth lift procedure drawings	✓	[Signature]	
3	Post Construction			
A	Ensure steel pier section is left in a stable condition	✓	[Signature]	

Comments:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

Feb 12/2010

March 1/10



ITP 302-1 - INSPECTION TEST PLAN DEH CHO BRIDGE - LIFTING LUG BOLTING

Inspected By: Richard J. J. J. J. Date: Feb 1, 2010

Location: Pier 3 N East and West

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	Y	
2	Construction			
A	Lifting Lug is bolted on. New bolts are used. Bolts tightened by one of the approved methods.	Y	Y	
3	Post Construction			
A	Connection is inspected to ensure it is attached as per the design drawings.	Y	Y	

Comments:

Sign Off:

[Signature]
QC Inspector Signature
Feb 7, 2010

[Signature]
General Contractor Signature
Feb 12/2010

[Signature]
QA-Inspector Signature
March 1/10



ITP 303-1 - INSPECTION TEST PLAN DEH CHO BRIDGE - PIER SECTION BOLTING

Inspected By: R. Fournier / S. Pereira

Date: Feb 3, - Feb 10 2010

Location: Pier 3N Rest and West legs to Base Section.

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	RF	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)	Y	RF	
C	Remaining holes filled with connection bolts and tightened to snug tight	Y	RF	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	Y	RF	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	Y	SP	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	Y	RF	

Comments:

Bolts tightened using turn of Nut Method.

Tightening procedure witnessed and bolts inspected for 1/2 Turn Nut Rotation by Allnorth QC. Steve Pereira

Connection bolts visually inspected by Owner Representative Danny Keeler.

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

March 1/2010

March 1/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Ronald Lawrence Date: Feb 7 2010

Location: Pier 3 N East end west

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	SP	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	SP	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	SP	

Comments:

- All lifting lugs removed.

Sign Off:

QC Inspector Signature

Feb 10 / 2010

General Contractor Signature

Feb 12/2010

QA Inspector Signature

March 1/10



ITP 333-1 INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER 3 UPPER STEEL SECTION**

Inspected By: Richard P. [Signature] Date: Feb 3, 2016

Location: Pier 3

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	HC	
B	Design Drawings reviewed	Y	HC	
C	Allnorth Lift Procedure drawings reviewed	Y	HC	
D	Shop Drawings reviewed	Y	HC	
E	Required equipment and operators available and on site	Y	HC	
F	Lifts reviewed and crane charts checked	Y	HC	
G	DCBC certification letter for upper pier steel section received	Y	HC	
2	Construction - Reorientation Phase			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	HC	
B	Dwydag Bars installed in upper pier section ITP 307-1	Y	HC	
C	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	HC	
D	Crane pads are in place as per Allnorth drawings	Y	HC	
E	Cranes positioned as per Allnorth Lift Procedure drawings	Y	HC	
F	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	HC	
G	Lifting assemblies installed as per Allnorth drawings	Y	HC	
H	Steel section lifted and reoriented (from upside down to on its side)	Y	HC	
I	Steel section lowered back onto truck bridge	Y	HC	
J	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	HC	
3	Construction - Installation Phase			
A	Cranes positioned as per Allnorth Lift Procedure drawings	Y	HC	
B	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	HC	
C	Lifting assemblies installed as per Allnorth drawings	Y	HC	
D	Steel section lifted and rotated into position as per drawings	Y	HC	
E	Steel section lowered into position and installed as per drawings	Y	HC	
F	Upper and side sections bolted together and Inspection Test Plan ITP 303-1 Pier Section Bolting completed	Y	HC	
G	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	SP	
4	Construction - Pier Completion Phase			
A	Pier Alignment Checked	Y	SP/RM	
B	Pier alignment is adjusted (if not within dimensional tolerances) and Inspection Test Plan ITP 305-1 Pier Jacking completed	Y	HC	See note 1
C	Lower section anchor bolts installation completed and Inspection Test Plan ITP 306-1 Anchor Bolts completed	Y	HC	See note 1
D	Upper section Dwydag bars installation completed and Inspection Test Plan ITP 307-1 Dwydag Bars completed	Y	HC	
3	Post Construction			
A	Submit documentation of steel section elevation/ location checks	Y	HC	



ITP 333-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 3 UPPER STEEL SECTION

Comments:

1 - Pier representation done on bridge deck
not on truss

2 - lifting lugs were included in field not shop

3 - QC review acceptance letter is in ITP 300.1

4 - ITP 300 and 306 to be completed in
Phase 2 work

Sign Off:

QC Inspector Signature

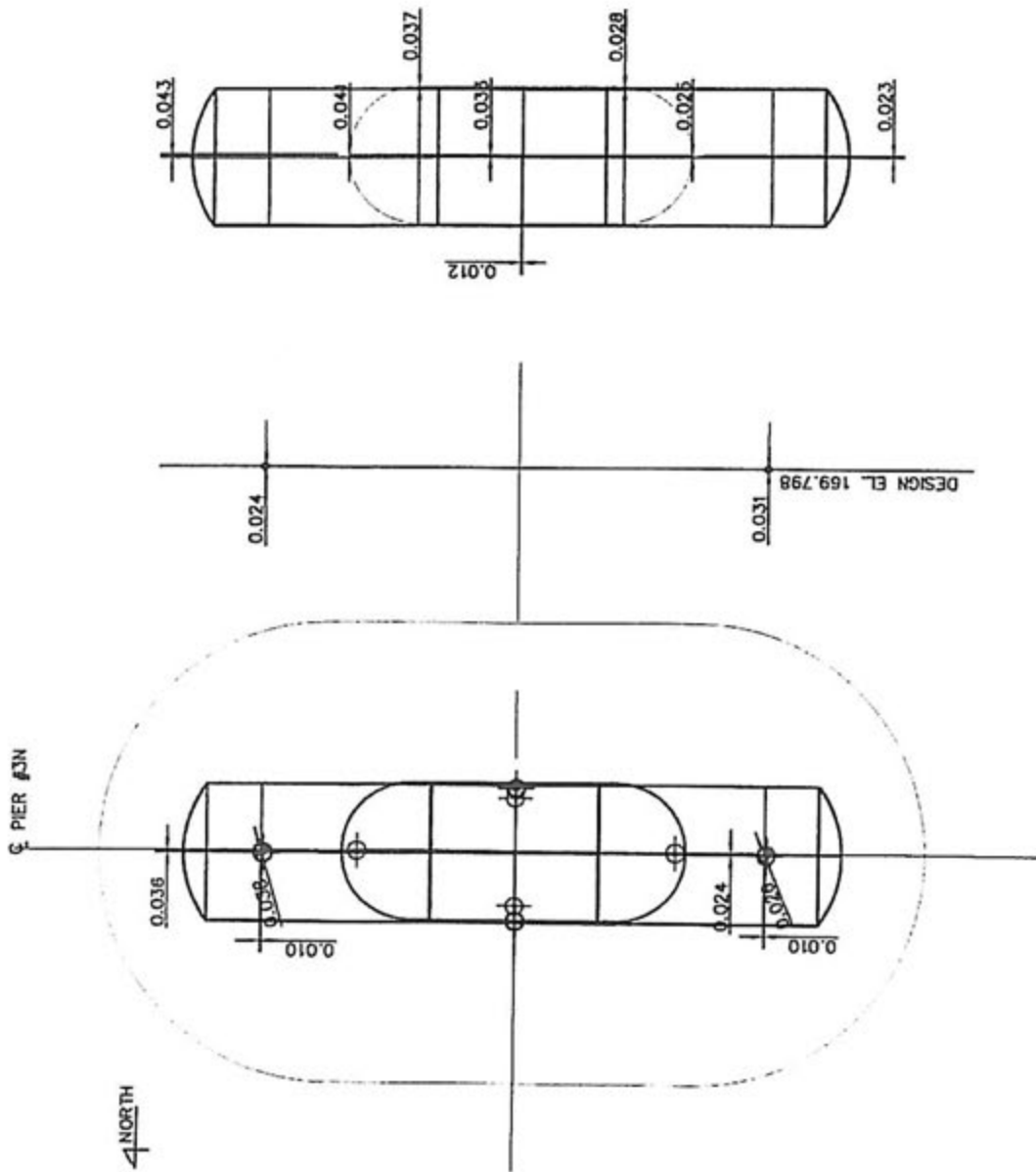
March 2, 2010

General Contractor Signature

March 2/2010

QA Inspector Signature

MARCH 2, 2010



TOP LOCATION VS BASE

ELEVATION VARIANCE

BEARING LOCATIONS VS
DESIGN LOCATIONS

LOCATIONS OF BASE AND TOP SECTION
INTERPOLATED FROM AS BUILT CENTER LINES IN
NORTH SOUTH AND EAST WEST DIRECTION

FIG. 12. 2010



ITP 308-1 – INSPECTION TEST PLAN **DEH CHO BRIDGE – STEEL PIER SECTION REORIENTATION**

Inspected By: Richard Fournelle Date: Feb 8, 2010

Location: Pier 3

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure Allnorth lift procedure drawings are reviewed	✓	RF	
B	Ensure lifting slings, lifting assembly, and tag lines are on site	✓	RF	
C	Ensure steel pier section c/w appropriate lifting lugs are on site	✓	RF	
D	Ensure appropriate personnel and equipment are on site and available	✓	RF	
E	Ensure appropriate support/dunnage is available	✓	RF	
2	Construction			
A	Reorientation lift conducted as per Allnorth lift procedure drawings	✓	RF	
3	Post Construction			
A	Ensure steel pier section is left in a stable condition	✓	RF	

Comments:

- Section reorientation done on bridge deck

Sign Off: RF
 QC Inspector Signature
 Feb 8, 2010

[Signature]
 General Contractor Signature
 Feb 12/2010

[Signature]
 QA Inspector Signature
 March 1/10



ITP 301-1 - INSPECTION TEST PLAN
DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard Lawrence Date: Feb 4/2010

Location: Pier 3 N reconstruction phase

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	<u>Y</u>	<u>HL</u>	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent Structure). Remaining weld ground out	<u>Y</u>	<u>HL</u>	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	<u>Y</u>	<u>HL</u>	

Comments:

- All reconstruction lifting lugs were removed

Sign Off:

[Signature]
QC Inspector Signature
Feb 4, 2010

[Signature]
General Contractor Signature
Feb 12/2010

[Signature]
QA Inspector Signature
March 1/10



ITP 303-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER SECTION BOLTING**

Inspected By: R. Fairweather / S. Pozio

Date: Feb 3 - 11 2010

Location: Pier 3 to 7, foundation phase upper section to Bent 1 West legs.

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	RF	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)	Y	RF	
C	Remaining holes filled with connection bolts and tightened to snug tight	Y	RF	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	Y	RF	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	Y	SP	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	Y	RF	

Comments:

All bolts were tightened using turn of Nut method

Bolts visually inspected and Random Bolts were Retightened with similar conditions of original tightening. Procedure to see if Nut would Rotate.

Nut did not rotate indicating bolts did not loose friction during Bolting Procedure.

Visual and Retightening procedure witnessed by Owner Representative Denny Becker.

Sign Off:

R. Fairweather
 QC Inspector Signature
 Feb 2 2010

[Signature]
 General Contractor Signature
 March 2/2010

[Signature]
 QA Inspector Signature
 March 1/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Steve Pereira

Date: Feb 10 - 2010

Location: Pier # 3 North upper section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	SP	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	SP	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	SP	

Comments:

Sign Off:

QC Inspector Signature

Feb 10, 2010

General Contractor Signature

Feb 12/2010

QA Inspector Signature

March 1/10



ITP 305-1 - INSPECTION TEST PLAN DEH CHO BRIDGE - PIER JACKING

to be completed in Phase II

Inspected By: _____

Date: see 331

Location: Pier 3 Photo

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Jacking procedure reviewed			
B	Access drawings reviewed			
C	Appropriate personnel and equipment are on site and available			
D	Jacking frames are on site			
2	Construction - Jacking			
A	Jacking frames installed as per Jacking procedure			
B	Dywidag anchor bolt nuts loosened			
C	Pier jacked up to the required height.			
D	Pier is level			
E	Jacks locked off			
3	Construction - Lowering			
A	Jacks unlocked			
B	Pier lowered down			
C	Anchor bolts tightened to snug tight			

Comments:

Sign Off:

QC Inspector Signature _____

General Contractor Signature _____

QA Inspector Signature _____



ITP 306-1 – INSPECTION TEST PLAN **DEH CHO BRIDGE – ANCHOR BOLTS**

To be completed in phase II
see 331

Inspected By: _____

Date: _____

Location: *Page 3 of 12*

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Tensioning and grouting procedure reviewed			
B	Access drawings reviewed			
C	Appropriate personnel and equipment are on site and available			
D	Tensioning and grouting equipment are on site			
E	Grout is on site and mill certificates are obtained			
2	Construction			
A	Anchorbolts tensioned as per the tensioning sequence			
B	Anchorbolts tensioned up to 70% Fpu (1245.3kN)			
C	Anchor bolt tensions recorded			
D	Heating and hoarding provided (if the ambient temperature is below 10 degrees Celsius) for 24 hours prior to grouting			
E	Grout mixed as per the manufacturer's specification			
F	Grout installed into all of the anchor bolts			
G	Any grout that gets between the base plates is removed			
H	Four grout samples taken			
3	Post Construction			
A	Heating and Hoarding (if required) maintained for 72 hours after grouting			
B	Anchor bolt tensioning records provided			
C	Grout mill certificates are provided			
D	Grout test results provided			

Comments:

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

ITP 307-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - FCM DYWIDAG INSTALLATION

Inspected By: Robert Lawrence / J. Veldman Date: Feb 21, 2010

Location: Deh Cho

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Work procedure 307 reviewed	✓		
B	Shop Drawings reviewed	✓		
C	Threadbar material certification letter received from owner	✓		
2	Construction			
A	Threadbars installed in upper pier section as per shop drawings	✓		
B	Threadbars stressed to lock off as specified in work procedure	✓		
C	Lift off test conducted on stressed threadbars and is within 5% of Required lock off load	✓		
D	If No to C then end anchorage reset and re test of lift off performed Until stress is within 5% of required lock off load	✓		
E	Upon completion of stressing threadbar covers are installed	✓		

Comments:

1. Following tests as attached page template
locking into at least 10 thread bars

2. All boundaries are now capped

3. Form acceptance is attached to Part 6.11 ITP 307-1

Sign Off:

J. Veldman
QC Inspector Signature
Feb 22, 2010

[Signature]
General Contractor Signature
March 2/2010

[Signature]
QA Inspector Signature
MARCH 2, 2010

Client: Kushin Job # 08-PC-0126 File # _____
 Project: Dek Cho Bridge Date: Feb 15 2010 Rev: _____
 Subject: Load Requirements for tensioning Prep by: S. Pereira Checked by: KV
FCM Thread bars Page 1 of 2

10% Yield for Horizontal dywidg Rods = 175 kN (LL)

5 loads during stressing 1 kN = 0.224 809 Kips

Alignment load = $0.1 \cdot LL = 17.5 \text{ kN} = 3.934 \text{ Kips}$
 $= 100 \text{ PSI}$

$0.25 \text{ LL} = 43.75 \text{ kN} = 9.835 \text{ Kips} = 300 \text{ PSI}$

$0.5 \text{ LL} = 87.5 \text{ kN} = 19.67 \text{ Kips} = 630 \text{ PSI}$

$0.75 \text{ LL} = 131.25 \text{ kN} = 29.506 \text{ Kips} = 1000 \text{ PSI}$

$1.0 \text{ LL} = 175 \text{ kN} = 39.342 \text{ Kips} = 1300 \text{ PSI}$

Gauge Reading on Tensioning pressure gauge for equivalent
 Forces Required.



DEH CHO BRIDGE

PIER #4 NORTH STEEL SECTIONS - CERTIFICATION

The development and implementation of specific work procedures, inspection test plans, and an overall quality management plan were utilized to ensure that Pier #4 Steel Section was completed in compliance with the contract plans, specifications and applicable CSA Standards. The following work procedures and inspection test plans were utilized:

Work Procedure	Inspection Test Plan	ITP Status	QC Engineer Initial Reviewed & Accepted
WP 341 Pier 4 Lower Steel Section	ITP 341-1	Completed and submitted to owner	DDW
WP 342 Pier 4 Side Steel Section	ITP 342-1 West	Completed and submitted to owner	DDW
WP 342 Pier 4 Side Steel Section	ITP 342-1 East	Completed and submitted to owner	DDW
WP 343 Pier 4 Corner Steel Section	ITP 343-1 West	Completed and submitted to owner	DDW
WP 343 Pier 4 Corner Steel Section	ITP 343-1 East	Completed and submitted to owner	DDW
WP 344 Pier 4 Mid Steel Section	ITP 344-1	Conditional sign off submitted to owner. Final sign off subject to completion of outstanding work.	DDW

The following were NCR items found on Pier #4 Steel Section:

Non Conformance Reports	NCR Status	QC Engineer Initial Reviewed & Accepted
NCR #13	Owner provided approval to proceed with installation of Deficient material.	DDW
NCR #17	Corrective action completed and accepted by owners rep	DDW
NCR #23	Corrective action completed and accepted by owners rep	DDW
NCR #27	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW
NCR #28	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW
NCR #29	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW
NCR #30	Non Conformance identified and submitted to owner. Corrective actions to be completed at a later date	DDW

I certify that the Pier #3 Steel Sections have been erected in accordance with the contract plans, specifications and applicable CSA standards except as noted within ITP 333-1 and NCR #s 13, 17, 23, 27, 28, 29, and 30. Please see previously submitted documentation noted above to support this certification.

Pier steel is not ready for installation of superstructure.



Don Williams PEng.

May 12, 2010

ALLNORTH CONSULTANTS LIMITED

P4N
ERECTION ITPs

ITP 304N-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - NORTH PIER BASE SHIMMING**

Inspected By: S. Pereira

Date: Feb 18, 2010

Location: Pier # 4N Base

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Review Allnorth base shimming procedure and drawings	Y	SP	
B	Ensure shim material is available	Y	SP	
C	Ensure shim material mill certificates received and reviewed	Y	SP	
D	Ensure appropriate personnel and equipment are on site and available	Y	SP	
2	Construction			
A	Install shims as per Base Shim plan	N	SP	See Note
B	After pier base is installed, adjust shims and add/remove as required to ensure base is in the correct location	Y	SP	
C	Final location of pier base section surveyed and within tolerances	Y	SP/RM	
D	Ensure shims are welded/secured to stop them from sliding.	N	SP	
E	Anchor bolts tightened to snug tight	Y	RF	

Comments:

- Pier # 4N - only installed shims in 6 locations to match those indicated on Silvio sketch dated Nov 5, 2009 P4 North Anchoring Detail.
- Shimming procedure similar to that of pier # 1 North
- Final survey for base elevation 3 points completed and within tolerance - see attached survey information. Level points marked on base with paint pen.
- Tuck welding to occur after final survey confirmation of pier location and no further tucking or shimming required.

Sign Off:

[Signature]
QC Inspector Signature
Feb 20, 2010

[Signature]
General Contractor Signature
Feb 20/2010

[Signature]
QA Inspector Signature
FEB 20, 2010



DEH CHO BRIDGE - QUALITY CONTROL MEMO #11

Date: February 12, 2010

Attn: Corey Ross
Project Manager
Ruskin Construction Ltd.

Re: Pier #4 North Bearing Beam Fabrication

This memo is to confirm that the bearing beams supplied by Ruskin Construction for installation in the base of Pier #4 North have been fabricated in a CWB certified facility. The materials used for fabrication were reviewed and accepted by Ruskin's quality control. Please see attached mill certifications and CWB certificate.

 Feb 12-2010
Steve Pereira
Quality Control
Deh Cho Bridge Project



Date: Feb 27, 1910

Location: Pier 4 N East Section is orientation phase 1

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent Structure). Remaining weld ground out	Y	RF	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	RF	

Comments:

Sign Off:

QC Inspector Signature

Feb 24, 2010

General Contractor Signature _____

March 3/2011

QA Inspector Signature

Maroon 4/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard Fournelle

Date: Feb 23, 2010

Location: Pier 4 N East section Reorientation phase 2

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	RF	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	RF	

Comments:

Sign Off:

RF Fournelle
QC Inspector Signature
Feb 24, 2010

[Signature]
General Contractor Signature
March 3/2010

[Signature]
QA Inspector Signature
March 4/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard L. L. L.

Date: Feb 21, 2010

Location: Pier 4N West Section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RL	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	RL	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	RL	

Comments:

Sign Off:

Richard L. L. L.
QC Inspector Signature
March 5, 2010

[Signature]
General Contractor Signature
March 5/2010

[Signature]
QA Inspector Signature
March 5/10.



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard Fairbrother

Date: Feb 26, 2010

Location: Pier 410 West Section No. Construction phase 1

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	RF	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	RF	

Comments:

Sign Off:

Richard Fairbrother
QC Inspector Signature

Feb 27, 2010

Wah
General Contractor Signature

March 3/2010

Richard Fairbrother
QA Inspector Signature

March 4/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard Lawrence

Date: Feb 21, 2010

Location: Pier 4-W West Section Reorientation phase 2

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	HP	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	HP	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	HP	

Comments:

Sign Off:

Richard Lawrence
QC Inspector Signature

Feb 22, 2010

[Signature]
General Contractor Signature

March 3/2010

[Signature]
QA Inspector Signature

March 4/10



Location: P.O. 4 N. 7.5th Station Phase East Section

Comments:

QA Inspector Signature



Location: Pier 4 N. Reclamation Phase 2 East Section

Comments:

QA Inspector Signature
March 4/00



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard Fauservice Date: Feb 20, 2010

Location: P4 N Reorientation Phase 1 First Section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	RF	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	RF	

Comments:

Sign Off:

Richard Fauservice
QC Inspector Signature

Feb 20 2010

[Signature]
General Contractor Signature

March 3/2010

[Signature]
QA Inspector Signature

March 4/10



ITP 301-1 – INSPECTION TEST PLAN **DEH CHO BRIDGE – WELD ON LIFTING LUG REMOVAL**

Inspected By: Richard Peirson Date: Feb 28 2010

Location: Pier 4 N West Section Installation Phase

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RP	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	RP	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	RP	

Comments:

Sign Off:

Richard Peirson
 QC Inspector Signature
 March 4, 2010

[Signature]
 General Contractor Signature
 March 5/2010

[Signature]
 QA Inspector Signature
 March 5/10.



Location: Plot 4 N West Section reorientation phase 1

Comments:

QA Inspector Signature



ITP 301-1 - INSPECTION TEST PLAN
DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard Fawcett

Date: Feb 25, 2010

Location: Pier 410 West Section re orientation phase 2

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	RF	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	RF	

Comments:

Sign Off:

Richard Fawcett
QC Inspector Signature
Feb 27, 2010

[Signature]
General Contractor Signature
March 3/2010

[Signature]
QA Inspector Signature
March 4/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Richard Fairweather Date: Feb 22, 2010

Location: Pier 4 N East Section Installation Phase

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	RF	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	RF	

Comments:

Sign Off:

RF
QC Inspector Signature
March 4, 2010

[Signature]
General Contractor Signature
March 5/2010

[Signature]
QA Inspector Signature
March 5/10



ITP 301-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - WELD ON LIFTING LUG REMOVAL

Inspected By: Michael [Signature] Date: Feb 28, 2010

Location: Pier 4/10 reconstruction phase 1

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	HP	
2	Construction			
A	Lifting Lug is removed. Removal conducted by cutting torch (within 6mm of permanent structure) or air arc (within 3mm of permanent structure). Remaining weld ground out	Y	HP	
3	Post Construction			
A	Pier Steel section surface inspected and verified that it is ground smooth and free from all weld material	Y	HP	

Comments:

Sign Off:

[Signature]
QC Inspector Signature
Feb 28, 2010

[Signature]
General Contractor Signature
March 3/2010

[Signature]
QA Inspector Signature
March 4/10



ITP 302-1 - INSPECTION TEST PLAN DEH CHO BRIDGE - LIFTING LUG BOLTING

Inspected By: Supervisor

Date: Feb 18 2010

Location: Pier #4N Base

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	SP	
2	Construction			
A	Lifting Lug is bolted on. New bolts are used. Bolts tightened by one of the approved methods.	Y	SP	
3	Post Construction			
A	Connection is inspected to ensure it is attached as per the design drawings.	Y	SP	

Comments:

Note lifting lugs installed when Pier base arrived on site for offloading.

Sign Off:

QC Inspector Signature

Feb 18 2010

General Contractor Signature

March 3/2010

QA Inspector Signature

March 4/10



ITP 303-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER SECTION BOLTING**

Inspected By: Harold J. [Signature]

Date: 1 Feb 2010

Location: Deh Cho Bridge

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	✓	✓	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	✓	✓	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)		✓	
C	Remaining holes filled with connection bolts and tightened to snug tight	✓	✓	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	✓	✓	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	✓	✓	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	✓	✓	

Comments:

Sign Off:

[Signature]
 QC Inspector Signature
 March 4/10

[Signature]
 General Contractor Signature
 March 5/2010

[Signature]
 QA Inspector Signature
 March 5/10



ITP 303-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER SECTION BOLTING**

Inspected By: Richard Fournier

Date: FIL 21, 2010

Location: Pier 4 NW West Section - Top to base

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	RF	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)	Y	RF	
C	Remaining holes filled with connection bolts and tightened to snug tight	Y	RF	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	Y	RF	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	Y	RF	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	Y	RF	

Comments:

- All bolts placed except bolts indicated on NCR 17 and 23

Sign Off:

QC Inspector Signature

General Contractor Signature

QA Inspector Signature

March 3/2010

March 4/10

ITP 303-1 - INSPECTION TEST PLAN

DEH CHO BRIDGE - PIER SECTION BOLTING

Inspected By: Richard Fournier Date: Feb 22, 2010

Location: Pier 4 N Leg to Base East Section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RF	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	RF	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)	Y	RF	
C	Remaining holes filled with connection bolts and tightened to snug tight	Y	RF	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	Y	RF	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	Y	RF	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	Y	RF	

Comments:

- All bolts placed except bolts indicated on
Plan 17 and 23

Sign Off:

RF
QC Inspector Signature
Feb 22, 2010

[Signature]
General Contractor Signature
March 2/2010

[Signature]
QA Inspector Signature
March 4/10.



ITP 303-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER SECTION BOLTING**

Inspected By: R. P. Service / R. McNamee Date: Feb 26, 2010

Location: Pier 4 W. West Section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RP	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	RP	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)	Y	RP	
C	Remaining holes filled with connection bolts and tightened to snug tight	Y	RP	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	Y	RP	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	N	RP	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	N	RP	

Comments:

- Some issue as East section, see sketch with East section
- 8 7" bolts were used along east edge due to stifferer spacing NCR 28
- 2 holes are too close to outer skin to allow torquing. Bolts done hand tight NCR 29

Sign Off:

R. P. Service
 QC Inspector Signature
 March 4 2010

[Signature]
 General Contractor Signature
 March 5/2010

[Signature]
 QA Inspector Signature



ITP 303-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER SECTION BOLTING**

Inspected By: R. Boudreau / R. McNamee Date: Feb 7th, 2010

Location: Pier 4 N West section

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Ensure required equipment and personnel are available	Y	RC	
2	Construction			
A	Connection surfaces prepared (any bends, burrs or debris are fixed and surfaces cleaned of mill scale or foreign material)	Y	RC	
B	Connection aligned (50% of the holes filled with drift pins or fitting up bolts)	Y	RC	
C	Remaining holes filled with connection bolts and tightened to snug tight	Y	RC	
D	Drift pins removed and connection bolts installed in drift pin holes. Bolts tightened to snug tight.	Y	RC	
A	All bolts tightened by one of the approved methods. Tightening Sequence followed (inner perimeter first then outer perimeter)	N	RC	
3	Post Construction			
A	Connection is inspected to ensure it as per the design drawings.	N	RC	

Comments:

- 8 7" bolts were used along west edge due to narrower spacing NCR 19.
- 2 holes are too close to cut side skin to allow torquing. Bolts done hand tight NCR 29.

Sign Off:

[Signature]
 QC Inspector Signature
 March 6, 2010

[Signature]
 General Contractor Signature
 March 5/2010

[Signature]
 QA Inspector Signature
 March 5/10.



ITP 304N-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - NORTH PIER BASE SHIMMING**

Inspected By: S. Perice

Date: Feb 18, 2010

Location: Pier # 4N Base

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Review Allnorth base shimming procedure and drawings	Y	SP	
B	Ensure shim material is available	Y	SP	
C	Ensure shim material mill certificates received and reviewed	Y	SP	
D	Ensure appropriate personnel and equipment are on site and available	Y	SP	
2	Construction			
A	Install shims as per Base Shim plan	N	SP	See Note
B	After pier base is installed, adjust shims and add/remove as required to ensure base is in the correct location	Y	SP	
C	Final location of pier base section surveyed and within tolerances	Y	SP/RM	
D	Ensure shims are welded/secured to stop them from sliding.	N	SP	
E	Anchor bolts tightened to snug tight	Y	CF	

Comments:

- Pier # 4N - only installed shims in 6 locations to match those indicated on Silvio sketch dated Nov 8, 2009, 24 North Anchoring Detail.
- Shimming procedure similar to that of pier # 1 North
- Final survey for base elevation 3 points completed and within tolerance - see attached survey information. Level points marked on base with paint pen.
- No welding to occur after final survey. Confirmation of pier location and no further touching or shimming required.

Sign Off:

[Signature]
 QC Inspector Signature
 Feb 20, 2010

[Signature]
 General Contractor Signature

Feb 20/2010

[Signature]
 QA Inspector Signature

FEB 20, 2010



Client: Rushin Job # 08-PC-0126 File # _____
Project: Del Cho Bridge Date: Feb 15, 2010 Rev: _____
Subject: Load Requirements for tensioning Prep by: S. Pearce Checked by: KV.
FCM Thread bars. Page 1 of 2

10 % Yield for Horizontal dywidg Rods = 175 Kn (LL)

5 loads during stressing 1kn = 0.224 809 kips

Alignment load = $0.1 \cdot LL = 17.5 \text{ Kn} = 3.934 \text{ kips}$
= 100 PSI

0.25 LL = 43.75 Kn = 9.835 kips = 300 PSI

0.5 LL = 87.5 Kn = 19.67 kips = 630 PSI

0.75 LL = 131.25 Kn = 29.506 kips = 1000 PSI

1.0 LL = 175 Kn = 39.342 kips = 1300 PSI

Gauge Reading on Tensioning pressure gauge for equivalent Forces. Required.

ITP 341-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 4 LOWER STEEL SECTION

Inspected By: S. Pereira /

Date: Feb 18-2010

Location: Pier 4 N

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	✓	SP	
B	Design Drawings reviewed	✓	SP	
C	Allnorth Lift Procedure drawings reviewed	✓	SP	
D	Shop Drawings reviewed	✓	SP	
E	Steel section in proper position on truck trailer	✓	SP	
F	Required equipment and operators available and on site	✓	SP	
G	Lifts reviewed and crane charts checked	✓	SP	
H	DCBC certification letter for lower pier steel section received	✓	SP	See Note
2	Construction - Reorientation Phase			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	N/A	SP	See Note
B	Finger bridge is reinforced as per Allnorth drawings c/w crane pads			
C	Crane pads are in place as per Allnorth drawings			
D	Cranes positioned as per Allnorth Lift Procedure drawings			
E	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs			
F	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs			
G	Lifting assemblies installed as per Allnorth drawings			
H	Steel section lifted and reoriented			
I	Steel section lowered back onto truck			
J	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed			
K	Bolted on lifting lugs removed	✓		
2	Construction			
A	Cranes positioned as per Allnorth Lift Procedure drawings	✓	SP	
B	Lifting lugs bolted on and Inspection Test Plan ITP 302-1 Lifting Lug bolting completed	✓	SP	
C	Lifting assemblies installed as per Allnorth drawings	✓	SP	
D	Requirement for installing shims between the base and upper buttress assessed	✓	SP	
E	Shims installed (if required) and Inspection Test Plan ITP 304-1 Pier Base Shimming partially completed	✓	SP	
F	Steel section lifted and rotated into position as per drawings	✓	SP	
G	Steel section lowered into position and installed as per drawings	✓	SP	
H	Base steel section aligned	✓	SP	
I	Shim installation (if required) completed and Inspection Test Plan ITP 304-1 Pier Base Shimming completed	✓	SP	
J	Dywidag anchors snug tightened			
K	Lifting assembly removed	✓	SP	
L	Lifting lugs removed	✓	SP	
3	Post Construction			
A	Submit documentation of steel section elevation/ Location checks and required shimming.	✓	SP	

ITP 341-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 4 LOWER STEEL SECTION

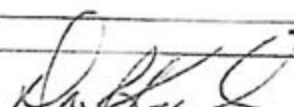
Comments:

- Lift weights and crane charts Reviewed by Crane operators.
- Pier Base Arrived on site in correct orientation.
- Note Pier # 4N Base Received Additional Beams to be installed as per infinity dug # 09-203-SK003, SK004, SK005
- A Fabrication error on the beams regarding hole location was reviewed and the accepted solution was to move the Beams up 25mm as per Julev Sketch dated Feb 03-2010 Deh Cho Pier # 4N Reinforcement
- Rushin provided mill certs and fabrication information as noted within GC Memo # 11 to the owner.
- As built information attached for 14N Reinf Beams.

Sign Off:


 QC Inspector Signature
 March 3/2010


 General Contractor Signature
 March 3/2010


 QA Inspector Signature
 March 4/10

ITP 342-1 INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER 4 SIDE STEEL SECTION**

Inspected By: Richard Fairweather

Date: Feb 21, 2010

Location: Pier 4 N West Section

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	RF	
B	Design Drawings reviewed	Y	RF	
C	Allnorth Lift Procedure drawings reviewed	Y	RF	
D	Shop Drawings reviewed	Y	RF	
E	Required equipment and operators available and on site	Y	RF	
F	Lifts reviewed and crane charts checked	Y	RF	
G	DCBC certification letter for side pier steel section received	Y	RF	
2	Construction - Reorientation Phase - round side up to on it's side			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	RF	
B	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	RF	
C	Crane pads are in place as per Allnorth drawings	Y	RF	
D	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RF	
E	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	N	RF	
F	Lifting assemblies installed as per Allnorth drawings	Y	RF	
G	Steel section lifted and reoriented (from round side up to on its side)	Y	RF	
H	Steel section lowered back onto truck	N	RF	
I	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RF	
3	Construction - Reorientation Phase - on it's side to round side down			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	RF	
B	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RF	
C	Bolted stabilizing legs in place as per Allnorth Lift Procedure dwgs	Y	RF	
D	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	N	RF	
E	Lifting assemblies installed as per Allnorth drawings	Y	RF	
F	Steel section lifted and reoriented (from on its side to round side down)	Y	RF	
G	Steel section lowered back onto truck	N	RF	
H	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RF	
3	Construction - Installation Phase			
A	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RF	
B	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	N	RF	
C	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RF	
D	Lifting assemblies installed as per Allnorth drawings	Y	RF	
E	Steel section lifted just off the truck <i>Positive lock</i>	Y	RF	
F	Bolted on stabilizing legs removed	Y	RF	
G	Steel section lifted and rotated into position as per drawings	Y	RF	
H	Steel section lowered into position and installed as per drawings	Y	RF	
I	Side and lower sections bolted together and Inspection Test Plan ITP 303-1 Pier Section Bolting completed	Y	RF	
J	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RF	
K	Bolted on lifting lugs removed	Y	RF	

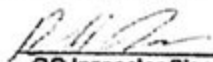


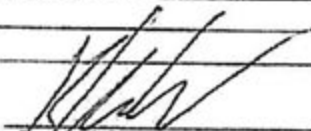
ITP 342-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 4 SIDE STEEL SECTION

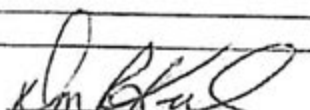
Comments:

- Sections were reorientated on bridge deck not on a truck
- All lifting lugs were field welded not shop welded on.

Sign Off:


QC Inspector Signature
March 14, 2010


General Contractor Signature
March 8/2010


QA Inspector Signature
March 4/10

ITP 342-1 INSPECTION TEST PLAN **DEH CHO BRIDGE - PIER 4 SIDE STEEL SECTION**

Inspected By: Richard Fairweather

Date: Feb 20, 2010

Location: Pier 4 N East Section

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	RF	
B	Design Drawings reviewed	Y	RF	
C	Allnorth Lift Procedure drawings reviewed	Y	RF	
D	Shop Drawings reviewed	Y	RF	
E	Required equipment and operators available and on site	Y	RF	
F	Lifts reviewed and crane charts checked	Y	RF	
G	DCBC certification letter for side pier steel section received	Y	RF	
2	Construction - Reorientation Phase - round side up to on its side			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	RF	
B	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	RF	
C	Crane pads are in place as per Allnorth drawings	Y	RF	
D	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RF	
E	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RF	
F	Lifting assemblies installed as per Allnorth drawings	Y	RF	
G	Steel section lifted and reoriented (from round side up to on its side)	Y	RF	
H	Steel section lowered back onto truck	N	RF	
I	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RF	
3	Construction - Reorientation Phase - on its side to round side down			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	RF	
B	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RF	
C	Bolted stabilizing legs in place as per Allnorth Lift Procedure dwgs	Y	RF	
D	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	N	RF	
E	Lifting assemblies installed as per Allnorth drawings	Y	RF	
F	Steel section lifted and reoriented (from on its side to round side down)	Y	RF	
G	Steel section lowered back onto truck	N	RF	
H	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RF	
3	Construction - Installation Phase			
A	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RF	
B	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	N	RF	
C	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RF	
D	Lifting assemblies installed as per Allnorth drawings	Y	RF	
E	Steel section lifted just off of the truck	N	RF	
F	Bolted on stabilizing legs removed	Y	RF	
G	Steel section lifted and rotated into position as per drawings	Y	RF	
H	Steel section lowered into position and installed as per drawings	Y	RF	
I	Side and lower sections bolted together and Inspection Test Plan ITP 303-1 Pier Section Bolting completed	Y	RF	
J	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RF	
K	Bolted on lifting lugs removed	Y	RF	



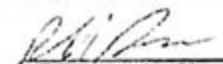
ITP 342-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 4 SIDE STEEL SECTION

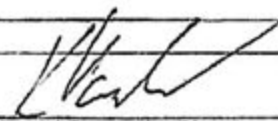
Comments:

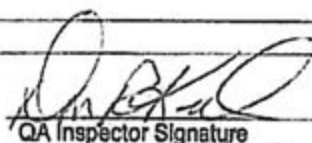
- Sections were re-inspected on bridge deck
not on truck

- All lifting lugs were field welded

Sign Off:


QC Inspector Signature
March 6, 2010


General Contractor Signature
March 5/2010


QA Inspector Signature
March 5/10

ITP 343-1 INSPECTION TEST PLAN

DEH CHO BRIDGE - PIER 4 CORNER STEEL SECTION

Inspected By: Richard Lawrence

Date: Feb 28, 2010

Location: Pier 4 N West Section

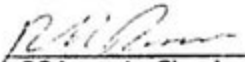
Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	RC	
B	Design Drawings reviewed	Y	RC	
C	Allnorth Lift Procedure drawings reviewed	Y	RC	
D	Shop Drawings reviewed	Y	RC	
E	Required equipment and operators available and on site	Y	RC	
F	Lifts reviewed and crane charts checked	Y	RC	
G	DCBC certification letter for corner pier steel section received	Y	RC	
2	Construction - Reorientation Phase			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	RC	
B	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	RC	
C	Crane pads are in place as per Allnorth drawings	Y	RC	
D	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RC	
E	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
F	Lifting assemblies installed as per Allnorth drawings	Y	RC	
G	Steel section lifted and reoriented (from upside down to on its side)	Y	RC	
H	Steel section lowered back onto truck	Y	RC	
I	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RC	
J	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RC	
K	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
L	Lifting assemblies installed as per Allnorth drawings	Y	RC	
M	Steel section lifted and reoriented (from on its side to right side up)	Y	RC	
N	Steel section lowered back onto truck	Y	RC	
O	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RC	
3	Construction - Installation Phase			
A	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RC	
B	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
C	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RC	
D	Lifting assemblies installed as per Allnorth drawings	Y	RC	
E	Steel section lifted and rotated into position as per drawings	Y	RC	
F	Steel section lowered into position and installed as per drawings	Y	RC	
G	Corner and side sections bolted together and Inspection Test Plan ITP 303-1 Pier Section Bolting completed	Y	RC	
H	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RC	
I	Bolted on lifting lugs removed	Y	RC	

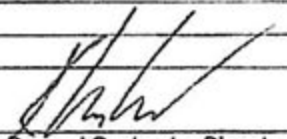
ITP 343-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 4 CORNER STEEL SECTION

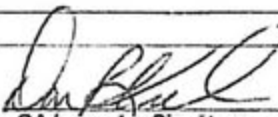
Comments:

- All lifting lugs were field welded on
- re-orientation was done on bridge deck not on truck

Sign Off:


 QC Inspector Signature
 March 3/2010


 General Contractor Signature
 March 3/2010


 QA Inspector Signature
 March 4/10

ITP 343-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 4 CORNER STEEL SECTION

Inspected By: Richard Fournelle

Date: Feb 27, 2009

Location: Pier 4 NW East Section

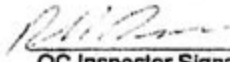
Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	RI	
B	Design Drawings reviewed	Y	RI	
C	Allnorth Lift Procedure drawings reviewed	Y	RI	
D	Shop Drawings reviewed	Y	RI	
E	Required equipment and operators available and on site	Y	RI	
F	Lifts reviewed and crane charts checked	Y	RI	
G	DCBC certification letter for corner pier steel section received	Y	RI	
2	Construction - Reorientation Phase			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	RI	
B	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	RI	
C	Crane pads are in place as per Allnorth drawings	Y	RI	
D	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RI	
E	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RI	
F	Lifting assemblies installed as per Allnorth drawings	Y	RI	
G	Steel section lifted and reoriented (from upside down to on its side)	Y	RI	
H	Steel section lowered back onto truck	N	RI	
I	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed			
J	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RI	
K	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	N	RI	
L	Lifting assemblies installed as per Allnorth drawings	Y	RI	
M	Steel section lifted and reoriented (from on its side to right side up)	Y	RI	
N	Steel section lowered back onto truck	N	RI	
O	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RI	
3	Construction - Installation Phase			
A	Cranes positioned as per Allnorth Lift Procedure drawings	Y	RI	
B	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	N	RI	
C	Bolted lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	RI	
D	Lifting assemblies installed as per Allnorth drawings	Y	RI	
E	Steel section lifted and rotated into position as per drawings	Y	RI	
F	Steel section lowered into position and installed as per drawings	Y	RI	
G	Corner and side sections bolted together and Inspection Test Plan ITP 303-1 Pier Section Bolting completed	Y	RI	
H	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	RI	
I	Bolted on lifting lugs removed	Y	RI	

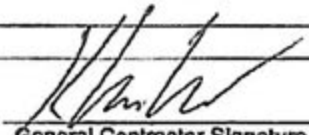
ITP 343-1 INSPECTION TEST PLAN
DEH CHO BRIDGE - PIER 4 CORNER STEEL SECTION

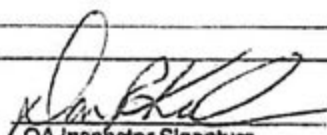
Comments:

- Section re-orientated on bridge deck
not on truck
- All lifting lugs were field welded

Sign Off:


 QC Inspector Signature
 March 3, 2010


 General Contractor Signature
 March 3/2010


 QA Inspector Signature
 March 4/10

WP 344 - WORK PROCEDURE

DEH CHO BRIDGE - PIER 4 MID STEEL SECTION

Inspected By: Richard [Signature]

Date: Feb 16, 2012

Location: Pier 4 N

Item No.	Description	Yes, No Or N/A	QC Inspector	QA Inspector
1	Preconstruction			
A	Special provisions (section 1.4.7, 1.4.9.2 reviewed)	Y	HT	
B	Design Drawings reviewed	Y	HT	
C	Allnorth Lift Procedure drawings reviewed	Y	HT	
D	Shop Drawings reviewed	Y	HT	
E	Required equipment and operators available and on site	Y	HT	
F	Lifts reviewed and crane charts checked	Y	HT	
G	DCBC certification letter for upper mid pier steel section received	Y	HT	
2	Construction - Reorientation Phase (upside down to on its side)			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	HT	
B	Cranes positioned as per Allnorth Lift Procedure drawings	Y	HT	
C	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	HT	
D	Lifting assemblies installed as per Allnorth drawings	Y	HT	
E	Steel section lifted and reoriented (from upside down to on its side)	Y	HT	
F	Steel section lowered back onto truck	Y	HT	
G	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	HT	
3	Construction - Reorientation Phase (on its side to right side up)			
A	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	HT	
B	Cranes positioned as per Allnorth Lift Procedure drawings	Y	HT	
C	Shop installed lifting lugs in place as per Allnorth Lift Procedure dwgs	Y	HT	
D	Lifting assemblies installed as per Allnorth drawings	Y	HT	
E	Steel section lifted and reoriented (from on its side to right side up)	Y	HT	
F	Steel section lowered back onto truck	Y	HT	
G	Welded on lifting lugs removed and Inspection Test Plan ITP 301-1 Weld on Lifting Lug Removal completed	Y	HT	
4	Construction - Installation Phase			
A	Finger bridge is reinforced as per Allnorth drawings c/w crane pads	Y	HT	
B	Crane pads are in place as per Allnorth drawings	Y	HT	
C	Cranes positioned as per Allnorth Lift Procedure drawings	Y	HT	
D	Expansion strut installed between pier side sections	Y	HT	
E	Alignment clamp installed on one corner section	Y	HT	
F	Gap between corners measured and enlarged with jack to a minimum Of 25mm larger than the mid section	Y	HT	
G	Steel section on truck and moved into position as shown on the Allnorth Lift Procedure drawings.	Y	HT	
H	Lifting assemblies installed onto mid section	Y	HT	
I	Lifting rigging installed as per Allnorth drawings	Y	HT	
J	Steel section lifted and rotated into position as per drawings	Y	HT	
K	Steel section lowered into position and installed as per drawings	Y	HT	
L	End of mid section away from alignment clamp bolted to the corner Section. Do not fully torque bolts. Inspection Test Plan ITP 303-1 Pier Section Bolting partially completed	Y	HT	
M	Alignment clamp moved into position over joint and connection aligned	Y	HT	

WP 344 - WORK PROCEDURE

DEH CHO BRIDGE - PIER 4 MID STEEL SECTION

N	End of mid section near alignment clamp bolted to the corner Section. Do not fully torque bolts. Inspection Test Plan ITP 303-1 Pier Section Bolting partially completed	1	11	
O	Dwydag Bars installed in upper mid and corner sections	2	11	
P	Jack relaxed	3	11	
Q	If a gap exists between the mid and corner section then close the gap using work procedure WP 307 - Dwydag bars	4	11	
R	Bolts fully torqued bolts between the mid and corner sections. Inspection Test Plan ITP 303-1 Pier Section Bolting fully completed	5	11	
S	Crane disconnected	6	11	
T	Lifting assemblies, alignment clamp and expansion strut removed	7	11	
5	Construction - Pier Completion Phase			
A	Pier Alignment Checked	8	11	
B	Pier alignment is adjusted (if not within dimensional tolerances) and Inspection Test Plan ITP 305-1 Pier Jacking completed	9	11	
C	Lower section anchor bolts installation completed and Inspection Test Plan ITP 308-1 Anchor Bolts completed	10	11	
D	Upper section Dwydag bars installation completed and Inspection Test Plan ITP 307-1 Dwydag Bars completed	11	11	
6	Post Construction			
A	Submit documentation of steel section elevation/ location checks	12	11	

Comments:

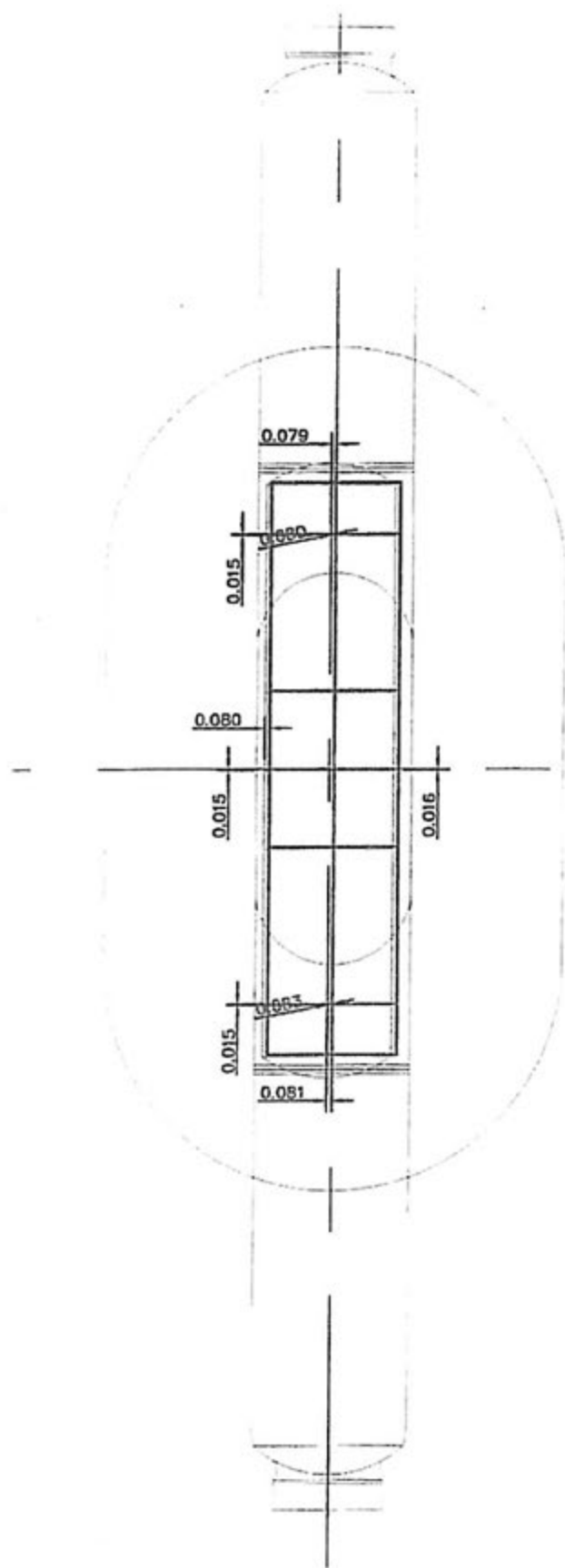
Documentation done as per ground conditions. Check
all bolting has been installed and
- documentation done in good with corner on same side
- All bolts done within limits of corner section
- Alignment clamp not used
- ITP 308 and 307 have been completed in phase 1
work
- Pier location as of March 4, 2010. Pier location
towards north NCH 76
- After final jacking there are gaps between mid
section to end support and gaps noted in NCH 76

Sign Off:

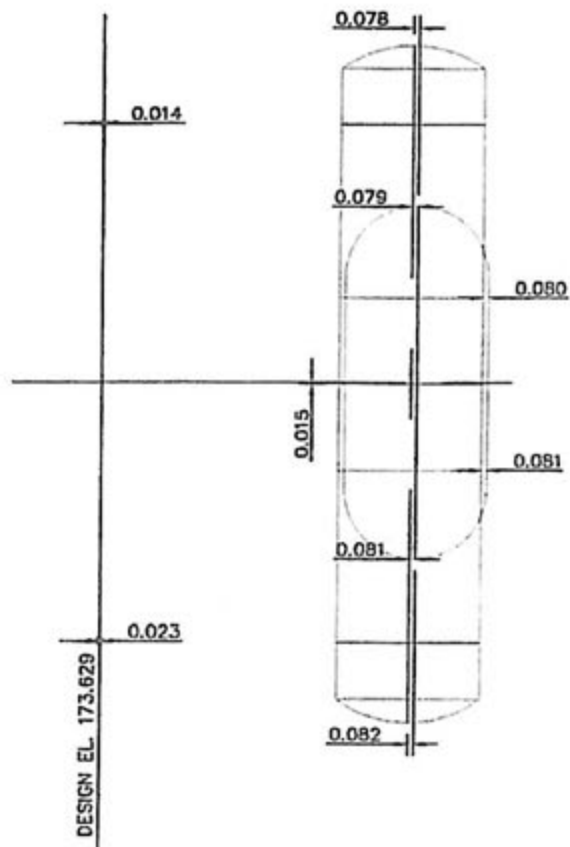
QC Inspector Signature

General Contractor Signature

QA Inspector Signature



BEARING LOCATIONS VS
DESIGN LOCATIONS



ELEVATION VARIANCE

TOP LOCATION VS BASE

PIER 4
LOCATIONS OF BASE AND TOP SECTION
INTERPOLATED FROM AS BUILD CENTER LINES IN
NORTH SOUTH AND EAST WEST DIRECTION



ITP 304N-1 - INSPECTION TEST PLAN **DEH CHO BRIDGE - NORTH PIER BASE SHIMMING**

Inspected By: S. Pereira

Date: Feb 18 - 2010

Location: Pier # 4N Base

Item No.	Description	Yes, No Or N/A	QC Inspector	Photo Record Yes or No
1	Preconstruction			
A	Review Allnorth base shimming procedure and drawings	Y	SP	
B	Ensure shim material is available	Y	SP	
C	Ensure shim material mill certificates received and reviewed	Y	SP	
D	Ensure appropriate personnel and equipment are on site and available	Y	SP	
2	Construction			
A	Install shims as per Base Shim plan	N	SP	See Note
B	After pier base is installed, adjust shims and add/remove as required to ensure base is in the correct location	Y	SP	
C	Final location of pier base section surveyed and within tolerances	Y	SP/RM	
D	Ensure shims are welded/secured to stop them from sliding.	N	SP	
E	Anchor bolts tightened to snug tight	Y	RF	

Comments:

- Pier # 4N - only installed shims in 6 locations to match those indicated on detail sketch dated Nov 5 - 2009 P4 North Anchoring Detail.
- Shimming procedure similar to that of pier # 1 North
- Final survey for base elevation 3 points completed and within tolerance - see attached survey information. Level points marked on base with paint pen.
- Tack welding to occur after final survey confirmation of pier location and no further Tackling or shimming required.

Sign Off:

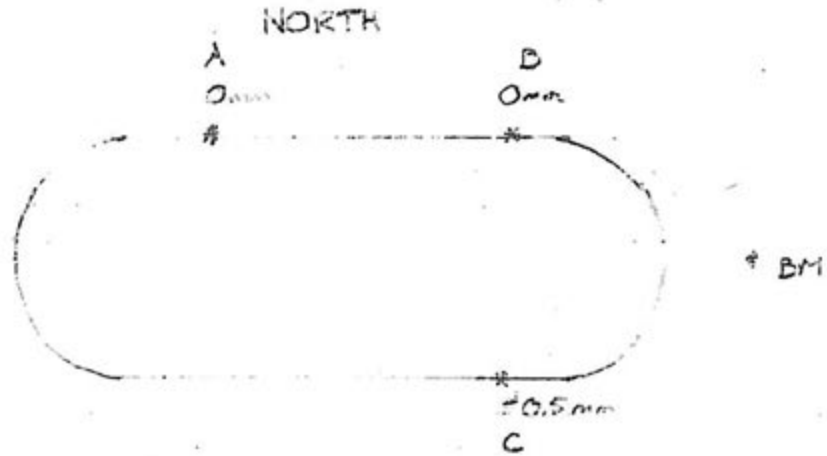
[Signature]
 QC Inspector Signature
 Feb 20, 2010

[Signature]
 General Contractor Signature
 Feb 20/2010

[Signature]
 QA Inspector Signature
 FEB 20, 2010



Client: RUSKIN Job # _____ File # _____
 Project: _____ Date: FEB 18/10 Rev: _____
 Subject: P4N STEEL Prep by: RM Checked by: _____
 Page 1 of 1

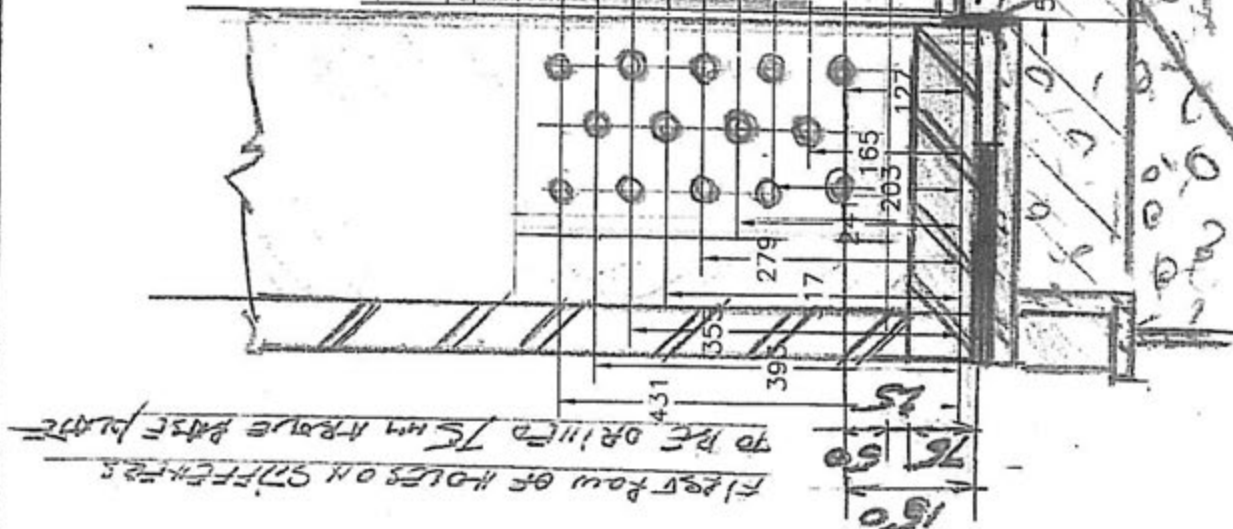
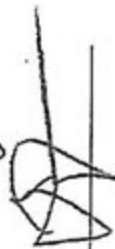


NORTH SIDE A	NORTH SIDE B	SOUTH SIDE C
BM 0.782	BM 0.782	BM 0.788
<u>-0.024</u>	<u>-0.024</u>	<u>-0.005</u>
0.758	0.758	0.783

* SURVEY POINTS ARE MARKED WITH YELLOW LINES



NOTE: IF ASSEMBLED "AS FABRICATED" THE
BOTTOM FLANGE OF BEAM WOULD RESULT 25mm
ABOVE THE DECK BASE PLATE.
THIS ARRANGEMENT WOULD REQUIRE INCREASE
OF THE SUPPORTING CONCRETE LAYER BY 25mm.



Two Beams with
holes incorrectly
drilled to
dimensions to
bottom of flange

CURRENT CONCRETE LEVEL
L APPX 1712

TO BE FINED UP WITH
CONCRETE

BARRIER

DEN CMO
P. 4-4
REINFORCEMENT

FEB 09. 2010



**APPENDIX B
SUPPORTING DOCUMENTS**

TAB L

INSPECTION REPORT

Project: Deh Cho Bridge – Scour Protection
EBA File: Y14101106.003
Date: November 6, 2008

Client: Rowe's Construction Ltd.
Client Representative: Lyndon Kipling
EBA Representative: Kevin Giroux

Purpose:

Assess gradation of potential scour protection materials. Specifically, determine the gradations of a material proposed for use as lower scour protection, i.e. all but the upper 600 mm of scour protection.

Methodology:

Kevin Giroux, of EBA Engineering Consultants Ltd. (EBA), travelled to site on November 6, 2008, arriving at about 10:00. Spoke to Lyndon Kipling of Rowe's about test methods.

One subsample was collected from each the north and south sides of the stockpile, and two subsamples were collected from the middle of the stockpile. The samples were collected using an excavator. The excavator bucket was approximately one cubic yard.

The subsamples from the north and south sides were placed on a plastic tarp, 4 m long by 3 m wide. The material was arranged by size and separated into 100 mm, 200 mm and 600 mm top-size fractions (Photo 2). The visually assessed results are presented on Table 1.

TABLE 1: SCOUR ROCK CONSTITUENT GRADATIONS

Particle Size	Blast Rock Gradations	
	Percents Passing	Percents Retained
600 mm	100	0
200 mm	40 ± 5	60 ± 5
100 mm	15 ± 5	85 ± 5

There was no particular specification for this material. We understand that there was an agreement between Rowe's Construction and the engineer that the scour rock for all but the upper 600 mm of the depth to be placed had to comprise primarily material coarser than 100 mm (i.e. small proportion finer than 100 mm). The upper 600 mm of the scour rock was to conform to the coarser, revised specification.

There were pockets of fines/sand located in the stockpile. It was recommended to the excavator operator that these pockets of finer material be discarded or segregated. The excavator could be used to drive the finer materials to the bottom of the piles and the upper, coarser materials could be loaded.



PHOTOGRAPHS



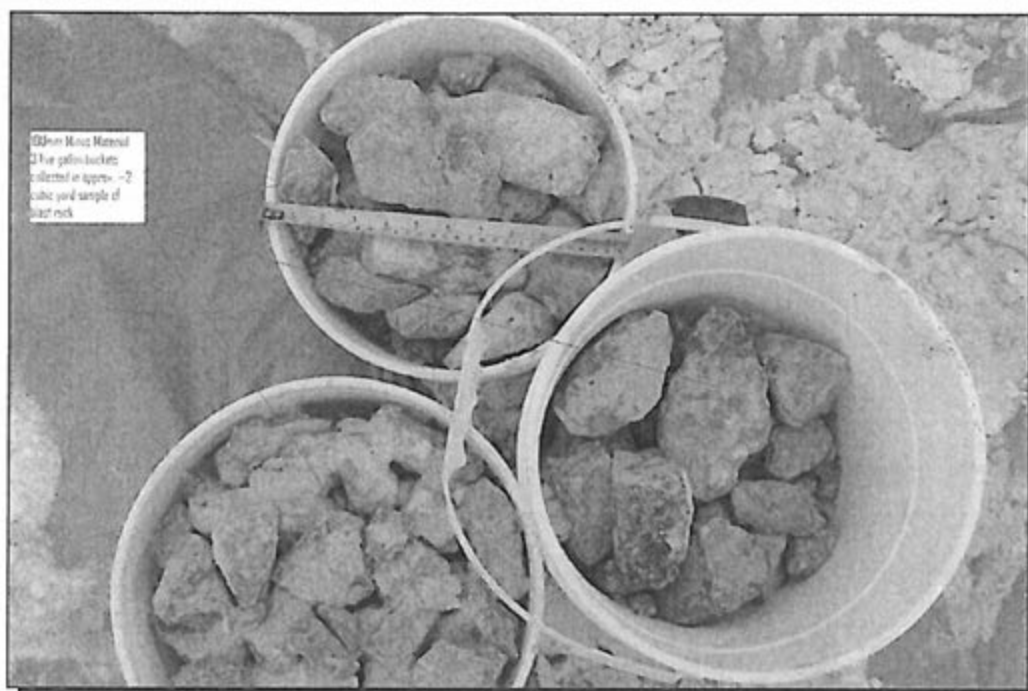


Photo 3
100 mm material from approximately 2 cubic yard sample of blast rock.



Photo 4
Blast rock delivered to Pier 2 South, on the temporary bridge deck.

INSPECTION REPORT

Project: Deh Cho Bridge – Scour
Protection

Client: Rowe's Construction Ltd.

EBA File: Y14101106.003

Client Representative: Lyndon Kipling

Date: December 3, 2008

EBA Representative: Kevin Giroux

Purpose: Assess gradation of potential scour protection materials. Specifically, determination the gradations of two products and recommend a blend proportion to satisfy the revised scour protection material specification.

Methodology:

Kevin Giroux, of EBA Engineering Consultants Ltd. (EBA), travelled to site on December 2, 2008, arriving at about 10:30. Visually examined stockpiles of blast rock and boulders at about km 23 along Highway 3 (south side of the river).

Drove to the Rowe's Construction Ltd. (Rowe's) camp at km 191.3 along Highway 1. Spoke to Lyndon Kipling of Rowe's about test methods. Lyndon mentioned that equipment need to be mobilized to site and that it could take better than half a day to get the equipment ready.

Drove back to site for standby until the equipment arrived at site. The ferry crossing limited the amount of trucks that could cross and it took several hours to get equipment from the north side to the south side. The equipment arrived on site at about 18:00, but daylight was an issue. Therefore, it was decided that the materials would be sampled and tested the following day.

Arrived on site at 08:30 on December 3, 2008. Discussed with Lyndon and the excavator operator how to sample and place the material for assessment.

The first sample to be tested was the granite boulders km 151 along Highway 1 and km 87 along Highway 3. One subsample was collected from the pile with a Cat 330 excavator. A second subsample was collected from the opposite side of the stockpile, in an effort to collect a representative sample. The subsamples were placed on a green plastic tarp. The material was arranged by size (Photo 1). The visually assessed results are presented on Table 1.

The second sample to be tested was the blast rock from km 155 along Highway 3. One subsample was collected from the pile with a Cat 330 excavator. A second subsample was collected from the opposite side of the stockpile, in an effort to collect a representative sample. The subsamples were placed on a blue plastic tarp. The material was arranged by size (Photo 2). The visually assessed results are presented on Table 1.

TABLE 1: SCOUR ROCK CONSTITUENT GRADATIONS

Specification – Revision 1	Granite Boulders		Blast Rock	
	Percents Passing	Percents Retained	Percents Passing	Percents Retained
100% < 600 mm	100	0	100	0
50% > 400 mm	40	60	100	0
80% > 200 mm	5	95	100	0

It can be seen in Table 1 and the photo that essentially all of the blast rock was determined to be finer than 200 mm. The gradation of the blast rock was determined to be approximately as follows.

TABLE 2: APPROXIMATE GRADATION OF BLAST ROCK

Particle Size	Percent Retained	Percent Passing
200 mm	0	100
100 mm	35 ± 5	65 ± 5
50 mm	65 ± 5	35 ± 5

Conclusions:

The blast rock could either be rejected, or blended with the granite boulder material, if there was a desire to “tighten up” the gradation. There was the occasional piece of rock up to 800 mm diameter in the boulder material, so there was some room for more of the finer materials passing 200 mm. Therefore, a ratio of 4 buckets of boulders to 1 bucket of blast rock was discussed on-site as a suitable blend for the scour rock.

Prepared by:
EBA Engineering Consultants Ltd.



Kevin Giroux
Engineering Assistant
Phone: 867.920.2287
kgiroux@eba.ca



T.E. Hoeve, P.Eng.
Project Director, NT/NU Region
Direct Line: 867.766.3728 x114
choeve@eba.ca

Attachments

PHOTOGRAPHS

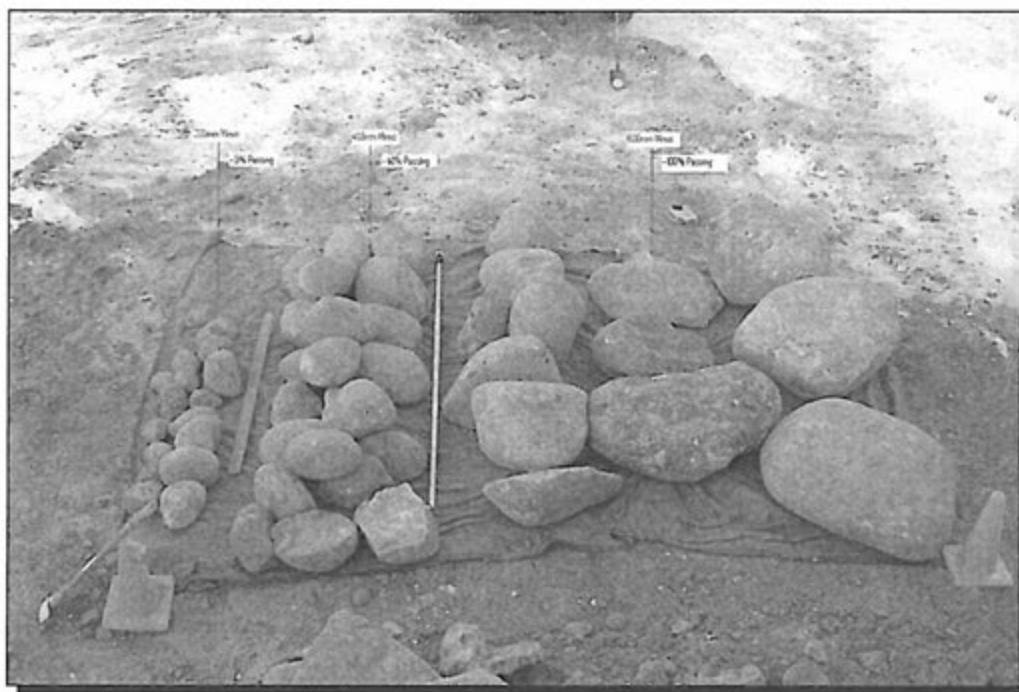


Photo 1
Granite boulders sorted by size



Photo 2
Blast rock sorted by size

SCOUR ROCK INSPECTION REPORT

EBA File:	Y14101106.003	Client:	Rowe's Construction Ltd.
Project:	Deh Cho Bridge – Scour rock QC Monitoring	Client Rep.:	Lyndon Kipling
Location:	South Piers (1, 2, 3 and 4)	EBA Rep.:	Fai Ndofor
Start:	January 27, 2009 @ 10:30	Finish:	January 27, 2009 ~ 13:30

OBJECTIVE

Monitor the supply of scour rock to the bridge site to verify that it is delivered following the accepted mix of two buckets of round natural boulders and one bucket of blasted granite. Also evaluate the gradation of the mix that is delivered to the bridge site.

INTRODUCTION

Mr. John Hopf, of Rowe's Construction Ltd. (Rowe's), made a request on Monday January 26, 2009 for EBA Engineering Consultants Ltd. (EBA) to send a representative to monitor the supply of scour rock at the Deh Cho bridge site and also to evaluate the gradation of the material supplied to the bridge. EBA was advised the supply of material at the bridge site was scheduled to start on Tuesday January 27, 2009 at 09:00 am.

Fai Ndofor of EBA arrived on site at 10:00 am and the scour rock supply started at about 11:00 am.

METHOD OF MIX

The rounded natural rock was first loaded into a 16 m³ capacity truck to two-thirds of its capacity. The truck then drove to the blasted granite stockpile where it was filled. It should be noted that the 2:1 ratio was mostly approximations as the loaders on both ends had different bucket capacities making it difficult to come out with exact quantities for every load supplied to the bridge.

Once at the bridge site, the material was dumped, mixed by an excavator, and then placed into the cofferdam. Attached is a photograph showing the buckets on the crane used to place the material into the cofferdam.

EBA ACTIVITIES

- Fai traveled from Yellowknife to Fort Providence on Tuesday January 28, 2009, and arrived at the Deh Cho Bridge at 10:00 am. Scour rock supply to the bridge started at about 11:00 am, as both scour rock stock piles were covered by snow and had to be cleared.
- EBA's primary role was in monitoring the proportioning of the two rock sources to make sure the material was supplied to the bridge site at a ratio of two-thirds of the round natural rock to one-third of the blasted granite.

- EBA had determined the gradation of the rounded boulders during a previous inspection. The gradation of the blasted granite was determined during this inspection. With the aid of the loader that was used in loading the blasted granite, a bucket of this material was collected from the middle of the stockpile and placed on a tarp. The gradation of the material placed on the tarp was determined and results summarized on Table 1 attached. Also attached are photographs showing the testing.
- A gradation of the mix that was supplied to the bridge was also carried out. After mixing the material, the excavator collected a bucket of this material and placed it on a tarp. The material was then sorted by different size ranges and its gradation determined. The gradation test results are summarized on Table 2 attached.
- Comparing the gradation obtained after the 2:1 mix to the specified gradation also presented in Table 2, we came to a conclusion it was in conformance with the specifications. Photographs showing this test and the mix are also attached.
- Fai left the bridge site, as requested by Rowe's, at about 13:30, after determining the material gradation and having verified the material was being supplied following the ratio accepted.

OBSERVATIONS AND RECOMMENDATIONS

- It was observed that for the first two loads the rounded material was loaded into the truck about three-quarters full. As a result, the material supplied to the bridge had more of the rounded natural rock than was recommended. Rowe's was advised to make sure only two-thirds of the rounded material is loaded into the truck each time.
- It was suggested that to be sure the mixing was done as recommended, two full truck loads of the rounded rock should be dumped on the temporary bridge deck followed by one full load of the blasted rock dumped on this. This could then be mixed by the excavator before placement into the cofferdam. The suggestion was not accepted as there were concerns of limited space and safety on the temporary bridge.
- After discussions with Lyndon of Rowe's, a mixing protocol was established. Two and a half buckets of the rounded natural material were to be put in the truck as this filled the truck to two-thirds its capacity followed by 3 buckets of the blast rock. This mix was monitored for about 2 loads dumped on the bridge and it met the 2:1 ratio required.
- It is recommended that to come out with exact quantities in future, the loaders placed at the two stockpiles should have the same bucket capacity. This will make things easier for the operators and lead to a more consistent mix.

We trust the information provided meets your present requirements. Should any questions arise, please contact our office at your convenience.

Prepared by:



Fai Ndofor
Engineering Geologist
Direct Line: 867.766.3728 x124
fndofor@cba.ca

Reviewed by:



T.E. Hoeve, P. Eng.
Project Director, NT/NU Region
Direct Line: 867.766.3728 x114
ehoeve@eba.ca

Attachments: Tables and Photographs



TABLES



TABLE 1: GRADATION OF BLASTED GRANITE

Particle Size	Blast Rock Gradations	
	Percents Passing	Percents Retained
700 mm	100	0
600 mm	95	5
400 mm	55 ± 5	45 ± 5
200 mm	20 ± 5	80 ± 5
100 mm	5 ± 10	95 ± 5

TABLE 2: GRADATION OF MIXED ROCK AT THE BRIDGE SITE COMPARED TO SCOUR ROCK SPECIFICATIONS

Particle size	Mixed Rock supplied to the bridge site		Scour rock Specifications
	Percent Retained	Percent Passing	Percent Passing
700 mm	0	100	100
600 mm	2	98	100
400 mm	50 ± 5	50 ± 5	50
200 mm	85 ± 5	15 ± 5	20
100 mm	90 ± 5	10 ± 5	-



PHOTOGRAPHS





Photo 1
Blasted granite placed on tarp for gradation test



Photo 2
Blasted granite spread out and sorted according to size



Photo 3
Mixture of round rock and blasted granite ready for placement at bridge site



Photo 4
Buckets attached to crane for placing the scour rock into the cofferdam

EBA monitored the placement of some material at Pier 2 south. The material was dumped on the temporary bridge deck. From there it was dropped about 7.5 m to the surface of the footing. The material was then distributed with a Bobcat. The handling during placing resulted in some breaking up of the material. So the material in place was somewhat finer than in the stockpile.

Jivko Jivkov, the engineer, was on site monitoring the placement of the material. He mentioned that the first few loads delivered to Pier 2 South were looking good.

Conclusions:

The gradation was considered to conform to the intent of the gradation for the lower scour rock (below 600 mm from the top), and was considered to be suitable for placement.

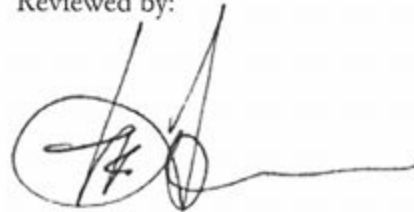
EBA Engineering Consultants Ltd.

Prepared by:

Kevin Giroux
Engineering Assistant
Phone: 867.920.2287
kgiroux@eba.ca

Attachments

Reviewed by:

A handwritten signature in black ink, appearing to be 'T.E. Hoeve', written over a circular stamp or seal.

T.E. Hoeve, P.Eng.
Project Director, NT/NU Region
Direct Line: 867.766.3728 x114
choeve@eba.ca

APPENDIX B

TAB M

February 20, 2008

Mr. Jivko Jivkov, P.Eng.
Jivkov Engineering
5610 - 50A Avenue
Yellowknife, NT
X1A 1G3

Re: Deh Cho Bridge Project (the "Project")

Dear Sir:

This letter is in response to the series of e-mails and other correspondence that I have recently received from you, the Deh Cho Bridge Corporation Ltd. (the "Corporation") and from its consultant Andrew Gamble. This letter is to clarify the position of J.R. Spronken & Associates Ltd. ("Spronken") with respect to the issues raised in this correspondence and the termination of our involvement with the Project.

Spronken agreed to provide design engineering and supervision services under our Fee Proposal submitted on August 5, 2003, which was subsequently accepted and agreed to by Jivkov Engineering (the "Engineering Contract"). Notwithstanding dramatic changes in the scope, duration and cost of the Project, Spronken diligently completed the services contemplated under items A. Preliminary Design; B. Detailed Design and Outlined Tender Drawings; and C. Complete Design and Drawings as set forth under in the Engineering Contract. Unfortunately, after Spronken issued and certified the Issued for Construction drawings for the Project, Jivkov Engineering advised Spronken that our further services would not be compensated under the Engineering Contract or under any other satisfactory basis for the engineering and supervision services required in order to see the Project through to completion. Specifically, Spronken was advised that it would not be compensated by Jivkov Engineering under the Engineering Contract for items D. Continuous Office Supervision and E. Continuous Engineering Site Supervision.

In the circumstances, the refusal by Jivkov Engineering to continue to compensate Spronken under the Engineering Contract represents a repudiation of the contract. As per our previous communications and correspondence to you, Spronken has accepted your repudiation of the Engineering Contract. As such, the Engineering Contract is now at an end and Spronken will not be performing any further services in relation to the Project.

.../2

J.R. SPRONKEN & ASSOCIATES LTD.
CONSULTING PROFESSIONAL ENGINEERS

1917 20TH AVENUE NW, SUITE 200 CALGARY, AB T2M 1H6 P 403 265 1123 F 403 265 1784 E jrsa@spronken.net

CDP 01/17/08

Spronken stands behind the engineering work it has performed to date in relation to the Project. However, the design and construction of this bridge involve highly technical engineering issues and require the dedicated services of a properly qualified design engineer to see the Project through to completion. Spronken performed its services under the Engineering Contract on the express understanding and under the condition that Spronken would perform the supervision and design work through the construction stage of the Project to completion. Spronken acknowledges that Jivkov Engineering, having now repudiated the Engineering Contract, can (and should) retain another duly qualified engineering firm to oversee the completion of the work. However, Spronken will not be liable for any changes, modifications or interpretations whatsoever to its drawings and all such changes, modifications or interpretations must be fully reviewed, approved and certified by a duly qualified design engineer in accordance with prudent engineering practice and the applicable professional standards.

In the circumstances and given the premature repudiation of the Engineering Contract and termination of Spronken's services, Spronken assumes no responsibility or liability whatsoever in connection with the use, interpretation, modification or other application of its drawings on a go forward basis, other than in strict accordance with the Spronken certified Issued for Construction drawings.

Notwithstanding your repudiation of the Engineering Contract, Spronken recognizes that Jivkov Engineering and the Corporation are anxious to carry on with the Project and to make use of the drawings completed and delivered by Spronken under the terms of the Engineering Contract. In order to assist you in this regard, Spronken hereby confirms the following:

1. Spronken is a licensed professional engineer in and for the jurisdiction of the Northwest Territories and the Issued for Construction drawings for the Project have been duly certified as having been properly prepared in accordance with the specifications for the Project that were provided to Spronken.
2. You have covenanted and undertaken to provide a satisfactory professional liability errors and omissions insurance policy to cover all work done by Spronken in connection with the Project. In that regard, Spronken will supply your insurer with the necessary information to put the required coverage in place. Upon Spronken receiving proof of such coverage in a form satisfactory to Spronken, Jivkov Engineering is hereby authorized to use Spronken's drawings under the terms and conditions set forth below.
3. In consideration of and for Spronken receiving proof of insurance coverage as set forth above, at the request of Jivkov Engineering, Spronken shall irrevocably assign to the Corporation all right, title, and interest in and to the drawings prepared and issued by Spronken under the Engineering Contract for the Project (the "Drawings") provided, however, that Spronken shall retain ownership of all intellectual property in and to the Drawings. Contemporaneously with the aforesaid assignment, Spronken shall grant to the Corporation an irrevocable, non-exclusive, royalty-free license in perpetuity to use, modify and reproduce the Drawings and the associated intellectual property for all proper purposes relating to the Project, all at the Corporation's sole risk, liability and expense. In

addition, Spronken shall grant to the Corporation the right to grant sub-licenses and assign the benefit of the license and the right to grant sub-licenses, under the same terms and conditions, to:

- i. the Government of the Northwest Territories; and
- ii. any lender(s) in connection with the grant of a security interest in the Project; and
- iii. a purchaser, lessees or concessionaire of the Project; and
- iv. any subsequent assignee of the same.

We trust that the foregoing clarifies our position and provides you with what you require in order to move forward with the Project with the other stakeholders and under the direction and supervision of a duly qualified design engineering firm through to completion.

Yours truly,

J.R. SPRONKEN & ASSOCIATES LTD.



John R. Spronken, P. Eng.

JRS:as

cc. Andrew Gamble

consulting engineers since 1961

1917 20TH AVENUE NW SUITE 200 CALGARY, AB T2M 1H6 P 403 265 1123 F 403 265 1784 E jrs@spronken.net



APPENDIX B

TAB N



Division of
SNC-LAVALIN INC.
40 Fielding Avenue
Dartmouth, Nova Scotia
Canada B3B 1E4

Telephone: 902-468-6230
Fax: 902-468-7864

GEOCON ATLANTIC QUALITY ASSURANCE REPORT DEH CHO BRIDGE PROJECT

DATE OF VISIT: Nov 2-6/09

REPORT No: 55

BY: Client QA George Crocker

CLIENT: Sargent Eng. & Associates

VENDOR: Atcon Industrial Services LTD (AIS)

CLIENT CONTACT: Dennis Sargent

VENDOR CONTACT: Derek Locke

POSITION: Engineer

POSITION: QC Manager

VENDOR LOCATION: Atcon Fabrication Shops Miramichi New Brunswick

REFERENCE: Project Schedule, Drawings, Job Specifications, Applicable Codes per Specifications, Special provisions, Procedures, Geocon Progress Reports,

FABRICATION: Pier Bents 1, 2, 3, 4 North & South, Armour 1, 2, 3, 4 North & South

REASON FOR VISIT: QA Surveillance

REPORT DISTRIBUTION: Sargent Engineering & Associates, Geocon Atlantic File & George Crocker Client QA

ATTACHMENTS: Punch list Pier 4 North, Pier 5 North final dimensional survey, Punch list global documentation, All punch list for South and North Pier Bents and armours are attached to AIS percentage claim report, AIS percentage claim, Percent bearing accepted Pier 2 North, Final dimensional accepted Pier 2 North, Percent bearing accepted Pier 4 North, Photo record of shipping M200, M100, M202 & M201,

SUMMARY

This report will detail QA Surveillance activities conducted on at Miramichi NB fabrication shops of Atcon Industrial Services Inc, 67 General Manson Way, New Brunswick, E1N 6K6. Surveillance is to monitor production and quality of product provided by fabricator.

This is the final report on fabrication of pier bents at AIS for Deh Cho Corporation. All bent and armour fabrication is now finished and has been shipped to site. Documentation review and completion is ongoing

Meeting and/or Discussions (With Whom)

AIS QC Manager Derek Loc

James Mather General manager

Contractor Progress and QA Fabrication Surveillance Details Main & Sub Assembly This Visit

Pier 1 South

- AIS considers fabrication completed
- Trial fit completed
- Shipped to site



- Armour and template M6 ring shipped to site and installed. These were completed and shipped prior to owner QA mobilized to AIS.
- At time owner QA mobilized to AIS this pier bent was 37% completed.
- Any deficiencies found by owner QA during monitoring and review were corrected when found and/or stated in NCR's, RFI's and Punch list
- Final punch list developed by owner QA attached please reference for any outstanding items.
- AIS are responsible for quality of product

Pier 2 South

- AIS considers fabrication completed
- Trial fit completed
- Shipped to site
- Armour and template M6 ring shipped to site and installed. These were completed and shipped prior to owner QA mobilized to AIS.
- At time owner QA mobilized to AIS this pier bent was 48% completed.
- Any deficiencies found by owner QA during monitoring and review were corrected when found and/or stated in NCR's, RFI's and Punch list
- Final punch list developed by owner QA attached please reference for any outstanding items.
- AIS are responsible for quality of product

Pier 3 South

- AIS considers fabrication completed
- Trial fit completed
- Shipped to site
- Armour and template M6 ring shipped to site and installed. These were completed and shipped prior to owner QA mobilized to AIS.
- At time owner QA mobilized to AIS this pier bent was 92% completed.
- Any deficiencies found by owner QA during monitoring and review were corrected when found and/or stated in NCR's, RFI's and Punch list
- Final punch list developed by owner QA attached please reference for any outstanding items.
- AIS are responsible for quality of product

Pier 4 South

- AIS considers fabrication completed
- Trial fit completed
- Shipped to site
- Armour and template M6 ring shipped to site and installed. These were completed and shipped prior to owner QA mobilized to AIS.
- At time owner QA mobilized to AIS this pier bent was 74% completed.
- Any deficiencies found by owner QA during monitoring and review were corrected when found and/or stated in NCR's, RFI's and Punch list
- Final punch list developed by owner QA attached please reference for any outstanding items.
- AIS are responsible for quality of product

Pier 1- N

- AIS considers fabrication completed
- Trial fit completed
- Shipped to site



- Armour and template M6 ring shipped to site and installed. M6 template was fabricated prior to owner QA prior to owner mobilized to AIS. Trial fitting of armour, welding and trial fit of M6 template took place during owner QA monitoring
- At time owner QA mobilized to AIS this pier bent was 30% completed.
- Any deficiencies found by owner QA during monitoring and review were corrected when found and/or stated in NCR's, RFI's and Punch list
- Final punch list developed by owner QA attached please reference for any outstanding items.
- AIS are responsible for quality of product

Pier 2- N

- AIS considers fabrication completed
- Trial fit completed
- Shipped to site
- Armour and template M6 ring shipped to site and installed. M6 template was fabricated prior to owner QA prior to owner mobilized to AIS. Trial fitting of Armour, welding and M6 template trial fit occurred during owner QA monitoring.
- At time owner QA mobilized to AIS this pier bent was 21.8% completed.
- Any deficiencies found by owner QA during monitoring and review were corrected when found and/or stated in NCR's, RFI's and Punch list
- Final documentation has not been submitted by AIS to date for review by owner QA and final punch list is to be developed.
- AIS are responsible for quality of product

Pier 3-N

- AIS considers fabrication completed
- Trial fit completed
- Shipped to site
- Armour and template M6 ring shipped to site and installed. M6 template was fabricated prior to owner QA prior to owner mobilized to AIS. Trial fitting of Armour, welding and M6 template trial fit occurred during owner QA monitoring.
- At time owner QA mobilized to AIS this pier bent was 47% completed
- Any deficiencies found by owner QA during monitoring and review were corrected when found and/or stated in NCR's, RFI's and Punch list
- Final documentation to be review by owner QA and final punch list developed.
- AIS are responsible for quality of product

Pier 4- N

- AIS considers fabrication completed
- Trial fit completed
- Shipped to site
- Armour and template M6 ring shipped to site and installed. M7 template was fabricated prior to owner QA prior to owner mobilized to AIS. Trial fitting of Armour, welding and M7 template trial fit occurred during owner QA monitoring.
- At time owner QA mobilized to AIS this pier bent was 38% completed
- Any deficiencies found by owner QA during monitoring and review were corrected when found and/or stated in NCR's, RFI's and Punch list
- Final documentation to be review by owner QA in progress and final punch list developed.
- AIS are responsible for quality of product



- Final dimensional survey has not been filed by AIS to date

QA Surveillance NDT Review

- NDE was performed by Technico.
- Owner QA acted as a monitor of the NDE to ensure use of correct codes and procedures
- Owner QA reviewed NDE reports

QA Surveillance AIS QC Review

- AIS was responsible for Quality
- AIS QC were responsible for in process QC and final quality of product.
- Technico performed final visual inspection of completed assemblies
- Owner QA was a monitor of the quality program, documentation review and acted as a site liaison for the owner.
- AIS have submitted documentation to owner QA for Piers 1, 2, 3, 4 South and Pier 1 and 3 North and Global documentation binder. These were reviewed at site by owner QA and punch list developed. Most items were closed but some are still open, see attached punch list. The documentation has been forwarded by AIS to Sargent for final review.
- Owner, AIS site QA has reviewed Pier 4 North documentation and developed a punch list (*attached*) AIS are presently working to close items.
- Global documentation submitted for all Piers 1, 2, 3, 4 North and South review completed (*see attached punch list*)
- Pier 2 North documentation has not been submitted by AIS to date.

NCR's

Outstanding NCR's to close:

DEH CHO 03- Armour's-Submitted- No response from Sargent or Jivko on this to date.

DEH CHO 12- Pier 1-S- open

RFI's

- AIS, RFI No.41 rev 1 submitted. This is to address Pier 4 South Punch list Item # 16 (*Sargent and Jivko are reviewing and are to respond when review completed*)
- AIS, RFI 43 submitted (*attached*) This RFI is for external edge gaps at connection locations M400 to M403 East and West at top of Pier 4. Submittal is to prevent any debris entering the opening when Pier is in use at site. (*Sargent and Jivko to review*)
- Review of global documentation. Many RFI's did not have a response from owner. AIS QC has been directed by owner QA to ensure responses accompany all RFI's.

Punch List

Note: Punch List for outstanding items for all assemblies is developed by Client QA/Geocon on ongoing bases as QA monitor only. Punch list may not be a complete list of outstanding items. Atcon, Jivko and/or Sargent may add other items at any time during their review. In no way does punch list developed by Client QA relieve the Fabricator, Atcon Industrial Services, of their responsibility for quality of their product. Client QA does not assume any responsibility for product quality.

Punch List for Pier bents as noted below has been developed and Filed with Atcon, Sargent and Jivko

Pier 1 South (two outstanding item)

Pier 2 South (one outstanding items)



Pier 3 South (one outstanding items)
Pier 4 South (three outstanding items)

Pier 1 North (two outstanding items)
Pier 2 North (outstanding items)
Pier 3 North (one outstanding item)
Pier 4 North (outstanding items open)

Global punch list (attached) items open

Armours— Documentation and comments made per punch list. Total 28 items/26 items closed/ 2 items open

Areas of Concern This Report

None to report this week

Outstanding Areas of Concerns from Last Report

- 1) Pier 4 North M403- Checked overall length dimension—shop drawing require OAL to be 9358mm—actual measured was 9351—short 7mm. This was verified by Atcon QC Mathew McCollum. Client QA has sent to AIS and copied to Jivko and Sargent stating concern. *(AIS stated will be fixed at trial fit, final dimensional survey has been submitted by AIS and is currently under review by owner)*

Weld Procedures

- Monitor correct use of weld procedures.
- Review of Weld tables cross reference to procedures shows some discrepancies. Email sent to AIS QC requesting review and revision. *(Weld tables for South piers were revised and sent to AIS engineer for review owner QA has never received a copy.)*

Surveys.

- a) Pier 1 North final dimensional survey completed & report filed by AIS. *(has been accepted by Jivko)*
- b) Pier 3 North final dimensional survey completed & report filed by AIS. *(has been accepted by Jivko)*
- c) Pier 2 North final dimensional survey completed & report filed by AIS. *(has been accepted by Jivko)*
- d) Pier 4 North Trial fit final dimensional survey slated for Tuesday Oct 20/09. *(Report has been filed by AIS, Owner to review)*

Percentage Completion Report

None to report

Completed Items Ready for Load Out

- Pier 1,2,3,4 South shipped
- Pier 1, 3, 4, Pier 2 M200 shipped. M202 and M201 to be shipped by Nov 9/09

Note #1; Pier 1, 2, 3, 4, North & South ITP's;

Documentation is presented to Owner QA site at AIS who completes an initial review. After his review the owner QA representative has initialled the ITP as shown in AIS submitted documentation. AIS then forward the documentation to Sargent Engineering Associates for final review and acceptance. Item 19 on all ITP "Final documentation review" has been left for Sargent Engineering & Associates to sign when

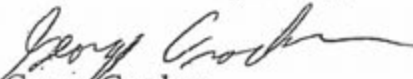


they have completed their review. A copy of the completed ITP is than to be forwarded to AIS QC manager Derek Locke for his records

Note #2; Reference % completion report claim by AIS dated Nov 28/09. When owner QA was mobilized AIS had been working on the Pier Bent and Armour fabrication contract for more than a year. At owner QA arrival at AIS the pier bent completion was: Pier 1 North 30%, Pier 2 South 48%, Pier 2 North 21.8%, Pier 3 South 92%, Pier 3 North 47%, Pier 4 South 74%, Pier 4 North 38%. Owner QA then monitored the completion from that period to all pier bent completion Nov 2009.

Note #3; All Pier Bent fabrication is currently completed at AIS as of Nov 6/2009. Documentation review and documentation completion is ongoing.

Shop Visit and Reported by


George Crocker

CWB Inspector Level III

AWS Certified Inspector (CWI)



GEORGE CROCKER

CWI 07020627

QC1 EXP. 4/01/10



ATTACHMENT 1

8	Pier 4 N	Spec's and AWS D1.5	George Crocker	M401	Spec's and Dwg	Weld undersize/poor profile to be completed prior to trial fit and to be accepted by QC	A	Atcon Production & QC	May 26/09	Closed	Oct 30/09
9	Pier 4 N	Spec's and AWS D1.5	George Crocker	M400/403/402/401	Spec's and Dwg	NDE procedures for UT and visual to be revised	A	Atcon QC	May 26/09	Closed	Oct 30/09
10	Per 4 N	Spec's and AWS D1.5	George Crocker	M400/403/402/401	Specs	Turnover package document for blasting dated incorrectly	A	AIS QC	Nov 2/09		
11	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	Documentation	Weld map M400 references two number one's	A	AIS QC	Nov 2/09		
12	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	Documentation	M400 joint list, ITP and List of UT joints as state left and right corners while should state east and west as shown on NDE reports.	A	AIS QC	Nov 2/09		
13	Per 4 N	Spec's and AWS D1.5	George Crocker	M402	Documentation	M402 ITP, list of joint #'s, and NDE matrix state left and right legs; should state east and west	A	AIS QC	Nov 2/09		
14	Per 4 N	Spec's and AWS D1.5	George Crocker	M400/403/402/401	NDE and visual reports	A number of NDE/UT/MT and visual reports submitted by Technico not signed by technician. Please review all including those added to NCR's	A	AIS QC	Nov 2/09		
15	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	Spec's	No report submitted by AIS for Final Dimensional survey Pier 4 North	A	AIS QC	Nov 2/09		
16	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	Documentation	Pier 4 North document list of heat numbers state left and right should state east and west	A	AIS QC	Nov 2/09		
17	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	Spec's/procedures	Number of NCR's do not have Eng signature. Other areas listed where to sign if no signature required then should write N/A	A	AIS QC	Nov 2/09		
18	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	Documentation	NCR 36- Clear sketch and correct mill cert not added per Sargent response to NCR.	A	AIS QC	Nov 2/09		

ATTACHMENT 1

ATTACHMENT 1

19	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	NDE reports	Many reviewed NDE/UT reports reference wrong acceptance table per AWS D1.5. Tension Table 6.3 and compression. Table 6.4. Please review all reports including report added to NCR's and revise to correct acceptance table reference where applicable.	A	AIS QC	Nov 2/09		
20	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	NDE reports	NCR 21- UT report Reference M400 North. Please also reference if east or west.	A	AIS QC	Nov 2/09		
21	Per 4 N	Spec's and AWS D1.5	George Crocker	M401	NDE reports	NCR 22 - hardness report required	A	AIS QC	Nov 2/09		
22	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	NDE reports	NCR 25-- require UT reports	A	AIS QC	Nov 2/09		
23	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	Documentation and NDE reports	NCR 35- Crack at M400 east joint 17 not referenced correctly. Also NDE and visual report reference wrong assembly. Date of UT accepted does not concur with date stated in NDE matrix for assembly.	A	AIS QC	Nov 2/09		
24	P 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	NCR 36	NCR-36- NCR is for Pier 4 and Pier 2 North- all weld procedures not included	A	AIS QC	Nov 2/09		
25	P 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	ITP	ITP Item 19 final documentation to be signed of by Sargent	A	AIS QC	3-Nov		
26	P 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	RFI	RFI 43 open	A	AIS QC	3-Nov		
27	Pier 4 N	Spec's and AWS D1.5	George Crocker	M400/403/402/401	Final Documentation	Final Documentation and ITP to be reviewed at Pier completion.	A	Atcon QC	May 26/09		
Category A Completed prior to accepted					Note: This punch list			on By	Atcon Quality Control		
									Inspector Client Rep		

LOCATION: / Fabrication ATTACHMENT 1

Atcon Industrial Services Miramichi New Brunswick Canada

DEH CHO Bridge

PUNCH LIST ELECTRONIC FORM Global Turn Over Package

Inspector Punch Item #	Assembly NO	Reference Documents	ORIGINATOR	Reference to Known Equipment † Tag No.	Ref. Doc. Or Dwg	Punch Item Description	Cate gory	Action By	Punch Item Issued on	Punch Item Closed out on	STATU S
1	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Signature Log	Missing Alan Frennett, Dean Maidmant, Marshall Cunningham, Roger diagle	A	AIS QC	Nov 3/09		
2	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Mill certs	List of heat #'s for Pier 3 South M301- Mill cert for Ht # 2D578 not included in package	A	AIS QC	Nov 3/09		
3	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Pier heat numbers references	List of heat #'s Pier 2 north and south M202,, under description-- should say splice plate or D ring for that part #	A	AIS QC	Nov 3/09		
4	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Pier heat numbers references	List of heat #'s Pier 2 South M300 and M301,, under description-- should say splice plate or D ring for that part #	A	AIS QC	Nov 3/09		
5	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Pier heat numbers references	All Heat # reference lists where east and west is relavent it state sleft and right for items. This should state east or west depending on location	A	AIS QC	Nov 3/09		
6	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Pier heat numbers references	Pier 3 South has repeat sheets with diffenent heat numbers i. e. M300 South. There are no heat # reference list for Pier 3 North	A	AIS QC	Nov 3/09		
7	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Mill certs	Pier 4 North M401 reference heat # 2D976. No mill cert for this number included.	A	AIS QC	Nov 3/09		

	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Weld procedures	Wellhead Procedures	AIS QC	Nov 3/09	
8	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	NDE Techs	Qualification for Technico tech Val Brideau required	A	Nov 3/09	
9	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Calibration Certs	Calibration certs for Technico NDE equipment prior to June 2009 is missing	A	Nov 3/09	
10	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	RFI's	RFI log to be included	A	Nov 3/09	
11	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	RFI's	Responses from owner for RFI's # 1, 2, 3, 4, 5, 19, 20, 21, 22, 23, 24, 25, 27, 31, 34, 35, 41, 42 and 43 not in turnover package. These are to be included with referenced RFI.	A	Nov 3/09	
12	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	RFI's	No signatures on RFI's	A	Nov 3/09	
13	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	RFI's	RFI 's # 6,7,8,9,10,11,12,13,14,15,16,17,18, 19, 42 and 43 are missing. Please include RFI and response from owner.	A	Nov 3/09	
14	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Punch list	All completed punch list for to be included.	A	Nov 3/09	
15	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Change orders	Any Change orders to be included	A	Nov 3/09	
16	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Mill certs	Material List not included	A	Nov 3/09	
17	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A					
18	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A					

	Atcon Quality
AIS	QC = Control

ATTACHMENT 1

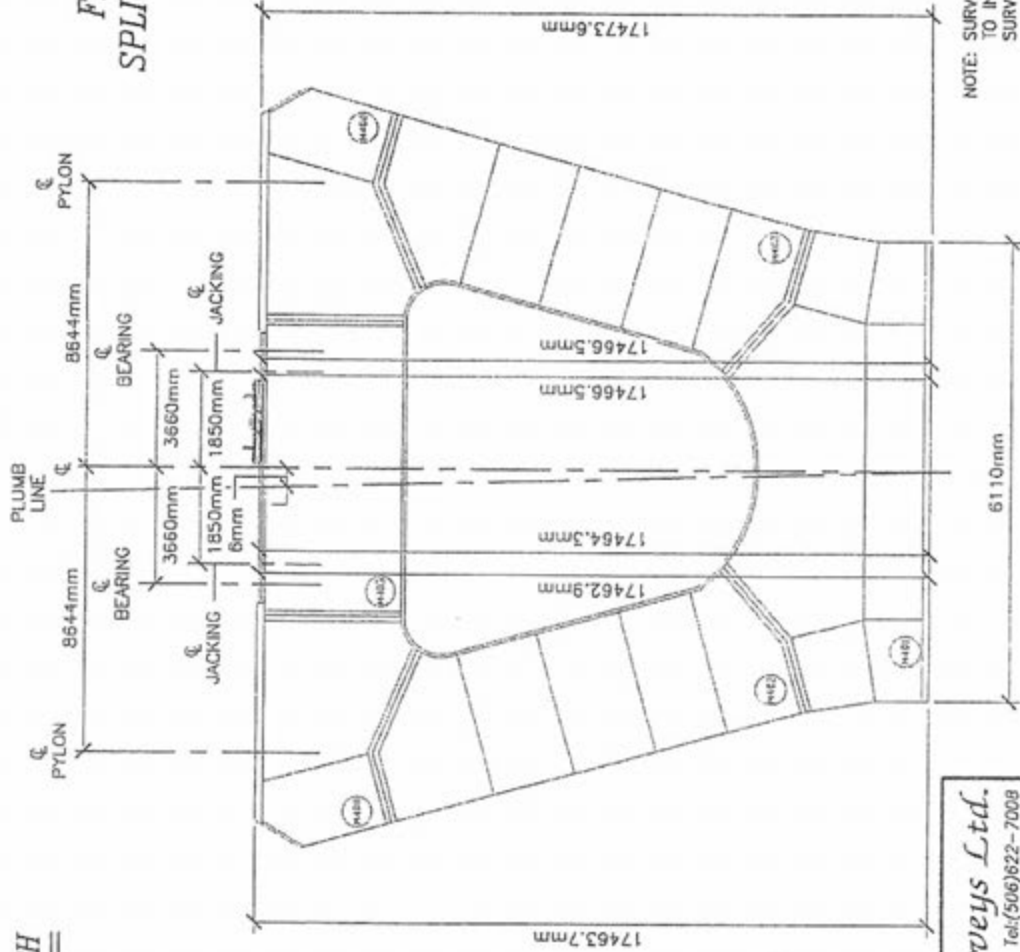
This Punch List Only covers the global documentation package turn over by AIS QC as presented to owner QA .
Sargent Engineering and/or Jivko may have other items upon their final considerations and final review
AIS has the responsibility for Quality of product and proper documentation

ATCON

DEH CHO BRIDGE - YELLOWKNIFE HWY#3 KM23 ON MacKENZIE RIVER
OCTOBER 16, 2009

PIER #4 NORTH

FINAL WELD OF
SPLICE JOINT PLATES



NOTE: SURVEY RESULTS REFER
TO IN SHOP FABRICATION
SURVEY

- SKETCH NOT TO SCALE.
- MEASUREMENTS ARE SHOWN IN MILLIMETERS.



T.G. Williston Surveys Ltd.
499 King George Hwy.
Miramichi, N.B.
E7V 1M6
Tel: (506) 622-7008
Fax: (506) 622-1946
willisurv@nbnet.nb.ca

ATCON

2/4

DEH CHO BRIDGE - YELLOWKNIFE HWY#3 KM23 ON MacKENZIE RIVER

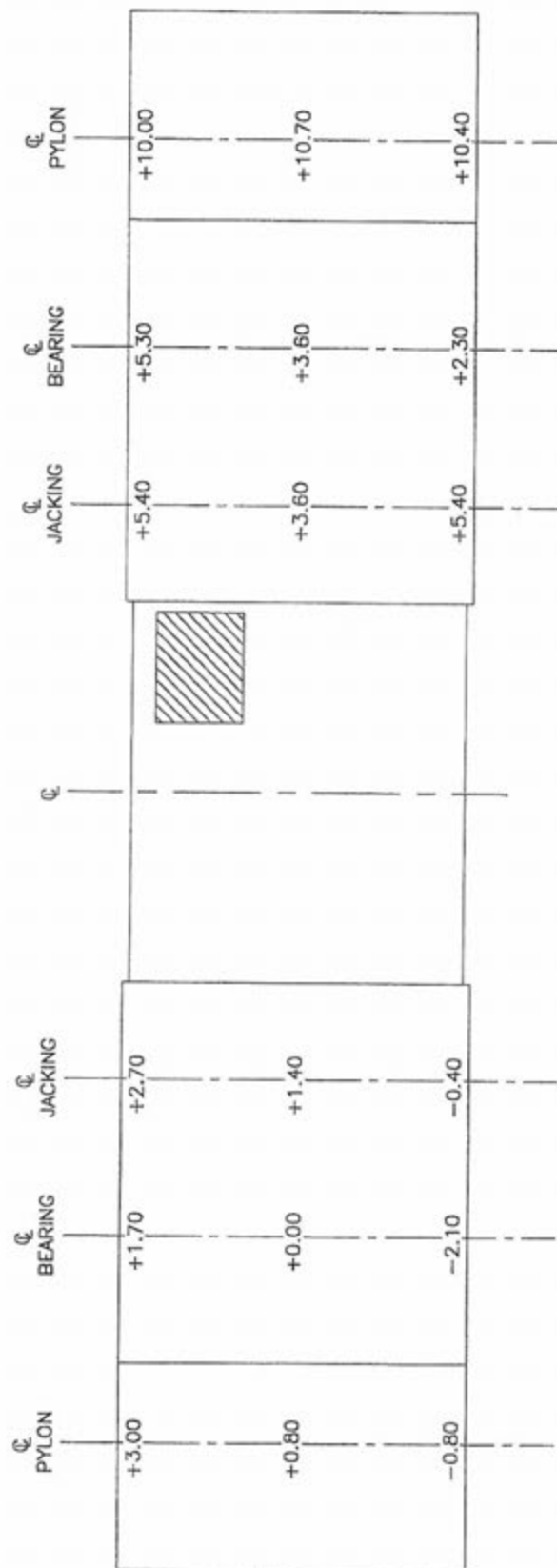
OCTOBER 16, 2009

FINAL WELD OF SPLICE JOINT PLATES

PIER #4 NORTH

VIEW FROM PIER TOP

NORTH



SOUTH



T.G. Williston Surveys Ltd.
 499 King George Hwy.
 Miramichi, N.B.
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 Fax: (506) 622-1946
 willisurv@nbnet.nb.ca

NOTE: SURVEY RESULTS REFER TO IN SHOP FABRICATION SURVEY

- SKETCH NOT TO SCALE.
- DISTANCES SHOWN IN MILLIMETERS.
- OBSERVATIONS SHOW PARALLELNESS WITH BOTTOM VERTICAL REFERENCE PLANE AS PIER SITS ON IT'S SIDE (NORTH SIDE DOWN)

ATCON

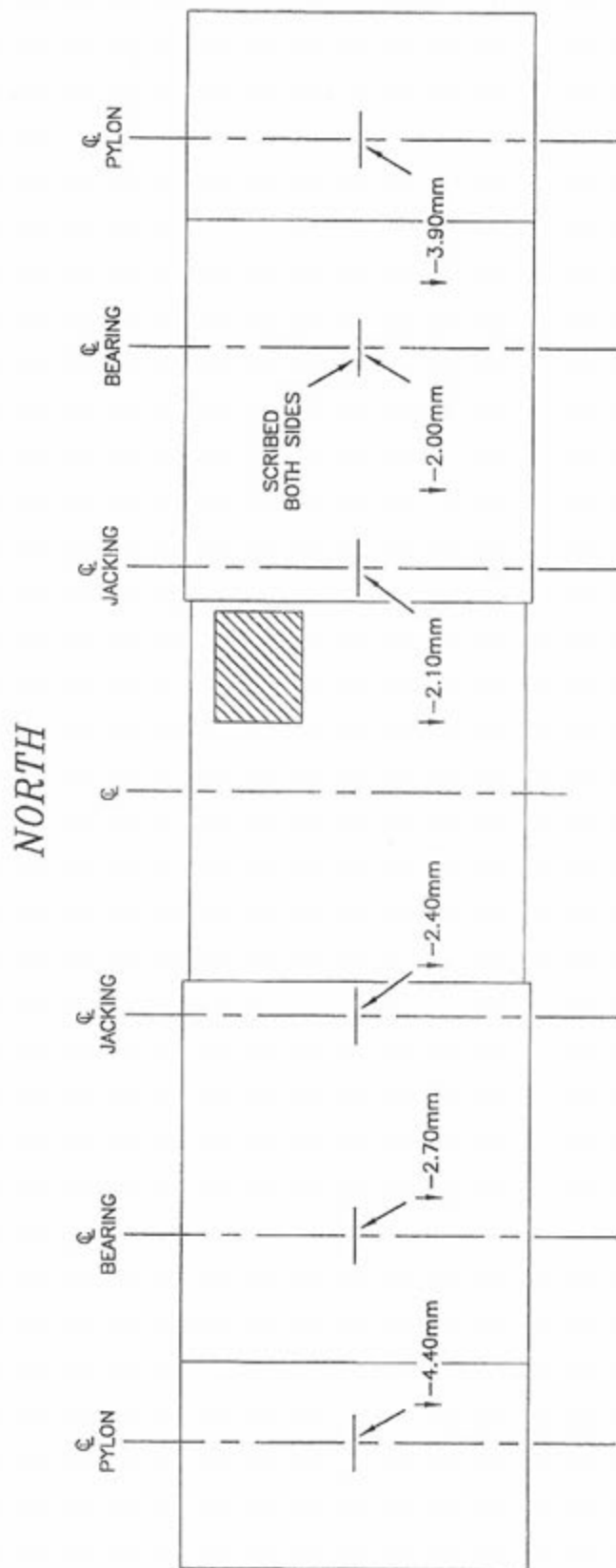
DEH CHO BRIDGE - YELLOWKNIFE HWY#3 KM23 ON MacKENZIE RIVER

OCTOBER 16, 2009

FINAL WELD OF SPLICE JOINT PLATES

PIER #4 NORTH

VIEW FROM PIER TOP



HΛNOS

-- SKETCH NOT TO SCALE.
-- DISTANCES SHOWN IN MILLIMETERS.

NOTE: SURVEY RESULTS REFER TO IN SHOP FABRICATION SURVEY

DATE Oct 16/03

T.G. Williston Surveys Ltd.

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Miramichi, N.B.

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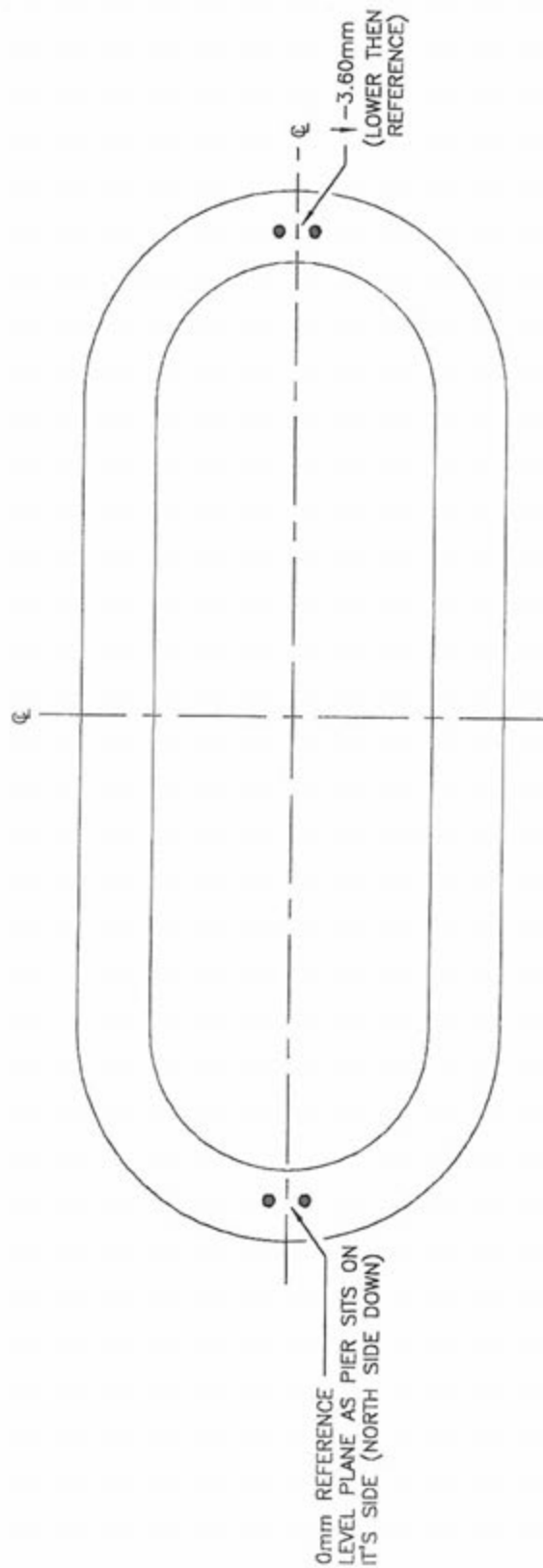
will@wobnet.nb.ca

will@wobnet.nb.ca

ATCON
DEH CHO BRIDGE - YELLOWKNIFE HWY#3 KM23 ON MacKENZIE RIVER
OCTOBER 16, 2009
FINAL WELD OF SPLICE JOINT PLATES
VIEW FROM PIER BOTTOM

PIER #4 NORTH

NORTH



SOUTH



T.G. Williston Surveys Ltd.

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willisur@nbnet.nb.ca

NOTE: SURVEY RESULTS REFER
TO IN SHOP FABRICATION
SURVEY

- SKETCH NOT TO SCALE.
- DISTANCES SHOWN IN MILLIMETERS.

*DC-08 ~ 01
Addendum 1
Pier 4 North
Pier 4 N
acceptance
bearing %*

George Crocker

From: "Dennis Sargent" <dennis.sargent@sargentengineering.com>
To: "Derek Locke" <dlocke@atcongroup.com>
Cc: "George Crocker" <gscrocker@eastlink.ca>; "Jivko I. Jivkov" <jivko@jivko.ca>; "Christrian Copps" <christrian.copps@sargentengineering.com>; "James Mather" <jmather@atcongroup.com>; "Bill Macleod" <bmacleod@atcongroup.com>; "Frank Flanagan" <f.flanagan@atcongroup.com>; "Phoebe Parent" <phoebe@jivko.ca>; "Lloyd Dayagbil" <lloyd@jivko.ca>
Sent: Thursday, October 29, 2009 9:14 PM
Subject: Re: Addendum to Condition Report DC-08
 Hi Derek:

While the weld mapping submitted for the Pier 4 connections using 0.5 mm and 1 mm thickness gauges generally meets acceptable global tolerances for the contact surfaces, the connection between M400-M402 East shows local contact along the straight (west) surface as having only approximately 44% contact. Quality Assurance measurements showed that mapping with a 1 mm thickness gauge along this surface increased this area to approximately 60%. However, there is up to a 5 mm gap near midlength of the outer edge.

We have spoken with Jivko Jivkov and in the interest of time, the pier elements may be released for shipment. Nevertheless, we wish to advise that, depending on the final fitup of the connection on the site, it may be necessary to have remedial work, perhaps by means of shim installation, be performed at the site to improve the bearing in this location.

Regards
 Dennis

Dennis D. Sargent, M.A.Sc., P.Eng.
 Senior Structural Engineer
 President
 Sargent & Associates Engineering Ltd.
 Phone: (250) 370-9221 Fax: (250) 370-9223
 Email:

----- Original Message -----

From:
To:
Cc:

Sent: Tuesday, October 27, 2009 10:32 AM
Subject: Addendum to Condition Report DC-08

Dennis,

Please review the attached documentation regarding SHIM measurements taken between the bolted splice plate connections for M400, M401, M402 and M403 East and West assemblies of Pier 4 North. This report is an addendum to condition report DC-08. Please review and respond at your earliest convenience.

Please sign and fax back to me the attached transmittal.

Thanks



 506 627 0539

 506 625 1639

 506 627 1259

DC-08-01
~

George Crocker

From: "George Crocker" <gscrocker@eastlink.ca>
To: "Dennis Sargent" <dennis.sargent@sargentengineering.com>; "Jivko I. Jivkov" <jivko@jivko.ca>
Cc: "Christian Copp" <christian.copp@sargentengineering.com>
Sent: Tuesday, October 27, 2009 3:34 PM
Attach: Pier 4 North Report DC-08 -1 D ring connection bearing percentage.pdf
Subject: Bearing percentage AIS report DC-08-01 Pier 4 North D ring connections
 Dennis

I have attached AIS report DC-08-01 showing bearing percentage for D ring splice connections for Pier 4 North M400 to M403 east and west, M400 to M402 east and west and M402 to M401 east and west. Please review with Jivko ASAP.

I have verified the measurements shown in matrix. Any difference in measurements taken by owner QA and AIS QC, the owner QA measurements were incorporated into the report DC -08-1

Note: Pier 4 dimensional survey had a soemreverse dimensions and James has sent to surveyor for review . Should be available on Oct 28/09.

Note Pier 4 M401 has been sent to rail yard for shipment. M402, M403 and M400 at at shot blast stage. They are slated to be sent to rail yard end of week.

George Crocker
 Owner QA
 DEH CHO Project
 Location; AIS



Dated: _____ Signed: _____

George Crocker

From: "Derek Locke" <dlocke@atcongroup.com>
To: "Dennis Sargent" <dennis.sargent@sargentengineering.com>
Cc: "George Crocker" <gscrocker@eastlink.ca>; "Jivko I. Jivkov" <jivko@jivko.ca>; "Christrian Copps" <christrian.copps@sargentengineering.com>; "James Mather" <jmather@atcongroup.com>; "Bill Macleod" <bmacleod@atcongroup.com>; "Frank Flanagan" <f.flanagan@atcongroup.com>; "Scott Orr" <sorr@atcongroup.com>; "Fredericton Document Control" <freddocctrl@atcongroup.com>
Sent: Tuesday, October 27, 2009 2:32 PM
Attach: Condition Report Transmittal DC-08 - Addendum #1 - October 27, 2009 - Pier 4 North Splice Plate SHIM Measurements.pdf; 0.5mm SHIM Measurements - Pier 4 North - M401 to M402.pdf; 0.5mm SHIM Measurements - Pier 4 North - M400 to M402.pdf; 1 mm SHIM Measurements - Pier 4 North - M401 to M402.pdf; 0.5mm SHIM Measurements - Pier 4 North - M400 to M403.pdf
Subject: Addendum to Condition Report DC-08
Dennis,

Please review the attached documentation regarding SHIM measurements taken between the bolted splice plate connections for M400, M401, M402 and M403 East and West assemblies of Pier 4 North. This report is an addendum to condition report DC-08. Please review and respond at your earliest convenience.

Please sign and fax back to me the attached transmittal.

Thanks

Derek Locke
EHS/Quality Control Manager



Industrial Services

Fabrication, Structures & Welding



506 627 0539

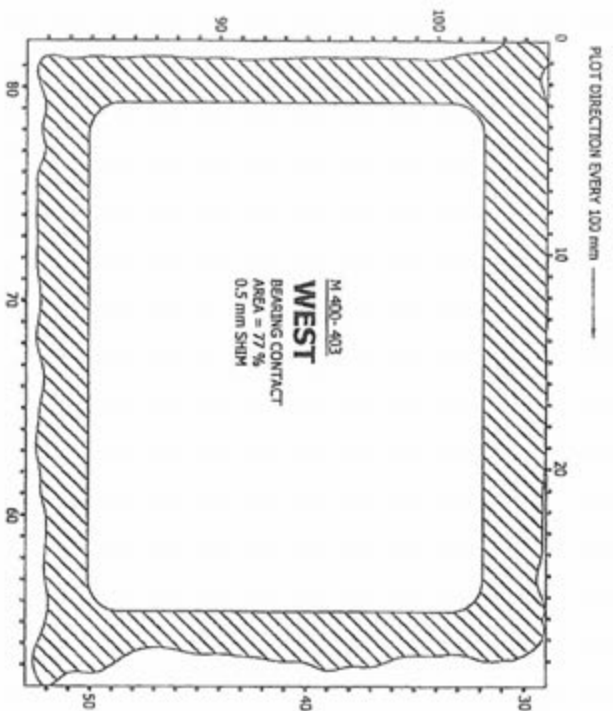


506 625 1639



506 627 1259

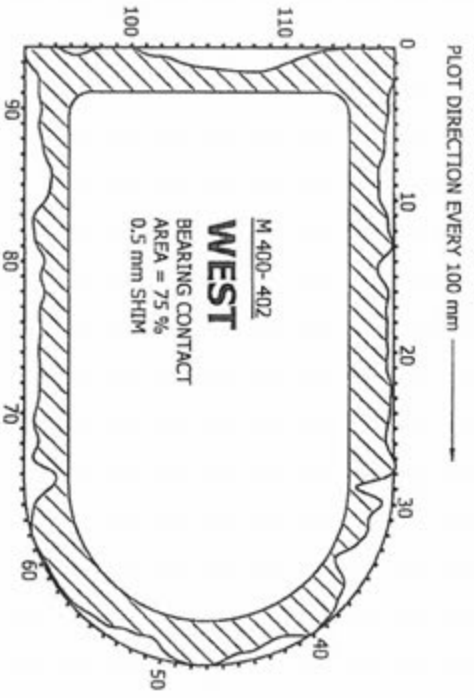
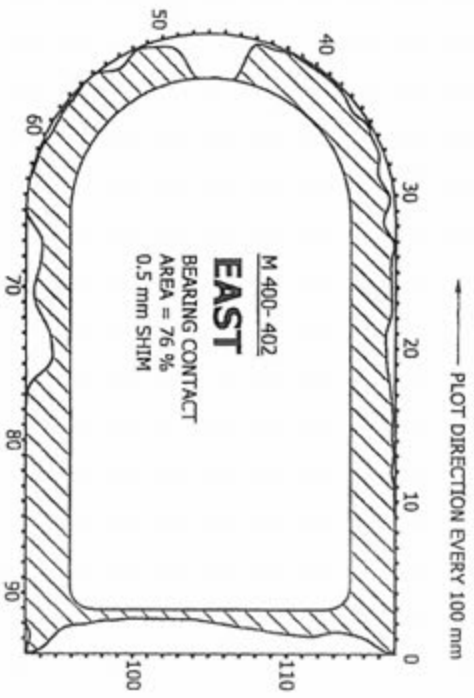
EAST SIDE										WEST SIDE									
M400 to M403 - 0.5mm SHIM																			
Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)		Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)					
1	85	40	58	79	64		1	0	40	110	79	89							
2	138	41	66	80	75		2	30	41	115	80	66							
3	50	42	66	81	93		3	5	42	130	81	52							
4	145	43	57	82	32		4	0	43	141	82	73							
5	150	44	42	83	0		5	0	44	152	83	86							
6	100	45	50	84	0		6	0	45	151	84	76							
7	95	46	66	85	0		7	0	46	171	85	81							
8	95	47	73	86	27		8	0	47	182	86	79							
9	53	48	87	87	23		9	0	48	160	87	74							
10	33	49	74	88	0		10	0	49	98	88	79							
11	25	50	75	89	10		11	0	50	60	89	84							
12	45	51	80	90	55		12	0	51	60	90	81							
13	40	52	78	91	76		13	0	52	58	91	89							
14	37	53	85	92	70		14	5	53	37	92	86							
15	38	54	78	93	58		15	5	54	57	93	83							
16	31	55	20	94	42		16	0	55	94	94	78							
17	39	56	17	95	27		17	0	56	106	95	77							
18	52	57	10	96	8		18	5	57	92	96	80							
19	32	58	0	97	0		19	5	58	89	97	77							
20	22	59	0	98	0	20	6	59	75	98	82								
21	21	60	0	99	0	21	15	60	94	99	83								
22	34	61	0	100	0	22	15	61	72	100	85								
23	42	62	0	101	0	23	17	62	67	101	62								
24	107	63	8	102	0	24	19	63	48	102	49								
25	123	64	28	103	0	25	40	64	54	103	0								
26	132	65	38	104	0	26	19	65	65	104	0								
27	150	66	90			27	19	66	83										
28	120	67	66			28	18	67	77										
29	20	68	69			29	183	68	50										
30	18	69	60			30	80	69	56										
31	44	70	30			31	123	70	69										
32	62	71	0			32	143	71	58										
33	78	72	0			33	145	72	49										
34	78	73	0			34	145	73	50										
35	69	74	22			35	145	74	48										
36	47	75	57			36	125	75	50										
37	51	76	75			37	90	76	54										
38	52	77	55			38	91	77	86										
39	52	78	50			39	74	78	74										



CONTACT AREA

[illegible]

EAST SIDE				WEST SIDE			
M400 to M402 - 0.5mm SHIM							
Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)
1	0	40	21	79	0	1	0
2	0	41	15	80	0	2	0
3	0	42	16	81	0	3	34
4	0	43	27	82	0	4	40
5	0	44	40	83	0	5	50
6	0	45	289	84	0	6	62
7	0	46	289	85	0	7	70
8	0	47	289	86	0	8	101
9	0	48	289	87	0	9	98
10	5	49	120	88	0	10	91
11	7	50	49	89	0	11	45
12	22	51	25	90	0	12	34
13	12	52	16	91	0	13	10
14	19	53	60	92	7	14	88
15	18	54	48	93	28	15	90
16	18	55	0	94	33	16	36
17	26	56	5	95	130	17	50
18	40	57	22	96	186	18	44
19	54	58	21	97	195	19	46
20	60	59	28	98	216	20	40
21	60	60	27	99	222	21	47
22	30	61	10	100	231	22	20
23	22	62	11	101	228	23	22
24	26	63	0	102	229	24	25
25	30	64	0	103	226	25	43
26	22	65	5	104	225	26	47
27	14	66	48	105	210	27	0
28	74	67	103	106	193	28	15
29	59	68	99	107	175	29	247
30	33	69	81	108	163	30	64
31	71	70	54	109	143	31	128
32	66	71	61	110	130	32	120
33	31	72	107	111	119	33	146
34	32	73	158	112	120	34	197
35	21	74	174	113	141	35	245
36	50	75	160	114	132	36	110
37	33	76	54	115	103	37	70
38	22	77	9	116	39	38	30
39	20	78	0			39	18



A B

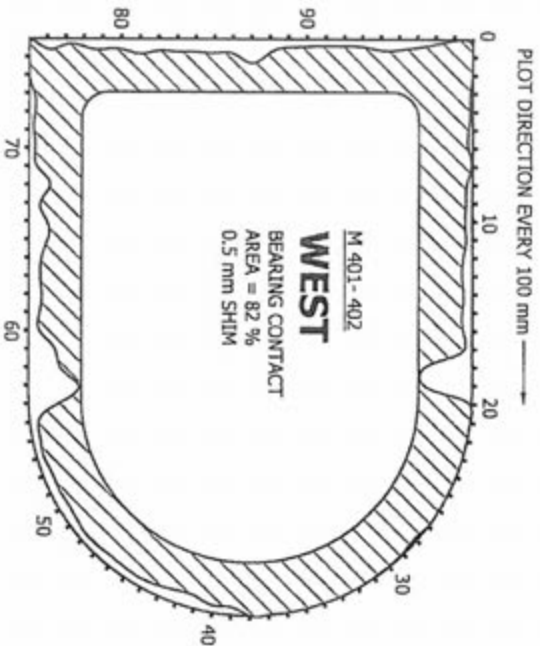
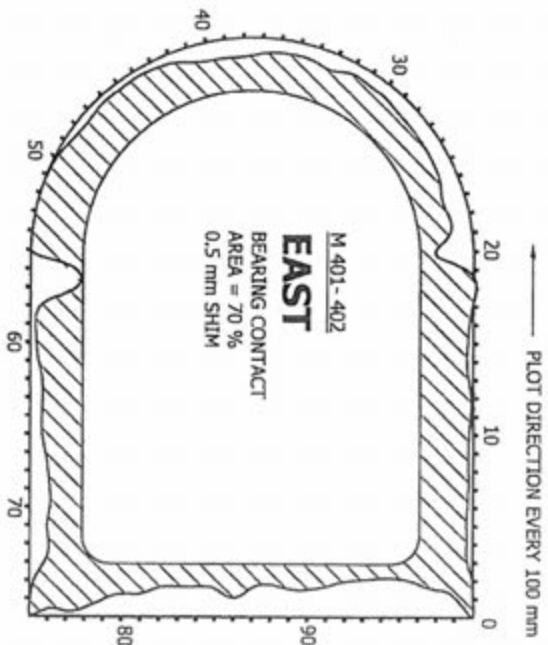
A B

4 3 2 1

DRAWN BY Campbell		10/22/2009	
DWG APPROVED BY			
LAYOUT	CHECKED BY	DATE	
COMP'D PART	CHECKED BY	DATE	
PARKING LOT			
 ITCON INDUSTRIAL SERVICES FABRICATION DIVISION 67 General Manson Way Merrimack, NH 03043 Phone: 508-627-1220 Fax: 508-627-1259			
DESCRIPTION 0.5 SHIM SIZE B QUANTITY 1 CUT SHEET # M400-M402 EAST & WEST SCALE NTS CUSTOMER SHEET 1 OF 1			

TOLERANCE: ±2mm UNLESS OTHERWISE NOTED

EAST SIDE						WEST SIDE					
M401 to M402 - 0.5mm SHIM											
Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)
1	0	36	73	71	109	1	0	36	0	71	35
2	0	37	85	72	84	2	0	37	0	72	30
3	30	38	102	73	27	3	14	38	0	73	27
4	34	39	101	74	5	4	15	39	40	74	6
5	35	40	101	75	41	5	22	40	67	75	57
6	30	41	84	76	30	6	22	41	71	76	32
7	25	42	54	77	47	7	6	42	57	77	44
8	26	43	42	78	91	8	31	43	45	78	59
9	28	44	34	79	125	9	35	44	45	79	58
10	23	45	39	80	126	10	40	45	50	80	82
11	14	46	36	81	16	11	34	46	46	81	66
12	12	47	45	82	166	12	48	47	40	82	71
13	24	48	46	83	167	13	55	48	50	83	71
14	36	49	31	84	154	14	46	49	57	84	77
15	31	50	11	85	104	15	53	50	52	85	81
16	24	51	4	86	157	16	48	51	53	86	133
17	2	52	0	87	177	17	42	52	39	87	76
18	270	53	0	88	152	18	283	53	43	88	45
19	39	54	0	89	148	19	283	54	50	89	41
20	209	55	0	90	166	20	12	55	175	90	36
21	126	56	249	91	193	21	0	56	275	91	38
22	111	57	258	92	204	22	0	57	175	92	42
23	125	58	60	93	213	23	0	58	145	93	61
24	103	59	31	94	210	24	0	59	60	94	59
25	94	60	36	95	183	25	0	60	62	95	46
26	90	61	48	96	150	26	0	61	72	96	27
27	89	62	69	97	110	27	0	62	65	97	5
28	88	63	71	98	107	28	15	63	72	98	31
29	82	64	68			29	8	64	106		
30	70	65	69			30	5	65	100		
31	69	66	87			31	2	66	65		
32	63	67	102			32	0	67	47		
33	94	68	113			33	0	68	44		
34	81	69	115			34	0	69	35		
35	72	70	99			35	0	70	27		

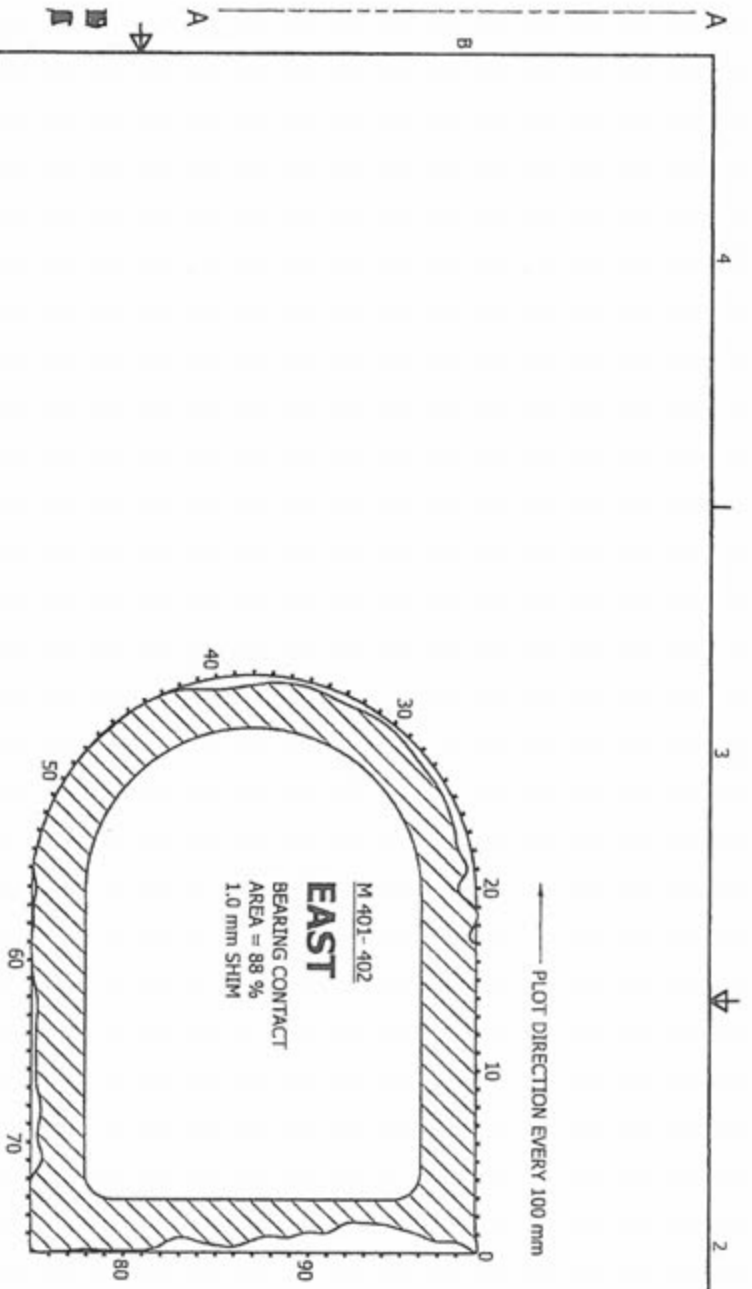


CONTACT AREA

TOLERANCE: ±.2mm UNLESS OTHERWISE NOTED

DRAWN BY frcampbell		10/22/2009	
DWG APPROVED BY			
LAYOUT	CHECKED BY	DATE	
COMP'D PART	CHECKED BY	DATE	
PARKING LOT			
ITCON INDUSTRIAL SERVICES FABRICATION DIVISION 67 General Mangon Way Milomich, NB, EIN 826 Phone: 506-492-1220 Fax: 506-617-1239			
DESCRIPTION 0.5 SHIM			
SIZE B	QUANTITY 1	CUT SHEET # M401-M402 EAST & WEST	REV
SCALE NTS	CUSTOMER	SHEET 1 OF 1	

EAST SIDE				WEST SIDE			
M401 to M402 - 1mm SHIM							
Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)		
1	0	36	30	71	60		
2	0	37	38	72	5		
3	0	38	56	73	0		
4	0	39	66	74	0		
5	0	40	64	75	0		
6	0	41	41	76	0		
7	0	42	15	77	5		
8	0	43	3	78	15		
9	0	44	0	79	8		
10	0	45	0	80	7		
11	0	46	6	81	9		
12	0	47	5	82	35		
13	0	48	3	83	81		
14	0	49	0	84	60		
15	0	50	0	85	39		
16	0	51	0	86	32		
17	0	52	0	87	64		
18	8	53	0	88	88		
19	11	54	0	89	83		
20	96	55	0	90	110		
21	42	56	23	91	107		
22	64	57	12	92	158		
23	63	58	11	93	162		
24	51	59	0	94	155		
25	45	60	3	95	129		
26	44	61	11	96	98		
27	47	62	30	97	62		
28	45	63	31	98	55		
29	36	64	26				
30	28	65	26				
31	29	66	28				
32	41	67	32				
33	46	68	53				
34	39	69	44				
35	30	70	40				



DRAWN BY Icampbell		10/22/2009	
DWG APPROVED BY			
LAYOUT	CHECKED BY	DATE	
COMP'D PART	CHECKED BY	DATE	
PARKING LOT			

1.0 SHIM

DESCRIPTION

ITCON

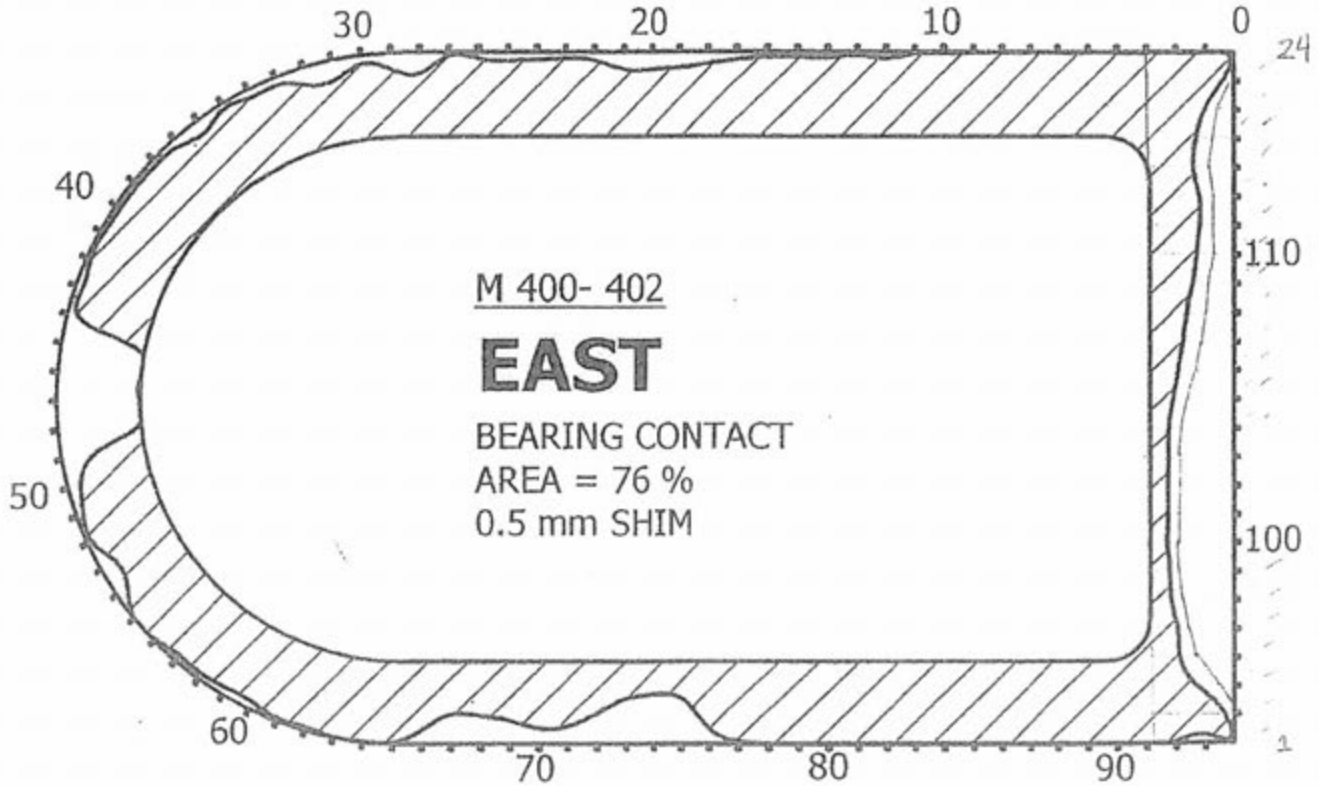
INDUSTRIAL SERVICES

FABRICATION DIVISION
 67 General Horton Way
 Miramichi, NB E1N 6K6
 Phone: 506-627-1220
 Fax: 506-627-1259

SIZE B	QUANTITY 1	CUT SHEET # M401- M402 EAST	REV
SCALE NTS	CUSTOMER	SHEET 1 OF 1	

TOLERANCE: ±2mm UNLESS OTHERWISE NOTED

← PLOT DIRECTION EVERY 100 mm



$$(290 \text{ mm} \times 2400 \text{ mm}) = 696000 \text{ mm}^2$$



CON

Scale Factor

$$290 \text{ mm} = 12 \text{ mm}$$

$$\therefore 0.04137931$$

Dimension

4	95
3.7	
5.7	
7.4	
7.7	
7.9	
8.0	
7.9	
7.9	
7.2	
6.3	
5.2	
4.6	
3.7	
2.7	
2.0	
1.6	
1.2	
0.8	

0.5 mm Shim (%)

1	70
2	70
3	45
4	30
5	25
6	20
7	10
8	10
9	10
10	10
11	10
12	10
13	10
14	10
15	10
16	10
17	10
18	10
19	10
20	10
21	10
22	10
23	10
24	10
25	10
26	10
27	10
28	10
29	10
30	10

$$\frac{1055}{2400} = 44\%$$

1.0 mm Shim (%)

1	100
2	95
3	70
4	50
5	45
6	40
7	35
8	30
9	25
10	20
11	15
12	10
13	10
14	10
15	10
16	10
17	10
18	10
19	10
20	10
21	10
22	10
23	10
24	10
25	10
26	10
27	10
28	10
29	10
30	10

$$\frac{1445}{2400} = 60\%$$

4

1

3

*P2N
Dimensional Survey
accepted by Jivko*

George Crocker

From: "Jivko Jivkov" <jivko@jivko.ca>
To: "George Crocker" <gscrocker@eastlink.ca>
Cc: "Danny Keeler" <Danny.Keeler@Jivko.ca>; "YK Ove Lagerquist" <ove.l@jivko.ca>; "YK Phil Munn" <phil.munn@jivko.ca>; "YK Lloyd Dayagbil" <lloyd@jivko.ca>; "Andrew Gamble" <agamble@theedge.ca>; "Christian Copp" <christian.copp@sargentengineering.com>; "Dennis Sargent" <dennis.sargent@sargentengineering.com>
Sent: Monday, November 02, 2009 1:45 PM
Attach: Final Survey - Pier 2 North.pdf
Subject: Fw: Advise of Pier 2 final dimensional survey

Dennis, George,
 I have reviewed the geometry and think we can release for shipping the pier 2N subject to your satisfaction on the quality of welding.

Phil, Danny,
 I note the pier is tilted 3mm to 6mm to the south. We should try to ensure no more tilt to the south is added during erection and shimming.

Jivko

----- Original Message -----

From:
To:
Cc: ;
Sent: Monday, November 02, 2009 9:22 AM
Subject: Fw: Advise of Pier 2 final dimensional survey

Jivko

Have you had a chance to look at Pier 2 North final dimensional survey. Please advise if acceptable to send to site.

George Crocker
 Owner QA
 DEH CHO Project
 Location; AIS

----- Original Message -----

From:
To:
Cc: ;
Sent: Thursday, October 29, 2009 3:08 PM
Subject: Advise of Pier 2 final dimensional survey

Jivko

Please review attached final dimensional survey for Pier 2 North. It appears to be okay. Please advise if the geometry is acceptable asap to not hold up shipping.

Pier 1 North Report for bearing at connection should be completed by Friday Oct 30/09. I am working with AIS to complete and verify numbers.

There will be some grinding pickup to do at M200 and install platforms on Monday next week. Should be cleared to ship by Tuesday next week.

George Crocker
 Owner QA
 DEH CHO Project
 Location; AIS

11/2/2009

George Crocker

From: "George Crocker" <gscrocker@eastlink.ca>
To: "Jivko I. Jivkov" <jivko@jivko.ca>
Cc: "Dennis Sargent" <dennis.sargent@sargentengineering.com>; "Christian Copp" <christian.copp@sargentengineering.com>
Sent: Thursday, October 29, 2009 4:08 PM
Attach: Final Survey - Pier 2 North.pdf
Subject: Advise of Pier 2 final dimensional survey
Jivko

Please review attached final dimensional survey for Pier 2 North. It appears to be okay. Please advise if the geometry is acceptable asap to not hold up shipping.

Pier 1 North Report for bearing at connection should be completed by Friday Oct 30/09. I am working with AIS to complete and verify numbers.

There will be some grinding pickup to do at M200 and install plateforms on Monday next week. Should be cleared to ship by Tuesday next week.

George Crocker
Owner QA
DEH CHO Project
Location; AIS

10/29/2009

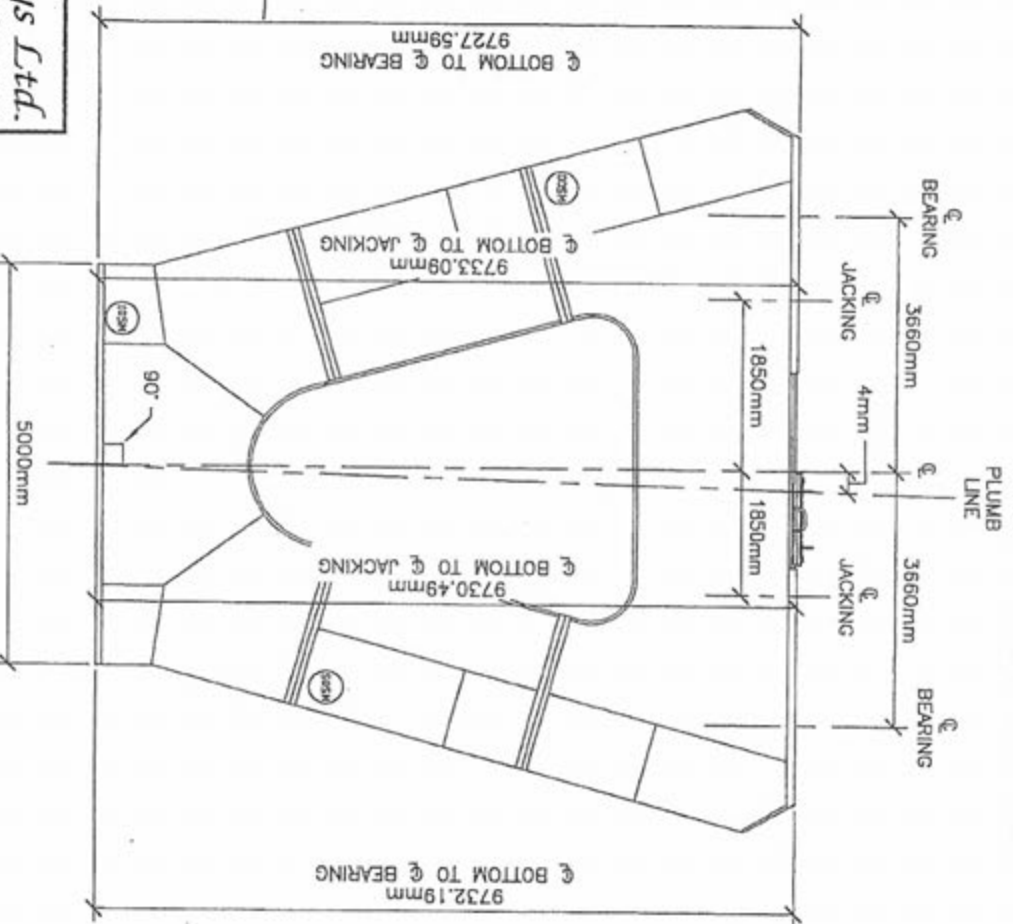
ATCON

DEH CHO BRIDGE - YELLOWKNIFE HWY#3 KM23 ON MACKENZIE RIVER

OCTOBER 16, 2009

PIER #2 NORTH

FINAL OBSERVATIONS
FINAL WELD OF SPICE JOINT PLATES



T.G. Williston Surveys Ltd.

499 King George Hwy.
Miramichi, N.B.
Tel: (506) 622-7008
Fax: (506) 622-1946
willisurv@nbnet.nb.ca
ETV 1M6

NOTE: SURVEY RESULTS REFER
TO IN SHOP FABRICATION
SURVEY

- SKETCH NOT TO SCALE.
- MEASUREMENTS ARE SHOWN IN MILLIMETERS.

ATCON

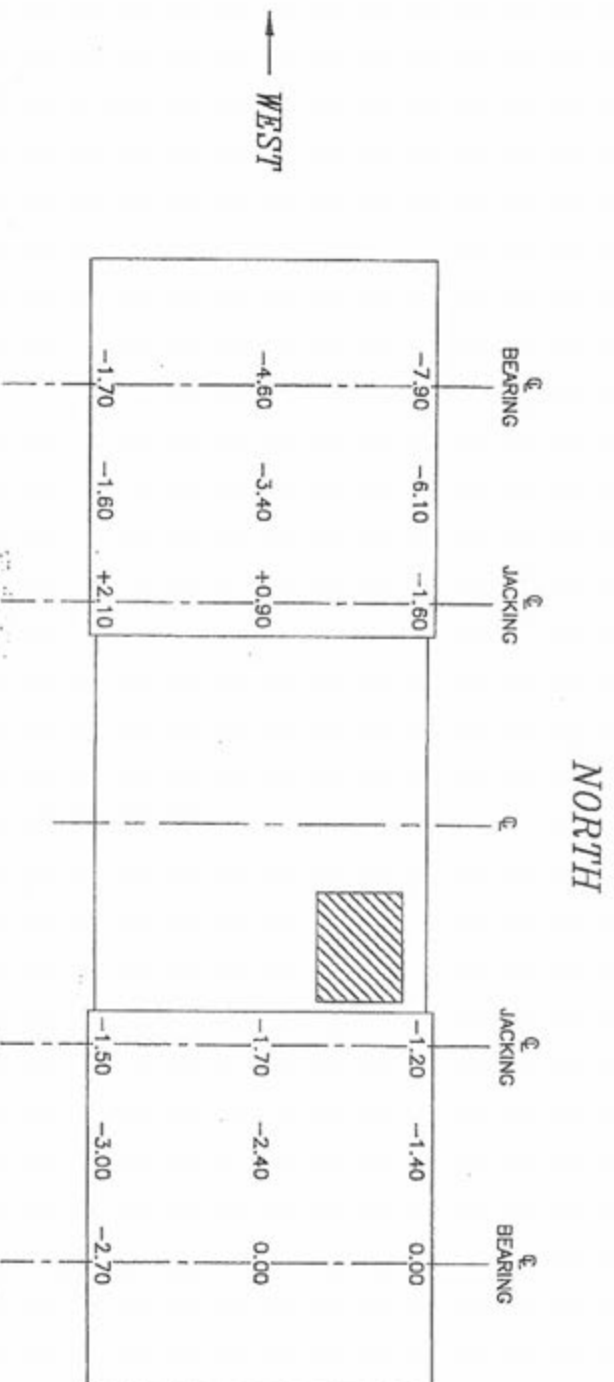
DEH CHO BRIDGE - YELLOWKNIFE HWY#3 KM23 ON MACKENZIE RIVER

OCTOBER 16, 2009

PIER #2 NORTH

FINAL WELD OF SPLICE JOINT PLATES

VIEW FROM PIER TOP

*T.G. Williston Surveys Ltd.*

499 King George Hwy.

Winnipeg, N.B.

ETV 1166

Tel: (506) 622-7008

Fax: (506) 622-1946

willisurv@nbnet.nb.ca



NOTE: SURVEY RESULTS REFER
TO IN SHOP FABRICATION
SURVEY

- SKETCH NOT TO SCALE.

- DISTANCES SHOWN IN MILLIMETERS.

- OBSERVATIONS SHOW PARALLELNESS WITH BOTTOM VERTICAL REFERENCE PLANE
AS PIER SITS ON IT'S SIDE (NORTH SIDE DOWN)

ATCON

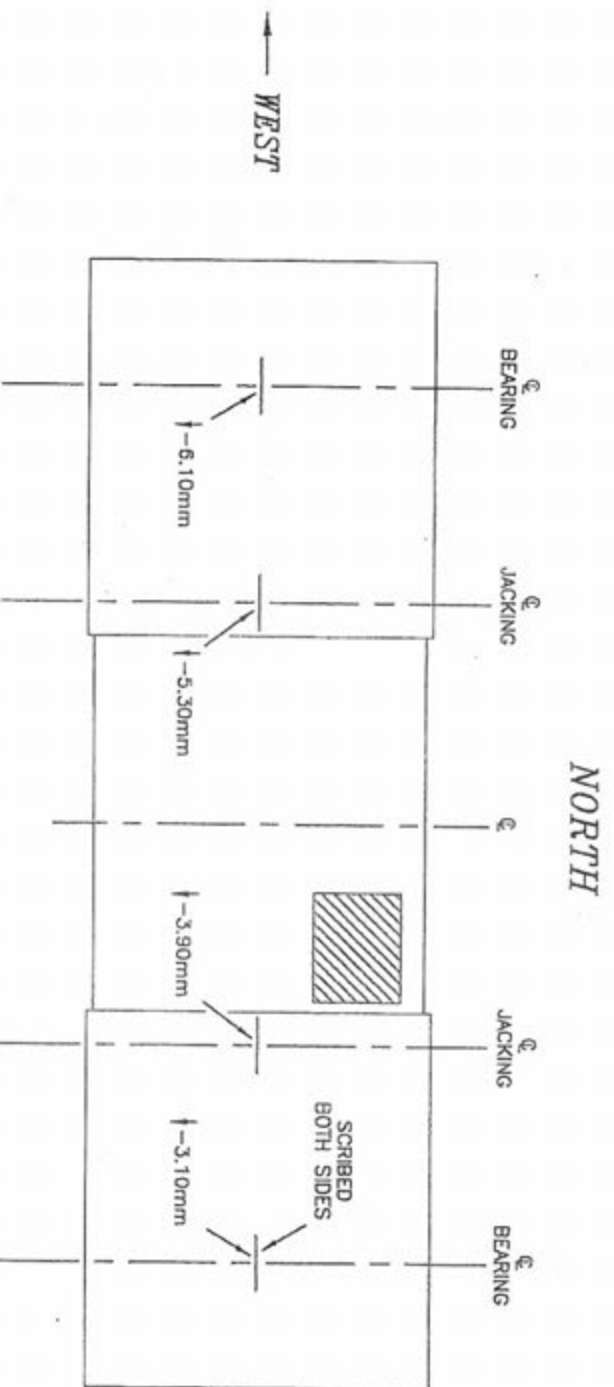
DEH CHO BRIDGE - YELLOWKNIFE HWY#3 KM23 ON MACKENZIE RIVER

OCTOBER 16, 2009

PIER #2 NORTH

FINAL WELD OF SPLICE JOINT PLATES

VIEW FROM PIER TOP



T.G. Williston Surveys Ltd.
 499 King George Hwy.
 Miramichi, N.B.
 E1V 1M6

Tel: (506) 622-7008
 Fax: (506) 622-1946
 willisur@nbnet.nb.ca



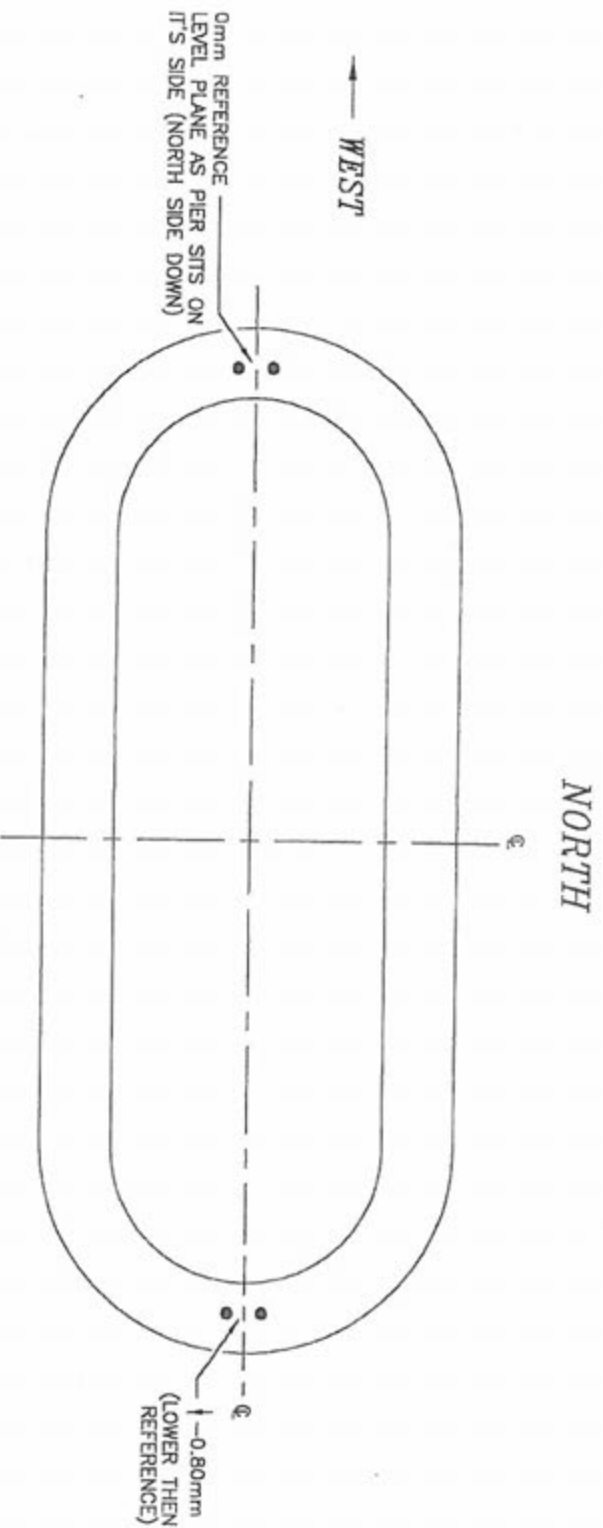
NOTE: SURVEY RESULTS REFER
 TO IN SHOP FABRICATION
 SURVEY

- SKETCH NOT TO SCALE
 - DISTANCES SHOWN IN MILLIMETERS.

ATCON
 DEH CHO BRIDGE - YELLOWKNIFE HWY#3 KM23 ON MACKENZIE RIVER
 OCTOBER 16, 2009

PIER #2 NORTH FINAL WELD OF SPLICE JOINT PLATES

VIEW FROM PIER BOTTOM



T.G. Williston Surveys Ltd.

499 King George Hwy.
 Miramichi, N.B.
 E7V 1M6

Tel: (506) 622-7008
 Fax: (506) 622-1946
 willisur@nbnet.nb.ca



NOTE: SURVEY RESULTS REFER
 TO IN SHOP FABRICATION
 SURVEY

- SKETCH NOT TO SCALE
 - DISTANCES SHOWN IN MILLIMETERS.

*Pier 2 North
Bearing at Connections
Splice D Rings
accepted by Sargent
& Jivko*

George Crocker

From: "Dennis Sargent" <dennis.sargent@sargentengineering.com>
To: "Derek Locke" <dlocke@atcongroup.com>
Cc: "YK Lloyd Dayagbil" <lloyd@jivko.ca>; "Christian Copp" <christian.copp@sargentengineering.com>;
 "Jivko Jivkov" <jivko@jivko.ca>; "George Crocker" <gscrocker@eastlink.ca>; "Phoebe Parent"
 <phoebe@jivko.ca>
Sent: Wednesday, November 04, 2009 5:48 PM
Attach: Addendum to condition report DC-06 - Pier 2 North.eml
Subject: Re: Addendum to condition report DC-06 - Pier 2 North
 Hi Derek:

The splice plate connections between M201 to M202 and between M200 to M202 assemblies are acceptable based on the contact area mapping as shown in the addendum documentation for condition report DC-06 Pier 2 North splice plate SHIM measurements shown in the attached email from AIS dated October 30, 2009. The contact area mapping has been reviewed by Jivko Jivkov as noted in his email below.

Regards
 Dennis

Dennis D. Sargent, M.A.Sc., P.Eng.
 Senior Structural Engineer
 President
 Sargent & Associates Engineering Ltd.
 Phone: (250) 370-9221 Fax: (250) 370-9223
 Email: Dennis.Sargent@sargentengineering.com

----- Original Message -----

From: Jivko Jivkov
To: George Crocker ; Dennis Sargent
Cc: YK Lloyd Dayagbil ; Christian Copp ; Derek Locke ; Andrew Gamble
Sent: Friday, October 30, 2009 9:26 AM
Subject: Re: Addendum to condition report DC-06 - Pier 2 North

George,
 I am in agreement with the release subject to acceptance from Dennis

Jivko Jivkov P. Eng.
 Jivko Engineering, Box 1341, Yellowknife, NT X1A 2N9, T: 867 920 4455, C: 867 446 0082, F: 867 873
 6090, E: jivko@jivko.ca

----- Original Message -----

From: George Crocker
To: Jivko I. Jivkov ; Dennis Sargent
Cc: Christian Copp ; Derek Locke
Sent: Friday, October 30, 2009 8:48 AM
Subject: Fw: Addendum to condition report DC-06 - Pier 2 North

Jivko and Dennis

The report DC-06 -1 is for bearing at D ring splice connections Pier 2 North M200 to M202 east and west, M202 to M201 east and west. Please note I have verified the measurements contained in the attached matrix of report DC-06-1 to be correct. Any measurements the owner QA had issue with, the owner QA measurements were incorporated into the AIS report. It appears AIS has reached the required minimum 75% bearing with

the .05mm shim. Please review and advise asap of acceptance. I will forward a photo report stating gaps at external and internal edges.

George Crocker
Owner QA
DEH CHO Project
Location; AIS

----- Original Message -----

From: Derek Locke

To: 'Dennis Sargent'

Cc: 'George Crocker' ; 'Jivko I. Jivkov' ; 'Christian Copp' ; 'James Mather' ; 'Bill Macleod' ; 'Frank Flanagan' ; 'Fredericton Document Control' ; 'Scott Orr'

Sent: Friday, October 30, 2009 10:40 AM

Subject: Addendum to condition report DC-06 - Pier 2 North

Dennis,

The attached documentation should added as an addendum to condition report DC-06

0.5mm SHIM Measurements - Pier 2 North - M201 to M202.pdf contains an excel spreadsheet with all the measured depths with a 0.5mm SHIM as well as a sketch of the bearing contact between the east and west bolted splice plate connections. 86% bearing was calculated for both the east and west connections.

0.5mm SHIM Measurements - Pier 2 North - M200 to M202.pdf contains an excel spreadsheet with all the measured depths with a 0.5mm SHIM as well as a sketch of the bearing contact between the east and west bolted splice plate connections. 79.8% bearing was calculated on the east side connection and 76.9% bearing was calculated on the west side connections.

AIS requests that you review the attached documentation and advise whether or not this is acceptable.

Derek Locke
EHS/Quality Control Manager



Industrial Services

Fabrication, Structures & Welding



506 627 0539



506 625 1639



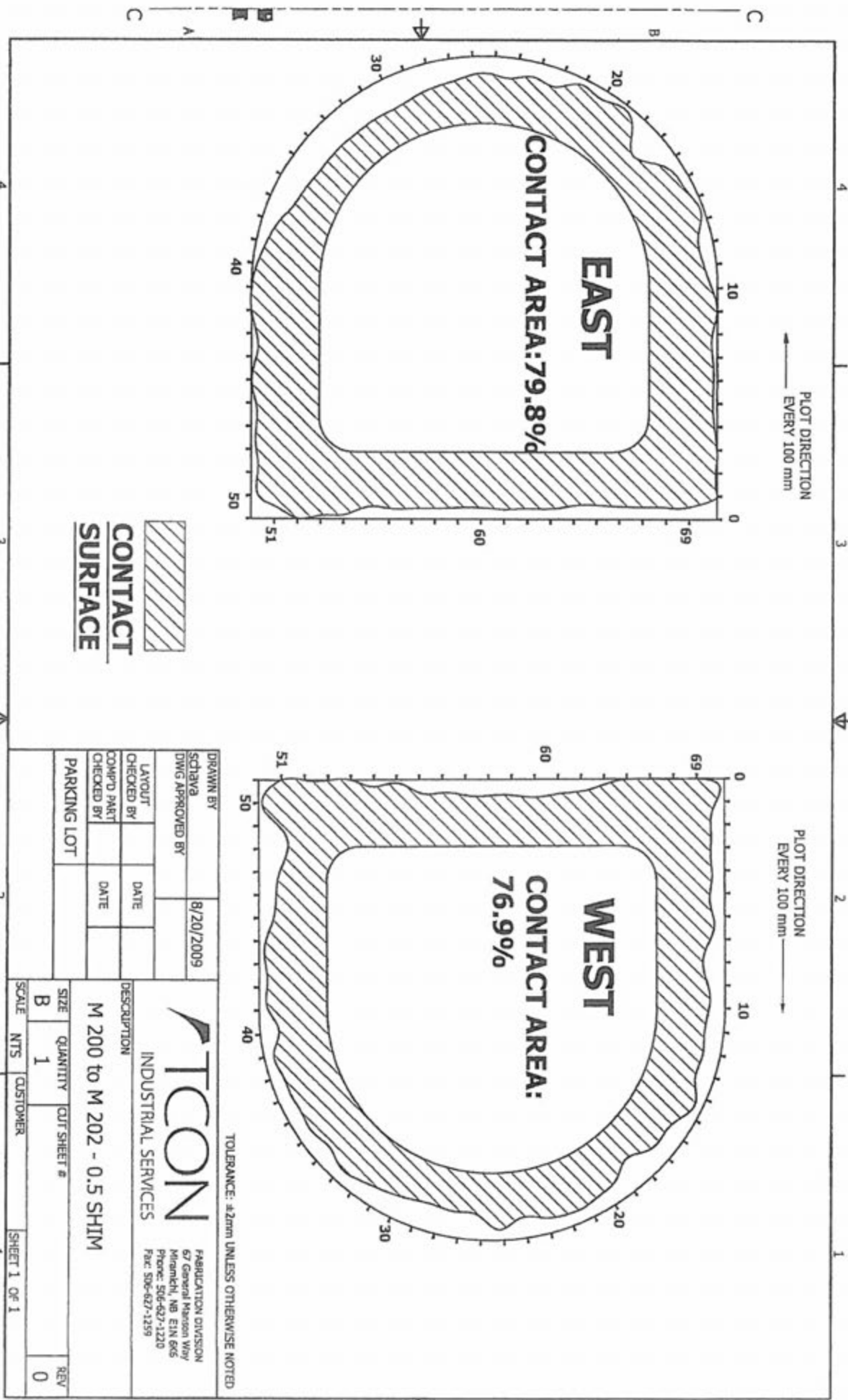
506 627 1259

EAST SIDE

WEST SIDE

M200 to M202 - 0.5mm SHIM

Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)
1	0	36	131	1	20	36	68
2	0	37	120	2	50	37	60
3	0	38	106	3	58	38	56
4	0	39	71	4	60	39	44
5	12	40	44	5	54	40	82
6	18	41	18	6	64	41	40
7	15	42	0	7	45	42	35
8	20	43	0	8	78	43	28
9	0	44	22	9	90	44	30
10	15	45	0	10	65	45	64
11	38	46	20	11	75	46	75
12	60	47	22	12	76	47	92
13	56	48	22	13	36	48	124
14	15	49	28	14	67	49	87
15	35	50	30	15	84	50	15
16	46	51	55	16	90	51	0
17	98	52	0	17	131	52	0
18	141	53	15	18	90	53	0
19	48	54	18	19	71	54	0
20	23	55	52	20	55	55	20
21	41	56	45	21	57	56	30
22	30	57	45	22	73	57	15
23	81	58	45	23	87	58	59
24	65	59	50	24	38	59	57
25	87	60	48	25	46	60	70
26	76	61	42	26	107	61	70
27	82	62	45	27	112	62	77
28	102	63	45	28	118	63	62
29	112	64	60	29	114	64	51
30	128	65	60	30	99	65	20
31	138	66	54	31	84	66	0
32	135	67	53	32	64	67	0
33	136	68	50	33	56	68	0
34	134	69	54	34	80	69	0
35	132			35	64		

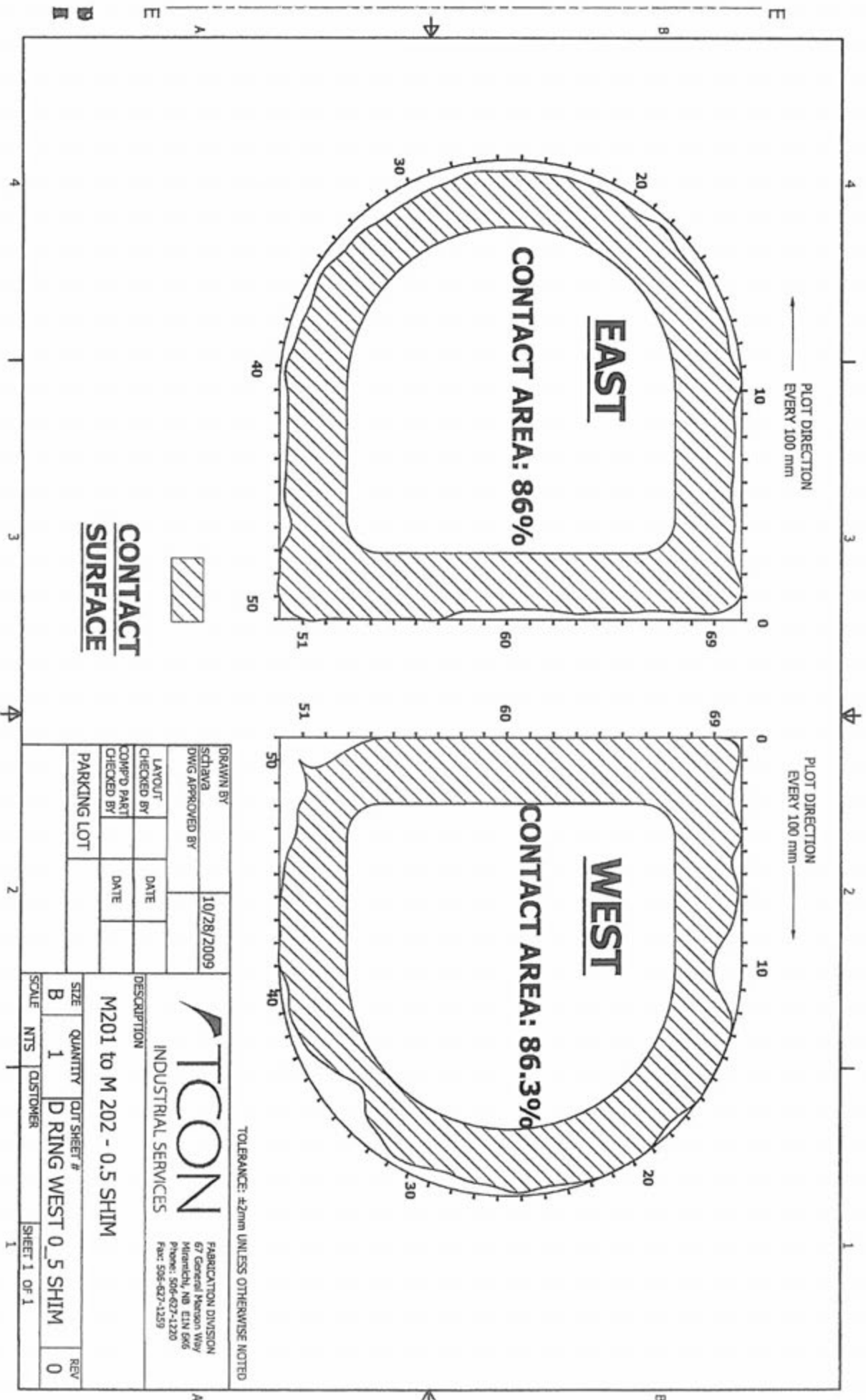


EAST SIDE

WEST SIDE

M201 to M202 - 0.5mm SHIM

Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)	Location #	Depth (mm)
1	0	36	41	1	20	36	140
2	30	37	55	2	20	37	96
3	40	38	48	3	40	38	53
4	33	39	42	4	28	39	32
5	45	40	21	5	0	40	23
6	37	41	33	6	42	41	0
7	35	42	35	7	22	42	0
8	31	43	35	8	22	43	0
9	0	44	30	9	48	44	0
10	35	45	25	10	107	45	43
11	39	46	28	11	124	46	48
12	50	47	50	12	80	47	18
13	45	48	8	13	15	48	39
14	55	49	0	14	0	49	75
15	48	50	0	15	0	50	84
16	34	51	0	16	0	51	115
17	58	52	0	17	0	52	53
18	50	53	0	18	28	53	10
19	48	54	0	19	22	54	0
20	48	55	0	20	0	55	0
21	45	56	0	21	0	56	0
22	50	57	35	22	0	57	0
23	48	58	35	23	10	58	0
24	48	59	45	24	24	59	0
25	40	60	43	25	25	60	0
26	35	61	45	26	14	61	0
27	40	62	38	27	40	62	0
28	58	63	26	28	46	63	0
29	62	64	33	29	60	64	0
30	70	65	30	30	55	65	0
31	73	66	39	31	37	66	0
32	70	67	35	32	39	67	0
33	55	68	30	33	74	68	0
34	58	69	32	34	103	69	0
35	40			35	165		



DRAWN BY SCHLAGA		10/28/2009	
DWG APPROVED BY			
LAYOUT	CHECKED BY	DATE	
COMP'D PART	CHECKED BY	DATE	
PARKING LOT			
TICON INDUSTRIAL SERVICES FABRICATION DIVISION 67 General Meridian Way Middletown, NJ 07940 Phone: 506-627-1220 Fax: 506-627-1259			
DESCRIPTION M201 to M 202 - 0.5 SHIM			
SIZE B	QUANTITY 1	OUT SHEET # ID RING WEST 0_5 SHIM	REV 0
SCALE NTS	CUSTOMER	SHEET 1 OF 1	

TOLERANCE: ±2mm UNLESS OTHERWISE NOTED

Attention Dennis Sargent

Reference: Comments to AIS Percentage Completion claim up to Nov 5, 2009 as attached

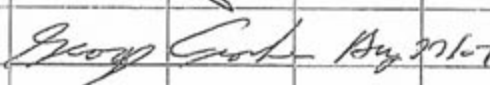
Dennis Sargent

- 1) Pier 1 South—Punch list items # 2 AIS NCR # 12 references to Dawidag covers reported by AIS as replaced has not been conformed to date. Punch item # 7 open Final documentation review by Sargent to be signed on ITP Item 19 when completed
- 2) Pier 2 South- Punch list item 14; Sargent to perform final documentation review and sign ITP item 19
- 3) Pier 3 South- Punch list item 24; Sargent to perform final documentation review and sign item ITP item 19
- 4) Pier 4 South—Punch List Items 15, 16 open. Also final documentation to be forwarded for review to and ITP item 19 be signed by Sargent.
- 5) Pier 1 North Punch list outstanding items # 14. QC documentation sent to Sargent for review after review Sargent to sign item 19 on ITP
- 6) Pier 2 North – documentation outstanding, Punch list item 1, 2, & 10 open. No visual or NDE reports have been filed for this Pier to date. Also Pier 2 North documentation has not been presented to owner QA for review at AIS shop.
- 7) Pier 3 North- Punch list item 14 outstanding. Sargent to sign of ITP item # 19 after final documentation review.
- 8) Pier 4 North- Punch list items 3, 4, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 open. Final survey report for Pier 4 North has not been filed by AIS to date.
- 9) Global documentation turn over package-Punch list items 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18, open
- 10) Armour's—Punch list item # 17 NCR 03 open
- 11) RFI's 41 Pier 4 South and RFI 43 Pier 4 North outstanding. Review of all other RFI's ongoing.

Percentage completion report attached for Nov 5/2009. Please not AIS as claiming 100% complete for all Piers. Please note as stated above there are some outstanding issues to be solved. Reference attached punch list. This assessment by client QA can and may be adjusted by Sargent Engineering Assoc and/or Jivko. Jivko and sergeant may be aware of other issue other than those listed.


George Crocker
Client QA
Deh Cho Project
Located at AIS

% COMPLETE AS OF 8/27/2009

ATCON INDUSTRIAL SERVICES - FABRICATION DIVISION								
DEH CHO BRIDGE								
FABRICATION % COMPLETE FOR PIER SHAFTS								
PIER 1								
% Complete as of	27-Aug-09							
				Parts Prep.	Fit	Weld	Trial Assembly	
	Total Kgs	Qty		15%	30%	45%	10%	Total
Pier 1 - South								
Upper Section	66,111	1		100%	100%	100%	100%	100%
Assembly M100								
Lower Section	26,487	1		100%	100%	100%	100%	100%
Assembly M101								
% Complete Pier 1 South				100%	100%	100%	100%	100%
Pier 1 - North								
Upper Section	66,111	1		100%	100%	100%	100%	100%
Assembly M100								
Lower Section	26,487	1		100%	100%	100%	100%	100%
Assembly M101								
% Complete Pier 1 North				100%	100%	100%	100%	100%
Total Pier 1	Total % Complete			100%	100%	100%	100%	100%
Certified By	Atcon Industrial Services							
	QA Deh Cho							

ATCON INDUSTRIAL SERVICES - FABRICATION DIVISION							
DEH CHO BRIDGE							
FABRICATION % COMPLETE FOR PIER SHAFTS							
PIER 2							
% Complete as of	3-Nov-09						
			Parts Prep.	Fit	Weld	Trial Assembly	
	Total Kgs	Qty	15%	30%	45%	10%	Total
Pier 2 - South							
Upper Section	61,613	1	100%	100%	100%	100%	100%
Assembly M200							
Intermediate Section	32,968	2	100%	100%	100%	100%	100%
Assembly M202							
Lower Section	26,312	1	100%	100%	100%	100%	100%
Assembly M201							
% Complete Pier 2 South			100%	100%	100%	100%	100%
Pier 2 - North							
Upper Section	61,613	1	100%	100%	100%	100%	100%
Assembly M200							
Intermediate Section	32,968	2	100%	100%	100%	100%	100%
Assembly M202							
Lower Section	26,312	1	100%	100%	100%	100%	100%
Assembly M201							
% Complete Pier 2 North			100%	100%	100%	100%	100%
Total Pier 2	Total % Complete		100%	100%	100%	100%	100%
Certified By	Atcon Industrial Services						
	QA Deh Cho						

ATCON INDUSTRIAL SERVICES - FABRICATION DIVISION

DEH CHO BRIDGE

FABRICATION % COMPLETE FOR PIER SHAFTS

PIER 3

% Complete as of	3-Nov-09							
				Parts Prep.	Fit	Weld	Trial Assembly	
	Total Kgs	Qty		15%	30%	45%	10%	Total
Pier 3 - South								
Upper Section	63,195	1		100%	100%	100%	100%	100%
Assembly M300 (Held)								
Intermediate Sections	52,979	2		100%	100%	100%	100%	100%
Assembly M302								
Lower Section	38,863	1		100%	100%	100%	100%	100%
Assembly M301								
Total Pier 3 South	% Complete Pier 3 South			100%	100%	100%	100%	100%
Pier 3 - North								
Upper Section (Held)	63,195	1		100%	100%	100%	100%	100%
Assembly M300								
Intermediate Sections	52,979	2		100%	100%	100%	100%	100%
Assembly M302								
Lower Section	38,863	1		100%	100%	100%	100%	100%
Assembly M301								
Total Pier 3 North	% Complete Pier 3 North			100%	100%	100%	100%	100%
Total Pier 3	Total % Complete			100%	100%	100%	100%	100%
Certified By	Atcon Industrial Services							
	QA Deh Cho							

ATCON INDUSTRIAL SERVICES - FABRICATION DIVISION

DEH CHO BRIDGE

FABRICATION % COMPLETE FOR PIER SHAFTS

PIER 4

% Complete as of	3-Nov-09								
			Qty Kgs. for		Parts Prep.	Fit	Weld	Pre Assembly	
	Total Kgs	Qty	62%		15%	30%	45%	10%	Total
Pier 4 - South									
Upper Center Section Assembly M403 (Held)	81,727	1	% Complete		100%	100%	100%	100%	100%
Upper Corner Section Assembly M400 (Held)	96,746	2	% Complete		100%	100%	100%	100%	100%
Intermediate Section Assembly M402	137,020	2	% Complete		100%	100%	100%	100%	100%
Lower Section Assembly M401	35,997	1	% Complete		100%	100%	100%	100%	100%
Total Pier 4 South			% Complete Pier 4 South		100%	100%	100%	100%	100%
Pier 4 - North									
Upper Center Section Assembly M403 (Held)	81,727	1	% Complete		100%	100%	100%	100%	100%
Upper Corner Section Assembly M400 (Held)	96,746	2	% Complete		100%	100%	100%	100%	100%
Intermediate Section Assembly M402	137,020	2	% Complete		100%	100%	100%	100%	100%
Lower Section Assembly M401	35,997	1	% Complete		100%	100%	100%	100%	100%
Total Pier 4 North			% Complete Pier 4 North		100%	100%	100%	100%	100%
Total Pier 4			Total % Complete		100%	100%	100%	100%	100%
Certified By	Atcon Industrial Services								
	QA Deh Cho								

PI South Page 1

LOCATION: / Fabrication ATTACHMENT 1											
Atcon Industrial Services Miramichi New Brunswick Canada											
DEH CHO Bridge											
PUNCH LIST ELECTRONIC FORM											
Instructor Punch Item #	Assembly NO	Reference Documents	ORIGINATOR	Reference to Known Equipment Tag No	Ref. Doc. No. DWG/P&ID	Punch Item Description	Category	Action By	Punch Item Issued on	Punch Item Closed out on	STATUS
1	Pier 1-S	Survey Report	George Crocker	Pier 1 S	Turnover Package	Hold point on ITP- Sargent and/or Jivko to review and advise if acceptable	A	Atcon QC	April/27/09	May 20/09	Accepted by Jivko
2	Pier 1-S	D1.5 & Project Spec's	George Crocker	M100	NCR	NCR Deh CHO 12 not complete to date	A	Atcon QC	April/27/09		See letter from DL and Sargent attached
3	Pier 1-S	Spec's and AWS D1.5	George Crocker	Pier 1-S	NDE Procedures	Revised NDE procedures Ultrasonic and Visual inspection showing conformance to Specifications and AWS D1.5 requested Feb 10/09. Not received from Atcon to date. No NDE can be accepted until submitted and reviewed for compliance	A	Atcon QC	April/27/09	June 2/09	Closed
4	Pier 1 S	Spec's and AWS D1.5	George Crocker	Pier 1-S	Documentation	Item Revised form May 20 update-- Document/Documentation status-- Client QA review incomplete	A	Atcon QC	April/27/09	June 2/09	Closed
5	Pier 1 S	Spec's and AWS D1.5	George Crocker	M101	NDE Report	UT Matrix to also reference Report R08- 2299 for Joints 1,2,11,12,14 for repairs recorded	A	Atcon QC	May 20/09	June 2/09	Closed
6	Piers 1 S	Sec's and owner request	George Crocker	Pier 1 S	Final Dimension Survey	Each drawing is to have signature of surveyor and certified by qualified engineer responsible for QC and survey. This is per Jivko email circulated to Atcon QC and Management	A	Atcon	May 13/09	June 2/09	Closed
7	Pier 1 S		George Crocker			Final documentation to be forwarded to sargent. Sargent to sign ITP-after review	A		Nov 4/09		OPEN
8	Pier 1 S	Spec's and AWS D1.5	George Crocker	Pier 1-S	Visual & NDE reports	Visual and NDE reports not signed by technicians performing inspection	A	Atcon QC	April/27/09	May 20/09	Closed

01 South
Page #2

ATTACHMENT 1

Catagory A Completed prior to accepted	Note: This punch list	on By	QC = Inspector _Client Rep	Atcon Quality Control
This Punch List Only covers fabrication for Pier 1 S performed at Atcon Industrial Services/QA Monitor Bases Only Sargent Engineering and/or Jivko may require other documentation upon their final considerations and final review				

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page #1

LOCATION: / Fabrication Division of											
Atcon Industrial Services Miramichi New Brunswick Canada											
DEH CHO Bridge											
PUNCH LIST ELECTRONIC FORM											
Inspector Punch Item #	Assembly NO	Reference Documents	ORIGINATOR	Reference to Known Equipment Tag No.	Ref. Doc. No. DWG/P&ID	Punch Item Description	Category	Action By	Punch Item Issued on	Punch Item Closed out on	STATUS
1	Pier 2-S	Ultrasonic Reports	George Crocker	M200	Turnover Package	Joint # 11 accepted with no repairs required on Report # R08-2427 Dec 1/08 and Report R09 0613 Marc 26/09 states repairs found then Report # R09 0616 March 26/08 states repairs completed and accepted, Joint 11 also accepted on report R09 0614, also UT matrix does not reflect correct information	A	Atcon QC/ Technico	April 7/09	May 20/09	Closed
2	Pier 2-S	Ultrasonic Reports	George Crocker	M200	Turnover package	Joint # 12 accepted without repairs on report # R08 2428 Nov 27/08. On report R09 0610 Mar 26/09 states repairs completed and accepted, also chck UT Matrix	A	Atcon QC/ Technico	April 7/09	May 20/09	Closed
3	Pier 2-S	NDE reports	George Crocker	M200/M201/M 202	Turnover Package	Add to NDE section the email from engineer stating sections in tension and compression	A	Atcon QC/ Technico	April 7/09	May 20/09	Closed
4	Pier 2-S	Ultrasonic Reports	George Crocker	M202 R/H	Turnover Package	Report # R09 0197 states joint # 6 is rejected. Documentat does not have a report stating accepted. Also in UT matrix joint # 6 does not show accepted.	A	Atcon QC/ Technico	April 7/09	May 20/09	Closed
5	Pier 2-S	Magnetic Particle Report	George Crocker	M200	Turnover Package	Report stating detection of Lamination. Report to state further investigation by UT and referenc UT report#	A	Atcon/ Technico QC	April 7/09	May 20/09	Closed
6	Pier 2-S	Visual Reports	George Crocker	M200	Turnover Package	Letter by derk Locke stating Hardness was acceptable to be signed.	A	Atcon QC	April 7/09	May 20/09	Closed
7	Pier 2 S	NDE and Visual reports	George Crocker	M200/M201/M 202	Turnover Package	All reports signed by reviewer but not by technician. Technician to sign all reports.	A	Technico	April 7/09	May 20/09	Closed
8	Pier 2-S	Survey Report	George Crocker	Trial Fit/Pier 2 South	Turnover Package	Hold point on ITP- Sargent and/or Jivko to review and advise if acceptable	A	Atcon QC	April 7/09	May 20/09	Closed as per Jivko email
9	Pier 2-S	Spec's/AWS D1.5	George Crocker	All Piers	NDE Procedure s	Required NDE procedures revised to suit contract	A	Atcon QC/ Technico	April 7/09	June 20/09	Closed

Pier 2 South
Page #2

10	Pier 2-S	D1.5 & Project Specs	George Crocker	M200	Turnover Package	NCR's Deh Cho -02 not accepted to date/Weld Procedure to be stamped by CWB	A	Alcon QC	April 7 /09	May 20/09	Closed
11	Pier 2-S	Project Spec's	George Crocker	M200/M201/M 202	Turnover Package	Copy of SAW operators qualifications required	A	Alcon QC	April 7/08	May 20/09	Closed
12	Pier 2-S	Spec's/AWS D1.5	George Crocker	M200	NCR	Outstanding NCR not signed of NCR Deh Cho -02	A	Alcon QC	April 27/09	May 20/09	Closed
13	Pier 2 - S	Specs and owner request	George Crocker	Pier 2 S	Dimension survey	Drawings to be signed by surveyor and certified by engineer responsible for QC and Survey	A	Alcon QC	May 13/09	June 20/09	Closed
14	Pier 1 S		George Crocker			Final documentation to be forwarded to sargent. After Sargent review sargent to sign ITP item 19	A		Nov 5/009		Closed
15	Pier 2-S	Spec's/AWS D1.5	George Crocker	Pier 2 S	Final Document	Revised from May 20 punch update to read—Review by Client QA incmpleted	A	Alcon QC	April 27/09	June 20/09	Closed

08/11

Category A To Complete Prior to Sargent Engineering and/or Jivko may require other items upon their final considerations and final review

Action By QC = _____ Alcon Quality Inspector _____ Client Rep

Please note documentation package only covers items for Pier 2 South Fabricated at Alcon Industrial Shop and monitored by Client QA Rep.

Please Note: This punch list has been generated by client Inspector George Crocker and may not be complete/QA monitor bases only

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page 1

ATTACHMENT 4

LOCATION: / Fabrication Division		Atcon Industrial Services Miramichi New Brunswick Canada											

Pier 3 South
Page 2

ATTACHMENT 1

	Pier 3-S	Project Spec's	George Crocker	Pier 3-S	Turnover Package	Copy of Company Certification CWB/CSA Standard 47.1/ Required	A	Atcon QC	Feb 16/09	Mar 10/09	Closed
11	Pier 3-S	Project Spec's	George Crocker	Pier 3-S	Turnover Package	Copy of Company Certification CWB/CSA Standard 47.1/ Required	A	Atcon QC	Feb 16/09	Mar 10/09	Closed
12	Pier 3-S	Project Spec's	George Crocker	Pier 3-S	Turnover Package	Document required Stateing/certifying all blasting has been performed per Bridge Specifications	A	Atcon QC	Feb 16/09	Mar 10/09	Closed
13	Pier 3-S	D1.5 & Project Spec's	George Crocker	Pier 3-S	Turnover Package	Section heading/Pier 3 -S Heat Numbers Add backup mill certs for matrix. Also another page and add general comment ie (internal stiffener Heat numbers with mill certs see attached. Also Mill certs for Dawidy Assembly plates/bars and nuts/bolts/washers.	A	Atcon QC	Feb 16/09	Mar 10/09	Closed Heat numbers listed for skin plates/ All Mill certs
14	Pier 3-S	D1.5 and Project	George Crocker	Pier 3-S	Turnover Package	Documents showing all NDT Technicians and Visual Inspector,s Qualifications	A	Atcon QC	Feb 16/09	May 20/09	Closed
15	Pier 3-S	Project Spec	George Crocker	Pier 3-S	Turnover Package	Spread Sheet referencing types of welds with procedures	A	Atcon QC	Feb 16/09	Mar 10/09	Closed
16	Pier 3-S	D1.5 & Project Spec's	George Crocker	Pier 3-S	Turnover Package	Mill Certs for ladders and Platforms/steel and bolts/nuts/washers	A	Atcon QC	Feb 20/09	Closed	To be added to Global
17	Pier 3-S	D1.5 & Project Spec's	George Crocker	Pier 3-S	Turnover Package	NCR's sign off/accepted	A	Atcon QC	Feb 20/09	Mar 10/09	Closed
18	Pier 3-S	Spec's and other agreemen	George Crocker	Pier 3-S	Turnover Package	Statement of Compliance with welding procedures and geometric accuracy of fabricated material.	A	Atcon QC	Feb 20/09	May 20/09	Closed
19	Pier 3 S	Spec's and other agreemen	George Crocker	Pier 3-S	Turnover Package	Turnover package will also require signature of structural engineer preparing and certfing erection scheme. The engineer shall also make clear statement that leveling of entirely erected bents could be achieved using jacks on appropriately installed in shop	A	Atcon QC	Feb 20/09	May 20/09	Closed
20	Pier 3 S	Spec's and other	George Crocker	Pier 3-S	Turnover Package	MPI Reports Lifting Lugs	A	Atcon QC	Mar 1/09	Mar 10/09	Closed
21	Pier 3 S	Spec's and other agreemen	George Crocker	Pier 3-S	Turnover Package	Mill Certs for lifting lugs &jacking stiffeners and material	A	Atcon QC	Feb 20/09	Closed	To be added to Global package
22	Pier 3 S	Spec's and AWS D1.5	George Crocker	Pier 3-S	NDE Procedures	Revised NDE procedures Ultrasonic and Visual inspection showing conformance to Specifications and AWS D1.5 requested Feb 10/09. Not received from Atcon to date. No NDE can be accepted until submitted and reviewed for compliance	A	Atcon QC	April/27/09	Closed	Reviewed and Minor changes required
23	Pier 3 S	Spec's and AWS D1.5	George Crocker	Pier 3-S	Documentat ion	Documentation status-- Owner QA review	A	Atcon QC	April/27/09	Closed	Sargent to do final acceptance

ATTACHMENT 1

83 Son #24
83 Jorg

24	Pier 3 S	George Crocker		Final documentation to be forwarded to Sargent for review. Sargent to sign ITP item 19	A	Nov 5/09		
25	Pier 3 S	George Crocker	M300	Missing UT reports	A	May 20/09	Closed	
26	Pier 3 S	George Crocker	Pier 3-S	Visual and NDE reports not signed by technicians performing inspection	A	April/27/09	May 20/09	Closed
Category A Completed prior to accepted								
					Action By	QC =	Atcon Quality Control	Inspector _Client Rep

Please Note: This punch list has been generated by client Inspector George Crocker and may not be complete/ list developed as QA monitor only
Sargent Engineering and/or Jivko may require other documentation upon their final considerations and final review

[illegible]

04 South
page 2

9	Pier 4-S	Survey Report	George Crocker	Trial Flt/Pier 2 South	Turnover Package	Hold point on ITP- Sargent and/or Jivko to review and advise if acceptable	A	Atcon QC	April 9/09	May 20/09	Closed per Jivko email
10	Pier 4-S	NDE Procedures	George Crocker	All Piers	Turnover Package	Required NDE procedures revised to suit contract	A	Atcon QC/Technico	April 9/09	June 3/09	Closed
11	Pier 4-S	D1.5 & Project Specs	George Crocker	M200	Turnover Package	NCR's Del Cho -09 cover sheet showing accepted needs to be added	A	Atcon QC	April 9/09	May 20/09	Closed
12	Pier 4-S	Project Spec's	George Crocker	M200/M201/M202	Turnover Package	Copy of all SAW operators performing welds qualifications required	A	Atcon QC	April 9/09	May 20/09	closed
13	Pier 4 South	Visual Reports	George Crocker	Pier 4-S	Turnover Package	Allan Frenette/technico -- His name stated on visual reports/include qualification cert.	A	Atcon QC/Technico	April 9/09	May 20/09	Closed
14	Pier 4 South	Documentation	George Crocker	Pier 4-S	Turnover Package	Documentation review by Client QA.	A	Atcon QC/Technico	April 27/09	June 10/09	Closed
15	Pier 4 South	Spec's/AWS D1.5	George Crocker	Pier 4-S	Fabrication	M403 2 fillet welds missing at k451d dwg 450.3 rev D. To be welded 4 sides only 3 side completed. Was to be done at rail yard prior to shipping. Not confirmed by inspector. To be confirmed at site.	A	Atcon QC/Technico	April 27/09	Attached	See email attached from D Locke and Dennis Sargent
16	Pier 4 South	Spec's/AWS D1.5	George Crocker	Pier 4-S	Fabrication	Connection to M400 and M403 had gaps. Photo's taken and report to Alcon Feb 17/09. No results. Email with sketches and photo's forwarded to Atco James Malher March 19/09 asking how Alcon proposed to fix. NO reply received.	A	Atcon QC	June 10/09	Attached AWS-RFI 41	Item has been transfer to Submitted AIS RFI # 41
17	Pier 4 S	Spec's/dwg	George Crocker	Pier 4-S	Dimension Survey	Final Dimensional Survey to have each drawing signed by surveyor and certified by engineer responsible for QC and Survey. Dimensions also to be accepted by Jivko	A	Atcon	May 13/09	June 3/09	Closed/see Jivko email acceptance attached
18	Pier 4 S		George Crocker			Final documentation to be forwarded to sargent. Sargent to review and sign ITP item 19	A		Nov 5/09		
19	Pier 4 South	Spec's/AWS D1.5	George Crocker	Pier 4-S	Fabrication/Visual inspection reports	Final Visual inspection reports for M400 and M403 do not stated accepted by Alcon inspection Technico.	A	Atcon QC/Technico	April 27/09	May 20/09	Closed
Catalogory	A	To Complete Prior to									

Action By QC = _____ Alcon Quality Control
Inspector _____ Client Rep

Please note documentation package only covers items for Pier 4 South Fabricated at Alcon Industrial Shop and monitored by Client QA Rep.

04 South
Rox #3

Please Note: This punch list has been generated by client Inspector George Crocker and may not be complete/developed as QA monitor only
Sargent Engineering and/or Jivko may require other items upon their final considerations and final review

Pier 1 North
Page 1

ATTACHMENT 1

LOCATION: / Fabrication Division ATTACHMENT 1														
Atcon Industrial Services Miramichi New Brunswick Canada														
DEH CHO Bridge														
PUNCH LIST ELECTRONIC FORM														
Inspector Punch Item #	Assembly NO	Reference Documents	ORIGINATOR	Reference to Known Equipment Tag No.	Ref. Doc. No. DWG/P&ID	Punch Item Description	Category	Action By	Punch Item Issued on	Punch Item Closed out on	STATUS			
1	Pier 1 North	Punch list M101 April 27/09	George Crocker	M101	Punch list	Punch List Items 1 to 6 reported April 27 for Pier 1 North assembly M101 has been revised and has been incorporated into this punch list and now titled Per 1 North Punch List. Punch list issued April 27/09 for Pier 1 North M101 is considered absolute	A	Client QA	Aug 6/2009	Aug 6/2009	Closed			
2	Pier 1-N	Spec's and AWS D1.5	George Crocker	Pier 1 North	Dwg's	Ladders to fit at Trial fit	A	Atcon QC	April/27/09	Aug 10/09	Closed			
3	Pier 1-N	AWS D1.5 & Project Spec's	George Crocker	Pier 1 North	Dwg's	Splice plates to fit at Trial Fit	A	Atcon QC	April/27/09	Aug 25/09	Closed			
4	Pier 1-N	Spec's and AWS D1.5	George Crocker	Pier 1 North	Spec's and Dwg	Final Dimensional Survey to be Performed, report filed and dimensions to be accepted by Jivko. Hold Point on ITP	A	Atcon QC	Aug/7 2009	Sept 24/09	Closed Jivko email acceptance include d in documentation			
5	Pier 1 N	Spec's and AWS D1.5	George Crocker	Pier 1 North	Spec's and Dwg	Trial Fit required and accepted by engineer	A	Atcon QC	April/27/09	Aug 25/09	Closed			

Pier 1 North
Aug 2

ATTACHMENT 1

6	Pier 1 N	Spec's and AWS D1.5	George Crocker	Pier 1 North	Visual & NDE reports	Visual and NDE Client QA review required— NDE reports M100 and M101 to state % of joint tested	A	Atcon QC	Aug 25/09	Sept 9/09	Closed
7	Pier 1 N	Spec's and AWS D1.5	George Crocker	Pier 1 North	Final Documentation	Final Documentation to be reviewed at Pier completion	A	Atcon QC	Aug 7/2009	Sept 9/09	closed
8	Pier 1 North	Meetings/Spec/Dwg	George Crocker	Pier 1 North	Agreed to by AIS at meetings	Pier 1 North at trial fit after welding of CJP at splice plate rings Bolts are to be released and then rebolted. Check for gaps or other non-conformances.	A	Atcon QC & Client QA	June 29/09	Aug 25/09	Closed
9	Pier 1 North	Spec's/dwgs and AWS D1.5	George Crocker	Pier 1 North	DW/Spec's	Pier 1 North Trial fit completed condition record submitted to Jivko and Sargent for review	A	Client QA	Aug 7/2009	Aug 25/09	Closed
10	Pier 1 North	Spec/dwg/ AWS D1.1	George Crocker	Pier 1 North	Spec's and Dwg	Armours to fit to base and accepted by Jivko and/or Sargent	A	Client QA	7-Aug	Sept 9/09	Closed /To be part of Armour package/
11	Pier 1 North	Spec/dwg/ AWS D1.1	George Crocker	Pier 1 North	NCR,s	NCR's per dispositioned by Sargent and Jivko	A	Atcon QC	Aug 7 2009	Aug 25/09	Closed
12	Pier 1 North	Spec/dwg/ AWS D1.1	George Crocker	Pier 1 North	NDE	NDE section add Email for Jivko stating sections in tension and compression	A	Atcon QC	Aug 25/09	Sept 9/09	closed
13	Pier 1 North	Spec/dwg/ AWS D1.1	George Crocker	Pier 1 North	NCR,s	NCR DEH CHO 29 missing from Binder	A	Atcon QC	Aug 25/09	Sept 9/09	Closed
14	Pier 1 North	Spec/dwg/ AWS D1.1	George Crocker	Pier 1 North	ITP	ITP Item # 19 Final Documentation to be signed by Sargent	A	Atcon QC	Aug 25/09		
15	Pier 1 North	Spec/dwg/ AWS D1.1	George Crocker	Pier 1 North	Reports	Condition reports for Splice pl connection at M100 to M101 with acceptance by Sargent/owner	A	Atcon QC	Aug 25/09	Sept 9/09	Closed
16	Pier 1 North	Specs/dwgs	George Crocker	Pier 1 North	Reports	Visual report # Vis - 01 states Top center section/should this read Pier 1 North Section M100? (2 locations)	A	Atcon AC	Aug 25/09	Sept 9/09	Closed
17	Pier 1 North	Specs/dwgs/AWS D1.5	George Crocker	Pier 1 North	Reports	MT reports reference lifting lugs/None installed	A	Atcon	Aug 25/09	Sept 9/09	Closed/ These were temporary for AIS purpose

ATTACHMENT 1

Pier 1 North
11/23/09

18	Pier 1 North	Spec/dwg/ AWS D1.1	George Crocker	Pier 1 North	Reports	Condition report for Template M6 connection to Base M101 with statement stating accepted by owner.	A	Atcon QC	Aug 25/09	Sept 9/09	closed/to be added to Armour package
19	Pier 1 North	Spec's/dwg's and AWS D1.5	George Crocker	Pier 1 North	Dwg's	Platforms to be installed	A	Atcon QC	Aug 7/2009	Aug 25/09	Closed
Category A Completed prior to accepted			Note: This punch list		on By		Atcon Quality QC = Control		Inspector _ Client Rep		

This Punch List Only covers fabrication for Pier 1 N performed at Atcon Industrial Services/QA monitor bases only
Sargent Engineering and/or Jivko may have other items upon their final considerations and final review
Development of this punch list is completed by client QA as a monitor only and does not relieve the contractor responsibility for Quality of product

LOCATION: / Fabrication Division of

ATTACHMENT 1											
LOCATION: / Fabrication Division of											
Atcon Industrial Services Miramichi New Brunswick Canada											
DEH CHO Bridge											
PUNCH LIST ELECTRONIC FORM											
Inspector Punch Item #	Assembly NO	Reference Documents	ORIGINATOR	Reference to Known Equipment + Tag No	Ref. Doc. No. DWG/P&ID	Punch Item Description	Category	Action By	Punch Item Issued on	Punch Item Closed out on	STATUS
1	Pier 2-N	Spec's and AWS D1.5	George Crocker	M201/M202/M200	Turnover Package	Final Documentation Package required for review at Pier 2 North Completion including ITP by owner QA. AIS has not submitted for review to date.	A	Atcon QC	April/27/09		
2	Pier 2-N	D1.5 & Project Spec's	George Crocker	M201/M202/M200	NDE & Visual Reports	NDE and Visual reports to be submitted for review	A	Atcon QC	April/27/09		
3	Pier 2-N	Spec's and AWS D1.5	George Crocker	M201/M202/M200	NDE Procedures	Revisions to UT and Visual procedures requested. Not submitted for review to date	A	Atcon QC	April/27/09	Oct 19/09	closed
4	Pier 2-N	Spec's and AWS D1.5	George Crocker	M201/M202/M200	Spec's	Trial Fit required	A	Atcon QC	April/27/09	Nov 5/09	Closed
5	Pier 2-N	Spec's and AWS D1.5	George Crocker	M201/M202/M200	Dwg's	Ladders, platform and Splice plates to be fitted at trial fit	A	Atcon QC	April/27/09	Nov 5/09	Closed
6	Pier 2-N	Spec's and AWS D1.5	George Crocker	M202	Dwg's	Measured leg at two locations. Measurements recorded at 4018mm and 4023mm. Drawing require OAL of 4025mm. AIS stated to address at trial fit	A	Atcon QC	May 26/09	Nov 5/09	Closed /Jivko accepted final dimension al
7	Pier 2-N	Spec's and AWS D1.5	George Crocker	M201/M202/M200	Dimensional survey	Final dimensional survey to be performed at trial fit and to be accepted by Jivko	A	Atcon QC	May 26/09	Nov 5/09	Closed Jivko accepted

ATTACHMENT 1

Pier 2 NCR #2

8	Pier 2-N	Spec's and AWS D1.5	George Crocker	M202	Dwgs	Measured leg at two locations. Measurements recorded at 4019mm and 4024mm. Drawing require OAL of 4025mm. AIS stated to address at trial fit	A	Atcon QC	June 2/09	Nov 5/09	Closed Jivko accepted final dimensional
9	Pier 2-N	Spec's and AWS D1.5	George Crocker	M202	Reports	One leg lying at storage area. Technico inspector has not accepted to date.	A	Atcon QC	June 2/09	Oct 19/09	Closed
10	Pier 2 N		George Crocker			Final documentation Package forwarded to Sargent and final review ITP item 19 to be signed by Sargent	A	AIS QC	Nov 3/09		Open
11	Pier 2-N	Spec's and AWS D1.5	George Crocker	M201/M202/M200	NCR's	All NCR's Closed	A	Atcon QC	June 2/09	Nov 5/09	Closed
Category A Completed prior to accepted		Note: This punch list		on By		QC =		Atcon Quality Control		Inspector _ Client Rep	

This Punch List Only covers fabrication for Pier 2 N performed at Atcon Industrial Services/QA monitor bases only
Sargent Engineering and/or Jivko may require other documentation upon their final consideration and final review

[illegible]

ATTACHMENT 1

Pier 3 North
Page #2

9	Pier 3-N	Spec's and AWS D1.5	George Crocker	M301/M302/M300	Dimensional survey	LegM302- Drawing requires OAL of 6670. Measured at three locations 6674, 6670, 6660 for plus/minus of 14mm. To be addressed at trial fit	A	Atcon QC	April 27/009	Oct 19/09	Closed..Jivko accepted survey
10	Pier 3-N	Spec's and AWS D1.5	George Crocker	M301/M302/M300	NDE report UT	UT report 20415-UT-05 references center section/ no center section for this pier. Also Technico report # not shown on any UT reports	A	Atcon QC/Technico	Oct 27/009	Oct 28/09	Closed
11	Pier 3-N	Spec's and AWS D1.5	George Crocker	M301/M302/M300	NDE report MT	Report # R09-0902 and 2045 MT -03 show MT of lifting Lugs. NO lugs installed for Deh Cho on this pier.	A	Atcon QC/Technico	Oct 27/009	Oct 28/09	Closed/lugs left on M302
12	Pier 3-N	Spec's and AWS D1.5	George Crocker	M301/M302/M300	Weld Table	Weld table was revised/does not show correct rev or date	A	Atcon QC	Oct 27/009	Oct 28/09	Closed
13	Pier 3-N	Spec's and AWS D1.5	George Crocker	M300	NCR	NCR 31 was revised to NCR 31 rev 1. This rev is not in binder	A	Atcon QC	Oct 27/009	Oct 28/09	Closed
14	Pier 3 N		George Crocker			Final documentation to be forwarded to Sargent. Sargent to sign of IYTP item 19 after review	A	A			Open
15	Pier 3 N	Spec's and AWS D1.5	George Crocker	M300/M301/M302	Final Documentation	Final Documentation to be reviewed by owner QA at Pier completion	A	Atcon QC	May 20/09	Oct 28/09	Closed
Category A Completed prior to accepted		Note: This punch list		on By		Atcon Quality QC = Control		Inspector _Client Rep			

This Punch List Only covers fabrication for Pier 3 North performed at Atcon Industrial Services/QA monitor bases only
Sargent Engineering and/or Jivko may have other items upon their final considerations and final review
AIS is responsible for product quality

LOCATION: / Fabrication ATTACHMENT 1											
Atcon Industrial Services Miramichi New Brunswick Canada											
DEH CHO Bridge											
PUNCH LIST ELECTRONIC FORM											
Insp ctor Punch Item #	Assembly NO	Reference Documents	ORIGNATOR	Referenc e to Known Equipmen t Tag No	Ref. Doc. Or Dwg	Punch Item Description	Cate gory	Action By	Punch Item Issued on	Punch Item Closed out on	STATU S
1	Pier 4-N	Spec's and AWS D1.5	George Crocker	M400/4 03/402/ 401	Dwg's	Ladders/platforms to fit at Trial fit/weld and to be accepted by QC	A	Atcon Production & QC	May 26/09	closed	Oct 29/09
2	Pier 4-N	AWS D1.5 & Project Spec's	George Crocker	M400/4 03/402/ 401	Dwg's	Splice plates to fit/weld at Trial Fit and to be accepted by QC	A	Atcon Production & QC	May 26/09	closed	Oct 29/09
3	Pier 4- N	Spec's and AWS D1.5	George Crocker	M400/4 03/402/ 401	Dimensiona l survey report	Final Dimensional Survey to be Performed and accepted by QC and Jivko	A	Atcon QC	May 26/09		
4	Pier 4-N	Spec's and AWS D1.5	George Crocker	M400/4 03/402/ 401	Spec's and Dwg	Trial Fit required bearing % to be accepted by sargent and Jivko/ add acceptance email form Jivko and Sargent	A	Atcon Production & QC	May 26/09		
5	Pier 4-N	Spec's and AWS D1.5	George Crocker	M400/4 03/402/ 401	Visual & NDE reports	Visual and NDE reports not received for review	A	Atcon QC	May 26/09	closed	Nov 2/09
6	Pier 4 N	Spec's and AWS D1.5	George Crocker	M401	Spec's and Dwg	Gouge at face of Base Ring Plate k400a to be fill/welded and Grind, prior to Trial fit and to be accepted by QC	A	Atcon Production & QC	May 26/09	closed	Oct 29/09
7	Per 4 N	Spec's and AWS D1.5	George Crocker	M401	Spec's and Dwg	Taper at stiffener connection (4 Off) to blend/grind to be completed prior to trial fit and to be accepted by QC	A	Atcon Production & QC	May 26/09	closed	Oct 29/09

ATTACHMENT 1

Pier 4 North Stage 2

8	Pier 4 N	Spec's and AWS D1.5	George Crocker	M401	Spec's and Dwg	Weld undersize/poor profile to be completed prior to trial fit and to be accepted by QC	A	Atcon Production & QC	May 26/09	Closed	Oct 30/09
9	Pier 4 N	Spec's and AWS D1.5	George Crocker	M400/403/402/401	Spec's and Dwg	NDE procedures for UT and visual to be revised	A	Atcon QC	May 26/09	Closed	Oct 30/09
10	Per 4 N	Spec's and AWS D1.5	George Crocker	M400/403/402/401	Specs	Turnover package document for blasting dated incorrectly	A	AIS QC	Nov 2/09		
11	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	Documentation	Weld map M400 references two number one's	A	AIS QC	Nov 2/09		
12	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	Documentation	M400 joint list, ITP and List of UT joints as state left and right corners while should state east and west as shown on NDE reports.	A	AIS QC	Nov 2/09		
13	Per 4 N	Spec's and AWS D1.5	George Crocker	M402	Documentation	M402 ITP, list of joint #'s, and NDE matrix state left and right legs; should state east and west	A	AIS QC	Nov 2/09		
14	Per 4 N	Spec's and AWS D1.5	George Crocker	M400/403/402/401	NDE and visual reports	A number of NDE/UT/MT and visual reports submitted by Technico not signed by technician. Please review all including those added to NCR's	A	AIS QC	Nov 2/09		
15	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	Spec's	No report submitted by AIS for Final Dimensional survey Pier 4 North	A	AIS QC	Nov 2/09		
16	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	Documentation	Pier 4 North document list of heat numbers state left and right should state east and west	A	AIS QC	Nov 2/09		
17	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	Spec's/procedures	Number of NCR's do not have Eng signature. Other areas listed where to sign if no signature required then should write N/A	A	AIS QC	Nov 2/09		
18	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	Documentation	NCR 36- Clear sketch and correct mill cert not added per Sargent response to NCR.	A	AIS QC	Nov 2/09		

Pier 4 North
Page 3

ATTACHMENT 1

Many reviewed NDE reports reference wrong acceptance table per AWS D1.5. Tension Table 6.3 and compression. Table 6.4. Please review all reports including report added to NCR's and revise to correct acceptance table reference where applicable.

19	Per 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	NDE reports	Many reviewed NDE reports reference wrong acceptance table per AWS D1.5. Tension Table 6.3 and compression. Table 6.4. Please review all reports including report added to NCR's and revise to correct acceptance table reference where applicable.	A	AIS QC	Nov 2/09		
20	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	NDE reports	NCR 21- UT report Reference M400 North. Please also reference if east or west.	A	AIS QC	Nov 2/09		
21	Per 4 N	Spec's and AWS D1.5	George Crocker	M401	NDE reports	NCR 22 - hardness report required	A	AIS QC	Nov 2/09		
22	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	NDE reports	NCR 25-- require UT reports	A	AIS QC	Nov 2/09		
23	Per 4 N	Spec's and AWS D1.5	George Crocker	M400	Documentation and NDE reports	NCR 35- Crack at M400 east joint 17 not referenced correctly, Also NDE and visual report reference wrong assembly. Date of UT accepted does not concur with date stated in NDE matrix for assembly.	A	AIS QC	Nov 2/09		
24	P 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	NCR 36	NCR-36- NCR is for Pier 4 and Pier 2 North- all weld procedures not included	A	AIS QC	Nov 2/09		
25	P 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	ITP	ITP Item 19 final documentation to be signed of by Sargent	A	AIS QC	3-Nov		
26	P 4 N	Spec's and AWS D1.5	George Crocker	Pier 4 N	RFI	RFI 43 open	A	AIS QC	3-Nov		
27	Pier 4 N	Spec's and AWS D1.5	George Crocker	M400/403/402/401	Final Documentation	Final Documentation and ITP to be reviewed at Pier completion.	A	Atcon QC	May 26/09		
Category A Completed prior to accepted		Note: This punch list			on By		QC = Control		Atcon Quality Inspector _Client Rep		

ATTACHMENT 1

Pier 4 North
Page 4

This Punch List Only covers fabrication for Pier 4 North performed at Atcon Industrial Services/QA monitor bases only. AIS is responsible for product quality. Sargent Engineering and/or Jivko may have other items upon their final considerations and final review. All punch items Pier 4 North have been incorporated into this list and supersedes all other Pier 4 North punch list prior to this date of submission Nov 2/09

[illegible]

Inspector Punch Item #	Assembly NO	Reference Documents	ORIGINATOR	Reference to Known Equipment † Tag No.	Ref. Doc. Or- Dwg	Punch Item Description	Category	Action By	Punch Item Issued on	Punch Item Closed out on	STATUS
1	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Signature Log	Missing Alan Frennett, Dean Maidmant, Marshall Cunningham, Roger diagle	A	AIS QC	Nov 3/09		
2	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Mill certs	List of heat #'s for Pier 3 South M301- Mill cert for Ht # 2D578 not included in package	A	AIS QC	Nov 3/09		
3	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Pier heat numbers references	List of heat #'s Pier 2 north and south M202,, under description-- should say splice plate or D ring for that part #	A	AIS QC	Nov 3/09		
4	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Pier heat numbers references	List of heat #'s Pier 2 South M300 and M301,, under description-- should say splice plate or D ring for that part #	A	AIS QC	Nov 3/09		
5	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Pier heat numbers references	All Heat # reference lists where east and west is relevant it state sleft and right for items. This should state east or west depending on location	A	AIS QC	Nov 3/09		
6	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Pier heat numbers references	Pier 3 South has repeat sheets with different heat numbers i. e. M300 South. There are no heat # reference list for Pier 3 North	A	AIS QC	Nov 3/09		
7	Pier 1,2,3,4 North & South	Global Turnover Package	George Crocker	N/A	Mill certs	Pier 4 North M401 reference heat # 2D976. No mill cert for this number included.	A	AIS QC	Nov 3/09		

Global
Corp

ATTACHMENT 1

This Punch List Only covers the global documentation package turn over by AIS QC as presented to owner QA .
Sargent Engineering and/or Jivko may have other items upon their final considerations and final review
AIS has the responsibility for Quality of product and proper documentation

Armours
Page #1

LOCATION: / Fabrication		Atcon Industrial Services Miramichi New Brunswick Canada									
DEH CHO Bridge											
PUNCH LIST ELECTRONIC FORM											
Inspector Punch Item #	Assembly NO	Reference Documents	Originator	Reference to Known Equipmen + Tag No	Ref. Doc. No. DWG	Punch Item Description	Category	Action By	Punch Item Issued or revised on	Punch Item Closed out on	STATUS
1	Armours	Specs & Drawing	George Crocker	Armour	N/A	Mill Certs for all plate steel, all bar steel, Review found most mill certs are included in binder. However no cert included for HT #2D552, 2C991, 2D252, 2D092, 2D062. These HT # are stated in documentation as being used by AIS for Armours	A	AIS QC	July 1/09	July 7/09	Closed
2	Armours	Specs & Drawing	George Crocker	Armour	N/A	Mill Certs for studs required	A	AIS QC	June 4/09	June 10/09	Closed
3	Armours	Specs & Drawing	George Crocker	Armour	N/A	Mill Certs for all bolts/washers/nuts required	A	AIS QC	June 4/09	June 10/09	closed
4	Armours	Specs & AWS D1.5	George Crocker	Armour	N/A	Certificates of compliance for consumables/electrodes required	A	AIS QC	June 4/09	June 10/09	Closed
5	Armours	Specs & AWS D1.5	George Crocker	Armour	N/A	CWB Approved Weld procedures used	A	AIS QC	June 4/09	June 10/09	Closed
6	Armours	Specs & AWS D1.5	George Crocker	Armour	N/A	Welder Qualifications	A	AIS QC	June 4/09	June 10/09	Closed
7	Armours	Spec & AWS D1.5	George Crocker	Armour	NDE Procedures	Approved NDE and Visual Procedures used	A	AIS QC	June 4/09	June 10/09	Closed
8	Armours	Specs & AWS D1.5	George Crocker	Armour	NDE Procedures	NDE Technicians qualifications	A	AIS QC	June 4/09	June 10/09	Closed

Armours page # 2

9	Armours	Specs & AWS D1.5	George Crocker	Armour	Visual Procedures	ATTACHMENT 1 Visual Inspector qualifications	A	AIS QC	June 4/09	June 10/09	Closed
10	Armours	Specs & AWS D1.5	George Crocker	Armour	QC procedures	Signature Log	A	AIS QC	June 4/09	June 10/09	Closed
11	Armours	Specs & AWS D1.5 & Drawings	George Crocker	Armour	As submitted and accepted	RFI's	A	AIS QC	June 4/09	June 10/09	Closed/In Binder Package
12	Armours	Specs & Drawings	George Crocker	Armour	N/A	As built drawings	A	AIS QC	June 4/09	July 1/09	AIS stated these were Submitted to Jivko in 2008
13	Armours	QC procedure	George Crocker	Armour	QC procedures	Documents where white out is used to be replaced	A	AIS QC	June 4/09	June 10/09	Closed
14	Armours	Specs & Drawing & AWS D1.5	George Crocker	Armour	Specs/AWS D1.5	QC documentation for Bearing plates M6 for Piers 1, 2, 3, North and South	A	AIS QC	June 4/09	June 11/09	Closed
15	Armours	Specs & Drawings & AWS D1.5	George Crocker	Armour	QC Procedures/ specs	NO documentation for Bearing plates M7 for Piers 4, North and South in binder	A	AIS QC	June 4/09	June 11/09	Closed
16	Armours	Specs/AWS D1.5	George Crocker	Armour	QC Procedures	ITP's to state who Atcon Visual and NDT contractor is	A	AIS QC	June 4/09	June 10/09	Closed
17	Armours	Specs/ AWS D1.5/ Drawings	George Crocker	Armour	NCR as submitted and accepted/ drawings	NCR # Deh Cho 03 Open	A	AIS QC	June 4/09		Jivko/Sarent to advise
18	Armours	Specs/ AWS D1.5	George Crocker	Armour	Reports	NDE report section of binder needs a total review by AIS QC	A	AIS QC	June 4/09	June 10/09	Closed

Armour's Log #3

19	Armours	Spec/ AWS D1.5	George Crocker	Armour	NDE Reports	NDE Reports	NDE Reports	UT field report copy in binder	A	AIS QC	June 4/09	July 1/08	Closed
20	Armours	Specs/ AWS D1.5	George Crocker	Armour	Visual inspection reports	Visual inspection reports	Visual inspection reports	Visual Inspection reports-- Not signed by technician, Visual procedure No. not entered, no reports for fillet weld at connection to bottom ring(i. e.) k12d to k78a, no reports for armour side to backing bar (i. e.) k78a to k16a, no reports for stud insp	A	AIS QC	June 4/09	July 1/09	Closed
21	Armours	Spec /Drawings	George Crocker	Armour	Reports/ drawings/sp ecs	Reports/ drawings/sp ecs	Reports/ drawings/sp ecs	No record of bearing plates trial fitted to pier bents prior to shipping	A	AIS QC	June 4/09	July 6/08	Closed Piers South Bearing Plates were sent to Site prior to Piers completion. Are installed on site.
22	Armours	Spec/ AWS D1.5	George Crocker	Armour	Reports	Reports	Reports	Binder sections marked Armours and section marked top ring have NDE and visual reports mixed	A	AIS QC	June 4/09	June 10/09	Closed
23	Armours	Spec/CSA W47	George Crocker	Armour	Weld Procedures	Weld Procedures	Weld Procedures	Weld Procedure's not used for fabrication/welding of these structures to be removed from submitted documentation	A	AIS QC	July 1/09	July 6/09	Closed
24	Armours	Turnover binder	George Crocker	Armour	Mill Certs	Mill Certs	Mill Certs	Plate Ht # 2D082 Listed for Armour Top. Mill cert review shows this is incorrect thickness	A	AIS QC	July 1/09	July 6/09	Closed
25	Armours	Turnover binder	George Crocker	Armour	Mill Certs	Mill Certs	Mill Certs	Four (4) Heat #'s stated for Backing Bar -- review of mill certs show these to be plate not flat bar steel. Also Heat #'s 2D082 and 2D089 are incorrect thickness	A	AIS QC	July 1/09	July 6/09	Closed
26	Armours	Turnover binder	George Crocker	Armour	Mill Certs	Mill Certs	Mill Certs	Item k18m not listed and No Heat numbers listed for item's K18m	A	AIS QC	July 1/09	July 6/09	Closed
27	Armours	Turnover binder	George Crocker	Armour	Documentati on	Documentati on	Documentati on	Signature Log-- ITP Signature for Atcon Person signing for Production Pier1,2,3 North is not shown on signature log	A	AIS QC	July 1/09	July 6/09	Closed
28	Armours	Specs	George Crocker	Pier 1,2,3,4 North	Specs/Drawi ngs	Specs/Drawi ngs	Specs/Drawi ngs	Bearing Plates Piers 1,2,3,4 North Jivko has issue and may have to be remade to ensure proper fit at site.	A	AIS QC	July 6/09	Oct-09	Jivko accepted



Atcon
Quality
Control

Action By QC = Control Inspector _Client Rep

ATTACHMENT 1

Please Note: This punch list has been generated by client Inspector George Crocker as observations only.
Sargent Engineering and/or Jivko may require other documentation upon their final considerations and final review

Date: Nov 6, 2009

North Pier Assembly's loaded or loading for shipping. Photo's taken at Marimichi New Brunswick Rail loading yard Nov 5, 2009. Report 55 Week Ending Nov 6/09



M100 North at loaded at CN Rail Yard



M200 North removing from truck to load onto rail cars at CN rail Yard



M200 North getting removed from truck to load onto rail car at CN rail yard



Pier 2 North M202 loaded onto truck for transport to site at Yellowknife



Pier 2 North M202 loaded onto truck for transport to Site at Yellowknife



Pier 2 North M201 being loaded onto truck for transport to site at Yellowknife



Pier 2 North M201 in process of loading onto truck for transport to site at Yellowknife

The included photos for this report were taken at the loading yard at CN Miramichi New Brunswick Canada November 5, 2009.

The assemblies Pier 2 North M201 and Pier 1 North M100 were loaded onto the rail cars by AIS and are to leave by CN Railway for Hay River Nov 5, 2009. Expected time of delivery is approximately two weeks to Hay River.

The assemblies M202 and M201 were loaded onto trucks and are to be transported to site at Yellowknife by truck.

Report By
George Crocker
Client QA Rep
Location; AIS

APPENDIX C

LEVELTON REPORTS

May 6, 2010 – Pier 2N

May 6, 2010 – Pier 35

June 7, 2010 – Pier 35

July 9, 2010 – Piers 1 – 4N



MEMORANDUM

Levelton Consultants Ltd.

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TO: Leslie Mihalik, P.Eng.
Associated Engineering (BC) Ltd.

FILE: RI09-1803-01

FROM: Oliver Gepraegs, P.Eng.

DATE: MAY 6, 2010

Project: Deh Cho Bridge

Subject: Pier 2N Rehabilitation

Levelton was retained by Jivko Engineering to provide materials engineering services for the rehabilitation of the lower buttress of Pier 2N. The proposed scope of our services is presented in the attached proposal, dated November 23, 2009. Prior to submittal of this proposal, I attended the site on November 13 and 14, 2009. The scope for this initial site visit was presented in the attached email, dated November 10, 2009.

Background

We understand that approximately 300 m³ of concrete was placed for the lower buttress of Pier 2N. During this pour, the cement and fly ash silos of the site batch plant were filled incorrectly by filling the cement silo with fly ash and the fly ash silo with cement. This resulted in the placement of approximately 100 m³ of concrete that contained 80% fly ash and 20% cement. This low-strength concrete was "sandwiched" between two layers of the correct concrete, requiring removal of the upper normal strength concrete as well as the section of low strength concrete to a sound substrate.

Levelton was retained to assist in the providing materials engineering services on behalf of Jivko Engineering for the rehabilitation of the lower buttress. Levelton's involvement was limited to providing recommendations and review of the rehabilitation efforts. Ruskin Construction was responsible for the rehabilitation of the pier. Ruskin retained Allnorth Consultants for quality control and EBA Engineering Consultants from Yellowknife for QC testing and coring services. EBA Edmonton was retained by Jivko Engineering and was represented on site during concrete pours at Pier 1N and 2N.

Delcan was retained by Jivko Engineering to assess repair and rehabilitation of damaged reinforcing steel in Pier 2N. This included review of damaged and bent bars and making recommendations for the installation of new bars (splices and couplers).



Summary

I attended the site in November 13 and 14, 2009 to review progress of the rehabilitation. My observations are summarised in the two attached emails dated November 13 and 14, 2009. Concrete removal was in progress using jackhammers attached to small and large excavators.

Subsequently, our technician René Haché attended the site from November 20 to December 4, 2009. The concrete of the lower buttress was removed by a combination of chipping and hydro-demolition. Final surface preparation was performed using hydrodemolition and pressure washing. Based on our observations, the deteriorated concrete was removed to a sound substrate and the surface preparation was acceptable. Levelton prepared eight field review reports while on site from November 20 to December 4 (attached).

EBA removed cores from the lower buttress to confirm all low strength concrete had been removed. The cores were tested in EBA's Yellowknife laboratory. Three cores were shipped to Levelton for comparison testing (two of these were suitable for compressive strength testing). The average compressive strength of these cores was 50 MPa, which is considerably higher than the specified strength of 35 MPa. René Haché has informally reviewed the core test results from EBA on site and was present during the coring (attached). We also received a sketch showing core locations but do not have official core test reports for these cores.

René Haché was present for the first part of the concrete pour of the lower buttress of Pier 2N on December 4th. Ruskin had some technical difficulties with the batch plant which resulted in some delays in the concrete placement (refer to attached email dated December 5, 2010). Ruskin added a set retarder to avoid the formation of cold joints during the pour. EBA was on site for quality control testing but we do not have any concrete test reports for this pour.

René Haché was also on site for the concrete pour of the upper portions of Piers 1N (November 21) and 4N (November 30). We observed some "balls" of dry cement and aggregate, caused possibly by insufficient mixing or frozen aggregate. Slump was in the order of 200 mm with some slump tests as high as 250 mm. Our observations during the two concrete pours are summarized in the attached Field Review Reports 2 and 8. EBA was conducting QC testing but we do not have copies of any test reports. We understand that EBA was revising the mix design between these two pours to utilize a different aggregate source and to address the formation of "balls".

Levelton was not on site for the pour of the upper buttress of Pier 2N. We note that Jivko Engineering conducted thermal monitoring of all piers to record heat of hydration and thermal gradients. We do not have any records of these and as such cannot comment on thermal gradients or associated induced thermal stresses or cracks. We did observe some cracking in the lower buttress of Pier 2N (also shown in Ruskin's sketch). The cracks appear to be thermally induced but considering their location well below the waterline the durability of the piers should not be compromised.



Levelton prepared a preliminary summary report for the remediation of Pier 2N. In general, the removal of concrete and the preparation of the substrate were acceptable. Acceptance of the Pier 2N is subject to Ruskin/EBA providing documentation for core testing (including reference of core numbers to the attached sketch) and for QC records of the pier concrete. This information may have been already submitted to Jivko but Levelton did not receive a copy.

Yours truly,

LEVELTON CONSULTANTS LTD.

Reviewed by:

[Original Signed by Oliver Gepraegs]

[Original Signed by Neil Cumming]

Per: Oliver Gepraegs, P.Eng.

N.A. Cumming, F.A.C.I., P.Eng.

OKG*aeb

Oliver Gepraegs

From: Rene Hache
Sent: December-05-09 10:33 PM
To: phil.munn@jivko.ca
Cc: Oliver Gepraegs
Subject: RE: P2-Lower Buttress Remedial Work

Hi Phil,

Just got back into Comox,
The planes were late in both Edmonton and Calgary, but i am please to be back home with my family.
I really enjoyed the projects and working with you , Danny, Jivko and Terry.
I agree that the concrete should be fine, with Delvo and the concrete at a temperature of +/- 10 degree Celcius
It should be fine, i don't think a cold joint will be a problem.

Keep in touch

René

From: Phil Munn [phil.munn@jivko.ca]
Sent: Saturday, December 05, 2009 5:28 PM
To: Rene Hache; Oliver Gepraegs
Cc: Jivko Jivkov; Danny Keeler ; 'Terry Whiteman'
Subject: P2-Lower Buttress Remedial Work

Rene,

As you are aware the concrete plant broke down at approximately 12:30 PM due to a failure of the end roller on the feed conveyor. This was the same problem as in the morning but the other side of the roller. It took until 3:30 PM to repair and it was almost 4:00 before we resumed the pour. Hopefully with the benefit of the Delvo (3hr retardant) this will not result in a cold joint. The concrete was still workable at the time the pour resumed and they were able to penetrate the in place concrete with the vibrator according to Rolley. The balance of the concrete production and placement went well, the loads were consistent and within spec. The overall concrete volume was 174m3 and the pour was completed at 6:30PM.

Your input and participation was greatly appreciated. Hope to work with you and Oliver again in the future.

Regards,

Phil



November 30, 2009

File: EE09-1759-00

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Jivko Engineering
Box 1341
Yellowknife, NT X1A 2N9

Attention: Mr. Jivko Jivkov, P.Eng.

PROJECT: Deh Cho Bridge

SUBJECT: Pier 2N – Lower Buttress Remediation

Dear Sir:

Levelton has reviewed concrete removal and surface preparation of the Lower Buttress at Pier 2N. The suspect concrete has been removed to a sound substrate concrete. The substrate concrete has been confirmed by removal of cores that were tested for unit weight and compressive strength. Cores were removed and tested by EBA with additional companion testing of cores by Levelton. All test results were found to be acceptable with compressive strengths greater than the specified 35 MPa.

Some cracking was observed in the remaining concrete. These cracks appear to have been induced by thermal stresses due to relatively high temperature gradients. Considering that the cracks are narrow and located below the water level, the durability of the pier concrete should not be compromised. As such, injection is not required. We understand that the structural designers have been made aware of the cracks and that there are no structural implications.

Based on our observations and testing performed by EBA and Levelton, we recommend that steel installation proceed. Levelton will review the substrate after final cleanup and preparation has been completed. This will require final pressure washing to remove all debris, dirt, laitance and grease just prior to placing new concrete. The concrete substrate shall be brought to SSD condition with all ponding water to be removed with compressed air. A bonding slurry consisting of cement, sand and water shall be applied immediately prior to concrete placement. If sufficiently stiff, the slurry may consist of cement and water only. The w/c ratio of the slurry shall not exceed 0.40. The slurry shall be brushed in with a stiff broom. The slurry shall not be allowed to dry prior to concrete placement.

Construction Materials
Building Science
Geotechnical
Metallurgy and Corrosion
Environmental
Physical Testing



Hoarding and heating shall be provided to ensure the substrate has a minimum temperature of 5 degrees Celsius at the time of concrete placement.

We will prepare a summary report after our final review of the substrate and concrete placement. Please call if you have any questions or require anything further.

Yours truly,

LEVELTON CONSULTANTS LTD.

Per: Oliver Gepraegs, P.Eng.
Manager – Alberta
Principal
e-mail: ogepraegs@levelton.com
Phone: 403-269-4141 x227



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 8515, 808 - 461 Avenue, SW Calgary, AB T2P 3P8
 (403) 268-4141 FAX: 265-5002

CORE TEST RECORD (CSA A23.2 - 14C)

CLIENT: Jivko Engineering				DATE TESTED: November 28, 2009		DATE REPORTED: November 28, 2009	
PROJECT: Deh Cho Bridge - Fort Providence				FILE NO.: EE08-1758-00		REPORT NO.: 1	
SAMPLE IDENTIFICATION	DIMENSIONS (mm)		L/D	LOAD (kN)	STRENGTH (MPa)		REMARKS
	LENGTH	DIA.			TESTED	CORRECTED	
2-1	179	185	1.98	342.5	49.8	49.6	Top Bottom Top Bottom
2-4	179	185	1.98	345.2	50.2	50.0	
3-1	180	187	2.00	345.6	50.1	50.0	
3-4	180	187	2.00	348.3	50.6	50.6	

TECHNICIAN: AP

CAPPING MATERIALS USED: High Strength

CONDITIONING: As received

REMARKS:

LEVELTON CONSULTANTS LTD.



Failure Type



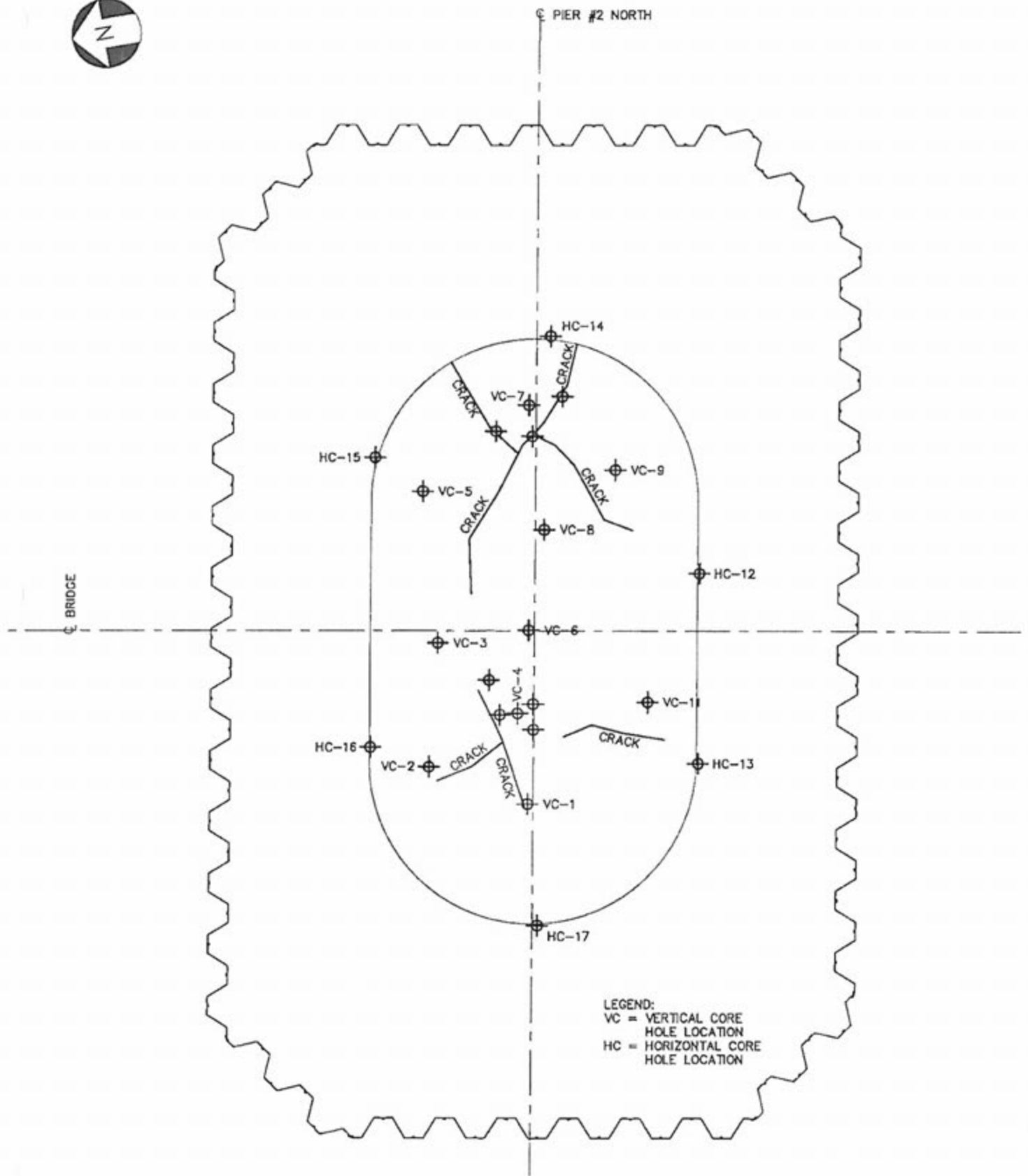
Per:

Amold F. Palmero, ASCT

This report represents a testing service only.
 No engineering interpretation is intended or implied.
 Engineering review and interpretation can be provided on written request.

Reviewed By:

Neil A. Cumming, FACI, P.Eng.



PIER #2 NORTH CORE
HOLE LOCATION PLAN



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FIELD REVIEW REPORT

PROJECT:	Deh Cho Bridge	No:	8	c.c.	Owner Cons. Eng.	☐ Gen. Contr. ☐ Contr.	Arch. Other	☐
LOCATION:	Fort Providence	DATE:	30 Nov 2009		In Attendance:			
CONTRACTOR:	Ruskin Construction Ltd.	EE09-1759-00	Danny K. Phil Munn, Jivko Engineering					
OWNER:	Deh Bridge Corporation							
CONTRACT REF:	Jivko Engineering Ltd.							
START:	07:30	FINISH:	20:30	WEATHER:	Sunny, light to moderate wind	TEMP:	= -14° C	
OBSERVATIONS / REMARKS / ACTIONS BY: Rene Hache, Civil Eng. Technologist								

Please refer to previous field review memos.

November 30, 2009

Observations and Recommendations

- Tarps and heater are now in place on the perimeter of the pier #2. Heat was on all day to melt ice and snow. Met with night crew at 08:00 pm to look at the exposed concrete. A few isolated areas will require additional concrete chipping and removal. Areas were identified and contractor informed. After demolition is completed, they will use compress air to removed most of the debris and install the formwork. A final pressure wash will be required prior to concrete placement.
- The horizontal core holes will be dry packed using Sika 212 grout after the concrete pour is completed and the formwork has been removed.
- Rebar placement is ongoing, Efforts are concentrating on perimeter steel, Vertical and Horizontal bars.
- The concrete behind the broken horizontal 35 mm rebar has been chipped and a mechanical coupler was installed. The new bar is several centimeters away from the vertical bar. But will have more then 250mm of concrete cover.
- Today, concrete pour at Pier # 1 Upper, total of approximately 250 cubic meter.
- Pour at Pier 1 was scheduled to start at 08:30 but was delayed by approximately one hour due to some mechanical problems at the batch plant.
- Today's pour was done using the modified concrete mix design with a different aggregate source than the previous pour. An EBA representative was on site to assist the contractor with batching procedures.
- Access to the batching plant was somewhat difficult due to some management decisions. Overall, the concrete batch plant appears to be in good order. The concrete aggregates are stored inside a shed with limited heat source. Concrete rocks were approximately at minus 4 degree Celsius and the sand around plus 4 degree C.
- Concrete still had "balls" of dry cement and aggregates. The slumps at point of delivery were in the 200 mm range, some as high as 250mm. EBA Technician only tested every 5th truck for air and slump and temperature. Some of the "not tested " truck appears to have higher slumps then the 210mm max as per proposed mix design. Unit weights were not measured (no scale).
- Concrete temperature ranged from 7 to 9 degree Celsius.
- Digital photos taken (in file)
- Concrete pour for Pier #2 Lower is scheduled for Friday of this week.



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FIELD REVIEW REPORT

PROJECT:	Deh Cho Bridge	No:	7	c.c.	Owner	☐ Gen. Contr.	Arch.	☐
					Cons. Eng.	☐ Contr.	Other	☐
LOCATION:	Fort Providence	DATE:	29 Nov 2009		In Attendance:			
CONTRACTOR:	Ruskin Construction Ltd.	EE09-1759-00	Danny Keeler					
OWNER:	Deh Cho Bridge Corporation		Phil Munn					
CONTRACT REF:	Jivko Engineering		Jivko Jivkov					
START:	08:00	FINISH:	19:00	WEATHER:	Sunny, light wind	TEMP:	= -12° C	
OBSERVATIONS / REMARKS / ACTIONS BY:		Rene Hache, Civil Eng. Technologist						

Please refer to all / any previous field review memos.

November 28, 2009

Observations and Recommendations

- Night crew installed tarps and heaters at Pier # 2. They also removed some of the ice buildup around the perimeter with a mini excavator.
- Day crew power washed the exposed surface and installed additional heaters to dry the surface .
- All the exposed surface appears to be sound, and are considered ready to proceed with rebar and formwork placement. There are a few isolated area in the North East corner where there is still a little bit of ice. The contractor removed all the tarps to allow for rebar placement except in the N-East area. Heater will stay on until ice has melted and Levelton will review the area on Monday morning.
- Rebar placement started in mid afternoon, Effort are concentrate on perimeter steel, Vertical bars only.
- As recommended, the vertical Crack on the east side has been sawcut , chipped, and power wash. Contractor plans on filling it with Sika 212 once the formwork is in place.
- The concrete behind the broken horizontal 35 mm rebar has been chipped to allow for the installation of a mechanical coupler.
- Digital photos taken (in file)
- Concrete pour for Pier #1 upper is still schedule for tomorrow am , concrete on deck at 08:30.
- Concrete pour for Pier #2 Lower is schedule for Thursday or Friday of this week.



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FIELD REVIEW REPORT

PROJECT:	Deh Cho Bridge	No:	6	c.c.	Owner Cons. Eng.	☐ Gen. Contr. ☐ Contr.	Arch. Other	☐
LOCATION:	Fort Providence	DATE:	28 Nov 2009		In Attendance:			
CONTRACTOR:	Ruskin Construction Ltd.	EE09-1759-00	Jivko Jivkov, Danny Keeler, Phil Munn					
OWNER:	Deh Cho Bridge Corporation							
CONTRACT REF:	Jivko Engineering							
START:	08:00	FINISH:	19:00	WEATHER:	Fog, calm wind	TEMP:	-12° C	
OBSERVATIONS / REMARKS / ACTIONS BY:		Rene Hache, Civil Eng. Technologist						

Please refer to all / any previous field review memos.

November 27, 2009

Observations and Recommendations

- Rebar installation is ongoing at Pier #2, All the efforts concentrate on the center core.
- No heat and no tarps today due to during rebar placement
- Meeting on site at 15:00 to discuss pier # 2. Core ID #2, #3 & #6 were shipped to Levelton Richmond office, The other 3 cores were delivered to EBA Yellowknife office. EBA provided us with a verbal results stating that there were no cores results lower then 37 MPa. Official written core results will be issued at a later date. Levelton should receive the cores today and will issue the results tomorrow.
- The general comment from Levelton and EBA is that the Cracks on the concrete at pier #2 are likely to be thermally induced and due to the locations and exposure at this locations they would be acceptable to leave them as is. (no epoxy injection)
- A slurry of neat cement must be applied to the Saturated Surface Dry (SSD) surface of the exposed concrete prior to placing the new concrete. Contractor to ensure the slurry does not dry prior to be covered by the fresh concrete.
- Horizontal core holes to "dry pack" using Sika 212 grout.
- It was recommended that the vertical Crack on the east side should be sawcut , chipped, power wash formed and pour prior to forming the Pier 2 Lower.
- There was some discussions on how to modified the concrete batching methodology to try to come up with a solution on how to removed the "Balls " of dry cement and aggregates. They will discuss with EBA and /or BASF to find some solutions.
- It was recommended that the QC concrete testing do unit weight on the plastic concrete. Moisture content on the fine concrete aggregate could also be done to confirm the accuracy of the moisture probe.
- Contractor will issue the minutes of the meeting.
- Digital photos taken (in file)

November 28, 2009

Fog, light wind ~-10 degree C

- Received Preliminary core results from Levelton Lab. They seem to concur with EBA report and contractor should keep proceeding with concrete preparation and rebar placement. Final report to follow in a few days
- Reduced crew on site today due to Ferry breakdown. Limited activity at Pier 2, no rebar placement.
- According to the contractor, there is enough concrete aggregate on site to complete Pier 1 upper, and Pier 2 lower and upper. Pier 1 upper and Pier 2 upper will be cast using the new "cleaner" aggregate stockpile.
- Pier 2 lower will be cast using the "not as clean" original aggregate stockpile
- The concrete aggregate are kept inside a shelter, Sand is under a tarp with external heat. New "clean aggregate stockpile is uncovered
- Another drawing showing the "Hairline Crack" location in a plan view was provided by Ruskin.
- No additional cutting or chipping was done today.

Concrete pour at Pier #1 is now schedule for Monday November 30, 2009. Pier 2 lower is still schedule for this coming Thursday or Friday.



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FIELD REVIEW REPORT

PROJECT:	Deh Cho Bridge	No:	5	c.c.	Owner Cons.Eng.	☐ Gen. Contr. ☐ Contr.	Arch. Other	☐
LOCATION:	Fort Providence	DATE:	25 Nov 2009		In Attendance:			
CONTRACTOR:	Ruskin Construction Ltd.	EE09-1759-00	Danny K. Jlvko Phil Munn BP Super					
OWNER:								
CONTRACT REF:								
START:	07:00	FINISH:	19:00	WEATHER:	Light snow, windy	TEMP:	= -8° C	
OBSERVATIONS / REMARKS / ACTIONS BY:		Rene Hache, Civil Eng. Technologist						
Please refer to all / any previous field review memos. November 25, 2009 Observations and Recommendations - Ron Lindenaar of Northern Concrete Cutting Ltd. Was on site today to do an additional 6 concrete cores to the full depth of the Buttress at Pier #2. Four Cores were taken around the Core ID #4 dated November 20, 2009. This is the locations where EBA had a result of 24.1 MPa in the lower section of the core. The other two cores were taken on the East side of Pier # 2 over a visible crack . These core were ID # 5 & #6. Each cores were done in four segments (Core barrel is ~360mm total length) for a total length of approximately 1200 to 1400mm long. - Core ID #2, #3 & #6 were shipped to Levelton Richmond office., The other 3 cores were delivered to EBA Yellowknife office. Evaluation and recommendation from the lab will be issued . - In addition to CSA Requirement for reporting, It would be useful to confirm which section of the core was taken for the compressive strength. Ie: the cores is 350mm long, the report is for a section 200mm long, Where was the section tested? Hopefully it will be as close to possible to the top of the upper core. Photos, Type of failure and description of the cores condition would be useful. - Night crew did some additional chipping and they power wash the surface of the exposed concrete. There is a few area along the perimeter of the concrete structure that still has ice . These area will need to be heated and power wash. The exposed surface of the concrete appears to be sound, and except for a few deficiencies would be considered ready for rebar placement. Core results will confirm on site evaluations. - One small area in the South East corner of Pier #2 will required additional cutting to provide the 100 mm "Bench" - The contractor chipped along one of the "CRACK" on the East side . The area on both sides of the chipped area must be sawcut and power wash as per the previous recommendations. - Digital photos taken (in file) November 26, 2009 Fog, ~-5 degree C - Contractor decided to erect the rebar steel in the center core. - All the tarp and heat was removed. - Drawing showing the "Crack" location in a plan view was provided by Ruskin. Another drawing showing some additional crack will be provided later. - No additional cutting or chipping was done today. - Concrete pour at Pier #1 is now schedule for Sunday November 29, 2009.								



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FIELD REVIEW REPORT

PROJECT:	Deh Cho Bridge			No:	4	c.c.	Owner Cons. Eng.	☐ Gen. Contr. ☐ Contr.	Arch. Other	☐	
LOCATION:	Fort Providence			DATE:	24 Nov 2009		In Attendance:				
CONTRACTOR:	Ruskin Construction Ltd.			EE09-1759-00		Danny K. Jivko Phil Munn BP Super					
OWNER:											
CONTRACT REF:											
START:	08:00	FINISH:	17:00	WEATHER:	Clear, Windy		TEMP:	= -18° C			
OBSERVATIONS / REMARKS / ACTIONS BY:				Rene Hache, Civil Eng. Technologist							

Please refer to all / any previous field review memos.

November 24, 2009

Observations and Recommendations

- Concrete removal is ongoing at Pier # 2. Efforts are concentrated on the perimeter of the concrete structure.
- Night crew didn't completed the chipping, final inspection will be delay until all the chipping is completed and all the exposed concrete has been power wash.
- One small area in the South East corner of Pier #2 will required additional cutting to provide the 100 mm "Bench"
- Power washing is schedule to be completed by the next night crew, and final visual review for Tomorrow am Nov 25,2009
- Contractor confirms the pour at Pier #1 scheduled for Friday is now reschedule for Saturday.
- Levelton finally received a copy of the concrete cores test report At 17:30 today, complete with comments and photos. The additional concrete coring is schedule for first thing Tomorrow am. This doesn't give Levelton much time to response / review the proposed additional investigation.
- This will certainly delay the pour on Pier #2 that was schedule for Sunday November 29,2009.
- Today, I notice a few cracks in the exterior of the concrete structure. They are located on the South East corner of Pier #2. Since EBA representative will be on site for the additional coring, I recommend that we do an additional core over that area to confirm the extend of the "Crack"
- Pier # 2 still has some ice buildup in some area on the outside of the concrete structure. Once these areas have been heated and wash, they will need to be evaluated.



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FIELD REVIEW REPORT

PROJECT:	Deh Cho Bridge	No:	3	c.c.	Owner Cons.Eng.	☐ Gen. Contr. ☐ Contr.	Arch. Other	☐
LOCATION:	Fort Providence	DATE:	23 Nov 2009		In Attendance:			
CONTRACTOR:	Ruskin Construction Ltd.	EE09-1759-00	Danny K. Jivko Phil Munn BP Super					
OWNER:								
CONTRACT REF:								
START:	07:00	FINISH:	17:00	WEATHER:	Clear, Windy	TEMP:	≈ -20° C	
OBSERVATIONS / REMARKS / ACTIONS BY:		Rene Hache, Civil Eng. Technologist						

Please refer to all / any previous field review memos.

November 22, 2009

Observations and Recommendations

- Visited the concrete batch plant to look at aggregate stockpile and overall installation (Digital photos taken);
- Aggregate stockpile doesn't appear to be large enough to complete the next 3 concrete pours;
- Contractor schedule is to do: Pier #1 Upper, Pier #2 Lower and Pier #2 Upper. (In that order);
- Concrete removal is ongoing at Pier # 2. Efforts are concentrated in the section outside of the center core. Day shift started using larger air powered concrete breaker, they were instructed to use small hand held electric chipping hammer. They complied immediately;
- Contractor is using compressed air to clean debris of the concrete surface. It is acceptable to get an overall idea that their methodology is acceptable, but they were advised that the concrete will need to be power washed prior to Levelton final review.
- Pier # 2 is under insulated tarp and has several heaters to keep temperature above freezing.

November 23, 2009

Observations and Recommendations

- Concrete removal is ongoing at Pier #2. The section inside the rebar appears to be completed. The contractor is now concentrating its effort on the outside section cutting and chipping the outside edge to create a "bench" at least 100 mm in width;
- After all the cutting and chipping is completed, the contractor will power wash all the exposed concrete prior to Levelton final inspection;
- Final inspection is scheduled for Tuesday, November 24, 2009;
- EBA gave the contractor some results from the concrete cores taken on November 20, 2009. These results will be forwarded to Levelton shortly;
- New concrete pour schedule as of 17:00 today is: Pier # 1 Upper on Friday, November 27 and Pier # 2 Lower on Sunday, November 29, 2009;
- There is a reduced crew for the night shift, uncertain on the amount of work that will be carried out at Pier # 2.

FIELD REVIEW REPORT

PROJECT:	Deh Cho Bridge	No:	2	c.c.	Owner Cons.Eng.	☐ Gen. Contr. ☐ Contr.	Arch. Other	☐
LOCATION:	Fort Providence	DATE:	Nov 21-2009		In Attendance:			
CONTRACTOR:	Ruskin Construction Ltd.	FILE:	EE09-1759-00		Danny K. Jivko			
OWNER:				Phil Munn, B.P. Super				
CONTRACT REF:								
START:	07:00	FINISH:	20:00	WEATHER:	Overcast, light snow	TEMP:	~-8	
OBSERVATIONS / REMARKS / ACTIONS BY:		René Haché Civil Eng. Technologist						

November 21, 2009

Observations and Recommendations

Concrete pour

- Concrete pour at Pier #4 ,Upper Buttress, Total concrete place 320 cubic metre. Pour started around 09:00 am, completed around 21:30.
- Ambient temperature was around -8 degree C, Concrete temperature was around +11 degree C.
- Almost all the concrete truck had some " Balls " of dry cement and aggregate, They don't appear to be frozen material and they were more common at the beginning and end of each load. Size was variable with the larger one ~ 200mm in diameter. Uncertain if trial batch were done to try to alleviate this ie: methodology of batching, initial batch using only water and adding superplasticizer at the place of delivery. Changing amount of initial water, rate of loading Condition of mixing fins in mixers, mixing time, mixing speed etc...
- Concrete batch plant is equipped with stove top burner and scale to do moisture content on concrete aggregates and sand. Uncertain if they are doing some or if they rely on the moisture probe in the sand silo. Concrete aggregate appears to be coated with a thin layer of fine dust.
- Slump were fairly high, some as high as 250mm. Superplasticizer is added with the initial batch water.
- EBA had two technicians on site, they were doing air, slump, temperature and casting concrete cyls for compressive strength.
- No unit weights were done.
- Concrete was placed by pump, and was consolidated with hand held vibrator. It appears that the amount of mechanical consolidation was minimum.
- Thermocouples were install at various locations inside the formwork prior to concrete placement.
- Contractor installed insulated tarp and heaters at pier #2. Concrete chipping with hand held hammer is ongoing, Contractor is concentrating his effort around the center core.
- Rebar contractor flame cut all of the vertical bars.
- Saw cut were done on the outside perimeter of the exposed concrete. Depth is variable, LCL recommended a sawcut to a minimum depth of 30 mm with a "bench" 100 mm wide, the bench could be done with hand held chipping hammer.
- Exposed Rebar is generally free of concrete. Some isolated rebar is showing some sign of damage caused during concrete demolitions.
- Levelton will assist in identifying the locations and help in establishing a methodology. It is the contractor responsibility to remove all the soft and damaged concrete.
- Contractor will need to pressure wash the exposed concrete surface prior to Levelton final review.

Digital photos taken (not attached)

PER: _____
LEVELTON CONSULTANTS LTD

FIELD REVIEW REPORT

PROJECT:	Deh Cho Bridge	No:	1	c.c.	Owner Cons. Eng.	☐ Gen. Contr. ☐ Contr.	Arch. Other	☐
LOCATION:	Fort Providence	DATE:	Nov 20-2009		In Attendance:			
CONTRACTOR:	Ruskin Construction Ltd.	FILE:	EE09-1759-00		Danny K. Jivko Jivko J. Jivko Phil Munn,			
OWNER:								
CONTRACT REF:								
START:	Nov-20-09	FINISH:	Nov-20-09	WEATHER:	Overcast	TEMP:	~-10	
OBSERVATIONS / REMARKS / ACTIONS BY:		René Haché Civil Eng. Technologist						

November 20, 2009

- Arrived in Fort Providence around 12:00
- Met Jivko representative and drove to the site early in the afternoon.
- Another consultant is on site to review the rebar conditions and make recommendations.
- Concrete coring was completed earlier in the afternoon, a sketch was provided with the numbering sequence and location. Contractor will supplied a detail drawing with accurate locations and elevations. Some of the horizontal cores are located quite lower then the top of existing concrete. Some are > 1.0 metre lower.
- A quick visual inspection reveals that the majority of the concrete appears to be sound. A few cores had sign of poor consolidation with "Bug holes" to 10 mm in diameter.
- Cores were ship to Yellowknife today to be tested for compressive strength and Specific gravity

Observations and Recommendations

- Hydromilling and heavy mechanical breaker are no longer in use. (Hydromilling equipment apparently left the construction site). Contractor is using small electric hand held hammer with chisel.
- Several areas are covered with concrete debris and /or mud and ice, making it very hard to evaluate the condition of the concrete surface. There is also some ice covering some sections on the sides of the concrete.
- More chipping is required to remove concrete around some of the horizontal bars. Contractor was informed to provide a minimum of 30 mm clearance.
- Rebar contractor is flame cutting some of the vertical bars.
- Feathered edges, No saw cut were done at time of site visit, Focus representative is recommending a saw cut of 100 mm in depth.
- Exposed Rebar is generally free of concrete.
- Contractor will keep on removing the "soft" concrete and any other areas where there is delamination. Or sign of damaged concrete ie: cracked etc
- Digital photos taken.

PER: _____
LEVELTON CONSULTANTS LTD



November 23, 2009

File: EE09-1759-00

Levelton Consultants Ltd.

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Web Site: www.levelton.com

Jivko Engineering
Box 1341
Yellowknife, NT X1A 2N9

Attention: Mr. Jivko Jivkov, P.Eng.

PROJECT: Deh Cho Bridge

SUBJECT: Proposal for Consulting Engineering Services

Dear Sir:

Levelton Consultants Ltd. are pleased to present this proposal for the above-captioned project. Levelton proposes to provide materials engineering services for the remediation of Lower Buttress N2. This work is already underway and this proposal formalizes our agreement as discussed in our emails dated November 10, 2009.

We understand that the Lower Buttress of Pier N2 was constructed with approximately 300 m³ of concrete, and that the lower third proceeded normally, the middle third was placed with concrete produced with fly ash instead of cement, followed by approximately 100 m³ of concrete that contains cement only rather than cement plus fly ash. The concerns that need to be resolved are:

- Ensure that all of the deficient concrete is removed to expose the sound concrete comprising the lower lift, and that the surface is adequately prepared.
- Ensure that any remaining rebar is sound and has not been damaged by the removal operations or by bending.
- Ensure that vibration caused by the removal has not affected the bond of rebar remaining embedded in the lower lift of sound concrete.

In addition, we understand that Jivko Engineering intends to retain Levelton to provide engineering services for quality assurance for the remaining substructure pours planned for 2009.

Construction Materials
Building Science
Geotechnical
Metallurgy and Corrosion
Environmental
Physical Testing



SCOPE OF SERVICES

Pier 2N Lower Buttress Remediation

- Levelton proposes to provide material engineering services as follows:
- Review demolition procedures as proposed by Ruskin and provide comments and recommendations.
- Provide comments on adequacy of the equipment used for the demolition and recommend alternative equipment and technique of demolition if necessary.
- Provide criteria and guidance for preparation and acceptance of the concrete substrate prior placing the new concrete.
- Review the final stages of concrete removal and surface preparation.
- Review the concrete substrate just prior to concrete placement.
- Review concrete core test results.

We will provide field reviews and memos while on site. Upon completion of the work, we will provide a letter report under Professional Engineer's seal and signature, summarizing our observations. This summary letter does not relieve the contractor from their responsibility to meet the project specifications. Also, a separate review by the structural engineer responsible will be required to address reinforcing steel issues and repairs.

Quality Assurance for Remaining Substructure Concrete Pours

As discussed, Levelton would be please to provide quality assurance surveillance for the remaining substructure concrete pours. We would have a Levelton representative on site for the remaining pours to review the quality control testing conducted by the Contractor's Consultant. Levelton would not conduct any companion testing. We would provide comments as it relates to concrete quality, including:

- Slump
- Air content
- Density
- Temperature
- Thermal protection and temperature gradients (measured by Jivko representatives)
- Corrective measures by the Contractor if test results do not meet specifications

We would also review the mix design and aggregate qualifications. We would prepare field review reports while on site and provide a summary letter after the substructure work is completed. We note that our involvement would be to provide review of the contractor's QC testing. We would provide recommendations to Jivko Engineering but we would not provide instructions to the Contractor or their QC Consultants.



Fees

Our invoices will reflect time expended and disbursements at the following rates, plus GST:

- N.A. Cumming, FACI, P.Eng. \$200/hour
- O.K. Gepraegs, MASC., P.Eng. \$180/hour
- Project Engineer \$135/hour
- Senior Technician \$100/hour
- Clerical \$55/hour
- Vehicle \$0.55/km
- Disbursements Cost plus 10%

Based on the uncertainties in the scheduling of the work and the associated time required on site, we cannot provide a budget estimate at this time. We will provide regular budget upgrades on a monthly basis.

To confirm retention of our services, please complete the Acceptance area following and return fax to us within fourteen days. Alternatively, we will accept a purchase order that references this proposal. Thank you for contacting Levelton.

Please call if you have any questions or require anything further.

Yours truly,

LEVELTON CONSULTANTS LTD.

Reviewed by:

Per: Oliver Gepraegs, P.Eng.
Manager – Alberta
Principal
e-mail: ogepraegs@levelton.com
Phone: 403-269-4141 x227

Neil A. Cumming, FACI, P.Eng.
Executive Vice President



Acceptance

The undersigned is authorised to sign on behalf of: _____

Street Address: _____

City & Postal Code: _____

Signature: _____

Print Name: _____

Date: _____

Attachment: Terms of Engagement

Oliver Gepraegs

From: Jivko Jivkov [jivko@jivko.ca]
Sent: November-14-09 10:18 PM
To: Andrew Gamble
Cc: ED Dave Robson@EBA; YK Ed Hoeve@EBA; VAN Matthias Schueller; PR G Corey Ross@Ruskin; 'PR G Don Williams'; VIC Christian Copp; VIC Dennis Sargent; Andrew Purdey; phil.munn@jivko.ca; Oliver Gepraegs; Neil Cumming; YK Lloyd Dayagbil; Danny Keeler; ED Stuart D. Smith; YK Bob Milburn@dot
Subject: Re: Lower Buttress N2
Importance: High

Andrew,

Here below is a briefing from Mr. Oliver Gepraegs MASc., P.Eng. of Levelton. We will be implementing all specified recommendations and will be involving a structural engineer to provide the required input. We will be discussing with Levelton potential for expanding their role in assessment and remedial work on the buttress. Before proceeding with remedy implementation plan we will be seeking acceptance from Dr. Schueller and Stuart Smith.

Tomorrow Sunday I will meet Oliver for an hour in our offices. You could join if available. Further briefings and report will follow.

We would appreciate if Dr. Schueller, Don Williams, Stuart Smith, Dennis Sargent and anyone else on the distribution list provide quick comments on this submission.

Regards,

Jivko Jivkov P. Eng.

Jivko Engineering, Box 1341, Yellowknife, NT X1A 2N9, T: 867 920 4455, C: 867 446 0082, F: 867 873 6090, E: jivko@jivko.ca

----- Original Message -----

From: Oliver Gepraegs
To: jivko@jivko.ca ; phil.munn@jivko.ca
Cc: Neil Cumming
Sent: Saturday, November 14, 2009 9:08 PM
Subject: Lower Buttress N2

Gentlemen:

The following presents a summary of our observations for Saturday, November 14, 2009 and a brief discussion and recommendations.

OBSERVATIONS

I reviewed progress of the demolition work and as of 5:00 pm, most of the top layer of concrete outside of the inner core has been removed. Ruskin is chipping the concrete on the inner core and continues removal in the exterior portion. Demolition is being done using backhoes and handheld jackhammers.

Hydrodemolition contractor arrived on site and conducted a trial on concrete blocks set up in the yard. Concrete removal was done using a handheld wand and hydromilling removed paste and aggregate.

None of the vertical bars in the centre core have been cut. Some bars have been damaged by jack hammers although generally Ruskin is trying to minimize damage to bars. We understand that Ruskin does not intend to cut any of the centre core bars.

As stated in our previous email, outer bars have been flame cut to approximately 0.3 m above the concrete. Cutting of the bars was mostly limited to the spliced upper bars and not the lower dowel bars that extend into the footing (original bar ends are still visible). On the north side, some lower dowel bars may have been cut. This will have to be evaluated after concrete removal is completed.

Due to restricted access, some of the outer vertical bars have been bent by the small backhoe on the north side. The bent portions of the bars will have to be cut and new bars spliced as they were not bent under controlled conditions.

DISCUSSION

Rebar

Based on discussions with Ruskin, we understand none of the vertical bars will be bent and subsequently straightened but rather cut and spliced with bar couplers. This approach is preferred as field bending bars at low temperature may damage the bars. Also, bar radii are difficult to control. We recommend that the structural design engineer review the bar couplers and acceptable staggering of the splices. We understand that Ruskin is planning to stagger splices at 300 mm.

Some rebar (exterior and centre core) has been damaged by impact from jack hammers. Some of these will have to be cut and spliced or additional bars may have to be added. The structural design engineer should review if any damage to the bars is permitted, and if so, how much damage is deemed acceptable.

Review of the rebar will be required after the demolition is completed.

Concrete

The delineation between the low strength and lower regular strength concrete is visible along the vertical face of the buttress. This line is not level, indicating that concrete removal to varying depths throughout the buttress may be required.

Ruskin indicated that hydromilling will be used for removal of the low strength concrete. The hydromilling contractor is on site to start as soon as jackhammering is completed.

Surface Preparation

The concrete substrate shall be free of cracks and consist of sound concrete as specified in CSA A23.1. The substrate shall be pressure washed to remove all laitance, dust, dirt, grease and brought to SSD condition. All standing water shall be removed.

The vertical face shall have a sawcut (25 mm minimum) perpendicular to the vertical face and concrete shall be chipped back to the depth of the sawcut. Featheredging shall not be permitted. We recommend that sawcutting be done after the level of sound concrete has been determined but prior to final chipping.

A bonding agent should be applied to the prepared surface. The bonding agent should conform with CSA A23.1-09, 7.6.4.2 and consist of a cement:water slurry with a w/c ratio not exceeding that of the concrete mix design (max. 0.4). The slurry shall be applied immediately prior to placing concrete and it shall not be permitted to freeze or dry. It should be scrubbed in with a stiff brush.

SUMMARY

If removal by hydromilling is successful, the substrate should be in a condition suitable to receive new concrete. If additional chipping is required, this should be done by handheld jackhammers with a maximum weight of 15 lbs to avoid extensive fracturing of the surface.

After concrete removal is complete (or near completion), cores should be removed to determine if the lower concrete is sound. Cores should be reviewed prior to cutting and breaking to identify possible changes in colour (which would indicate different fly ash/cement contents) and other discontinuities. We recommend that vertical cores be drilled to a depth of approximately 600 mm. Cores should be cut into three sections and each section should be tested for compressive strength and unit mass. This will provide information about concrete

properties in the vertical direction. If the top section of a core has the same compressive strength as the lower section (provided the lower section meets the specified strength) no further removal will be required. Should the top section have a lower strength, further concrete removal will be required. We discussed this with Ruskin and they will arrange for coring and testing by EBA. Levelton/Jivko will provide guidance on selecting core locations. We recommend that at least ten cores be removed. Should test results indicate large variations, additional cores and chipping would be required. In addition, we recommend that an additional six cores be removed from the vertical outer face to determine compressive strength outside of the outer rebar.

After concrete removal is completed, Jivko and Levelton will review all remaining rebar and mark damaged bars. Bars shall be repaired (spliced, new bars added) as required by the structural engineer. If bars are damaged too low for splicing, additional chipping may be required.

Where adjacent bars have been flame cut and it can not be determined which is the lower dowel bar and which is the upper spliced bar further investigation will be required. It is not know if this will be the case but we discussed this with Ruskin. We recommend that bars be sawcut rather than flame cut prior to splicing.

We discussed the above with Ruskin. Ruskin would like a copy of our observations and we will leave it to Jivko Engineering to distribute as required. I will prepare a summary in memo format when I am back in the office.

We will schedule a site visit towards completion of demolition and surface preparation. We will stay in contact with Phil over the next few days to discuss Ruskin's progress.

Regards,

Oliver

Oliver Gepraegs, MAsc., P.Eng.
Manager - Alberta
Principal

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Oliver Gepraegs

From: Jivko Jivkov [jivko@jivko.ca]
Sent: November-13-09 5:16 PM
To: phil.munn@jivko.ca; Oliver Gepraegs
Cc: VIC Christian Copp; VAN Matthias Schueller; VIC Dennis Sargent; ED Stuart D. Smith; YK Bob Milburn@dot; YK Lloyd Dayagbil; Andrew Gamble; Neil Cumming
Subject: Re: Deh Cho - Lower Buttress 2N

Thank you Oliver,
Please call later in the evening to discuss

Regards,
Jivko

----- Original Message -----

From: Oliver Gepraegs
To: jivko@jivko.ca ; phil.munn@jivko.ca
Cc: Neil Cumming
Sent: Friday, November 13, 2009 4:43 PM
Subject: Deh Cho - Lower Buttress 2N

Jivko, Phil:

Following up on our site visit today, the following presents a brief summary of my observations as well as some discussions on going forward.

- Phil and I reviewed progress of the demolition work. Approximately 2/3 of the outer portion of the top layer of concrete (high strength) as been removed by chipping. Removal extends up to the exterior of the inner steel. In some areas, some of the low strength concrete has been removed on the outside of the outer mat of steel. The inner section has not been demolished.

REBAR

- The outer vertical steel has been flame cut to approximately 0.3 m above the concrete to allow access for further chipping. Due to restricted access, some of the outer vertical bars have been bent by the small backhoe on the north side. The bent portions of the bars will have to be cut and new bars spliced as they were not bent under controlled conditions.
- The inner vertical bars have not been bent with the exception of some mild bending to allow access of the jackhammers. This is not considered significant at this point but bars should not be bent any further.
- Some of the bars have been damaged by impact from jack hammers. Some of these will have to be cut and spliced or additional bars may have to be added. The structural design engineer should review the maximum allowable loss in section due to damage.
- I spoke briefly with Kirk from Ruskin and he indicated that bars will not be bent but rather bent and spliced. This approach is preferred as field bending bars at low temperature may damage the bars. Also, bar radii are difficult to control. We recommend that the structural design engineer review the bar couplers and acceptable staggering of the splices (as proposed by Ruskin).

CONCRETE

- The delineation between the low strength and lower regular strength concrete is visible along the vertical face of the buttress. This line is not level, indicating that concrete removal to varying depths throughout

the buttress may be required.

- Ruskin indicated that hydromilling will be used for removal of the low strength concrete with the hydromilling contractor scheduled for arrival tomorrow. Based on progress to date and our observations, demolition by jackhammer may not be completed for a few more days.

SURFACE PREPARATION

- If removal by hydromilling is successful, the substrate should be in a condition to receive new concrete. If additional chipping is required, this should be done by handheld jackhammers with a maximum weight of 15 lbs to avoid extensive fracturing of the surface.
- After concrete removal is complete (or near completion), cores should be removed to determine if the lower concrete is sound. Cores should be reviewed prior to cutting and breaking to identify possible changes in colour (which would indicate different fly ash/cement contents) and other discontinuities.
- Ruskin may want to consider removing cores from the vertical faces to determine the extent of the low strength concrete. This could be done while demolition is still in progress. Cores lengths should be less than the concrete cover to avoid damaging rebar. This may provide some information to determine required level of removal. It is anticipated that the depth of concrete removal varies considerably.
- After concrete removal is completed, Jivko or Levelton should review all remaining rebar and mark damaged bars. Bars shall be repaired (spliced, new bars added) as required by the structural engineer. If bars are damaged too low for splicing, additional chipping may be required. Alternatively, the structural engineer may review the possibility of installing doweled bars. These dowels would have to be load tested for acceptance.
- The concrete substrate shall be free of cracks and consist of sound concrete as specified in CSA A23.1. The substrate shall be pressure washed to remove all laitance, dust, dirt, grease and brought to SSD condition. All standing water shall be removed.
- Bonding agent should conform with CSA A23.1-09, 7.6.4.2 and consist of a cement:water slurry with a w/c ratio not exceeding that of the concrete mix design. The slurry shall be applied immediately prior to placing concrete and it shall not be permitted to freeze or dry. It should be scrubbed in with a stiff brush.

I suggest a site meeting with Ruskin tomorrow morning. Based on the progress to date, a further site visit later next week is recommended.

Regards,

Oliver

Oliver Gepreags, MASc., P.Eng.
Manager - Alberta
Principal

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30/04/2010

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Oliver Gepraegs

From: Jivko Jivkov [jivko@jivko.ca]
Sent: November-10-09 9:53 PM
To: Oliver Gepraegs
Cc: YK Phil Munn; YK Lloyd Dayagbil; Andrew Gamble
Subject: Re: Lower Buttress 2N Demolition- Proposal

Oliver,

Your client will be Jivko Engineering. The construction of the bridge is a P3 initiative. Owner is the aboriginal entity Deh Cho Bridge Corporation. The Owner has an agreement with the Government to design, build and operate for 35 years a toll bridge at that location. Jivko was retained to provide engineering services for the Owner.

Ruskin has an independent welding inspector on site for most of the time. We could contact them for the NDT once we establish with your help the scope of the testing.

The splicing will be designed and certified by our structural engineers. Most likely couplers would have to be used. We are hoping with your help to establish integrity of rebar and points of cutoffs in view of staggering.

Regards,
Jivko Jivkov P. Eng.
Jivko Engineering, Box 1341, Yellowknife, NT X1A 2N9, T: 867 920 4455, C: 867 446 0082, F: 867 873 6090, E: jivko@jivko.ca

— Original Message —

From: Oliver Gepraegs
To: Jivko Jivkov
Sent: Tuesday, November 10, 2009 8:52 PM
Subject: RE: Lower Buttress 2N Demolition- Proposal

Jivko:

A couple of other items. Will Jivko Engineering be our client or will it be NWT Transportation?

As far as the reinforcing steel is concerned, some NDT testing by a testing firm (mag particle testing) may be required. Also, splicing and/or the use/designs of couplers would require the input of a structural engineer/designer as it would be structural design aspect.

Regards,

Oliver

Oliver Gepraegs, MAsC, P.Eng.
Manager - Alberta
Principal

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From: Jivko Jivkov [jivko@jivko.ca]
Sent: November 10, 2009 18:41
To: Oliver Gepreags
Cc: Danny Keeler; VIC Christian Copp; VIC Dennis Sargent; PR G Corey Ross@Ruskin; Andrew Purdey; YK Phil Munn; YK Lloyd Dayagbil
Subject: Lower Buttress 2N Demolition- Proposal

Dear Oliver,

The presented proposal reflects accurately the current condition of the Lower Buttress 2N. In terms of resolving the specified concerns we would expect Levelton to consider carrying out the following tasks:

- Provide procedures for the demolition, or review and recommend acceptance of procedures prepared by Ruskin...or both.
- Provide comments on adequacy of the equipment presently used for the demolition and recommend alternative equipment and technique of demolition if necessary. This could include identifying unacceptable techniques for demolition.
- Provide criteria and guidance for preparation and acceptance of the final concrete surface prior placing the new concrete.
- Provide criteria for acceptance/rejection of rebar. This could include proposed method and pattern of splicing or extension of rebar if needed.
- Monitor final stages of preparation, inspect and recommend acceptance of the concrete surface and rebar prior placing the new concrete.

The work on most of the described above tasks could be presented in email-memo format. The recommendation for acceptance should be a formal letter including summary of Levelton observations.

The commercial part of the contract is acceptable as described below.
We are looking forward to meet with you on the evening of Thursday Nov 12 in Yellowknife.

Regards,
Jivko Jivkov P. Eng.
Jivko Engineering, Box 1341, Yellowknife, NT X1A 2N9, T: 867 920 4455, C: 867 446 0082, F: 867 873 6090, E: jivko@jivko.ca

----- Original Message -----

From: Oliver Gepreags
To: dennis.sargent@sargentengineering.com ; jivko@jivko.ca
Sent: Tuesday, November 10, 2009 11:42 AM
Subject: Deh Cho Bridge Proposal

Dennis, Jivko:

Further to our telephone conversation, we confirm that Levelton is available to provide engineering services to the Deh Cho Bridge Corporation to address concrete quality issues related to the N2 Lower Buttress. We

understand that the Lower Buttress of Pier N2 was constructed with approximately 300 m³ of concrete, and that the lower third proceeded normally, the middle third was placed with concrete produced with fly ash instead of cement, followed by ~100 m³ of concrete that contains cement only rather than cement plus fly ash. We have discussed this with Ruskin, who have indicated that they welcome Levelton's involvement. We understand Ruskin construction is currently in the process of removing the upper layer of concrete to expose the low strength layer which is supposed to be removed by hydromilling. It is expected that the hydromilling may proceed as early as tomorrow.

The concerns that need to be resolved are:

1. ensure that all of the deficient concrete is removed to expose the sound concrete comprising the lower lift, and that the surface is adequately prepared.
2. ensure that any remaining rebar is sound and has not been damaged by the removal operations or by bending.
3. ensure that vibration caused by the removal has not affected the bond of rebar remaining embedded in the lower lift of sound concrete.

We expect that as things develop there will be additional details which will need input from Levelton to resolve.

Initially we propose to attend the site and review the removal process to identify when a sound substrate has been reached. We would also visually review the rebar to identify possible damage from jack hammering and/or bending. We anticipate that any damage to bars will be limited to the upper lift of the pier, with the steel in the low strength concrete not being damaged by hydromilling as long as they are not bent.

We discussed the work with Ruskin and based on their schedule, we propose to fly to Yellowknife Thursday evening and travel to the site on Friday morning, remaining tentatively until Sunday. We recommend that a local coring contractor be available to remove cores from the sound lower layer for compressive strength testing. Levelton would identify sampling locations. Depending on the observed conditions, it is possible that non-destructive testing of damaged or bent rebar may be required. This would have to be done by a NDT firm, and can be arranged if the need arises. Based on our discussions with Ruskin, damage rebar above the weak concrete layer would be replaced. This would have to be decided on site.

Depending on the findings, subsequent site visits may be required.

Budget

We understand that we would be engaged by the Deh Cho Bridge Corporation. Our invoices would reflect actual hours spent and disbursements at the following rates (plus GST):

Neil Cumming, FACI, P.Eng.	\$200
Oliver Gepreags, P.Eng.	\$180
Project Engineer	\$135
Senior Technician	\$100
Clerical	\$55
Disbursements	cost plus 10%

For budgeting purposes, we recommend an allowance of \$15,000 for the initial site visit (fly up Thursday night, return Sunday) and preparation of a summary report. This estimate includes allowances for air fare, accommodation and a rental vehicle. Subsequent visits, if required, would be in addition to this estimate.

All work would be conducted in accordance with the attached Terms of Engagement. To confirm retention of our services, please reply to this email. Please provide us with Client Name and contact information.

I would have to be back in Calgary by Sunday night for some prior commitments next week. Depending on observations and findings, we would be able to have someone on site for next week. We can discuss on site.

Regards,

Oliver

Oliver Gepraegs, MAsC., P.Eng.
Manager - Alberta
Principal

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MEMORANDUM

TO: Associated Engineering (BC) Ltd.
Attention: Leslie Mihalik, P.Eng.

FILE: RI09-1803-01.50

FROM: N.A. Cumming, P.Eng.

DATE: May 6, 2010

PROJECT: Deh Cho Bridge - Phase 1

SUBJECT: Status of Pier 3S

The first of the Jivko documents arrived in our office on May 5, 2010 and we have begun our comprehensive review. We have also reviewed other documents available on the Buzzsaw site, as well as those contained in Levelton's files from work done in late 2008-early 2009 on behalf of Ruskin Construction. The following will provide a review of the status of the Pier 3S condition based on our current state of knowledge.

As we understand it, the sequence of events related to the construction and remediation of Pier 3S is:

- The Pier 3S footing was poured on September 23, 2008, apparently without significant incident;
- On dewatering of the cofferdam it was observed that some surface rebar was exposed (Allnorth Consultants Ltd. letter of November 27, 2008);
- On October 27, 2008, Mr. D. Williams, P.Eng. of Allnorth issued a Pier Footing Certification confirming that the footing had been constructed in accordance with the applicable CSA Standards and with the Plans and Specifications, except for proof of the final design concrete strength;
- Subsequently, it was determined that the till surface had not been reviewed by EBA prior to the concrete being placed. To address this, three cores were drilled through the footing to allow the contact zone between till and underside of concrete to be reviewed. It was determined to be as expected by EBA (EBA report of April, 2010);
- It was observed that the concrete cores intersected intermittent zones of weak, friable concrete in the footing. This was raised as a concern and additional cores were drilled to assess the concrete condition. It was determined that the area containing the zones of defective concrete was limited to the east end of the footing;
- EBA attended the site on November 10, 2008 and observed removal of concrete in progress from the top of the footing over an area roughly 1.0 x 1.2 m in lateral dimension and about 0.9 m deep. It was located between the lower buttress and the east end of the footing. (EBA letter of November 14, 2008);



- The defective concrete and its implications were reviewed by Allnorth Consultants Ltd. (Allnorth letter of November 27, 2008). Allnorth determined that the thickness of the footing needed to be increased by 1.0 m to ensure adequate shear resistance. This analysis was based on certain assumptions that were unconfirmed at that point;
- Nevertheless, Allnorth prepared a design for the remediation, which involved the construction of a 1.2 m $\pm$ thickness of reinforced concrete on the top of the footing in a horseshoe shape around the east end of the lower buttress. Allnorth also prepared a Work Procedure and an Inspection and Test Plan for repair of the footing. The work procedure required removal of defective concrete from the footing surface to an elevation 50 mm below the top rebar;
- Jivko Engineering undertook to certify the design of the remediation (email Jivko to Atcon November 29, 2008). A design similar to the Allnorth concept was developed and sealed by Jivko Engineering On December 5 and 17, 2008;
- The concrete for this new slab was placed on December 22, 2008 (email Jivko to Kevin McLeod April 5, 2010). Photos 14 through 20 provided with this email clearly show concrete being placed in a location consistent with the remediation design and the location of the cavity referred to by EBA in their letter of November 14, 2008;
- On April 1, 2010 CBC News reported on an interview with a former employee of Ruskin Construction, who alleged that at least one defect in one of the piers was left unrepaired. The employee was quoted as follows: *"It's on the northeast corner, next to the lower buttress...and it's probably a metre by a metre, by probably half a metre deep."* It is not stated in the news report which pier is referred to, however the information quoted correlates well with the information cited above with respect to defects in the footing of Pier 3S and the subsequent remediation.

Hence, the cavity referred to in the news report is believed to be the same cavity referred to in the EBA letter of November 14, 2008, which is located directly under the additional 1.2 m thickness of concrete that was placed on December 22, 2008 (Jivko email and photos of April 5, 2010). It is therefore not considered possible that the cavity was left unfilled.

Based on this information available to date we have concluded that the allegation that unrepaired concrete was left behind is not credible. We continue to review documents to fill in missing details such as confirmation of Allnorth's design assumptions, concrete strength test reports, field review reports related to rebar and concrete placement, the completed Inspection and Test Plan, and other related documents.

We will provide updated reports on the condition and status of Pier 3S as new information becomes available.

Levelton Consultants Ltd.

[Original Signed by N.A. Cumming]

N.A. Cumming, F.A.C.I., P.Eng.
Executive Vice President



LEVELTON

MEMORANDUM

TO: Associated Engineering (BC) Ltd.
Attention: Leslie Mihalik, P.Eng.

FILE: RI09-1803-01.50

FROM: N.A. Cumming, P.Eng.

DATE: June 7, 2010

PROJECT: Deh Cho Bridge – Phase 1

SUBJECT: Status of Pier 3S

Further to our memorandum of May 6, 2010 we have conducted a further review of documents and held interviews with several people directly involved in the construction of and repairs to Pier 3S. The following will provide an update of our state of knowledge regarding these events.

Interview with Mr. Terry Whiteman

Mr. Whiteman was Ruskin's site superintendant during the construction and repairs to Pier 3S. In an interview with CBC News dated April 1, 2010 he alleges that at least one defect was left unrepaired after it was first detected. He is quoted as follows: *"It's on the northeast corner, next to the lower buttress...and it's probably a metre by a metre, by probably half a metre deep."*

Initial investigation by Levelton confirmed that a 1.0 m thick reinforced concrete slab had been added to the east end of the footing, which would have covered the area referred to by Mr. Whiteman. It had been concluded that the allegation that cavities in the top of the footing at this location had been left unrepaired were not credible.

In a subsequent interview with Levelton Mr. Whiteman stated the following:

- The unrepaired depression was actually located on the north side of the footing, west of the centreline. This is contrary to the information quoted in the CBC News report.
- The depression was prepared for repair and Ruskin was awaiting a repair procedure from Jivko Engineering, which was never received.
- During excavation of concrete for the repair at the east end, the prepared depression west of the centreline became filled with debris. When the new slab at the east end was completed, the cofferdam was filled with scour rock, the sheet piles were pulled, and the scour rock was allowed to spill out around the lower buttress.
- In this sequence of events repairs to the depression west of centerline were not completed.

In an email of May 9, 2010 Mr. Whiteman provided four photos of the area where repairs were allegedly not carried out, however on review it was found that the photos did not show the area of concern. One photo (Photo 1 below) dated November 7, 2008 showed a depression with exposed rebar partially filled with fresh concrete. This is a significant photo and will be referred to below.



Photo 1: Depression partially filled with fresh concrete, November 7, 2008. This could be either the southeast or northwest corner of the Lower Buttress.

Two other photos dated October 17, 2008 (Photos 2 and 3) showed concrete removal in progress where the top rebar was exposed. The area shown is primarily inside the dowels for the lower buttress, and extends slightly outside this area. However the location shown does not correlate with Mr. Whiteman's verbal description of the location of the unrepaired depression.



Photo 2: Concrete removal in progress, October 17, 2008. Note that the depression extends outside the dowels for the lower buttress. This could be either the northwest or southeast corner.



Photo 3: Close up of area shown in Photo 2.

A fourth photo, dated December 5, 2008 shows broken concrete and debris piled on top of the footing against the cofferdam. It is difficult to tell where this area is in relation to the allegedly unrepaired areas. Again, the date of this photo is significant as will be discussed below.



Photo 4: Debris piled against cofferdam, December 12, 2008.

Interview with Mr. Ove Lagerquist

Mr. Lagerquist was Jivko Engineering's site representative during November 2008. He prepared hand-written Project Daily Records and took numerous photos. He confirmed that two depressions with exposed rebar were observed on the north side of the footing, one along the face of the lower buttress at about the 10:00 position, the other near the centerline against the cofferdam, i.e. the 12:00 position. He provided four photos, two of which are reproduced below (Photos 5 and 6).

Mr. Lagerquist wrote in his daily report on November 8, 2008: *"Repair of exposed rebar (N. Side) was done yesterday without notifying me. Keith stated that Allnorth signed off."*

"Yesterday" would have been November 7, 2008, the same date as Photo 1 provided by Mr. Whiteman, which shows a depression partially filled with fresh concrete.

Hence, it appears that the depression near the northwest corner of the lower buttress was filled on November 7, 2008. Photo 5, provided by Mr. Lagerquist, was taken on November 7, 2008 and shows a depression partially filled with fresh concrete. Photo 6 shows the depression against the cofferdam on November 12, 2008, indicating that it was not filled at the same time.

Mr. Lagerquist has stated verbally and in an email of May 18, 2010 that the repairs to both depressions were completed satisfactorily.



Photo 5: Depression partially filled with fresh concrete, November 7, 2008. This appears to be the same area shown in Photo 1.



Photo 6: Depression near cofferdam, November 12, 2008.

Interview with Mr. Don Williams, P.Eng.

Mr. Williams is employed by Allnorth Consultants Ltd. and was acting in the capacity of Ruskin Construction's Quality Control Manager. He has stated verbally that the repairs were completed satisfactorily and undertook to provide photos. As of the date of this report no photos have been received from Mr. Williams.

It is noted that Mr. Williams signed and sealed a certification on October 27, 2008 in which he states, *"I certify that Pier Footing 3S has been constructed in accordance with the applicable CSA Standards and with the Plans and Specifications except for proof of final design concrete strength. Interim signoff only. Please see the attached supporting documentation (as listed above) that supports this certification."* The major problems with deleterious inclusions in the footing were discovered subsequently, however the depressions in the top surface where rebar was exposed would have been evident on the date of this certification.

Information from Mr. Frank Flanagan

Mr. Flanagan was Atcon Construction's superintendent during 2008. Atcon was the General Contractor and had subcontracted the substructure work to Ruskin Construction. Mr. Flanagan has provided several emails and documents relating to the repairs at the east end of the footing which entailed the construction of the 1.0 m thick new slab. Mr. Flanagan has consulted with Keith Carson, who was Atcon's QC representative on site, who reports:

'I know it was done using the procedure prepared by Ruskin specifically for the repair. I don't have pictures but I saw the repair and have it in my log for Nov 8 that 'continued chipping of concrete P3 and repairing of the exposed rebar sections with grout as per the procedure'."

Mr. Flanagan has undertaken to provide additional photos. As of the date of this report no further information has been received from Mr. Flanagan.

Interview with Mr. Jivko Jivkov, P.Eng.

Mr. Jivkov assumed the responsibility of the Engineer of Record in early 2008 when the original designer did not continue with the project. With respect to the Pier 3S footing he stated the following:

- He was not receiving adequate quality control records from Atcon and Ruskin.
- He had no budget for extensive quality assurance activities and therefore relied on Atcon/Ruskin's quality control activities.
- Depressions in the top surface of the footing where rebar was exposed were mapped. Ruskin has the map; EBA Engineering Consultants Ltd. prepared a repair procedure.
- Jivkov assumed responsibility for the design of the new slab at the east end.
- BPTEC (the Owner's Advisor) reviewed and endorsed the repair procedure.

In a memorandum dated November 27, 2008 Allnorth presented a repair concept involving the construction of a reinforced concrete slab around the east end of the lower buttress. It was based on certain assumptions stated in the report:

- *Poor concrete/weak areas can be modeled as an overall reduction in concrete strength;*
- *The original design strength of the footing (shear and bending) in the problem areas can be achieved by adding a monoslab on top of the footing. The slab increases the section depth and reduces the shear stress in the footing down to the strength of the weakened concrete. The slab also increases the section depth which reduces the compressive*

stresses in the concrete and tensile stresses in the steel reinforcing down to levels that coincide with the reduced concrete strength;

- *A 25% to 30% strength reduction (i.e. 21 MPa to 22.5 MPa) adequately models the effect of the poor concrete/weak areas encountered.*

The memorandum also contained a disclaimer stating that Allnorth accepts no professional liability associated with the accuracy of the assumptions or in the adequacy of the proposed repair if it turns out that the assumptions are deemed to be incorrect.

Jivkov prepared a design very similar to the Allnorth concept, which he sealed on December 17, 2008. Mr. Jivkov was asked whether the assumptions made by Allnorth were validated and he was unable to provide a definite answer. He stated that the design had been reviewed and accepted by Bptec.

Information from Ruskin Construction

Mr. Cliff Marcil of Ruskin has provided certain information after speaking with Mr. Whiteman. He also provided a hand-written note from Mr. Rollie Burgoyne who was a Ruskin foreman present during the repairs to Pier 3S. Mr. Burgoyne states that the depression (singular) starts inside the lower buttress and continued to the outside of it. This is consistent with the area shown in Photos 2 and 3. He states that this area was filled with concrete during the lower buttress pour, and that he is 100% sure that this area was completely repaired at that time. Concrete test reports prepared by EBA Engineering indicate that the lower buttress was poured on October 22, 2008. This information does not correlate with information cited above, which suggests the depression was filled on November 7, 2008, after the lower buttress was poured.

In a conference call on May 25, 2010, attended by several representatives of Ruskin and Don Williams of Allnorth, Levelton was advised that they concurred with Levelton's conclusion that there were three depressions in the top of the footing, and that two of them had been filled. Neither Ruskin nor Allnorth were able to provide any further documents confirming that the third depression near the sheet piles was filled.

Interview with Ms. Stevie McLeod

Ms. McLeod was employed by EBA and attended the site during the coring from November 17-26, 2008. When she arrived, removal of concrete from the top of the footing was in progress at the east end and much debris littered the area. She took numerous photos, which EBA has on file. She recalls two areas in the top of the footing were filled during the upper buttress pour. The Ruskin representative in charge of repairs at the west end was Denis Ferreira, who should have relevant records.

Subsequently EBA provided several photos and reports. The photos are generally consistent with other information received by Levelton. An exchange of emails between Terry Whiteman, Ms McLeod and Ed Hoeve of EBA dated November 26, 2008 refers to three areas of exposed rebar observed after the cofferdam was dewatered, two of which are located on the north side. It refers to a repair procedure approved by Atcon and Jivko.

Interview with Mr. Stuart Smith

BPTEC was acting in the capacity as advisor to the GNWT; Mr. Smith was BPTEC's representative. He reviewed and commented on the repair design prepared by Jivkov, and accepted it. He is unable to recall any details regarding the repairs to the depressions.

CONCLUSIONS

On a balance of probabilities, we are able to conclude the following at this point:

- There were three areas in the top of the Pier 3S footing where concrete was left low, which left small areas of the top mat of rebar exposed. One was located near the northeast corner of the lower buttress, which was subsequently covered when the repair slab was poured.
- A second depression was located adjacent to the lower buttress near the northwest corner. It was filled either during the pour of the lower buttress on October 22, 2008 or on November 7, 2008.
- A third depression was located on the north side of the lower buttress against the sheet pile cofferdam. It was not filled on November 12, 2008, and it is uncertain whether it was eventually filled.

Several people have stated verbally that all depressions were repaired satisfactorily; however as of this date we have seen no conclusive documentary evidence to confirm that this was the case. It appears that Ruskin is in the best position to provide the missing information, however they have admitted that they are unable to provide further relevant documentation.

The depression shown in Photo 6 is the one that may not have been repaired. It is not considered to be a serious structural defect, but it does expose the rebar to corrosion. Filling of the depression with concrete properly bonded to the substrate will reinstate the footing to its intended condition and will protect the rebar from corrosion. It is noted that there is no urgency to completing this repair; however it should be completed during the course of the Phase 2 construction work at a convenient time in the process.

RECOMMENDATIONS

It appears to Levelton that further efforts to search documents is unlikely to provide definitive information to show the third depression was filled, and we recommend that this aspect of the investigation be concluded.

It is recommended that a field investigation be conducted to visually examine the area in question, and to affect repairs if such are found to be necessary. This will involve removal of the scour rock that is presently in place above the footing. The depth of scour rock is unclear, but would appear to be in the order of one to two metres thick. Once this is done, the area can be cleaned and inspected using an underwater robot equipped with a video camera or by divers if conditions allow. Alternatively, a small cofferdam could be installed to allow the area to be dewatered for visual inspection and repair. Given the significant possibility that further repairs will be required, the latter option is likely to be the most expedient.

It is recommended that discussions be held with Ruskin to develop a workable approach to the investigation and repair.

Levelton Consultants Ltd.

Reviewed by:

[Original Signed by N.A. Cumming]

[Original Signed by O.K. Gepreags]

Per: N.A. Cumming, F.A.C.I., P.Eng.
Executive Vice President

O.K. Gepreags, P.Eng.
Principal



MEMORANDUM

TO: Associated Engineering (BC) Ltd.
Attention: Mr. Leslie Mihalik, P.Eng.

FILE: RI09-1803-01

FROM: B. Cook
N.A. Cumming, P.Eng.

DATE: July 9, 2010

PROJECT: Deh Cho Bridge

SUBJECT: Review of Piers 1-4 North, Updated

Levelton Consultants Ltd. has been retained by Associated Engineering to conduct a review of the Deh Cho Bridge Piers 1 to 4 North and Piers 1 to 4 South. The review encompasses inspection documents for each of the approvals covered in the Certifications issued by Quality Control Manager Don Williams P. Eng. of Allnorth Consultants Ltd. Sixty-three binders of construction documents delivered to Levelton in three groups prior to June 9, 2010 provided the material for the initial review. Six additional boxes binders of documents have since been delivered and in part, provide additional documents for this revision.

The Certifications cover all aspects of pier construction from cofferdam installation to completion of the upper buttress of each of the eight piers. This review follows the structure established by the Quality Management Plans drafted by Allnorth Consultants and deals with the certified construction items (footing, lower buttress and upper buttress of each pier) and does not deal with the steel structures mounted above the upper buttress. It is understood that the status of the steel structures is being reviewed by Infinity Engineering as part of the Phase 2 design work.

This memorandum pertains to Piers 1-4 North. Review of South Piers 1 to 4 will follow in a separate memorandum.

GENERAL ISSUES

Footing Bearing Inspection

Bearing soils were inspected at Piers 1 and 2 North and Piers 3 and 4 North and approved by EBA Engineering Consultants Ltd. prior to pouring footing concrete as documented in their letters of October 6, 2009 and Sept 24, 2009 respectively.

There are no outstanding issues with respect to the bearing soils.



Concrete

EBA inspected and tested the aggregate production from the Hwy 3, 87 km pit and approved it for concrete production. EBA tested and approved trial batches of each concrete type throughout production.

Based upon the documentation at hand, concrete strength and quality were acceptable throughout the project with two exceptions, Pier 3 South footing and Pier 2 North lower buttress.

Concerns with aggregate gradation (dirty aggregate) were cited as a concern, but concrete strengths remained above the specified strengths.

Thermal Cracking, North Piers

Considerable effort was made to protect and heat the buttress concrete while curing in very cold weather. Temperature differentials between the buttress core and the surface exceeded specified limits of 25 °C during curing in cold weather raising concerns of potential thermal cracking. Thermal cracking was addressed in the Feb. 25, 2010 Quality Control Memo #12, following an investigation by Ruskin, and Quality Control Manager, Don Williams P. Eng. (Allnorth) Mr. Williams wrote, "...if cracking does exist it should have a minimal effect on the piers".

Scour Protection Rock

Scour protection rock for the piers consists of armour rock from Hwy 3, Km 188.5 that was observed to break down during transport and presumably would continue to break down once in place. At a point in time that is not clear in the available documents, a mixture of $\frac{2}{3}$ limestone to $\frac{1}{3}$ granite armour rock from km 232 Hwy 3 pit was added.

It is understood that additional sounding is proposed to determine the condition of the scour protection rock on both North and South piers. There is an open NCR on this issue.

REMEDIATION WORKS

Pier 2 North Lower Buttress

A zone of poor quality concrete 1 to 1.5 m thick was discovered in the lower buttress. The poor quality concrete occurred as result of an error which placed fly ash and cement in the wrong silos. The silos were cleaned and their contents inspected and approved. The zone of poor concrete was removed to expose sound concrete and reinstated as detailed in the Levelton Consultants P2N Rehabilitation letter dated May 6, 2010.

Pier 3 and 4 North Footings

Following dewatering of the cofferdam three areas with exposed rebar were discovered in Pier Footing 3 North and one area on Pier Footing 4 North. All areas were repaired and inspected to the satisfaction of the owner as noted in Quality Control Memo # 6 dated Oct. 28, 2009.



QUALITY CONTROL CERTIFICATIONS

Certification documents have been completed by the Quality Control Manager Don Williams, P. Eng (Allnorth Consultants Ltd.). The certifications list Work Procedure Plans and Inspection Test Plans as verification that works were completed in accordance with the contract plans, specifications and applicable CSA standards. Non-Conformance Reports listed with the certifications are reported as being corrected and/or resolved to the owner's satisfaction.

In all cases where Work Procedure Plans and Inspection Test Plans were found in the documentation provided to Levelton, the ITPs confirmed the line item inspections as certified by the Quality Control Manager, Don Williams, P.Eng. Where specific ITPs were not located, details and comments are included with the individual Pier Reports which form the attached Appendix.

In our review of the quality control documents Allnorth and its quality control staff appear to have performed their Quality Control obligations in a professional manner and in the interest of the owner.

Piers 1 to 4 North

Although there are some missing individual ITPs in the documentation delivered to Levelton Consultants as of July 6, 2010 there is, in our opinion, sufficient overall inspection documentation and daily report information to provide confidence that the Allnorth's Quality Control Certifications of the Piers Footings, Lower Buttress and Upper Buttress in Piers 1, 2, 3 and 4 North are representative, with the exception of the scour rock, which is the subject of an open NCR as discussed above. Additional review of this outstanding issue is in progress.

Levelton recommends that Piers 1 through 4 North be accepted based on Allnorth's certifications.

Levelton Consultants Ltd.

[Original Signed by Blake Cook]

Blake Cook
Senior Technologist

[Original Signed by N.A. Cumming]

N.A. Cumming, F.A.C.I., P.Eng.
Executive Vice President



APPENDIX – Summary of Document Review

Pier 1 North Footing Certification Review

Certification of the Footing signed by Don Williams, P.Eng on Feb 25, 2010:

Work Procedure items:

WP 202 Sheet Pile Installation	ITP 202-1
WP 202 Cofferdam Excavation	ITP 203-1
WP 209 Scour Protection	ITP 209-1
WP 204 Pier Footing Rebar	ITP 204-2
WP 205 Pier Footing Tremie	ITP 205-1
WP 101 Concrete Aggregate	ITP 101-1
WP 102 Concrete Batch Plant Setup	ITP 102-1
WP 121 Scour Rock Production	ITP 121-1
NCR: None	

Pier 1 North Lower Buttress Certification Review

WP 206 Waler Installation & Dewatering	ITP 206-2
WP 207 Lower pier buttress	ITP 207-1

Pier 1 North Upper Buttress Certification Review

WP 208 Upper pier buttress	ITP 208-1
WP 209 Scour Protection	ITP 209-2

NCR 007 Shims to be installed with erection of pier base sections. See NCR 015
NCR 011 Top of buttress 2.3 degrees out of alignment. Additional fitting required to realign the lower buttress armour. See NCR 015
NCR 012 Measurement of gaps between bent and template. See NCR 015
NCR 015 Best fit of armour plate, corrective actions accepted by owner. Misalignment corrected prior to Upper Buttress concrete pour. (ITP 201-1 notes) As-built provided.

Review

121-1 note: Scour rock gradation varied from spec.

Allnorth considered the material met the intent of the specification and allowed its use.

201-1 ITP and drilling records not found.

Levelton: If the footing area was overdrilled the overdrill would have been detected at the time the cofferdam was excavated and the bearing approved.

203-1 Minor high areas noted in excavation approval.

205-1 Mix design approved by Jivko Engineering (email)

206-1 ITP Waler Installation and Dewatering not found.

Levelton: Any difficulties in this stage would have been noted in subsequent ITP's.

Conclusion

Based upon our review of the construction inspection documents made available to Levelton prior to June 25, 2010 we recommend acceptance of the Quality Control Manager Don Williams P. Eng. Certification of the Pier 1 **North Footing, Lower Buttress, Upper Buttress** and resolution of the associated Pier1North NCR's as presented.



See NCRs 005, 009 and 016

207-1 ITP - repair completed.

see NCRs 005, 009, 016 and Levelton Consultants Memorandum - Pier 2 North Rehabilitation , May 6, 2010.

208-1 ITP not found.

Concrete test data confirmed acceptable Upper Buttress concrete quality.

Review of Jivko Engineering Daily Reports during the construction period of Upper Buttress; deficiencies noted in the daily reports are covered in the resolution of NCR's 007 and 014

QC survey completed.

See NCR's 007 and 014

Gaps between bearing template and pier bent base section will be shimmed as per owners' instructions.

Conclusion

Based upon our review of the construction inspection documents made available to Levelton prior to July 6, 2010 we recommend acceptance of the Quality Control Manager Don Williams P. Eng. Certification of the Pier 2 North **Footings, Lower Buttress, Upper Buttress** and resolution of the associated Pier 2 North NCRs as presented.



Pier 3 North Footing Certification Review

Certification of the Footing signed by Don Williams, P.Eng on Feb 25, 2010

Work Procedure items:

WP 202 Sheet Pile Installation	ITP 202-1
WP 202 Cofferdam Excavation	ITP 203-1
WP 209 Scour Protection	ITP 209-1
WP 204 Pier Footing Rebar	ITP 204-2
WP 205 Pier Footing Tremie	ITP 205-1
WP 101 Concrete Aggregate	ITP 101-1
WP 102 Concrete Batch Plant Setup	ITP 102-1
WP 121 Scour Rock Production	ITP 121-1

NCR 001 rebar cage installed 200mm higher than design elev.

NCR 002 procedural error noted – during lifting of tremie, QC personnel advised.

NCR 003 rebar exposed in 3 locations of footing. Remediation completed.

Pier 3 North Lower Buttress Certification Review

WP 206 Waler Installation & Dewatering	ITP 206-2
WP 207 Lower buttress	ITP 207-1

Pier 3 North Upper Buttress Certification Review

WP 208 Upper pier buttress	ITP 208-1
WP 209 Scour Protection	ITP 209-2

NCR 007 Shims to be installed with erection of pier base sections.

NCR 008 Pier armour was rotated for best fit of bearing template.

NCR 018 Internal stiffeners not installed where bearing plate extends beyond the bearing plate.

No repairs recommended.

Review

121-1 note: Scour rock gradation varied from spec. Allnorth considered the material met the intent of the specification and allowed its use.

Conclusion

Based upon our review of the construction inspection documents made available to Levelton prior to June 25, 2010 we recommend acceptance of the Quality Control Manager Don Williams P. Eng. Certification of the Pier 3 North **Footing, Lower Buttress, Upper Buttress** and resolution of the associated Pier 3 North NCR's as presented.



Pier 4 North Footing Certification Review

Certification of the Footing signed by Don Williams, P.Eng on Feb 25, 2010

Work Procedure Items:

WP 202 Sheet Pile Installation	ITP 202-1
WP 202 Cofferdam Excavation	ITP 203-1
WP 209 Scour Protection	ITP 209-1
WP 204 Pier Footing Rebar	ITP 204-2
WP 205 Pier Footing Tremie	ITP 205-1
WP 101 Concrete Aggregate	ITP 101-1
WP 102 Concrete Batch Plant Setup	ITP 102-1
WP 121 Scour Rock Production	ITP 121-1

NCR 001 rebar cage installed 200mm higher than design elev.

NCR 002 procedural error noted – during lifting of tremie, QC personnel advised.

NCR 003 rebar exposed in 3 locations of footing. Remediation completed.

Pier 4 North Lower Buttress Certification Review

WP 206 Waler Installation & Dewatering	ITP 206-2
WP 207 Lower buttress	ITP 207-1

Pier 4 North Upper Buttress Certification Review

WP 208 Upper pier buttress	ITP 208-1
WP 209 Scour Protection	ITP 209-2

NCR 007 Shims to be installed with erection of pier base sections.

NCR 010 Pier armour was rotated for best fit of bearing template. Internal stiffeners were installed where bearing plate extends beyond the bearing plate.

Review

121-1 note: Scour rock gradation varied from spec. Allnorth considered the material met the intent of the specification and allowed its use.

Conclusion

Based upon our review of the construction inspection documents made available to Levelton prior to July 6, 2010 we recommend acceptance of the Quality Control Manager Don Williams P. Eng. Certification of the Pier 4 North **Footing, Lower Buttress, Upper Buttress** and resolution of the associated Pier 4 North NCR's as presented.