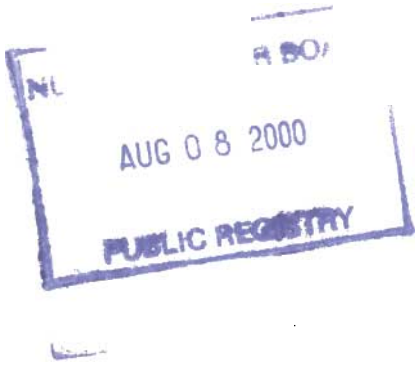
JIVKO ENGINEERING
5610 50A Ave Yellowknife NT X1A 1G3, Tel: (867) 920-4455, fax: (867) 873-6090, cel: (867) 444-1123, email: jivko@internorth.com

August 2, 2000
Project #ARB-00 2000



Ms. Rita Becker
Licensing Administrator
Nunavut Water Board
P.O. Box 119
Gjoa Haven, Nunavut
X0E 1J0

Dear Ms. Becker:

Application for Water Licence. Kugaaruk NU, Aliarusik River Bridge Construction.

The purpose of this correspondence is to request Water License from your agency to permit the construction of bridge across Aliarusik River near the Hamlet of Kugaaruk (Pelly Bay) Nunavut. The Applicant for this work is the *Government of Nunavut (GN), Department of Community Government and Transportation (CG&T)*. The Applicant has retained the Consultant *Jivko Engineering* of Yellowknife to submit applications to obtain required approvals before proceeding with the project. *Jivko Engineering* is also the designer and construction manager for the project.

The GN, Department of CG&T with the support of the Hamlet of Kugaaruk is proposing to complete this project over two Fiscal Years. In FY 99/00 will be completed the construction of the bridge abutments. In FY 00/01 will be installed the bridge superstructure. The bridge opening is scheduled for summer 2001.

The proposed bridge site is located 10 km west from the community, 1.0 km upstream from the confluence of the Aliarusik River and the major river on Simpson Peninsula, Kugajuk River. The bridge is part of Access Road Construction Project to abandoned FOL site near Kugaaruk NU, which is scheduled for clean up by the Federal Government in 2001. The bridge would also provide the community with all-weather access to rich hunting grounds and to area traditionally used by local residents for recreational purposes. The proposed bridge site was selected jointly by community representatives and Department of CG&T engineering staff.

The proposed bridge is 60.4 m long, single span steel structure with 4.3 m wide timber deck. It is installed on galvanised metal bin boxes in-filled with clean gravel and protected from scouring with armour rock. The bridge is designed for a vehicle designated as MS 200-77 in the CSA S6-78 and has a gross weight of 36,000 kg.

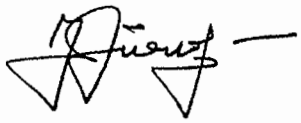
In addition to your office we have contacted the following government agencies:

Canada Coast Guard
Department of Fisheries and Oceans
DIAND Water Resource Management Board, Lands Division

JIVKO ENGINEERING
5610 50A Ave Yellowknife NT X1A 1G3, Tel: (867) 920-4455, fax: (867) 873-6090, cel: (867) 444-1123, email: jivko@internorth.com

Enclosed for your consideration is the Water Licence Application with 11 attachments. If you have any questions or wish additional information, please contact the undersigned at Tel (867) 920-4455, Fax (867) 873-6090, or email: jivko@internorth.com.

Sincerely,



Jivko I. Jivkov, P.Eng.
Principal
Jivko Engineering

cc Mr. Mr. Kojo Kumi, P. Eng. Municipal Infrastructure Development Officer
Department of CG&T, GN
Mr. Quinn Taggart, Senior Administrative Officer,
Hamlet of Kugaaruk

Enclosure:
- Water Licence Application Form
- Attachment 1..... Geographic Map 1:7,100,000
- Attachment 2..... Topographic Map, 1:50,000
- Attachment 3..... General Layout Drawing
- Attachment 4..... Aerial Photograph
- Attachment 5.a,b..... Typical Bridges for Arctic Communities
- Attachment 6.a,b,c.... Coral Harbour, Kirchoffer River Bridge
- Attachment 7..... Letter, Fish Habitat & HTA Support
- Attachment 8..... Letter, Community Council Support
- Attachment 9..... Project Summary in Inuktitut
- Attachment 10..... Project Summary in English
- Attachment 11..... Application Fee, $30.00

P.O. Box 119
Gjoa Haven, NU X0E 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

WATER LICENCE APPLICATION FORM

Application for: (check one)

X New **__ Amendment** **___Renewal** **___Assignment**

LICENCE NO: (for NWB use only) NWB4ALI

1. NAME AND MAILING ADDRESS OF APPLICANT/LICENSEE

Applicant: Kojo Kumi, P. Eng.
Municipal Infrastructure Development Officer
Department of CG&T, GN
P.O. Bag 110
CAMBRIDGE BAY, NU X0E 0C0
Phone: *(867) 983 7269*
Fax: *(867) 983 2617*
e-mail: *kkumi@gov.nu.ca*

2. ADDRESS OF CORPORATE OFFICE IN CANADA (if applicable)

Consultant: Jivko I Jivkov, P. Eng.
Principal
Jivko Engineering
5610, 50 A Avenue
YELLOWKNIFE, NT X1A 1G3
Phone: *(867) 920-4455*
Fax: *(867) 873-6090*
e-mail: *jivko@internorth.com*

3. LOCATION OF UNDERTAKING (describe and attach a topographical map, indicating the main components of the Undertaking)

The Nunavut Department of Community Government & Transportation (CG&T) is planning to construct a bridge over the Aliarusik River near the Community of Kugaaruk, NU.

The community of Kugaaruk (Pelly Bay), NU is shown on 1:7,100,000 Nunavut geographic map (*Attachment #1).* The proposed bridge site is indicated on 1:50,000 topographic map 57A/10 Login Bay, Kitikmeot Region *(Attachment #2).*

The bridge co-ordinates are:	**Latitude**	**89° 35' W**
	Longitude	**68° 33' N**

The proposed bridge site is located 10 km west of the community of Kugaaruk. The site is 1.0 km upstream from the confluence of the Aliarusik River and the major River on Simpson Peninsula, Kugajuk River. Approximately 11.0 km downstream from the confluence point the Kugajuk River flows into the St. Peter Bay, part of Pelly Bay/Gulf of Boothia.

4. DESCRIPTION OF UNDERTAKING (attach plans and drawings)

4.1 Introduction. The bridge is part of a Project for Access Road Construction to abandoned FOL site near Kugaaruk NU, which is scheduled for clean up by the Federal Government in 2001. The bridge would also provide the community with all-weather access to rich hunting grounds and to area traditionally used by local residents for recreational purposes. The proposed bridge site was selected jointly by community representatives and Department of CG&T engineering staff.

4.2 Bridge Parameters. The proposed bridge is 60.4 m long, single span steel structure with 4.3 m wide timber deck. It is installed on galvanised metal bin boxes in-filled with clean gravel and protected from scouring with armor rock. The vertical clearance under the bridge is 3.1 m at mean water level. The bridge is designed for a vehicle designated as MS 200-77 in the CSA S6-78 and has a gross weight of 36,000 kg. A General Layout Drawing and Aerial Photograph of the surrounding area are shown on *Attachment #3* and *Attachment #4.* Photographs of similar bridges, recently constructed in NU and NWT are shown on *Attachment #5 and Attachment #6.*

4.3 General Condition of the Site. The area surrounding the proposed bridge site is generally flat, vegetated with grasses and occasional willows typical for the arctic tundra. Silty/sandy permafrost underlies the 300 mm thick active soil layer. The riverbed is between 100 m and 200 m wide and is covered with coarse sands, cobbles and significant amount of boulders. The river is flowing fairly fast. Occasional small islands are splitting the river into two or more channels. The average river depth is less than 500 mm, except in areas, where a main channel with depth reaching 1.2 m is defined. The riverbanks are generally low and in periods of high water discharge the river may spill over the banks, flooding the tundra.
The proposed bridge site is located in area of rapids, with exposed bedrock on the riverbanks and riverbed. At this site the riverbed width is 43.0 m at mean water level with higher riverbanks.

4.4 Existing Habitat. Information for the fish population in the river was collected through personal interviews with Mr. Guido Tigvareark Assistant SAO for Kugaaruk, who consulted community elders. It was established that there is Char-fish in the Aliarusik River. During late June and first half of July every year, the Char migrate downstream, from inland lakes towards the sea. In August, the Char migrate upstream, from the sea towards the lakes to spawn. The fish run is completed before the end of August. No other fish species are known to inhabit the Aliarusik River. This information was confirmed in a letter from the local Hunters and Trappers Association (Attachment #7).

4.5 Construction details. The bridge will be constructed in three stages:

Abutment Construction – September 2000. The work on this stage will be completed within 14 productive working days. It will include:

- Mobilisation of the abutment material on site,
- Assembly of the prefabricated metal panels to form the bin boxes,
- Backfill of bin boxes with clean gravel,
- Backfill of bridge approaches behind abutments,
- Installation of armor rock in front of bin boxes and
- Casting concrete footings inside the bin boxes.

The abutments will be constructed on the dry bedrock banks, at least 6.0 m beyond the water line anticipated for the construction time. Local labourers assisted by a wheeled loader will carry out the work. For construction of the west abutment the loader will have to cross the river several times on a ford located few hundred meters upstream from the bridge crossing. The work on the north abutment will be completed within four productive working days.

Superstructure Installation - April 2001. The work on this stage will be completed within 20 productive working days. For the purpose of the bridge assembly a snow berm will be build-up between the abutments to the elevation of the underside of the bridge. All bridge components will be transported from town on a skid and assembled on top of the snow berm. After the assembly, the snow berm will be removed to allow the spring run-off.
Wheeled loader and bulldozer will be involved in the construction and removal of the snow berm. Steel workers and local labourers assisted by a loader will carry out the assembly of the bridge.
There is no in-stream activity associated with this stage of the work.

Bridge Deck Installation & Backfill of the Approaches – July 2001. The work on this stage will be completed within 20 productive working days. Local labourers assisted by a wheeled loader will complete the installation of the timber deck and metal railing. Loader, bulldozer and two dump trucks will be involved in the construction of the bridge approaches. At the end of this stage the construction site will be landscaped and the bridge will be opened for traffic.
There is no in-stream activity associated with this stage of the work.

5. **TYPE OF UNDERTAKING** (A supplementary questionnaire must be submitted with the application for undertakings listed in **"bold"**)

___ Industrial	___ **Remote/Tourism Camps**
___ **Mine Development**	___ **Municipal**
___ **Advanced Exploration**	___ Power
___ **Exploratory Drilling**	**X** Other (describe): **Construction of Permanent Bridge.**

6. **WATER USE**

___ To obtain water
___ To modify the bed or bank of a watercourse
___ To alter the flow of , or store, water
X To cross a watercourse
___ To divert a watercourse
___ Flood control
___ Other (describe): _____

The proposed work involves installation of a permanent structure over a watercourse. There would be no alterations of the riverbed associated with the construction. Modification of the riverbank would consist of installation of bridge abutments beyond the elevation of the average watermark. The abutments would be constructed from galvanised metal panels and would be protected from scouring with clean armour rock. The in-stream activities would be limited to fording of the river several times by wheeled loader, for the duration of the west abutment construction. The ford is presently used by the community for the construction of the road, which is not covered by this application

7. **QUANTITY OF WATER INVOLVED** (litres per second, litres per day or cubic metres per year, including both quantity to be used and quality to be returned to source)

NA

8. **WASTE** (for each type of waste describe: composition, quantity, methods of treatment and disposal, etc.)

___ Sewage
___ Solid Waste
___ Hazardous
___ Bulky Items/Scrap Metal
___ Waste oil
___ Greywater
___ Sludges
___ Other (describe):

There would be no waste material deposited in the stream or within the high water mark. Minimal amount of waste timber from the timber deck installation would be removed from the bridge site and disposed off in the community dump.

9. **PERSONS OR PROPERTIES AFFECTED BY THIS UNDERTAKING** (give name, mailing address and location; attach if necessary)

The work would be undertaken on crown land adjacent to the municipal boundaries of Kugaaruk. Recently the Community Council has made application to the Federal Government to include the land surrounding the bridge in the municipal boundaries. The Community Council supports the project (*Attachment #8).* No neighbouring property would be impacted. All adjoining lands are Federal.

Mr. Quinn Taggart
Senior Administrative Officer
Hamlet of Kugaaruk
General Delivery
Kugaaruk, NU X0E 1K0

In addition to your office, we have contacted the following government agencies:

DFO, Iqaluit Office
Canadian Coast Guard, Navigable Waters
DIAND, Water Resource Management Board, Lands Division

Land Use Permit - *PENDING*

DIAND	___ Yes	___ No	If no, date expected _____
Regional Inuit Association	___ Yes	___ No	If no, date expected _____
Commissioner	___ Yes	___ No	If no, date expected _____

10. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES (direct, indirect, cumulative impacts, etc.)

NIRB Screening ___ Yes ___ No If no, date expected _____

The potential environmental impacts and the appropriate mitigation measures are summarised below:

.1 Storage of Materials: **Gravel fill, steel bridge components, timber, galvanised metal panels and miscellaneous tools would need to be stored on site.**

Mitigation: **All materials would be stored safely, well back of the river high water mark. There would be no presence of material contaminating the water body.**

.2 Disturbing the Streambed: **Heavy equipment would be used on the site. Loader requires access to both sides of the river.**

Mitigation: **There would be no in-stream excavation. It is anticipated no more than 20 vehicle/crossings will be required for the duration of the bridge construction. All vehicles crossing the river would be inspected for leaks and repaired if necessary prior to beginning of the construction activities. Vehicles would cross the stream slowly, minimising disturbance of sediments.**

All construction activities would start several days after confirmation of the conclusion of the fish run. A local HTA member would be retained to monitor the stream prior to and during fish migration and provide advice.

.3 Debris Fallout **During installation of abutments there is a potential loose material to enter the streambed.**

Mitigation **In order to protect the water body, 5.0 m wide berm of undisturbed land would remain between the water line and the edge of the abutments.**

Gravel in-fill for abutments would be contained by steel Binwall and would not enter the stream.

.4 Fuel Spills: **Diesel fuel would be utilised to power the heavy equipment. No fuel would be stored on site. All fuel would be supplied by fuel truck. There is a risk of terrestrial and aquatic contamination. An accidental fuel spill could occur during:**

1. **Transfer of the fuel from the fuel truck to the machinery**
2. **As a result of leakage from working machinery.**
3. **As the result of a fuel truck accident, en route to or from the work site.**

Mitigation: **Refuelling of the equipment would take place at an appropriate safe distance from the water body.**

Prior to beginning the construction CG&T and Community representatives, including the heavy equipment operators, would meet in Kugaaruk to discuss and adopt a comprehensive Spill Contingency Plan. The plan would be prepared in compliance with the *Environmental Protection Act, Spills Contingency Planning and Reporting Regulations*. The Comprehensive Spill Contingency Plan will include:

- **Action Plan outlining procedure for spill reporting and spill clean up**
- **Scenarios outlining procedure for potential spills (e.g. fuel truck accident)**
- **List of emergency contacts and 24 hour phone numbers**
- **Identify vulnerable areas on site**
- **List of on-site and contact personnel**
- **All other pertinent information brought up by local authorities.**

11. INUIT WATER RIGHTS

Will the project or activity substantially affect the quality, quantity, or flow of water flowing through Inuit Owned Lands and the rights of Inuit under Article 20 of the Nunavut Land Claims Agreement?

The bridge construction project will not affect the quality, quantity, or flow of the water in the Aliarusik River.

If yes, has the applicant entered into an agreement with the Designated Inuit organization to pay compensation for any loss or damage that may be caused by the alteration. If no compensation agreement has been made, how will compensation be determined?

12. CONTRACTORS AND SUB-CONTRACTORS (name, address and functions)

The Government of Nunavut decided to break the work down into several separate contracts. The bridge materials will be purchased south under three separate contracts and shipped to Kugaaruk with the sealift.

The on-site work will be completed by local forces under the Engineer's direction as follows:

- **Heavy Equipment and Labourers: Hamlet of Kugaaruk, Quinn Taggart, SAO, Tel. (867) 769-6281**
- **Concrete Works: Koomiut Co-op Construction, Richard Barnik, Manager, Tel. (867) 769-6606**
- **Engineering: Jivko Engineering, Jivko Jivkov, P. Eng. Principal, Tel. (867) 920-4455**

13. STUDIES UNDERTAKEN TO DATE (list and attach copies of studies, reports, research, etc.)

No studies related to the bridge construction project have been undertaken to date.

14. THE FOLLOWING DOCUMENTS MUST BE INCLUDED WITH THE APPLICATION FOR THE REGULATORY PROCESS TO BEGIN

Supplementary Questionnaire	**X** Yes	__ No	If no, date expected _____
Inuktitut/English Summary of Project *(Attachment #9, #10)*	**X** Yes	__ No	If no, date expected _____
Application fee $30.00 *(Attachment #11)* (c/o of Receiver General for Canada)	**X** Yes	__ No	If no, date expected _____

15. PROPOSED TIME SCHEDULE

__ Annual (or) **X** Multi Year

Start Date: **September 15, 2000** Completion Date: **July 30, 2001**

Jivko I. Jivkov, P. Eng. Principal, Jivko Engineering			August 2, 2000
Name (Print)	**Title (Print)**	**Signature**	**Date**

For Nunavut Water Board use only

APPLICATION FEE **Amount: $**_____ **Receipt No.:**

WATER USE DEPOSIT **Amount: $** **Receipt No.:**

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HAMLET OF KUGAARUK
P.O. BOX 205
KUGAARUK, NT X0E 1K0
PH: 867-769-6281 FAX: 867-769-6069
e-mail: pellybay@arcticdata.nt.ca

Jivko

Talked to an elder , he says the fish runs down and same time they go up from Aliaruhik maybe end of June or first two weeks of July .

Than they go up first ~~two weeks of~~ August. The fish run for both river is finished by the third or last week of August.

Guido Tigvareark
ASAO

August 2, 2000

Hamlet of Kugaaruk
Kugaaruk, Nunavut
XOE 1KO

Kurtairojuark Hunters & Trappers Organization
Kugaaruk, Nunavut
P.O. Box 74
XOE 1KO

<u>Letter of Support for the Construction of the Bridge</u>

This is a letter of support for the Construction of the bridge, the study has been done, Kurtairojuark HTO is in fully support the construction of the bridge, HTO knows that it will not interfere with the fish run, from the elders traditional knowledge the fish run is in early spring.

Kurtairojuark HTO also support the constructions of the bridge for several reasons:

1) **river will be easier for the hunters to cross it to go hunting;**
2) **elders will have more access to go fishing to Barrow Lake during summer;**
3) **community will have new access road to rich gravel across the river.**
4) **Elders will able to go camping during summer months to the lakes in the Other side of the river**
5) **DND and DIAND will have access road to the Dew Line site to do the clean-up**

Kurtairojuark HTO is willing to work together with Hamlet of Kugaaruk, DND and DIAND for any concerns the might come up regards to Wildlife and environment.

For any concerns please call us the telephone number is (867) 769-6071 or Fax number (867) 769-6713.

Thank you,

Levi Illuitok
President of Kurtairojuak HTO
Kugaaruk, NT
LEVI Illuitok

ATTACHMENT #7

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HAMLET OF KUGAARUK

P.O. BOX 205
KUGAARUK, NT X0E 1K0
PH: 867-769-6281 FAX: 867-769-6069
e-mail: pellybay@arcticdata.nt.ca

Quinn Taggart
Senior Administrative Officer

August 2, 2000

Jivko Engineering
Yellowknife, NT

VIA FAX ONLY 873-6090

Dear Jivko;

At a council meeting back on July 29, 1999 the Hamlet Council reviewed and approved of the location of the bridge and the design report with motion number 99-98.

Ongoing support for the project has led to the securing of funding to proceed with the road to the river and the construction of the bridge this year.

While the bridge will be outside the Hamlet's current boundary, the Hamlet is applying to extend our boundary to include the bridge and the new gravel source.

If you need any further information or require clarification of this issue, please do not hesitate to give me a call at 867-769-6281.

Sincerely;

Quinn Taggart, SAO

Cc Kojo Kumi, CGT Cambridge Bay

ATTACHMENT #8

JIVKO ENGINEERING
5610 50A Ave, Yellowknife NT X1A 1G3, Tel: (867) 920-4455, fax: (867) 873-6090, cel: (867) 444-1123, email: jivko@internorth.com

ᐊᒍᓂ 2, 2000
ᐱᓕᕆᐊᒃᓴᖅ #ARB-00 2000

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ᓄᓇᕐᒥ ᓄᓇᓕᓂ ᑲᓇᒪᓕᕆᓚᓵᒍᕐᓂᑦ ᐃᖏᕕᖏᓐᓇᕆᓚᓵᒍᕐᓂᓕᓂᒃ ᐃᑲᓗᑎᓕᐅᕈᒪᓂᕆᒪᒪᒡᒐ ᐊᓕᐊᕈᓂᐅᐳᐸ ᑯᖅᓯᓂ ᖃᓄᐃᓇᓂᒃ. ᐃᑲᓗᑎᑲᖅᖃᖅ ᐱᓕᕆᓚᓵᒍᕐᓂᓕᓂᒃ ᐊᑐᐊᓕᓕᓵᕆᓂᕐᒥᓂᒃ ᐅᓇᓕᓚᓴᐃᒡᒐ ᐃᓕᒥᓂᓄᓇᓕᓂᒃ ᖃᒪᓕᕆᓂᖅᓴᓂᒃ ᑯᖅᓯᓂ ᐊᐅᓚᓂᓗᓵᒍᕐᓂᓕᓂᒃ 2001-ᖃᓄᐃᓕᒡᒐ. ᐃᑲᓗᒡ ᖃᖓᑐᐃᓐᓇᕆᐊᒃᑯᓂ ᐊᑐᐃᒍᒥ ᐊᑐᖅᑕᐅᓕᕆᓚᓵᒍᕐᓂᓕᓂᒃ ᓄᓇᖅᓯᓂ ᐊᖏᓇᓂᖅᐳᑦᓯᓂᒃ ᐅᐸᑕᐅᑲᑕᐃᓐᓇᕆᓚᓵᒍᕐᓂᓕᓂᒃ ᐊᒪᓚ ᓄᓇᑕᓂ ᐃᓚᐃᑕᐅᓂᖅᓯᓂ ᐃᓐᓴᓂᖅᓯᓂᒃ. ᐃᑲᓗᑎᓕᐊᖏᓐᓇᓕᓂ ᐅᓪᓗᐊᓂᑕᐅᓂᖅᓯᓂ ᐃᓐᓴᓂᖅᓯᓂᒃ ᑲᑎᒪᓐᓇᖅᑐᖅᓯᓂ ᐊᒪᓚ ᓄᓇᖅᓯᓂ ᐊᖏᓇᓂᖅᐳᑦᓯᓂᒃ ᑲᑎᒪᓐᓇᖅᑐᖅᓯᓂᒃ.

ᐃᑲᓗᑎᒃᖃᖅ ᐃᓂᖏᓐ ᐅᖏᓪᓂᓂᖅᓯᓐᖅ 10.0 ᑭᓚᒃᑕᓂᒃ ᑯᖅᓯᓂ ᐱᓇᓐᓇᖏᓂ, ᓄᓇᕐᒥ. ᐃᓂᖏᓐ 1.0 ᑭᓚᒃᑕᒥᒃ ᐅᖏᓪᓂᓂᒃ ᒪᐸᓕᐊᖅᐳᖏᓂᒃ ᐊᓕᐊᕈᓂᐅᐳᐸ ᑯᖅᓯᓂ ᐊᒪᓚ ᓪᓚᓐᓄ ᑯᖅᓯᓂ ᓄᕐᕆᓂᐊᖏᓂ, ᑯᖅᓯᓂ ᑯᖅᓂᓂ. ᐃᓚᖅ 11.0 ᑭᓚᒃᑕᓂᒃ ᑯᕐᓂᓂ ᑯᖅᓯᓂ ᑯᖅᓂ ᐱᑕᐅᐸ ᐃᒪᓐᓄᑦ, ᐃᓕᓂᖅ ᑯᖅᓯᓂ ᐃᒪᐃᐊᑕᓗ.

ᐃᑲᓗᑎᓕᐊᖏᓐᓇᒪᓕᕆᓚᖅ ᑕᑭᓂᓕᒃ ᐃᓚᖅ 60.4 ᒥᑕᓂᒃ, ᓴᐃᖅᑐᓕᓗᓂᓂ ᐊᑕᐅᓪᓚᑯᖏᓂᐊᖅᓂᓂ 4.3 ᒥᑕᒥᒃ ᓪᓕᓂᑎᑦᓗᓂᓂ ᖃᓂᖅ ᖃᓄᐃᓕᓗᓂᓂ. ᐃᓕᓪᓚᒪᓕᓗᑎᒃ ᑭᐸᓴᓂᑎᑭᓚᒪᒪᕐᓂ ᓴᐃᖅᑐᓂ ᓄᓗᐊᖅᖏᓐᓇᖏᓂ ᑐᐊᓕᓕᓪᓚᓯᓚᒪᕐᓂᓗᓂᓂ ᐊᒪᓚ ᐅᑭᖃᓕᓪᓚᓯᓚᒪᕐᓂᓗᓂᓂ ᐊᓐᓂᓗᐅᑕᖃᓂᖅᓯᓂᒃ. ᐃᑲᓗᑎᑕᐅᐸ ᐳᖅᑐᓂᒃ ᑲᓇᐃᖅᑐᓂᒃ 3.1 ᒥᑦᑐ. ᐃᑲᓗᒡ ᓴᓇᕐᑕᒪᓕᕆᖅ ᐊᑐᖅᑕᐅᓕᕆᓚᓵᒍᕐᓂᓕᓂᒃ ᓄᓇᓕᑕᐅᑎᓄᓂᒃ MS 200-77 ᐊᖏᖅᑕᐅᓕᒪᓕᓗᓂ CSA S6-78-ᓄᓂ ᐅᖃᓕᐃᓐᓂᑦᓯᖏᓕᕆᓚᓵᒍᕐᓂᓂ 36,000 ᑭᓗᒍᖏᓐᓂ.

ᐃᑲᓗᑎᑕᐅᐸ ᓴᓇᕐᑕᒪᓂᖅᓯᓐ ᐱᒋᐊᖏᕐᓂᖅ ᓕᓴᑎᓕ 2000 ᐊᒪᓚ ᐱᕐᓱᖏᑕᐅᓗᓂᓂ ᕿᓚᐃ 2001. ᐱᓕᕆᐊᖏᓂᓂᖅᓯᓂᒃ ᐃᓂᓐᓂᓂ ᐱᕐᓱᖏᑕᐅᓪᓚᖏᓂᖅᓯᓐ ᐃᓕᓴᖅ ᐅᓐᓗᓂᓂᒃ 20-ᓂᒃ. ᓄᓇᕐᒥᑕᐅᓂ ᓇᓕᒥᓂᖅ ᐱᓕᕆᓂᖏᓕᓂᒃ, ᐱᓕᒪᒃᑯᓂ ᐱᓕᕆᐊᖏᓂᓂᒃ ᐊᐃᒃᑐᐃᓚᓚᐅᖏᓐᓇᖅᓯᓂ ᐊᐳᑎᓂᓕᑐᓐᓇᓂᒃ ᑲᓐᓂᓪᓚᑕᐅᓕᕆᓚᓵᒍᕐᓂᓕᓂᒃ. ᐃᑲᓗᑎᓚᐅᖏᑎᒪᓂ ᓗᐅᐃᒃᑯᓂ ᓂᐅᐃᖅᑕᐅᓇᖅᓯᓂᓂ ᐱᓐᓗᐃᓚᓚᐅᖏᓐᓇᓂᒃ ᑲᓐᓂᖅᓯᓂ ᐊᒪᓚ ᐱᖃᑐᓂᓂᒃ ᑯᐃᓚᐅᖏᓐᓇᓂᒃ ᐅᓪᓗᕆᐊᖃᖅᑐᓂᒃ. ᓄᓇᓕᓐᓂ ᐃᓂᖏᓐᓇᖅᑎᓂ ᐊᐅᓚᓂᓗᓵᒍᕐᓂᓕᓂᒃ ᐱᖃᓐᓇᖅᓯᓂᒃ ᐱᓕᕆᐊᖏᓂᓂᒃ ᐃᓂᖏᓐᓇᖅᓯᓂᒃ.

ᑯᓚᒃᑭᓐᓄᓂ ᓴᓇᔪᖅᓴᖏᓕᕐᓂᖅ ᐊᑐᓕᓚᐅᖅᓯᖏᓕᓂᑎᓐᓚᒍ. ᐃᑲᓗᑎᓚᐅᕆᓕᐊᖅᓯᓚᓂᒃ ᐊᖅᑐᐃᓴᖅᖏᓕᕐᓂᓂᒃ ᐱᐅᓂᓐᓂᓂᒃ ᐱᐅᓂᓐᓂᓂᒃ ᑯᓐᑎᑦᓂᓚᓂᓐᓚᓂᓂ ᓚᓚᓚᓚᓂᒃ ᐊᓕᐊᕈᓂᐅᐳᐸ. ᐱᓚᓗᐅᔪᓂ ᐱᓕᕆᐊᖏᓂᓂ ᐊᑐᓂᓕᓂᖅᓯᓂ ᐊᒪᓚ ᐱᓴᓗᔪᓂᒃ ᐊᐅᓚᓂᓗᓵᒍᕐᓂᓕᓂᒃ ᓴᓇᔪᖅᓴᖏᓕᕐᓂᓂᒃ ᐱᓐᓗᐃᓚᓚᐅᖏᓐᓇᓂᒃ ᐱᓐᓗᐃᓚᓚᐅᖏᓐᓇᓂᒃ ᐃᓂᖏᓐᓇᖅᓯᓂᒃ ᐊᓕᐊᕈᓂᐅᐳᐸ.

ᓄᓇᕐᒥ ᑲᓇᑕᒥᒃ ᐊᐅᓚᓂᓗᓵᒍᕐᓂᓕᓂᒃ ᐊᑐᓕᓚᐅᖅᓯᓂᒃ ᐊᒪᓚ ᐱᓕᕆᐊᖏᓂᓂᒃ ᐃᓂᖏᓐᓇᖅᓯᓂᒃ ᐊᐅᓚᓂᓗᓵᒍᕐᓂᓕᓂᒃ ᐱᓐᓗᐃᓚᓚᐅᖏᓐᓇᓂᒃ ᐱᓐᓗᐃᓚᓚᐅᖏᓐᓇᓂᒃ ᐃᓂᖏᓐᓇᖅᓯᓂᒃ ᐊᓕᐊᕈᓂᐅᐳᐸ.

ᐃᓕᓴᕐᓂᖅ ᐊᐅᓚᓂᓗᓵᒍᕐᓂᓕᓂᒃ ᐊᐅᓚᓂᓗᓵᒍᕐᓂᓕᓂᒃ ᐃᓂᖏᓐᓇᖅᓯᓂᒃ ᐊᒪᓚ ᐱᓕᕆᐊᖏᓂᓂᒃ ᐃᓂᖏᓐᓇᖅᓯᓂᒃ ᐊᓕᐊᕈᓂᐅᐳᐸ.

ᐃᓕᓴᕐᓂᖅ ᐱᓕᕆᐊᖏᓂᓂᒃ ᐊᐃᑭᐳᓂᕐᓂᖅ ᐊᐅᓚᓂᓗᓵᒍᕐᓂᓕᓂᒃ ᐃᓂᖏᓐᓇᖅᓯᓂᒃ ᐊᓕᐊᕈᓂᐅᐳᐸ.

JIVKO ENGINEERING
ᐅᖃᐃ ᐊᐅᓚᓂᐅᖏᓕᕐᓂ

Jivko I. Jivkov, P.Eng.
Principal

ᐅᖃᐃ, Δ. ᐅᖃᒃᑭᖃ, ᐊᐅᓚᓂᐅᖅ
ᐊᖏᓕᖅᖃᒃᑭᖅ

ATTACHMENT #9

JIVKO ENGINEERING

5610 50A Ave, Yellowknife NT X1A 1G3, Tel: (867) 920-4455, fax: (867) 873-6090, cel: (867) 444-1123, email: jivko@internorth.com

August 2, 2000
Project #ARB-00 2000

EXECUTIVE SUMMARY

Community of Kugaaruk (Pelly Bay), NU. Proposed Bridge Construction over Aliarusik River.

The Nunavut Department of Community Government & Transportation is planning to construct a bridge over the Aliarusik River. The bridge is part of a Project for Construction an Access Road to abandoned FOL site near Kugaaruk, which is scheduled for clean up by the Federal Government in 2001. The bridge would also provide the community with all-weather access to rich hunting grounds and to area traditionally used by local residents for recreational purposes. The proposed bridge site was selected jointly by community representatives and Department of CG&T engineering staff. The project is fully supported by the Community Council and the local HTA.

The proposed bridge site is located 10.0 km west of the community of Kugaaruk, NU. The site is 1.0 km upstream from the confluence of the Aliarusik River and the major River on Simpson Peninsula, Kugajuk River. Approximately 11.0 km downstream from the confluence point the Kugajuk River flows into the St. Peter Bay, part of Pelly Bay/Gulf of Boothia.

The proposed bridge is 60.4 m long, single span steel structure with 4.3 m wide timber deck. It is installed on galvanised metal bin boxes in-filled with clean gravel and protected from scouring with armour rock. The vertical clearance under the bridge is 3.1 m. The bridge is designed for a vehicle designated as MS 200-77 in the CSA S6-78 and has a gross weight of 36,000 kg.

The bridge construction will start in September 2000 and will be completed in July 2001. The on-site work will be completed in three stages of approximately 20 days each. In order to provide opportunity for work to Nunavut firms, the Government decided to break the work down into several separate contracts. The bridge materials will be purchased under three separate contracts and shipped to Kugaaruk with the sealift. Local forces under the Engineer's direction will complete the on-site work.

There will be no in-stream construction activities associated with the bridge construction. The bridge construction project will not affect the quality, quantity, or flow of the water in the Aliarusik River. Mitigation Program will be implemented and comprehensive Spill Contingency Plan will be in place for the duration of the construction.

Prepared for the GN, *Department of Community Government and Transportation* by:

JIVKO ENGINEERING

Jivko I. Jivkov, P.Eng.
Principal

ATTACHMENT #10

5610, 50 A avenue, Yellowknife NWT, X1A-1G3
Phone (867) 920-4455 Fax (867) 873-6090

JIVKO ENGINEERING

TYPICAL SINGLE LANE BRIDGES SUITABLE FOR ARCTIC COMMUNITIES

Baker Lake, Prince River Bridge, Span 48 m. General View

Mackenzie Winter Road km 828, Devils Canyon Bridge. General View.

ATTACHMENT #5.a

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JIVKO ENGINEERING

TYPICAL TIMBER DECKS SUITABLE FOR BRIDGES IN ARCTIC COMMUNITIES

Baker Lake, Prince River Bridge, Span 48 m. Single lane timber deck

Mackenzie Winter Road km 828, Devils Canyon Bridge. Single lane timber deck

ATTACHMENT #5.b

JIVKO ENGINEERING
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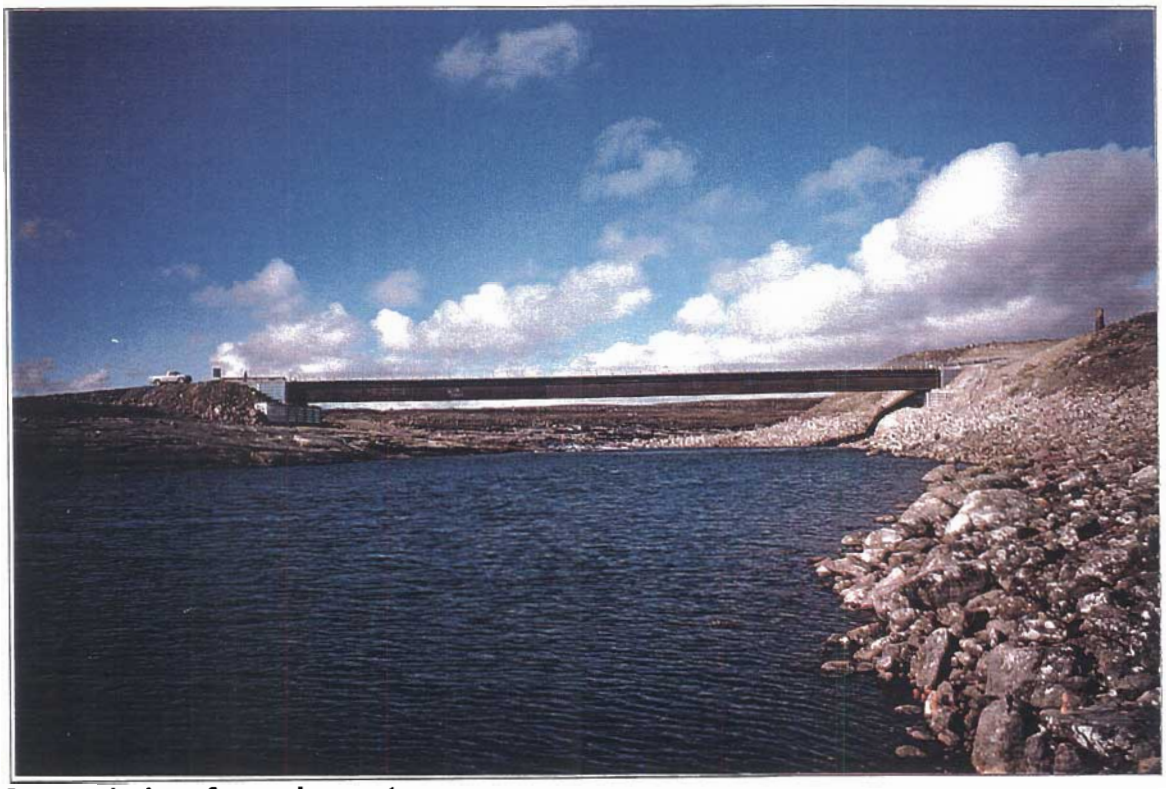
CORAL HARBOUR, KIRCHOFFER RIVER BRIDGE

General view from upstream



General view from downstream

ATTACHMENT #6.a

JIVKO ENGINEERING
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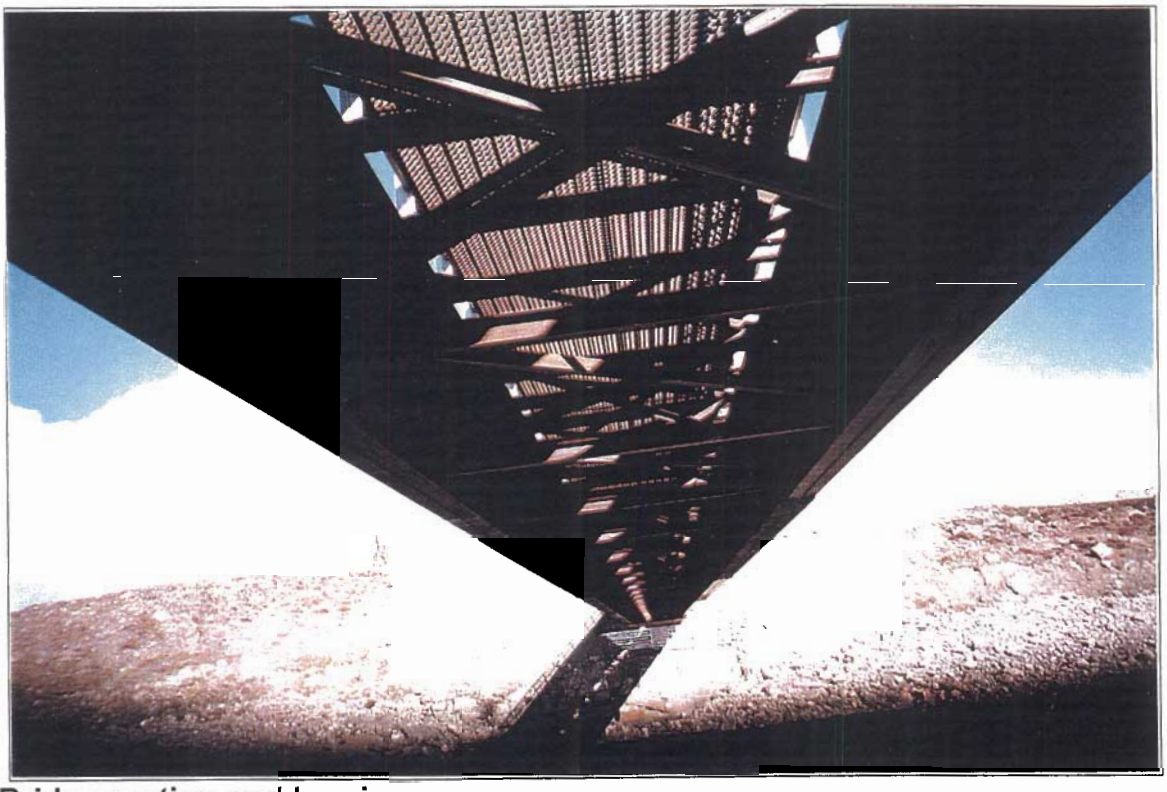
CORAL HARBOUR, KIRCHOFFER RIVER BRIDGE

Bridge deck and approaches



Bridge grating and bracing

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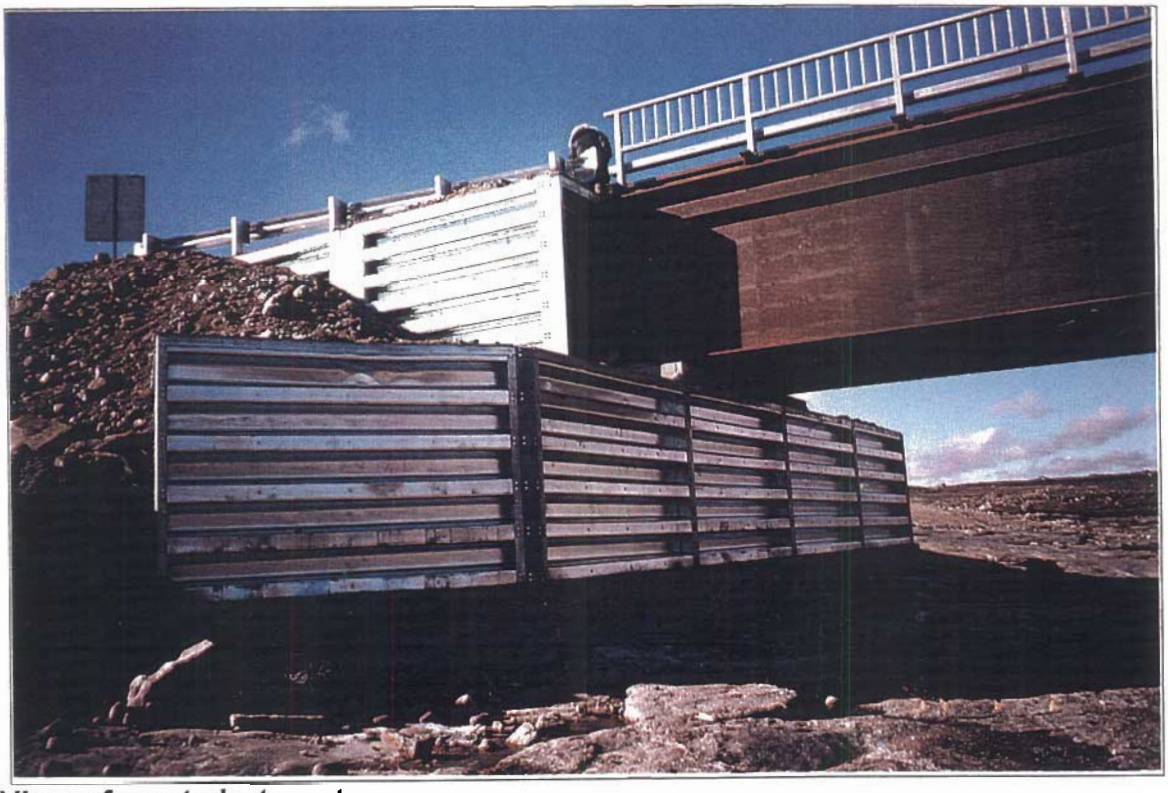
CORAL HARBOUR, KIRCHOFFER RIVER BRIDGE

View of east abutment



View of west abutment

ATTACHMENT #6.c

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KUGAARUK (PELLY BAY)

ATTACHMENT #1
NUNAVUT GEOGRAPHIC MAP
SCALE 1:7,100,000

PROPOSED
PROPOSED ALIARUSIK RIVER BRIDGE
SPAN 60.0 m

SITE 2

SITE 1

10.0

10.0

9.0

9.0

8.0

7.0

6.0

5.0

4.0

3.0

2.0

1.0

0.0

7.0

8.0

PROPOSED
KUGAJUK RIVER BRIDGE
SPAN 57.96 m

ALIARUSIK RIVER

BARROW LAKE

KUGAARUK

ST PETER BAY

PELLY BAY AIRFIELD

ATTACHMENT #2

Kugaaruk, NV

Aliarusik River Bridge

Preliminary design

Topographic Map 1:50,000

JIVKO ENGINERING
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ALIARUSIK RIVER

8000

4300

SPARE LINE.

PLAN 1:250

TO FOL SITE

15000 | 250 | 60500 END TO END RANGE | 60,000 CTC BEARINGS | 250 | 15000

TO KUGAARUK

EL 20.53

W. BEAM GUARD RAIL

5%

KML 16.00

WATER DEPTH 0.2÷0.7m. SEP 19, 1999

EL 18.10

WL 15.00

EL 15.40

1500 | 7000 | 43000 RIVER CHANNEL SEP 19, 1999 | 10000 | 1500

APPROX EL 16.40

ELEVATION 1:250

℄ BRIDGE

4300

3000

CREOSOTE TREATED D FIR
RUNNERS - 8"x10"x12'
SLEEPERS 8"x10"x14'

CONCRETE FOOTING
4500 x 1500 x 500

330 | 1150 | 1480

4000 | 4@ 3048 = 12192 | 4000

ABUTMENT ELEVATION 1:100

℄ BEARING

SUPERSTRUCTURE
STEEL TWIN GIRDERS

1500 | 250 | 3048

FREE DRAINING GRANULAR FILL

RIP RAP 70% LARGER THAN 500

600

1.0

COMMON FILL

GEOTEXTILE

1500 | 3018 | 1500

ABUTMENT SECTION ON ℄ - 1:100

4359

DESIGN "E"
TRIM ON FACE & SIDES

DESIGN "G"
TRIM ON FACE & SIDES

PLAN OF BIN WALL

2000
C to C FLOOR BEARING

3"x10"x14'

8"x10"x14'

℄ GIRDER

650

W 150.22

500

HSS 152.4x102.4x9.5

TIMBER DECK & BEARING - DETAIL 1:25

LOADING - 36 MTS HS 200
GROSS VEHICLE WEIGHT:
- 36.000 kg. or 80,000 LB.
MAXIMUM OVERLOAD:
- 58.000 or 128.000 LB.

MS250 '77	50 kN	200 kN	200 kN
MS200 '77	40 kN	160 kN	160 kN
MS150 '77	30 kN	120 kN	120 kN

A. detail number
B. location drawing number
C. drawing number

CG&T, GN

JIVKO ENGINEERING
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Kugaaruk, NV
Aliarusik River Bridge
Preliminary design

Title: GENERAL LAYOUT
60 m SPAN
BINWALL ABUTMENTS

Scale
Surveyed by JIVKO
Drawn by JIVKO
Designed by JIVKO
Insignia

REGISTERED PROFESSIONAL ENGINEER
J. JIVKOV
N.W.T.

Signature
Date APRIL 15 2000
Checked by
Approved by
Project No.
Drawing No. ATTACHMENT #3

ATTACHMENT #4

Kugaaruk, NV
Aliarusik River Bridge
Preliminary design
Air-photo Mosaic 1:7,500

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