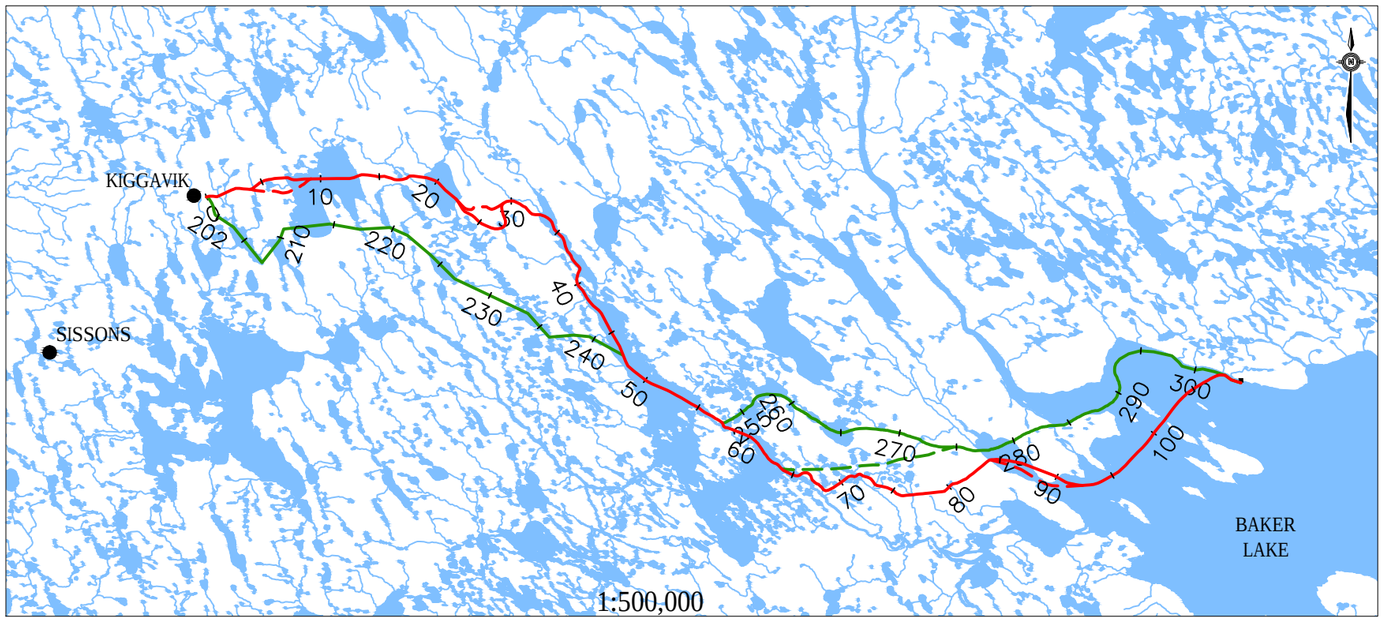
Q:\Vancouver\Transportation\V331\Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\DEIS Report\Title Sheet - Winter Routes.dwg [TITLE] March 26, 2010 - 11:44:35 am (BY: ANDREW DEEPWELL)

CIVIL INFRASTRUCTURE REPORT
APPENDIX C

AREVA

WINTER ROAD BATHYMETRY SURVEY
KIGGAVIK PROJECT

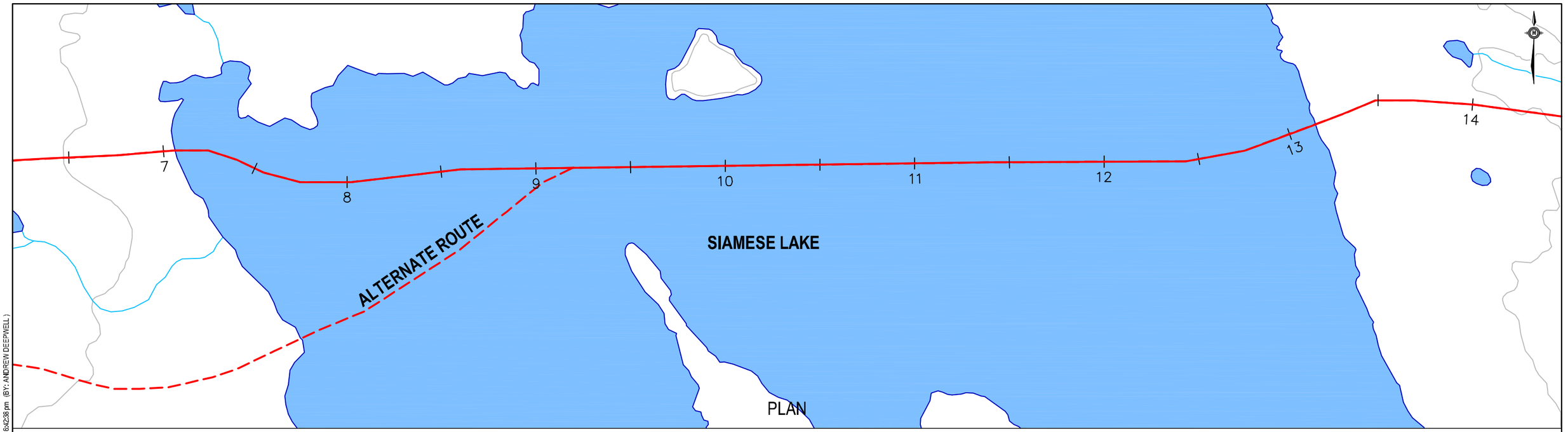


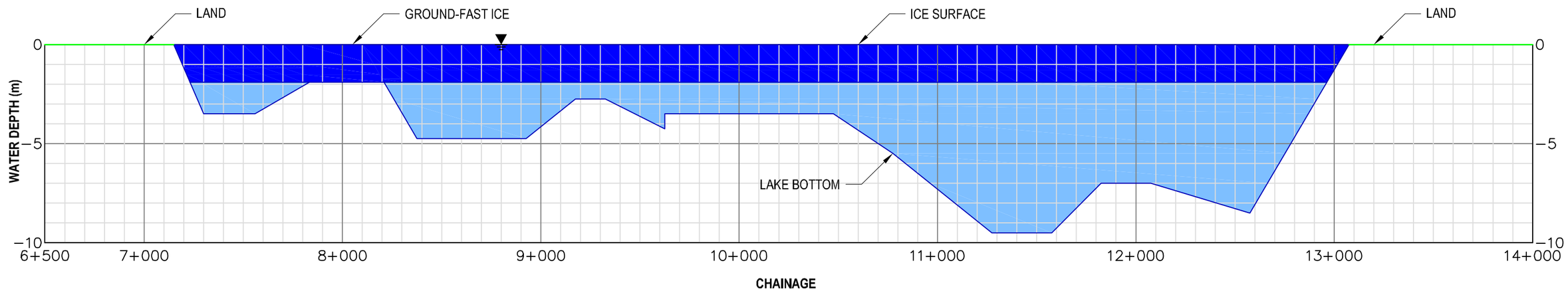
V33101016

March 2010

CREATING AND DELIVERING BETTER SOLUTIONS

EBA Engineering Consultants Ltd.





PROFILE

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COMMENTS
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CLIENT
AREVA

EBA Engineering Consultants Ltd.

KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

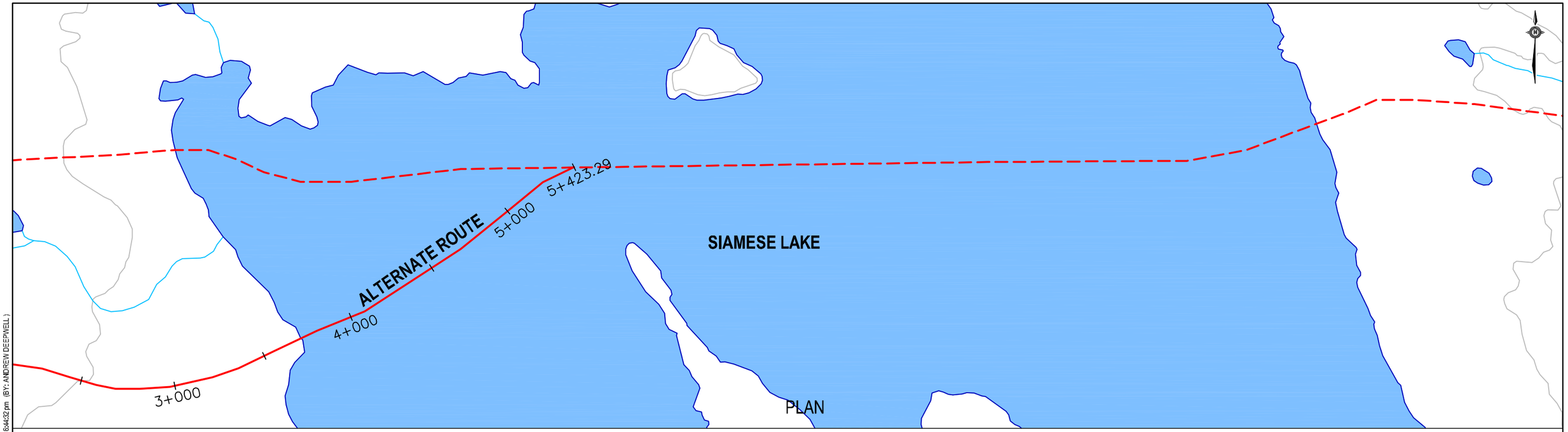
WINTER ROAD
BATHYMETRIC SURVEY OF
SIAMESE LAKE - MAIN ROUTE

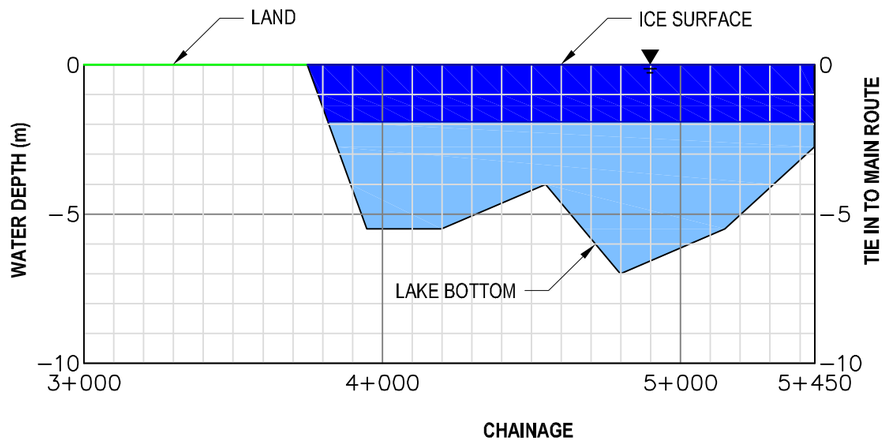
PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0

OFFICE: VANC
DATE: December 1, 2009

Figure C-1

Q:\Vancouver\Transportation\V331\Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles (1 of 2).dwg [FIGURE C-1] October 05, 2010 - 6:42:38 pm (BY: ANDREW DEEPWELL)





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EBA Engineering Consultants Ltd.

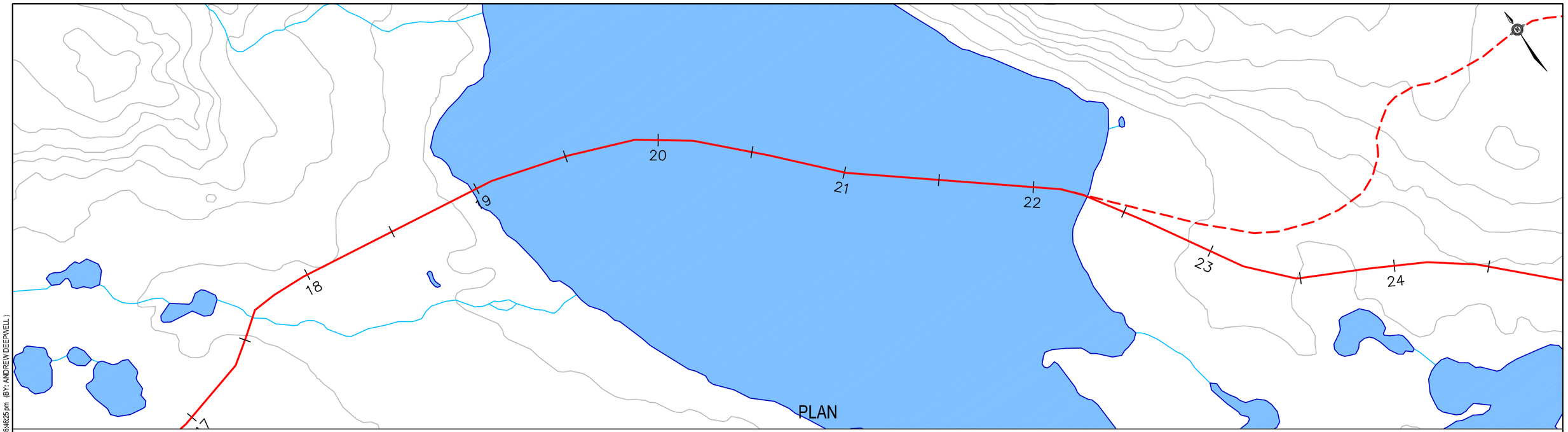
KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

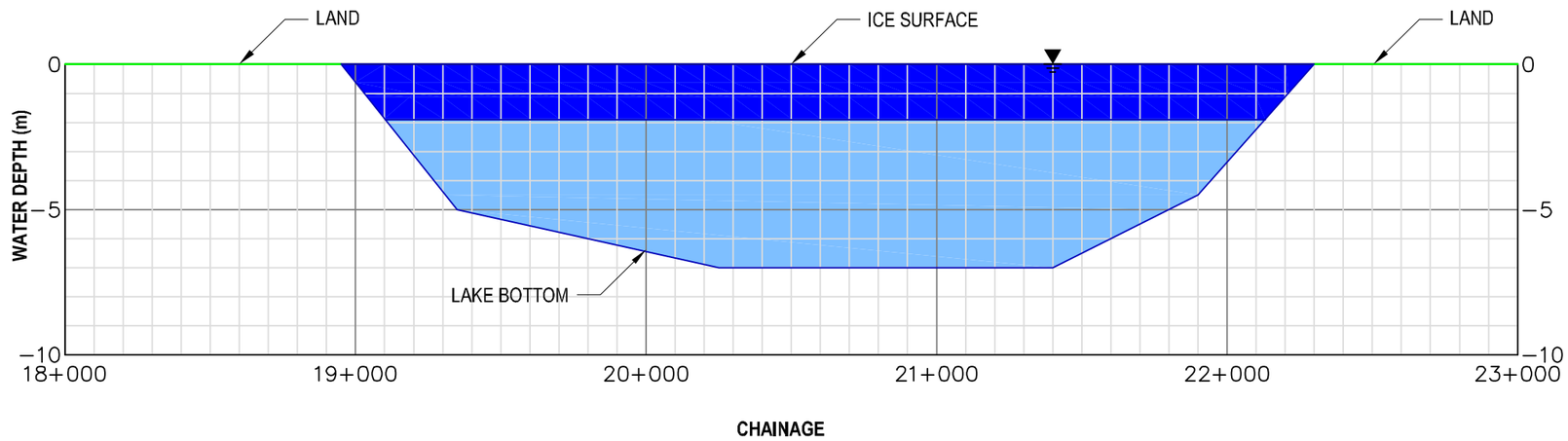
WINTER ROAD
BATHYMETRY SURVEY OF
SIAMESE LAKE - ALTERNATE ROUTE

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-2

Q:\Vancouver\Transportation\V33\1\Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles (1 of 2).dwg [FIGURE C-2] October 05, 2010 - 6:44:32 pm (BY: ANDREW DEEPWELL)





PROFILE

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CLIENT
AREVA

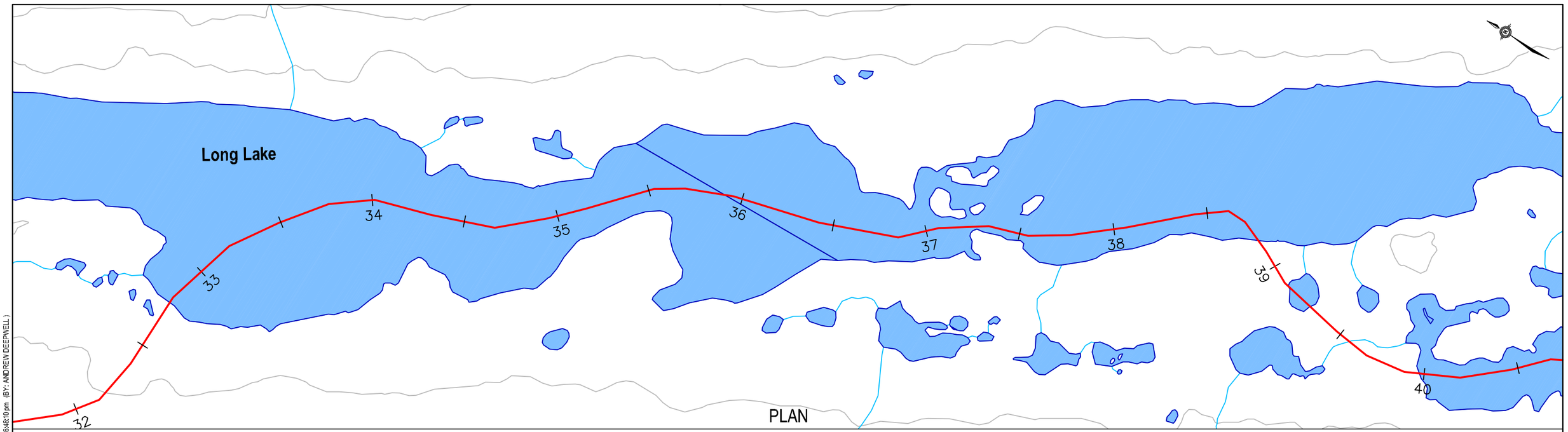
KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE
WINTER ROAD
BATHYMETRIC SURVEY OF
20KM LAKE

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-3

Q:\Vancouver\Transportation\V33\1\Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles (1 of 2).dwg [FIGURE C-3] October 05, 2010 - 6:48:25 pm (BY: ANDREW DEEPWELL)



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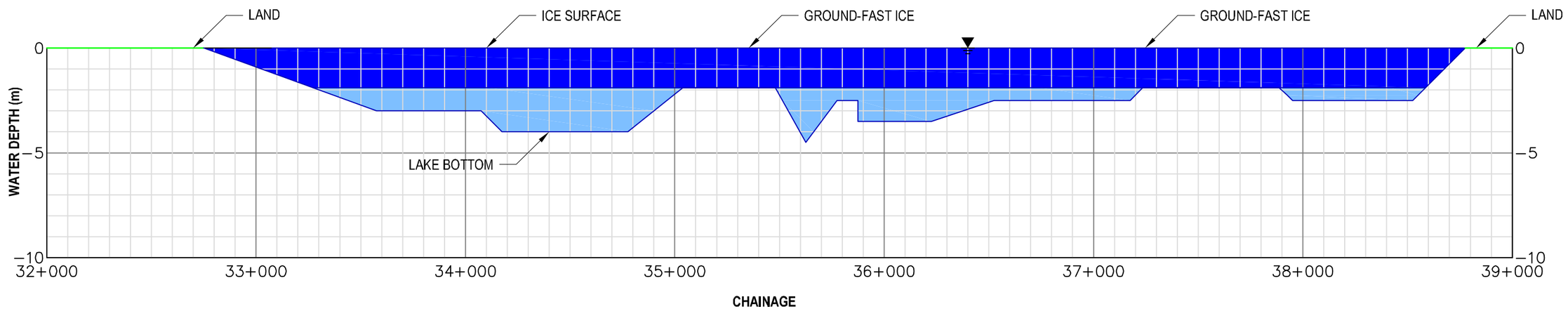

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AREVA

KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

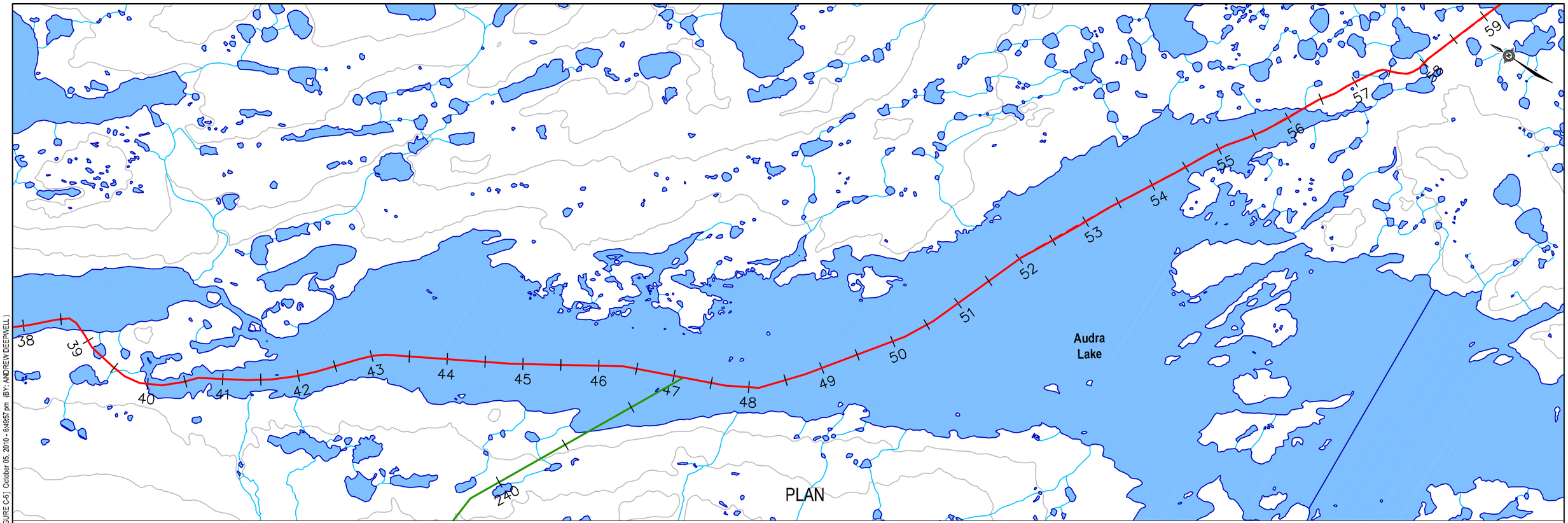
WINTER ROAD
BATHYMETRIC SURVEY OF
LONG LAKE

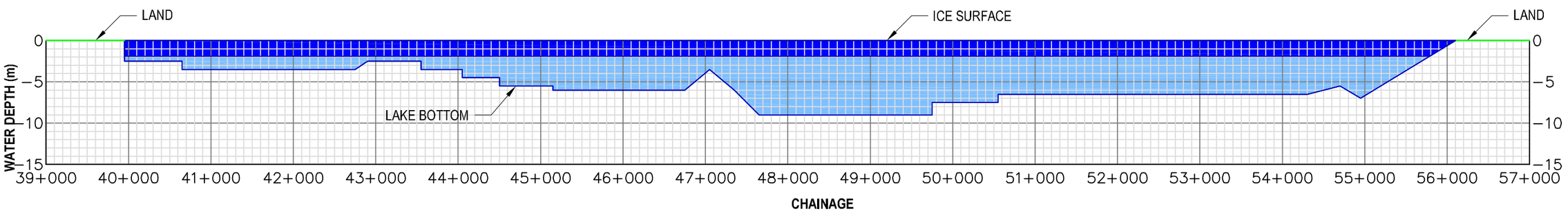
EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-4

Q:\Vancouver\Transportation\V331\Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles (1 of 2).dwg [FIGURE C-4] October 05, 2010 - 6:48:10 pm (BY: ANDREW DEEPWELL)





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CLIENT

AREVA

EBA Engineering Consultants Ltd.

KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

WINTER ROAD
BATHYMETRIC SURVEY OF
NORTH AUDRA LAKE

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-5

[FIGURE C-5] October 05, 2010 - 6x4857.pm (BY: ANDREW DEEPWELL)
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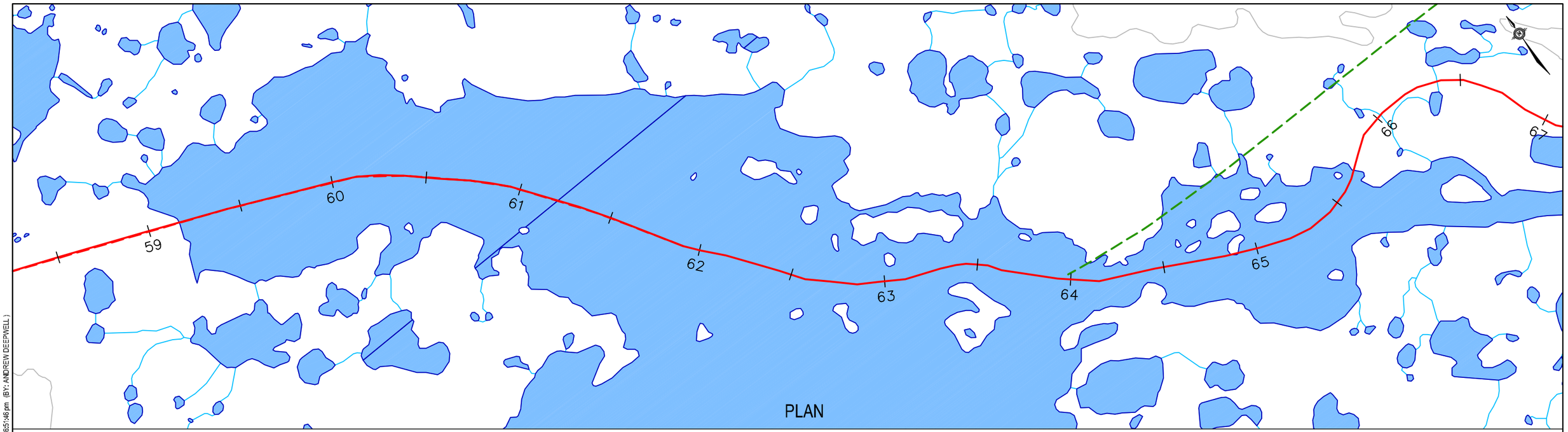

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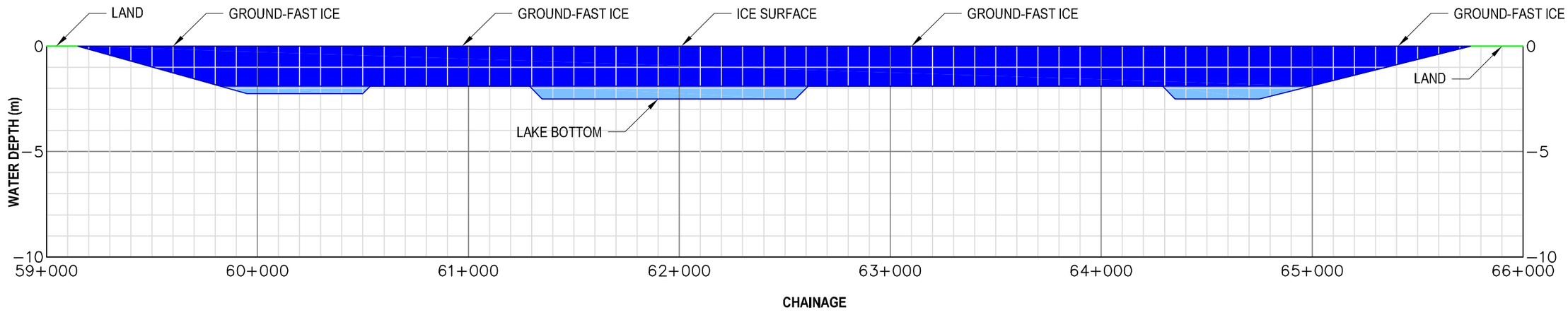

PROFILE

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COMMENTS:
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AREVA

KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

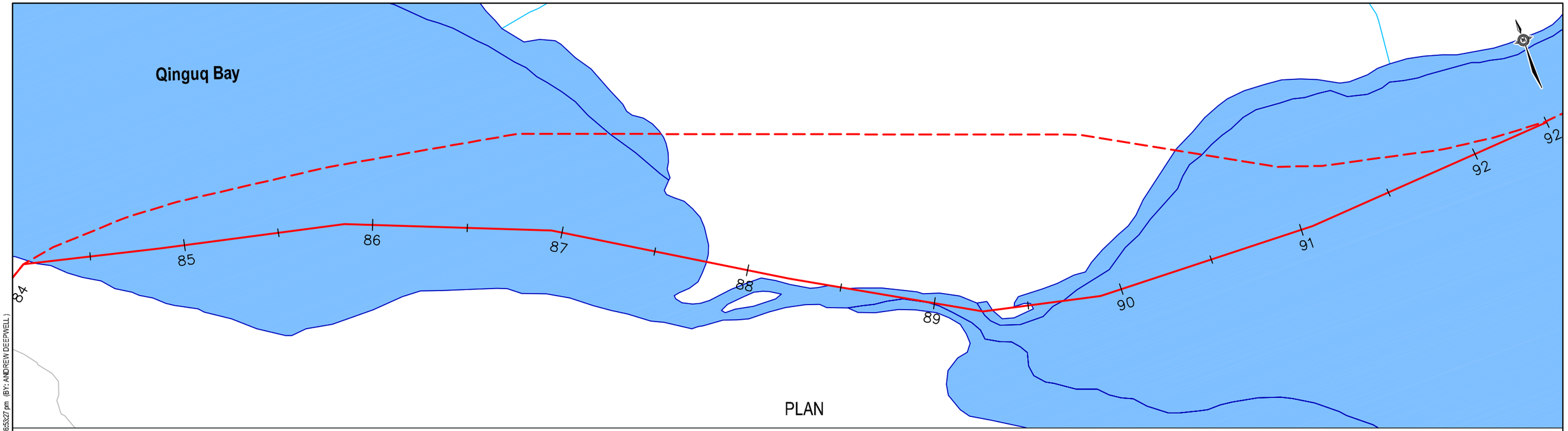
WINTER ROAD
BATHYMETRIC SURVEY OF
SOUTH AUDRA LAKE

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-6

Q:\Vancouver\Transportation\V331\Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles (1 of 2).dwg [FIGURE C-6] October 05, 2010 - 6:51:46 pm (BY: ANDREW DEEPWELL)



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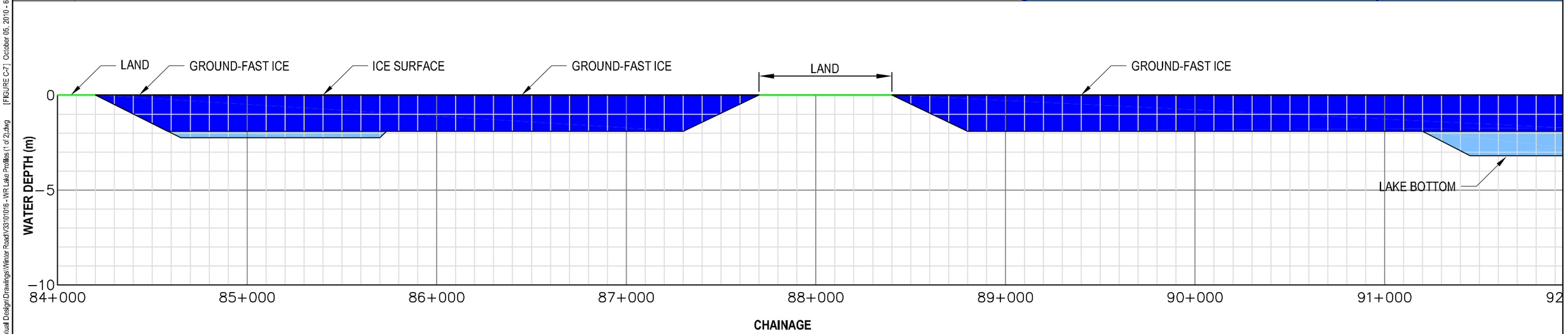

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AREVA

EBA Engineering Consultants Ltd.

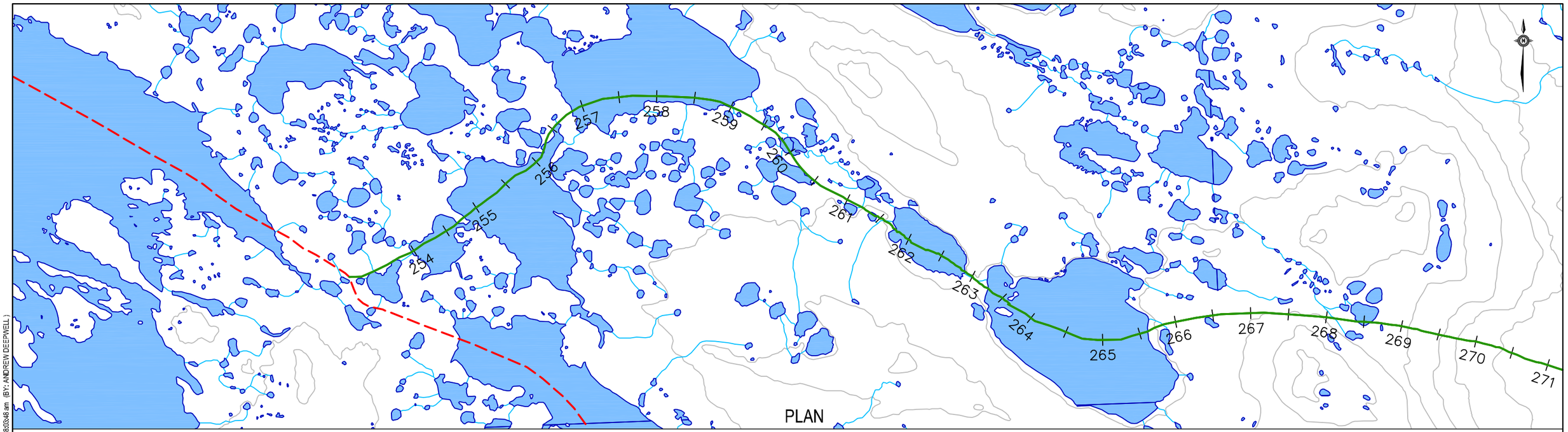
KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

WINTER ROAD
BATHYMETRIC SURVEY OF
QINGUQ BAY - BAKER LAKE ALTERNATE ROUTE

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-7

Q:\Vancouver\Transportation\V331\Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles [1 of 2].dwg [FIGURE C-7] October 05, 2010 - 6:53:27 pm (BY: ANDREW DEEPWELL)



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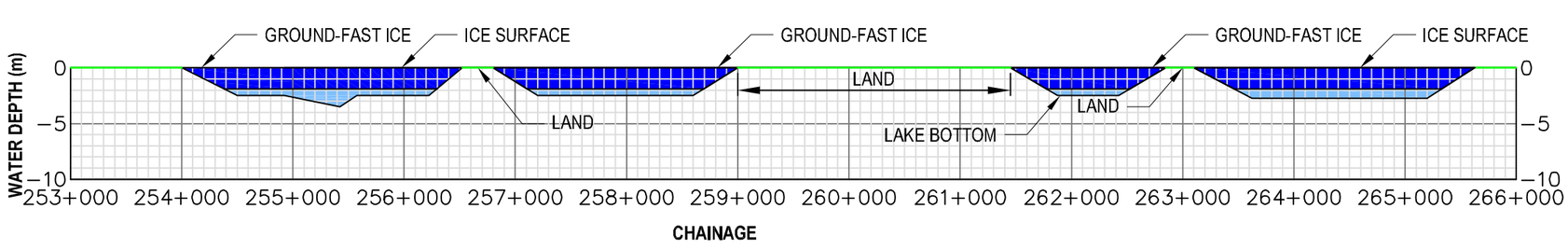

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CLIENT

AREVA

EBA Engineering Consultants Ltd.

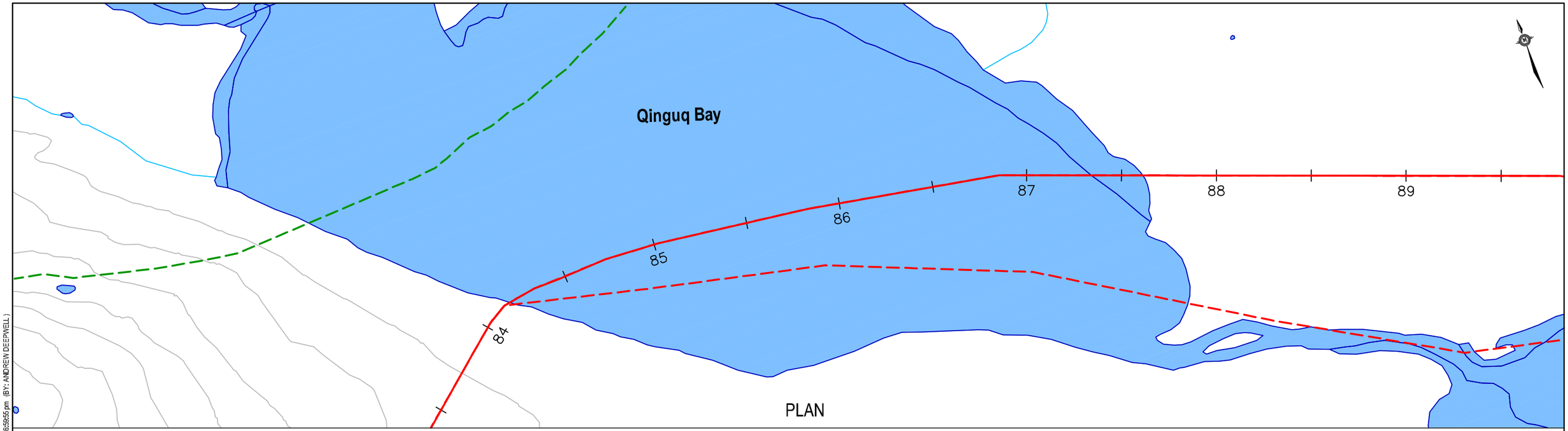
KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

WINTER ROAD
BATHYMETRIC SURVEY OF
UNNAMED LAKES - NORTH ROUTE

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-8

Q:\Vancouver Transportation\V33\1\Projects\V33101016 - ArevaCADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles (1 of 2).dwg [FIGURE C-8] October 06, 2010 - 8:03:46 am (BY: ANDREW DEEPWELL)



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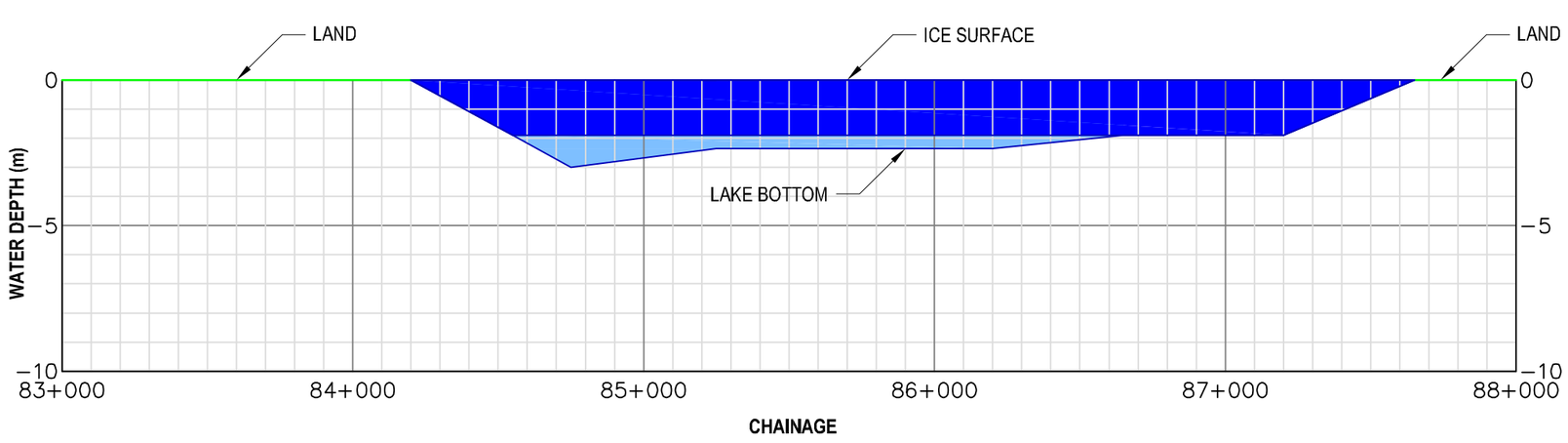

PROFILE

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COMMENTS:
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CLIENT
AREVA

EBA Engineering Consultants Ltd.

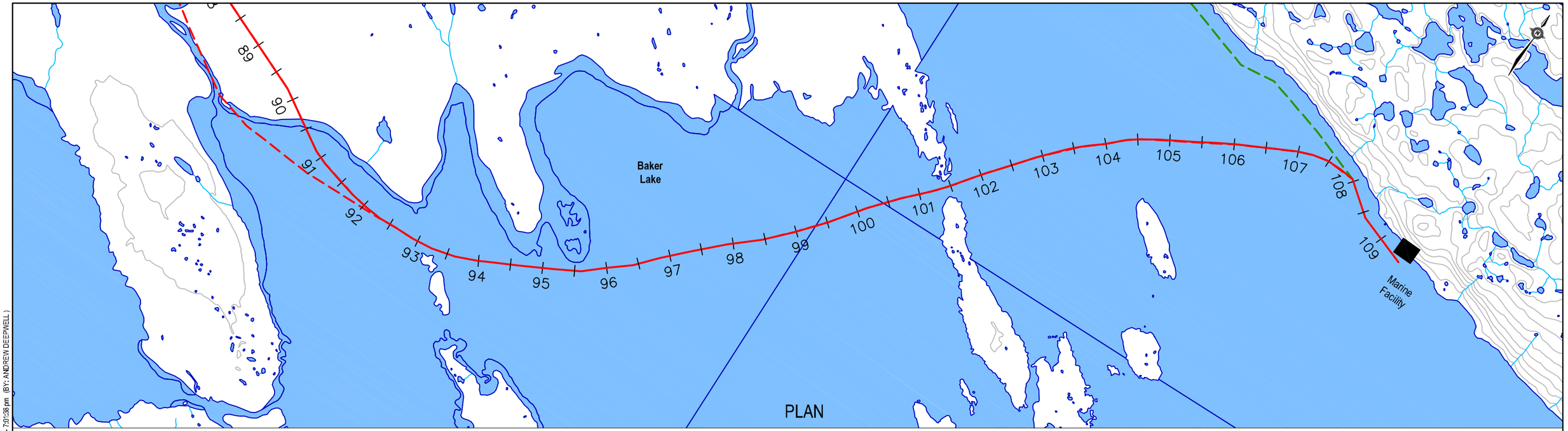
KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

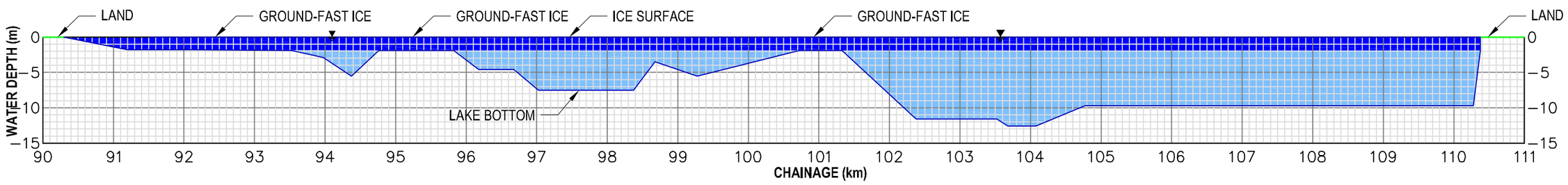
WINTER ROAD
BATHYMETRIC SURVEY OF
SOUTH QINGUQ BAY - MAIN ROUTE

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-9

Q:\Vancouver\Transportation\V33\1\Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles (1 of 2).dwg [FIGURE C-9] October 05, 2010 - 6:59:55 pm (BY: ANDREW DEEPWELL)





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AREVA

KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

WINTER ROAD
BATHYMETRIC SURVEY OF
SOUTH BAKER LAKE ROUTE

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-10

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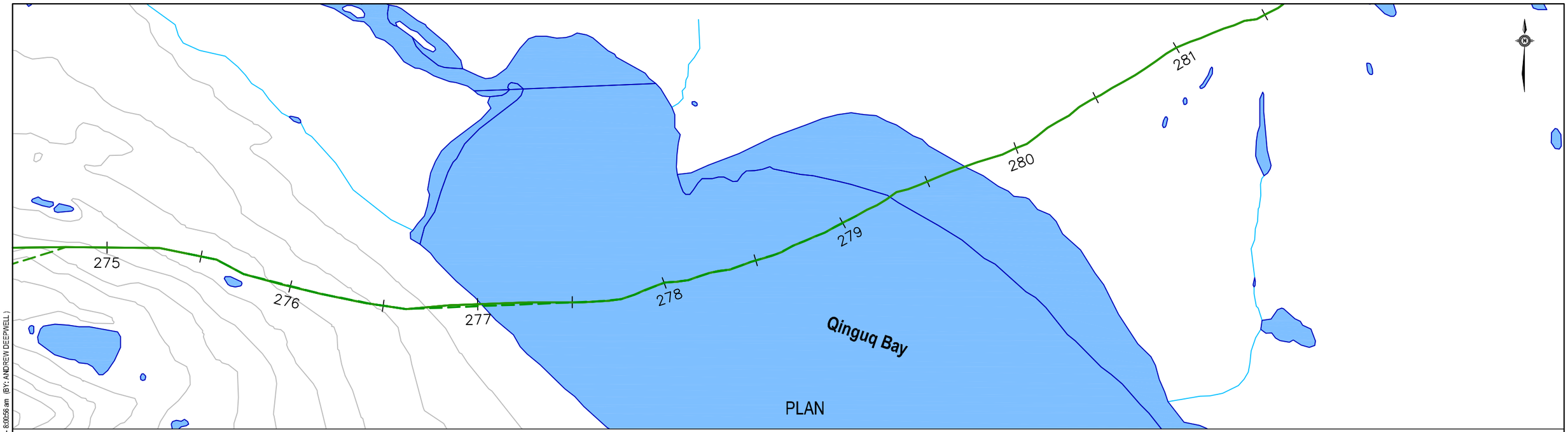

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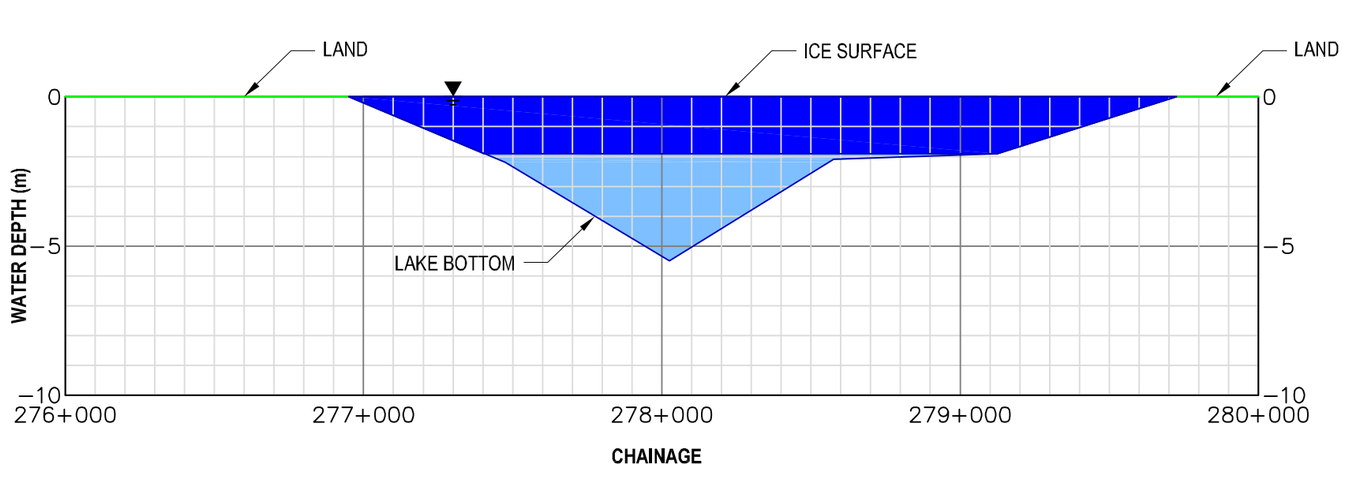

PROFILE

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AREVA

KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

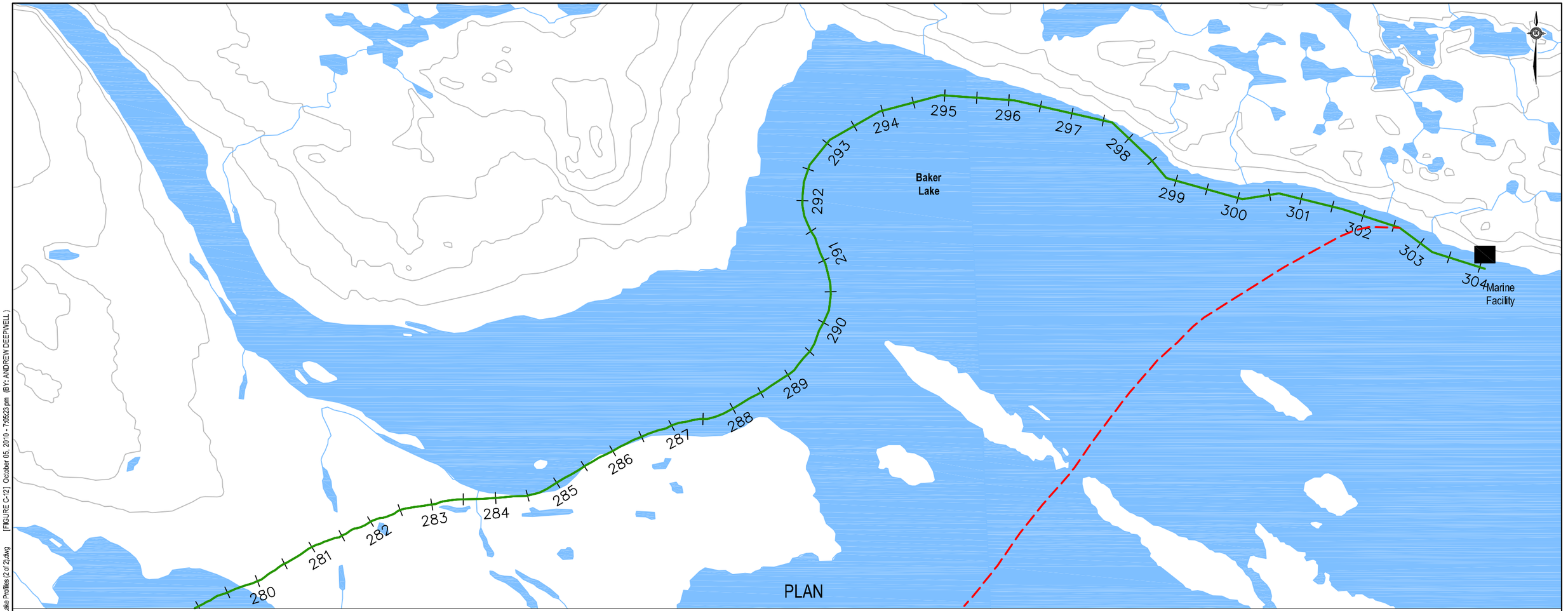
WINTER ROAD
BATHYMETRIC SURVEY OF
NORTH QINGUQ BAY

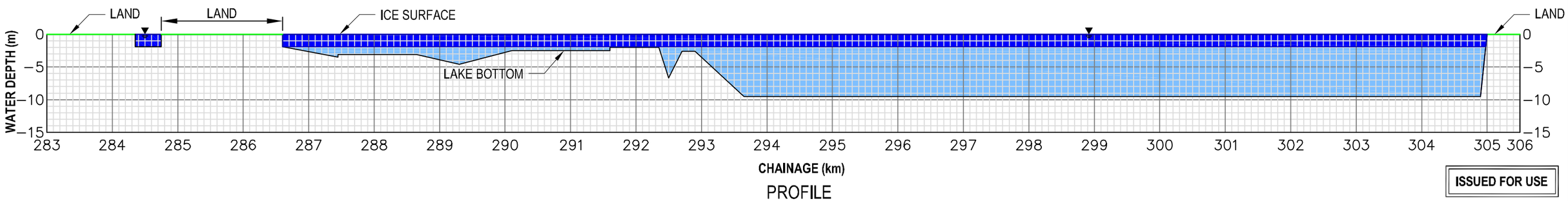
EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-11

Q:\Vancouver Transportation\V33\1Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles (1 of 2).dwg [FIGURE C-11] October 06, 2010 - 8:30:58 am (BY: ANDREW DEEPWELL)





PROFILE

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AREVA

KIGGAVIK PROJECT
CIVIL INFRASTRUCTURE

WINTER ROAD
BATHYMETRIC SURVEY OF
NORTH BAKER LAKE

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
V33101016	AD	VN	0
OFFICE: VANC	DATE: December 1, 2009		

Figure C-12

Q:\Vancouver\Transportation\V331\Projects\V33101016 - Areva\CADD\2009 Conceptual Design\Drawings\Winter Road\V33101016 - WR Lake Profiles (2 of 2).dwg [FIGURE C-12] October 05, 2010 - 7:56:23 pm (BY: ANDREW DEEPWELL)

Attachment B NUNA Review of EBA Report

NUNA LOGISTICS

Executive Office
340 Park Place, 666 Burrard Street
Vancouver, BC V6C 2X8
Tel 604 682 4667 Fax 604 682 4473
Email general@nunalogistics.com

April 20, 2010

Daniel Zunti
Project Manager/Kiggavik Site Supervisor
Areva Resources Canada Inc.
1, 2345 Avenue C North
PO Box 9204
Saskatoon, Saskatchewan
S7K 3X5

Dear Dan:

RE: Areva Resources Canada Inc. - Kiggavik Project - Transportation Option

I have gone through Areva's forwarded data and would like to provide comment which Areva may wish to consider during deliberations with respect to an all-weather road or winter road for the Kiggavik Project.

Regardless of the option selected, a constant for both roads is the single season shipping window derived from an approximately 70-day barge season.

	Inventory Carrying Costs	**Infrastructure Costs**
All Weather Road	The majority of Areva's inventory is pre-paid, therefore, a carrying cost of approximately 14 months when delivery times are added.	Access to an all-weather road would allow 60 million liters of storage at the Baker Lake dock site which takes into consideration warm weather burn rate (estimated to be 10 million liters). The fuel would be transported to the mine site on an "as needed" basis. This would result in keeping the road open year-round (approximately $1.5 million).
Winter Road	Due to the off-season shipping, the inventory carrying costs on a winter road will be approximately 18 months.	A 3-month winter haul would require 70 million liters storage at Baker and approximately 52,000 storage at the mine = 62 million liters of extra storage at an estimated construction cost of $0.40 per liter = $24.8 million.

The key to success on the Tibbitt to Contwoyto Winter Road (TCWR) barren land route sections is that the portages are actual raised road beds. This has a dual purpose:

1) The raised road beds blow clear of snow and normally only require portage entrance clearing after a storm; and

2) In the case of the TCWR most of the portages are constructed during winter from non-compacted esker gravel and at road start-up are watered to form a solid base then sanded for traction. This procedure is not labour or equipment intensive and can be accomplished in a few days. In a few locations crushed rock is placed which requires little or no winter haul preparation.

Roadways across the barren lands can be constructed by compacting snow and water. This method does form a good road bed, however, with considerable equipment and manpower utilization. Unfortunately, these types of roads are not raised and tend to collect snow and often after minor blows shutdown the road.

In the case of the EBA report regarding compacted roadways across the barren land for heavy haul units, our experience is that they have substantially under-estimated the cost per km and do not address the blowing snow issue. Short portages can be economically built-up with snow and water and can easily have the banks feathered back with snow cats to prevent clogging.

EBA selected 2 winter road routes which both unfortunately have 50% overland travel and the associated costs if built-up with fill.

Nuna has looked at 2 options that Areva may wish to consider.

1) A winter road concept that departs the Meadowbank road approximately 12 km north of Baker Lake. The route is 123 km long made up of 27 segments of water totally 97.4 km and 26 segments of land totally in 25.73 km (reference Appendix A - Distance Chart Meadowbank to Kiggavik Winter Road Route).

   There are 10 portages that should be build-up for long term heavy hauls via a winter road and they make up 18 km of the total overland section. The first 38 km departing from the north end of the road contain 8 of the portages representing 12.88 km. The other 2 portages are adjacent to the Thelon River. The Thelon River can be crossed with an ice bridge. The portages on the TCWR were built-up during winter with standard side-dump trucks and trailers.

2) This winter road option parallels the proposed northern overland route; therefore, Areva may wish to consider building 32 km of high grade from the mine site to the south end of Portage 19. This would bypass Portages 19 through 26. Should Areva decide at some later date to construct an all-weather road, the costs of the raised portages would not be lost. Portage 2 and Portage 3 could also be used as part of an all-weather road.

EBA Report

In the case of the EBA report, it is our opinion that they have under-estimated the cost of building long portages from compacted snow and water and ongoing operating costs. In the opposite direction, we feel that they have over-estimated the cost per km construction of an all-weather road. Please bear in mind that we have not been on the ground to inspect the route and our concept work is based on 1:50,000 NTS maps.

Segment 5.1 of EBA's report refers to the construction of a haul road from Andrew Lake to the main mine site (approximately 20 km). We question the use of 785 haul trucks on a 20 km haul bearing in mind that the front tires are under load in both directions resulting in a heat problem. The other issue is to avoid any kind of a berm on an out-of-pit arctic haul road as the berms are snow traps and the only way to clean the road is with a large loader lifting snow over the berm. Stay away from steep banks in non-pit areas and construct the slopes accordingly.

NUNA

Consideration should be given to the use trucks similar to Red Dog (modified tri-drive tractors with 2,400 rubber and planetary drives). They pull 2 quad side-dump trailers with a total payload of 120 tonnes at speeds of 43 km loaded and 55 km empty and are 10' wide. The access road used by the Red Dog fleet is 86 km long with a road surface of 10 m width.

Section 4.2 of the EBA report regarding load factors for equipment operating on a winter road to Kiggavik, EBA pulled data from the TCWR as a direct comparison which, in Nuna's opinion, is incorrect based on the following.

1) The TCWR is precedent with a 70 km Government highway which requires all vehicles to be highway legal.

2) Sections of the TCWR have steep grades and fairly severe corners which prevents the use of longer units to enhance ice loads.

3) The short season on the TCWR requires early shipment of partial loads, therefore, lower average tonnes per truck. This past season with lower forecasted tonnage, hauling was delayed from a normal 28" thick start to a 30" start which increases the average load by several tonnes.

4) A normal hauling start on the TCWR is approximately February 2-4 at an ice thickness of 28" and reaching 40" (full load) by February 23.

5) The EBA report proposes the use of 'B'-trains (7-axle) and Super-B trains (8-axle) as haul units on the Kiggavik road. They have omitted the 7-axle longer scissor-neck deck trailers to haul camps and equipment longer than 32'. As a matter of interest, B-train fuel tankers are no longer manufactured and older unit are not certifiable.

6) In future high arctic winter road programs with less than 6% grades, Nuna plans to utilize tri-drive tractors pulling two 53' drop-decks connected with a tandem converter (12-axle). These decks can be fitted with removable fuel tanks. The 12-axle units will give a legal GVW of 94,000 kgs or 60-tonne loads on 41" of ice.

7) The freezing index in Baker Lake is 38% colder than Yellowknife and consequently significantly better ice conditions. The ice thickness can be greatly enhanced by initial snow clearing and no reason to start with light loads. The TCWR suffers fractured road surface after approximately 3,200 loads which then requires flooding. With the longer heavier loads, the truck numbers will be less than EBA's projection and the haul season shorter.

Enclosed is a 1:50:000 map with the route marked in "red". The short yellow line is in the general direction of the proposed all-weather road route. Also enclosed is a modified copy of drawing Figure 4.5.1 Winter Road Options.

All-Weather Road

The problem with an all-weather road in the north is that under present Law Areva would be liable for reclamation, and therefore, an unknown potential major cost particularly with a large bridge.

In the case of a southern route, you are still isolated from Baker Lake for 2 seasons (freeze-up and break-up). A $200 million up-front cost for a northern route is a substantial number and should prompt more detailed studies for a suitable winter road.

NUNA

Hopefully the foregoing will be of assistance to Areva. Pat McHale and I would be pleased to meet you in Saskatoon at your convenience to answer further questions regarding this project.

Respectfully submitted,

NUNA LOGISTICS LIMITED
per:

John Zigarlick
JZ/jm

Encl:

Attachment A to April 20, 2010 Letter Addressed to Areva Resources Canada Inc.
Kiggavik Project - Winter Road Transportation Option (Meadowbank to Kiggavik)

Prepared by John Zigarlick, Nuna Logistics Limited

	kilometer	
	Water	**Land**
Meadowbank Road to Portage #1 Lake 230	17.00	
Portage 1		0.32
Lake 2	1.29	
Portage 2		2.74
Thelon River	0.48	
Portage 3		2.25
Lake 3	0.97	
Portage 4		0.32
Lake 188	11.90	
Portage 5		0.32
Lake 5	0.48	
Portage 6		0.32
Lake 6	0.32	
Portage 7		0.32
Lake 216	9.30	
Portage 8		0.48
Lake 7	0.32	
Portage 9		0.48
Lake 8	0.64	
Portage 10		0.32
Lake 9	0.48	
Portage 11		0.32
Lake 10	0.32	
Portage 12		0.16
Lake 11	0.32	
Portage 13		0.16
Lake 12	1.13	
Subtotal Distance km	44.95	8.51

	kilometer	
	Water	**Land**
Portage 14		0.16
Lake 13	3.22	
Portage 15		0.32
Lake 14	1.93	
Portage 16		0.32
Lake 15	0.32	
Portage 17		0.48
Lake 16	0.32	
Portage 18		0.32
Lake 257	26.23	
Portage 19		7.88
Lake 14	0.64	
Portage 20		1.13
Lake 114	2.25	
Portage 21		1.29
Lake 15	0.32	
Portage 22		1.45
Lake 16	1.13	
Portage 23		0.8
Siamese Lake 160	9.49	
Portage 24		0.97
Scotch Lake 155	1.29	
Portage 25		0.97
Jaeger Lake	2.41	
Portage 26		1.13
Pointer Lake 141	2.9	
Subtotal Distance km	52.45	17.22

Total Distance km	**97.4**	**25.73**

NUNA