INDIAN AND NORTHERN AFFAIRS CANADA

CLINTON CREEK CHANNEL STABILIZATION (STAGE 1) CONSTRUCTION REPORT

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Indian and Northern Affairs Canada

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April 28, 2003 File: 4440-042-02

Indian and Northern Affairs Canada
300 – 300 Main Street
Whitehorse, Yukon
Y1A 2B5

Attention: Mr. Brett Hartshorne

Reference Abandoned Clinton Creek Asbestos Mine – Clinton Creek Channel Stabilization (Stage 1) - Construction Report

Enclosed are 5 copies of our construction report summarizing the channel stabilization works completed in the fall of 2002 at the abandoned Clinton Creek Asbestos Mine. These repairs constitute the first stage of the channel stabilization work described in our Environmental Liability Report (UMA 2002). The title of the work has been changed from Clinton Creek Channel Stabilization – Short Term Repairs to Clinton Creek Channel Stabilization (Stage 1) to clarify that the work will be completed in stages.

The work undertaken between August 28 and October 5, 2002 includes constructing the first drop structure downstream of the lake outlet, re-grading of the lake outlet and the immediate area around the lake outlet, and upgrading the Wolverine Creek outfall at the confluence with Clinton Creek. The repair work has helped to mitigate the immediate concern related to a catastrophic breach of the waste rock blockage at the Hudgeon Lake outlet.

If we can be of further assistance, please contact Gil Robinson, M.Sc., P.Eng.

Yours truly,

UMA ENGINEERING LTD.

Tom Wingrove, P.Eng.
Vice President
GR/dh

L. Bielus, P.Eng., M.Sc.
Manager, Manitoba
Earth & Environmental

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1 INTRODUCTION

This report summarizes the first stage of the Clinton Creek channel stabilization work completed at the abandoned Clinton Creek Asbestos Mine in the Yukon Territory. The work was undertaken as the first stage in stabilizing the creek channel through the waste rock dump to help mitigate the downstream hazards associated with a sudden breach of the Hudgeon Lake outlet.

Four alternatives to mitigate the hazards associated with a breach of the waste rock dump were presented in UMA's Conceptual Design Report (UMA, 2001). Based on the monitoring completed to date, the preferred remedial option to address the landslide blockage is channel stabilization for which the capital construction costs are estimated to be in the range of $2,500,000 to $6,000,000. These costs are dependent on whether stabilization of the waste rock dump is also required. Given the possibility of conditions worsening at the Hudgeon Lake outlet before the practicable length of channel stabilization repairs could be implemented, the channel stabilization repairs will be staged to allow the most immediate concern (the condition of the outlet) to be addressed first. The design to address the condition of the lake outlet included the installation of four gabion drop structures within the first 150 metres of the channel downstream of the lake outlet. In the fall of 2002, the first stage of these repairs was undertaken, which was intended to include the installation of the first two drop structures. However, due to the impending winter season, the second drop structure was not constructed.

2 HISTORICAL SUMMARY

The abandoned Clinton Creek Asbestos Mine is located about 100 km northwest of Dawson City in the Yukon Territory, 9 km upstream of the confluence of Clinton Creek and the Forty Mile River. The mine consists of three open pits (Porcupine, Creek and Snowshoe), two waste rock dumps (Porcupine Creek and Clinton Creek) along the south side of Clinton Creek, and a tailings pile on the west side of Wolverine Creek (Figure 2-1). From 1968 until depletion of economic reserves in 1978, the Cassiar Mining Corporation extracted approximately 12 million tonnes of serpentine ore from the bedrock.

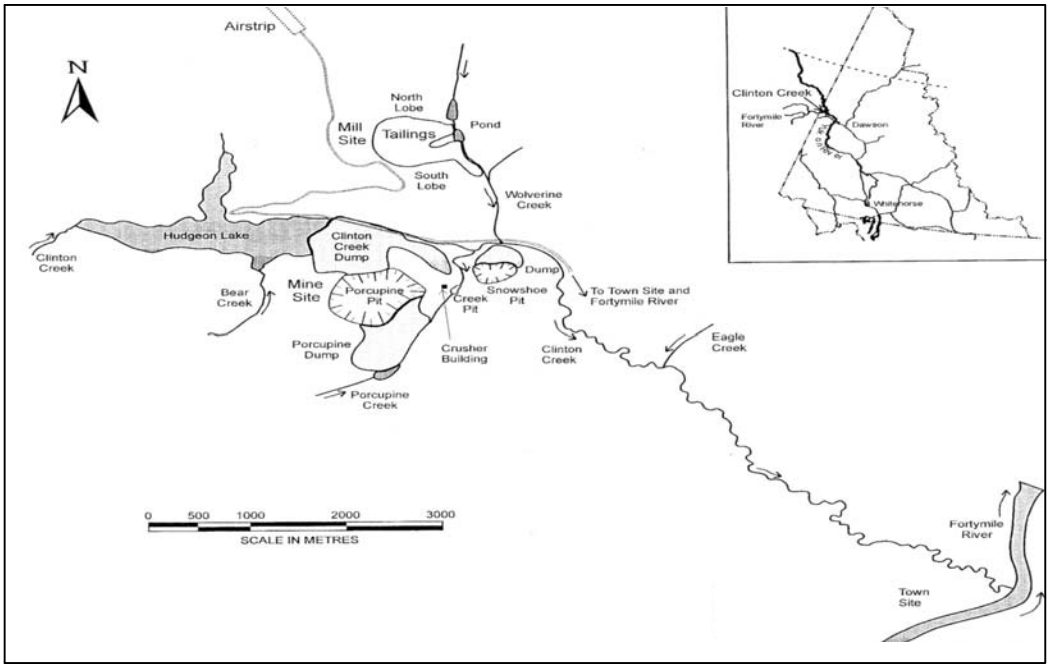


Figure 2-1) Abandoned Clinton Creek Asbestos Mine Site

Over 60 million tonnes of waste rock from the open pits was deposited over the south slope of the Clinton Creek valley at a location referred to as the Clinton Creek waste rock dump. The ore was transported by an aerial tramway to the mill located on a ridge along the west side of Wolverine Creek, a tributary of Clinton Creek. Over the same period of time, about 10 million tonnes of asbestos tailings from the milling operation were deposited over the west slope of the

Wolverine Creek valley (Wolverine Creek tailings piles). Since closure of the asbestos mine, concerns have been raised with respect to the physical condition of the site, in particular downstream hazards associated with breaching of the Hudgeon Lake outlet and channel blockages resulting from landslides of the Clinton Creek waste rock dump and Wolverine Creek tailings piles.

With respect to the potential for a catastrophic breach of the waste rock, the most immediate concern is the integrity (stability) of the existing creek channel at the Hudgeon Lake outlet. Comparing profiles of the creek channel from 1986, 1999 and 2001, it is clear that continued channel erosion is deepening (down-cutting) the channel from just downstream of the outlet to about 500m downstream of the outlet. As down-cutting continues, the toe of the waste rock pile is undercut and localized slope instabilities develop. The unstable waste rock slumps into the channel and temporarily blocks creek flow. In most instances, this material is quickly overtopped and transported downstream and deposited in the Clinton Creek channel downstream of the mine. As the down-cutting gradually retrogresses towards the outlet, conditions may quickly develop where normal flow and/or an overtopping event could trigger a full scale breach of the waste rock at the Hudgeon Lake outlet. The consequences of a breach and rapid draining of Hudgeon Lake are discussed in UMA's Risk Assessment Report (UMA 2000).

3 CHANNEL REPAIRS

3.1 Objectives

The objective was to complete as much work as possible with the available funds and within the remaining time before freeze-up. The most critical work component was stabilization of the channel immediately downstream of the Hudgeon Lake outlet. Construction was undertaken by Hän Construction Ltd. from Dawson City, Yukon. Hän Construction Ltd. is owned by Chief Isaac Inc., which is a business unit of the Tr'ondëk Hwëch'in First Nation. The work was completed under a Contribution Agreement between Indian and Northern Affairs Canada (INAC) and the Tr'ondëk Hwëch'in First Nation. Site supervision was provided by INAC and UMA Engineering.

Due to the potential for airborne asbestos fibres to be present during construction, a Health and Safety Plan (Appendix A) was developed to minimize the exposure of the people working on-site to airborne asbestos fibres until the test results from air quality samples were available. The test results indicated that the levels of airborne fibres were well below the allowable limit of 0.5 fibres per ml for an 8-hour exposure period. The test results are included in Appendix B.

A Letter of Advice was provided by the Department of Fisheries and Oceans (DFO) approving the proposed work (Appendix C). The advice given required that the work be conducted in a manner to minimize the release of sediment to downstream waters and that deleterious substances, and specifically lubricants, coolants and fuels be used, transferred and stored in such a manner that they are not and do not become deposited in fish bearing waters. In addition, the work had to be conducted in a manner to prevent harmful alteration, disruption or destruction of fish habitat.

3.2 Construction Activities

Construction activities included:

- Improvement to the access road from the Forty Mile River bridge to the mine site,
- Production of gabion rock fill material (Photograph 3-1),
- Installation of a diversion pipe to divert some of the flow from Hudgeon Lake around the work area (Photograph 3-2),
- Construction of a cofferdam across the outlet from Hudgeon Lake (Photograph 3-3),
- Removal of the two culverts from the lake outlet (Photograph 3-4), debris and vegetation from the channel and relocation of some boulders to facilitate construction of the gabion drop structure,
- Backfilling and shaping the creek channel to the design grades (Photograph 3-5),
- Construction of one gabion drop structure (Photograph 3-6 and 3-7),
- Re-grading of the outlet from Hudgeon Lake (Photograph 3-8),
- Restoring flow through the lake outlet into Clinton Creek (Photograph 3-9) and,
- Site restoration (Photograph 3-10).

The work completed during each week of the project is briefly described below and in the Weekly Project Reports included in Appendix D. Table 3-1 summarizes the approximate number of working days and cost required for each of the main construction tasks. Selected photographs have been included in this report and a complete set of digital photographs has been provided separately on Compact Disc. The record drawings for the work completed are included in Appendix A.

Table 3-1) Estimate Of Construction Days For General Work Tasks

Work Task	Equipment (days)	Labour (days)
Camp Set-up	0	9
Site Access, Produce Gabion Fill	5	0
Gabion Basket Assembly	0	3
Diversion Pipe	5.5	2.5
Drop Structure and Lake Outlet	16.5	16.5
Site Cleanup / Demob	3	3
Total Days	**30**	**34**

Week 1

Work completed during the first week to 10 days of work (starting on August 28) included improvements to the site access road, mobilization of equipment, construction camp set-up, production of rock fill for the gabions and delivery of materials (Table 3-2). The construction equipment mobilized to site included a D7 Caterpillar bulldozer, a 966C Caterpillar loader, a 320L Caterpillar excavator and a tandem dump truck. The gabion fill material was produced from the rock outcrop located on the main road at the confluence of Wolverine Creek and Clinton Creek (Photograph 3-1).

Table 3-2) Materials

Item	Quantity Delivered	Quantity Used	*Quantity Remaining
Gabion Baskets 3m x 1m x 0.5m – PVC coated	510	140	370
Gabion Mat 30m x 3m x 0.3m – PVC coated	1	1	0
Non-Woven Geotextile (ARMTEC 350) 418 m^2 per roll	2,926 m^2 (7 rolls)	1,254 m^2 (3 rolls)	1,672 m^2 (4 rolls)
Pneumatic Staple Guns (for SS rings) (Rented for duration of project)	2	2	0
Stainless Steel Rings	40	12	28 boxes

*Note: The leftover materials have been stored at the DIAND Regional Services storage area in Dawson City, YT.

Week 2

During the second week (September 8 to 14) a trench for the diversion pipe was excavated and the diversion pipe installed (Photograph 3-2). Initial assembly of the gabion baskets and hauling of the gabion fill to the work site was also completed.

Week 3

During the third week (September 15 to 21), a cofferdam was installed across the lake outlet and the creek channel was prepared for the gabion drop structure to be constructed just downstream of the outlet. Gabion baskets forming the floor of the lower level of the drop structure were installed and filled. A self-propelled vibratory drum compactor (Ingersoll-Rand SP-54) was mobilized to the site. (Photographs 3-3 to 3-6)

Week 4

Work completed during the fourth week (September 22 to 28), was mainly focussed on finishing the gabion drop structure. Additional work included rough grading the lake outlet between the cofferdam and the drop structure and producing additional gabion fill material (Photograph 3-7). Based primarily on the lateness of the season, a decision was made on September 25 to postpone construction of the second drop structure to the 2003 construction season.

Week 5

Work completed in the fifth and final week of construction (September 29 to October 5) included completion of the drop structure, re-grading the lake outlet, installation of a gabion mat and ford crossing across the lake outlet, removal of the cofferdam and diversion pipe, site clean up, main road restoration, upgrading the Wolverine Creek outfall and demobilizing the construction camp and equipment (Photographs 3-8 to 3-10).

3.3 Fish Salvage and Habitat

In accordance with the work plan and Letter of Advice provided by DFO, it was necessary to maintain a minimum flow of 0.2 m^3 per second in the creek channel, conduct a fish salvage operation and minimize any sediment load in the creek following removal of the cofferdam. Following installation of the cofferdam, a fish salvage operation was undertaken by INAC to recover any fish trapped in the creek between the cofferdam and the diversion pipe outfall. Three Arctic Grayling were salvaged, and returned to Hudgeon Lake, from the impoundment area and the creek, which was surveyed for fish entrapment. Fish passage was blocked immediately downstream of the diversion pipe to prevent fish from entering into the work area.

The sediment load generated during removal of the cofferdam was minimized by the following actions: First, the top 500mm of the cofferdam was removed before breaching the cofferdam. Second, the cofferdam was breached by opening a small notch in the crest to allow the channel between the cofferdam and the gabion structure to flood before removing the remainder of the cofferdam (Photograph 3-9). Third, flow was maintained through the diversion pipe for the first three to four hours following the breach to help dilute any sediment generated during dam removal. Water flowing through the new outlet from Hudgeon Lake began to run clear within 20 to 30 minutes of the initial breach of the cofferdam. The sediment load in the creek channel was also reduced by the presence of beaver dams and marsh areas downstream of the waste rock pile. The depth of water flowing over the gabion drop structure after the breach indicated that fish passage over the drop structure will not likely be hindered.

3.4 Control of Water

Water flowing from Hudgeon Lake was controlled during the construction period by i) allowing water levels in Hudgeon Lake to drop naturally to increase upstream storage, ii) constructing a cofferdam across the lake outlet and iii) installing a diversion pipe to maintain a base flow from the lake around the work area.

Hudgeon Lake was first allowed to drain naturally down to elevation 411.3m before building the cofferdam. Flow from the lake was temporarily increased by cleaning out the inlet side of the two culverts in the lake outlet. A cofferdam was then constructed across the lake outlet using waste rock material (mainly argillite). Water levels recovered to an elevation of 411.7m over the duration of the project or about 0.5 m below the high water mark visible along the lake shoreline. In addition to the diversion pipe, a 400 mm diameter emergency overflow pipe fitted with a valve was installed through the cofferdam in case additional flow was required to maintain the maximum water level without having to remove the cofferdam. The maximum water level established at the onset of the project was the high water mark visible along the lake shoreline.

Flow from Hudgeon Lake was diverted around the work area using a diversion pipe. The diversion pipe consisted of 180m of 600mm diameter CMP (Photograph 3-2) laid in a trench graded at a slope of 1.5 percent. The flow from the diversion pipe, estimated to be at least 0.2 m^3/second, helped to decrease the rate of lake level recovery and preserve fish habitat in the creek channel between the work area and the confluence with Wolverine Creek. Water leakage from the CMP couplers used to connect the CMP segments forming the diversion pipe was addressed by installing three check dams in the trench where leakage was the greatest (Photograph 3-12).

Subsequent to installing the diversion pipe, the lake level increased about 4 cm/day early in the project to 1 cm/day near the latter part of September. A graph of the lake levels is included in Appendix E. During the construction period there was never a need to let water flow through the overflow pipe in the cofferdam.

4 CONSTRUCTION ISSUES

4.1 2002 Construction Season

It was originally assumed that there would be enough loose cobble-sized material from the toe of the outcrop along the access road at the confluence of Wolverine Creek to fill the gabion baskets. This material however, was quickly used up and additional material was obtained by scaling weathered rock from the top of the outcrop using the excavator. Drilling and blasting may be necessary to obtain additional rock fill for future construction works.

During channel preparation, seepage was encountered from the toe of the waste rock pile at the lower level of the drop structure. A granular blanket drain was constructed under the floor of the lower level of the drop structure to provide a seepage path. A detail of the blanket drain is included on the record drawings and shown on Photograph 3-11.

Two pneumatic staple guns used to assemble the gabion baskets were rented from the gabion supplier. However, only one of the guns worked and it required constant maintenance. Since delivery time from Edmonton for a replacement gun can be as much as four days, it is essential that two working guns are available on-site at all times. This tool is essential for timely construction of the drop structures.

4.2 Future Construction

If more than one gabion structure is to be constructed, construction time could be reduced by having a crew of men and equipment working simultaneously on each structure. The diversion pipe scheme used in 2002 could be used for the construction of the second, and possibly the third drop structure by extending the diversion pipe about 50 to 75 metres further. Beyond this point however, an alternate means of diverting water may be required since the flat bench on the north side of the channel (the old mine access road) is non-existent further downstream.

Respectfully Submitted,

UMA Engineering

Gil Robinson, M.Sc., P.Eng.

Geotechnical Engineer,

Earth and Environmental

REFERENCES

UMA Engineering Ltd., 2000. "Indian and Northern Affairs, Abandoned Clinton Creek Asbestos Mine, Risk Assessment Report."

UMA Engineering Ltd., 2001. "Indian and Northern Affairs, Abandoned Clinton Creek Asbestos Mine, Conceptual Design Report."

UMA Engineering Ltd., 2002. "Indian and Northern Affairs, Abandoned Clinton Creek Asbestos Mine, Environmental Liability Report – DRAFT May 2002."

Photographs

Photograph 3-1) Quarry site at Wolverine Creek.

Photograph 3-2) Inlet of 600mm diameter CMP diversion pipe.

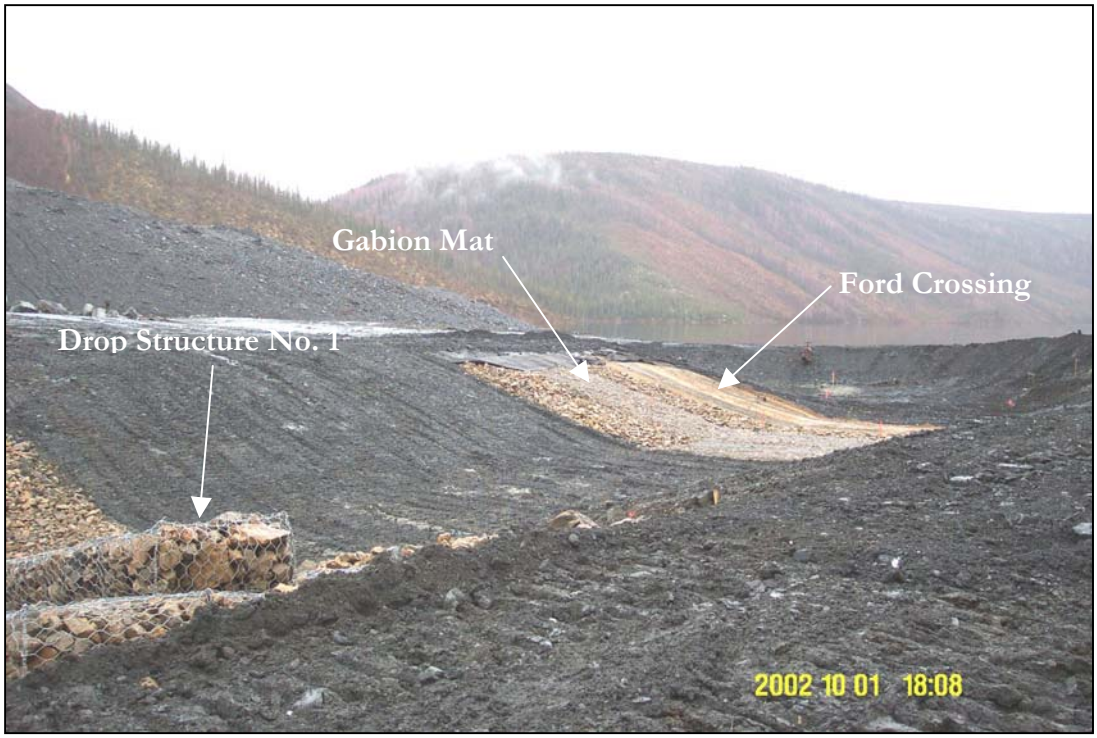
Photograph 3-3) Cofferdam construction.

Photograph 3-4) Channel preparation – Removing CMP's from original outlet.

Photograph 3-5) Backfilling channel.

Photograph 3-6) Filling gabions for lower level of drop structure.

Photograph 3-7) Gabion drop structure construction.



Photograph 3-8) Re-graded outlet from Hudgeon Lake.

Photograph 3-9) Restoring flow over the lake outlet.

Photograph 3-10) Site restoration in progress.

Photograph 3-11) Constructing a blanket drain below the lower level of the drop structure.

Photograph 3-12) Check dams installed in diversion pipe trench.

Appendix A – Construction Specifications, Record Drawings and Health and Safety Plan

JOB NO. 4440 042 02 01

DATE August 22, 2002

INDIAN AND NORTHERN AFFAIRS CANADA

SPECIFICATIONS FOR

CLINTON CREEK CHANNEL STABILIZATION

AT THE

CLINTON CREEK MINE SITE, YUKON TERRITORY

Material Suppliers

The list of material suppliers we intend to use on the Work is as follows:

Material	Supplier
Geotextile	
Gabion Baskets	
Gabion Mat	
Other:	

Equipment Schedule

The equipment we intend to use on the Work is as follows:

Excavation _____

Backfilling _____

Compaction _____

Trucking _____

Other:

_____ _____

_____ _____

_____ _____

Sub-Contractors

The list of Sub-Contractors (if any) we intend to use on the Work is as follows:

Description of Work	Subcontractor	Address
Excavation and Backfill:		
Material Delivery (Trucking):		
Gabion Drop Structure Construction:		
Other:		

Schedule of Work

FOR: CLINTON CREEK CHANNEL STABILIZATION,

CLINTON CREEK MINE SITE, YUKON TERRITORY

Items of Work	Percentage of Work Completed				
	Start Date 0%	25%	50%	75%	Completion 100%
1) Site Preparation					
2) Lake Diversion/Siphon					
3) Material Processing					
4) Channel Grading					
5) Gabion Drop Structures					
6) Hudgeon Lake Outlet Stabilization					

CONTRACTOR'S PROPOSED COMMENCEMENT DATE _____ 20

Estimated Material Quantities

Item	Description	Quantity	Unit
1.	Gabion Baskets	500	per basket
2.	Gabion Mats	1	per mat
3.	Non-Woven Geotextile	3000	square metres
4.	Gabion Fill	750	cubic metres
5.	Channel Fill	7200	cubic metres
6.	Channel Rip rap	400	cubic metres
7.	Side Slope Grading	3000	cubic metres

SP:1 CLINTON CREEK CHANNEL STABILIZATION

This Specification covers all aspects of the channel stabilization work.

1.1 General Information

The purpose of the work is to mitigate the potential for a breach of the outlet from Hudgeon lake which could result in flash flooding in the Clinton Creek Valley downstream of the mine site. The work involves stabilization of the outlet and a short portion of the Clinton Creek channel immediately downstream of the outlet.

1.2 Description of Work

The intent of the work is to stabilize the outlet from Hudgeon Lake and upto 150 metres of the channel downstream of the outlet. The outlet will be stabilized by removing the existing culverts and placing a 0.3 metre thick gabion mat over the outlet to minimize the potential for erosion. A fjord crossing will be constructed just upstream of the gabion mat. Downstream of the outlet upto four (4) gabion drop structures will be built to flatten the grade of the channel between the drop structures. The drop structures will be constructed using gabion baskets filled with clean rock. The existing channel will be filled as required to construct the drop structures.

The water elevation in Hudgeon Lake must be maintained at a level close to or below the level measured at the onset of construction. In any case, the lake levels shall not be permitted to rise to an elevation that jeopardizes the stability of the outlet. To facilitate construction, the flow from Hudgeon Lake shall be diverted around the work area using a pipe siphon of sufficient capacity to maintain the lake level and provide a minimum flow of about 0.2 cubic metres per second. The work should proceed in a manner that flow can be temporarily increased by using more siphons or be temporarily re-instated into the channel to account for increased flows from the lake as a result of precipitation events.

1.3 Regulations

All activities shall be conducted in accordance with all applicable Federal, Territorial, and local. Indian and Northern Affairs – Canada (DIAND) – Waste Management Program, Yukon Region, is identified as the Project Authority, and is conducting this work under the authority of the Yukon Waters Act. DIAND authorizes its designated agents, contractors, employees etc. to access the site and implement the described construction works and other activities directly associated with this project. The Contractor shall be responsible for conducting the work in accordance with all Labour, Workers Compensation and any and all other applicable regulations.

1.4 Materials

The Contractor shall be responsible for the supply of all materials. It is expected that delivery of the gabion baskets, gabion mat and geotextile will likely take about 10 to 14 days. Potential granular borrow areas have been identified near the confluence of Clinton and Wolverine Creeks. Any geotextile and gabion materials purchased for this work but not used during construction shall be returned to the Owner (INAC) for later use. The materials shall be stored at a location defined by the Owner (INAC).

1.4.1 Handling and Storage of Materials

All material shall be handled, stored, and/or stockpiled in a careful and workmanlike manner.

1.4.2 Approval

Materials supplied under this Specification shall be subject to inspection by the Contract Administrator. A representative sample of all granular materials will be submitted to the Contract Administrator prior to placement.

1.4.3 Geotextile

The geotextile shall be a non-woven AMOCO 4510, ARMTEC 300 or an approved equal that meets the following specifications:

PROPERTY	TEST METHOD	MINIMUM AVERAGE ROLL VALUE
Puncture Resistance	ASTM D-4833	670 Newtons
Mullen Burst Strength	ASTM D-3786	3,400 kilopascals
Grab Tensile Strength	ASTM D-4632	1,100 Newtons
Permeability	ASTM D-4491	0.30 centimetres per second
UV Resistance	ASTM D-4355*	70 percent @ 500 hrs.**

* Fabric Conditioned as per ASTM D-4355
** Percent of Minimum Grab Tensile After Conditioning

1.4.4 Gabion Baskets and Mats

The gabion baskets and mats shall be manufactured by Maccaferri Canada Ltd. and shall be made of PVC coated, galvanized wire. The size of the gabion baskets for the drop structures shall be 0.5m x 1.0m x 3.0m. The gabion mat size shall be 0.3m x 3.0m x 30.0m

1.4.5 Channel Fill

Channel fill material will be well graded and free of deleterious material, and **unfrozen**.

Channel fill shall conform to the following gradation:

Equivalent Stone Diameter		**Gradation Limits Percent Passing by Weight**
Metric Sieve (mm)	U.S. Standard	
150	6 inch	100
100	4 inch	75-90
25	1 inch	50 max

1.4.6 Channel Rip Rap and Gabion Fill

The channel rip-rap and gabion fill materials shall consist of hard, dense, durable rock fragments or field stone free from cracks, seams, or other defects that would tend to increase their susceptibility to destruction by water and frost.

The channel rip rap and gabion fill shall conform to the following gradation:

Equivalent Stone Diameter		**Gradation Limits Percent Passing by Weight**
Metric Sieve (mm)	U.S. Standard	
200	8 inch	100
150	6 inch	50
75	3 inch	0

1.5 Construction Requirements

1.5.1 Construction Sequencing

The work shall be completed in a sequence mutually agreed upon by the Contractor and the Contract Administrator, except that the flow from Hudgeon Lake must be diverted around the work area before any channel earth work is initiated.

1.5.2 Preparation of Work Areas

The Contractor shall prepare the work areas as necessary to complete the specified work. Work platforms or benches may be prepared on the south side and north side of the Clinton Creek channel, if required. Spoil material from this operation may be used as channel fill.

1.5.3 Hudgeon Lake Flow Diversion

The contractor shall be responsible for the design and construction of a suitable cofferdam and siphon to allow the flow from Hudgeon Lake to be diverted around

the work area. The proposed cofferdam and siphon construction shall be reviewed at the pre-construction meeting.

The level of Hudgeon Lake will be monitored daily. Should the lake level begin rising it may be necessary to temporarily re-instate flow in the channel to draw the lake down or the addition of more siphoning capacity may be required. At no time shall the Contractor allow the lake level to rise to a point that overtopping of the cofferdam or lake outlet is imminent or jeopardizes the stability of the cofferdam or the lake outlet.

1.5.4 Gabion Drop Structure Construction

The location of the gabion drop structures on the drawings is approximate. Final locations will be determined in the field based on survey data and constructability issues.

(1) Preparation of Structure Base

Where the gabions are placed in a cut area, level any ridges left from excavation and fill in the low spots. Compact the surface until the finished surface is smooth, level and conforms to the design outline.

Where the gabions are placed in a fill area, place the channel fill material in lifts not exceeding 200mm. Compact the fill in accordance with SP: 1.5.6 or to the satisfaction of the Contract Administrator. The finished grade shall be smooth, level and conform to the design outline.

Place the geotextile on the finished surface as shown on the drawings and in the manner described under SP:1.5.5 Geotextile Placement.

(2) Drop Structure Assembly

Assembly of the gabion baskets shall be done in accordance with the manufacturer's installation instructions. Stainless steel rings, at 80 to 120mm spacing, shall be used to interconnect and close the baskets.

For each tier of the drop structure, start by assembling and placing the gabion baskets on the horizontal structure floor. Install the lowest row of gabion baskets on the side slopes before starting the placement of gabion fill in the baskets on the structure floor. Complete the filling and closing of the gabion baskets on the structure floor before placing the remaining baskets on the side slopes. Fill and close the gabions on the side slopes.

Before placing the baskets for the next highest tier, pull the geotextile up so it covers the vertical upstream side of the gabion baskets, then place and compact the channel fill for the next highest tier. Following preparation of the base for the next highest tier, place the geotextile on the prepared surface in the manner described under SP:1.5.5 Geotextile Placement and according to the drawings before proceeding with placement of the baskets.

After all the gabions in one tier have been completed and the base for the next highest tier has been prepared, place loose material on top of the completed gabions. Manually strike off the material with a piece of lumber to fill the voids in the filled gabions. Exercise caution in doing so to prevent damage to the PVC coating on the baskets.

1.5.5 Geotextile Placement

Geotextile placement shall be as follows:

(i) Place the geotextile by unrolling onto the prepared surface and retain in position with weights or pins
(ii) Place geotextile smooth and free of folds, wrinkles, and creases.
(iii) Place geotextile perpendicular to the channel alignment (seams perpendicular to flow).
(iv) Overlap seams a minimum of 1000 millimetres wide. The geotextile panels shall be placed in an upstream direction so that the upstream panel overlaps the downstream panel at the location of the seam.
(v) Protect installed geotextile from displacement and damage until, during, and after placement of the overlying rip-rap.
(vi) Repair rips or tears with a patch to cover a minimum of 1 metre on each side of the rip or tear.
(vii) The geotextile shall be anchored at the upstream and downstream ends of the drop structures as shown on the Drawings. The geotextile at the top of the channel slopes shall be wrapped around the vertical upslope face of the last row of baskets, as shown on the drawings.

1.5.6 Channel Excavation, Backfilling and Side Slope Grading

Prior to initiating excavation or backfill activities clear the channel of any debris including trees and other deleterious material. Large boulders shall be moved aside for later use as channel armouring.

Excavate and backfill the channel as directed by the Contract Administrator. Channel side slopes and waste rock side slopes shall be re-graded as shown on the drawings.

Excavated waste rock material can be used as channel fill provided all oversize material is removed.

The backfill shall be placed and compacted in 200 mm lifts. The level of compactive effort or number of passes of the compaction equipment will be determined in the field.

1.5.7 Placement of Channel Rip-Rap

Channel rip-rap material shall be placed such that the underlying geotextile is not disturbed or damaged. Armouring of the channel between the drop structures shall be completed as directed by the Contract Administrator.

1.5.8 Hudgeon lake Outlet Stabilization and Fjord Crossing

Due to the increased potential for a breach to occur during this component of the work, this work shall not be undertaken until the channel stabilization works have been completed. Stabilization of the lake outlet requires removal and disposal of the existing culverts. Before the culverts are removed the Contractor shall have ready some geotextile and a suitable stockpile of material to fill in the outlet in the event that piping conditions occur.

The outlet will be stabilized by placing a gabion mat just above the invert of the existing culverts, as shown on the drawings. The final elevation of the gabion mat may change based on the conditions at the outlet when the work is undertaken. A fjord crossing shall be constructed just upstream of the gabion mat and the side slopes shall be re-graded as required.

1.5.9 Restoration of Flow From Hudgeon Lake

The natural creek flow shall be restored once the stabilization work in the channel and at the outlet from Hudgeon Lake have been completed. The flow from the lake shall be restored in a manner mutually agreed upon by the Contract Administrator and the Contractor. The objective of restoring flow is to prevent any sudden release of water into the channel, prevent erosion of the outlet and minimize any sediment load. If the lake level is not high enough to flow over the outlet upon completion of the work, the siphon(s) shall be redirected into the stabilized channel and allowed to flow until such time that the lake flow over the outlet has been restored naturally.

1.6 Quality Control

1.6.1 Inspection

Workmanship and materials furnished under this Specification are subject to inspection by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works which are not in accordance with the requirements of this Specification.

1.6.2 Access

The Contract Administrator shall be afforded full access for the inspection of materials, both at the site of Work and any borrow site used for the supply of

materials, to determine whether the material is being supplied in accordance with this Specification.

1.6.3 Materials

Materials supplied under this Specification shall be subject to approval by the Contract Administrator in accordance with SP:1.4.2 – Approval.

1.6.4 Corrective Action

The Contractor shall at his own expense, correct such work or replace such materials found to be defective under this Specification.

1.7 Method of Measurement and Basis of Payment

1.7.1 Method of Measurement

(1) Mobilization, Demobilzation and Preparation of Work Areas

Preparation of work areas for execution of the specified Work will be measured on a lump sum basis. This work shall include: all mobilization and demobilzation, the supply, installation and maintenance of the siphon, any site preparation work required to facilitate construction, the supply and upkeep of the decontamination trailer, the supply of safety gear required for working in an airborne asbestos environment, the provision of a construction camp for the Contractor's work force, the restoration of flow over the Hudgeon Lake outlet and any site clean-up required after construction is finished.

(2) Gabion Drop Structures

The supply and delivery of the gabion baskets to the work site will be measured on a lump sum basis.

Construction of the gabion drop structures will be measured on a per unit basis for each gabion basket installed. The amount paid for each basket installed shall include all costs associated with assembling, placing and interlocking the baskets, filling the baskets with gabion fill material, and placing loose material (fines) over the installed baskets.

(3) Geotextile

The supply and installation of the non-woven geotextile, will be measured for payment on a square metre basis for installed geotextile.

(4) Channel Excavation and Backfilling

Measurement for payment of channel excavation and backfilling activities will be measured on a time basis for the equipment used to complete the work. The Contractor shall provide hourly rates for all the equipment used on site. This will include any material hauled to site for the sole purpose of backfilling the channel.

(5) Channel Rip Rap and Gabion Fill

Measurement for payment for producing the channel rip rap and gabion fill will be measured on a time basis for the equipment used to complete the work. This will include hauling the material to the work site for placement in the channel and the gabion baskets. The Contractor shall provide hourly rates for all the equipment used on site.

(6) Hudgeon Lake Outlet Stabilization and Fjord Crossing

Stabilization of the outlet and construction of the fjord crossing will be measured on a time and materials basis.

1.7.2 Basis of Payment

(1) Mobilization, Demobilzation and Preparation of Work Areas

Payment will be made at the Contract Lump Sum Price, which shall be payment in full for performing all operations herein described and all other items incidental to the work for this item.

(2) Gabion Drop Structures

Payment for the supply and delivery of the gabion baskets to the work site will be made at the Contract Lump Sum Price, measured as specified herein.

Payment for the construction of the gabion drop structures will be made at the Contract Unit Price per basket installed which shall be payment in full for performing all operations herein described and all other items incidental to the work for this item.

(3) Geotextile

Payment will be made at the Contract Unit Price, which shall be payment in full for performing all operations herein described and all other items incidental to the work for this item.

(4) Channel Excavation and Backfilling

Payment will be made based on the hourly rates provided by the Contractor for the equipment used for the channel excavation and backfilling activities, which shall be payment in full for performing all operations herein described and all other items incidental to the work for this item.

(5) Channel Rip Rap and Gabion Fill

Payment will be made based on the hourly rates provided by the Contractor for the equipment used for the production and hauling of the channel rip rap and gabion fill, which shall be payment in full for performing all operations herein described and all other items incidental to the work for this item.

(6) Hudgeon Lake Outlet Stabilization and Fjord Crossing

Payment will be made based on the hourly rates provided by the Contractor for the labour and equipment used. Geotextile shall be paid as specified in SP:1.7.2(3) and the gabions shall be paid as specified in SP:1.7.2(2). This shall be payment in full for performing all operations herein described and all other items incidental to the work included in this specification.

APPENDIX A

HEALTH AND SAFETY PLAN

CLINTON CREEK PROJECT
OCCUPATIONAL AND ENVIRONMENTAL HEALTH AND SAFETY ISSUES AND EMERGENCY RESPONSE PLAN

Introduction

The purpose of the work is to mitigate the potential for a breach of the outlet from Hudgeon lake which could result in flash flooding in the Clinton Creek Valley downstream of the mine site. The work involves stabilization of the outlet and a short portion of the Clinton Creek channel immediately downstream of the outlet. The material forming the channel may contain some asbestos fibres that could become airborne during construction activities.

The Health and Safety Program is designed to anticipate, recognize, evaluate, and control adverse environmental conditions and physical hazards that may result in injury, impairment, or the exposure to toxic substances. The Emergency Response Plan provides a response to minimise the impact of an accidental release of substances that may affect the well-being of workers, and the local environment.

Location

The Clinton Creek Asbestos Mine is located 100 km northwest of Dawson City in the Yukon Territory. The location is at 64^0 22' 23" N and 140^0 42' 50" W adjacent to Clinton Creek approximately 9 km upstream of its confluence with the Forty Mile River. Porcupine and Wolverine Creeks are local tributaries of Clinton Creek. The project site is located at a failed waste rock deposit on the north-facing slope of the Clinton Creek valley. The failure created a landslide dam now referred to as Hudgeon Lake. The waste rock channel stabilization work will occur along Clinton Creek for a distance of approximately 150 metres downstream from the outlet of Hudgeon Lake.

Abbreviations

The following abbreviations and definitions are used in this document:

1. ANSI American National Standards Institute. Publishes consensus standards on a wide variety of subjects, including safety equipment, procedures, etc.
2. CEPA Canadian Environmental Protection Act
3. CSA Canadian Standards Association, the national consensus standards association for Canada is roughly the Canadian equivalent of ANSI in the US

4. DIAND Department of Indian Affairs and Northern Development
5. ERP Emergency Response Plan
6. HEPA High Efficiency Particulate Air filter. At least 99.97% efficient in the filtration of air borne particles 0.3 microns in diameter or greater
7. MSDS Material Safety Data Sheet provided by chemical manufacturers
8. MSHA Mine Safety and Health Administration, an agency of the US Department of Labour
9. NIOSH National Institute for Occupational Safety & Health. An arm of the US Centres for Disease Control, it does research and suggests guidelines for exposure control, but is not a regulatory agency
10. OSHA Occupational Safety & Health Administration, a part of the US Department of Labour, it regulates many job safety issues, including chemical handling and storage; also Occupational Safety & Health Act, the US Federal legislation which created OSHA (the Administration) and NIOSH
11. RMO Resource Management Officer
12. TDGA Transport of Dangerous Goods Act
13. WHMIS Workplace Hazardous Materials Information System. This program is legislated by the Canadian government, which requires, among other things, the creation and availability of material safety data sheets

Time Table (tentative)

August 19 to September 30, 2002.

Communication

A satellite phone will be available on site for communication and emergency calls.

Hazard Identification

1. Asbestos Hazards - inhalation of asbestos fibres by workers resulting from disturbance of the waste rock during excavation and backfilling activities.
2. Chemical Hazards - fuels used on site
3. Explosion or Fire - ignition of explosive or flammable liquids

4. Physical Hazards - mechanical equipment, sharp objects
   - increased risk of injury to personnel when wearing protective gear (if required) that may impair agility, stamina, hearing, and vision
   - electric shock when using power equipment in wet location or using poorly grounded tools
5. Wildlife - moderate risk (bears)

General Health and Safety Measures

1. All work will be conducted, as a minimum, in strict compliance to all applicable laws, ordinances, rules, regulations and orders and general practices for the safety of persons or property. The applicable requirements include any general safety rules and regulations of Yukon Workers' Compensation Health and Safety Board, WHMIS and Occupational Health and Safety legislation.
2. The Environmental Monitor / Safety Training Supervisor will be responsible for the Health and Safety legislation.
3. The Contractor shall provide wildlife monitors, acceptable to the Engineer, equipped with firearms to protect the safety of all workers including the Engineer, and Engineer's support staff during site operations.
4. Prior to the start of the work, all team members will participate in a mandatory safety briefing session to become familiar with all aspects of the Safety Program and Emergency Response Plan. Specific instructions on actions to be taken in case of safety violations, accidents, personal injury and emergencies will be provided.
5. Prior to commencement of specific work activities, all team members will be briefed on the following safety issues:
   a. safety equipment and use
   b. clearing, excavation and backfilling operations
   c. contaminants on site
   d. emergency measures in case of an accident or fire
6. A "buddy system" will also be used as a protective measure in particularly hazardous situations so that team members can keep watch on one another to provide quick aid if needed.
7. Contacts for emergency will include the DIAND project authority, the RCMP detachment and the nursing station in Dawson City, Yukon, and the Yukon Fuel and Oil Spills Report Line.

Waste Rock Excavation and Backfilling

1. The potential consequences of planned construction activities, such as excavating and backfilling, at the site will be considered prior to each action. Personnel assigned to work around the operating equipment will have the appropriate safety training.
2. Any persons within 800 metres of the work site while waste rock is being handled shall take necessary precautions to prevent exposure to airborne asbestos fibres.
3. There will be no eating, drinking or smoking near the work site.

Site Controls

Site controls minimize the potential contamination of personnel, protect the public from the site's hazards and prevent vandalism.

The work zone are divided into three general areas outlined below:

- **Exclusion Zone**; the contaminated area (asbestos).
- **Contamination Reduction Zone**; the area where personnel and equipment decontamination occurs.
- **Support Zone**; the uncontaminated area where personnel should not be exposed to Hazardous conditions.

The Contamination Reduction Zone shall include a **Decontamination Trailer;** the worker decontamination trailer shall comprise of three interconnecting rooms as follows:

1. Provide a set of curtain doorways between each room, and at both dirty and clean entrances to enclosure systems.
2. Equipment and Access Room: Build room between wash-up room and asbestos work area. Install waste receptor, and storage facilities for worker's shoes and any protective clothing to be reworn in asbestos work areas. Equipment and access room shall be large enough to accommodate specified facilities, and other equipment needed, and at least one worker allowing sufficient space to undress comfortably. Minimum size 3 m^2 (30 sq ft).
3. Wash-up Room: Build room between clean room and equipment and access room. Provide fresh water supply. Provide piping with water tight connections and connect to water sources and drains. Provide soap, clean towels and garbage disposal containers. Direct waste water to storage tank for appropriate disposal. Install water heater, if

required. Install ground fault protected power supply and hooks and shelves for storage of towels etc..

4. Clean Room: Build room between wash-up room and clean areas outside of enclosures. Provide hangers for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment.

Site Safety Meetings and Inspections

To ensure that the Site Safety Plan is being followed, the Safety Officer will conduct a safety meeting prior to initiating each site activity and at the beginning of each workday.

The purpose of the meetings is to:

- describe assigned tasks and their potential hazards;
- co-ordinate activities;
- identify methods and precautions to prevent injuries;
- plan for emergencies;
- describe any changes to the Site Safety Plan;
- get worker feedback on conditions affecting safety and health;
- get worker feedback on how well the Site Safety Plan is working.

The Site Safety Officer will also conduct frequent inspections of site conditions, facilities, equipment and activities. The Site Safety Officer and personnel will be responsible for inspecting the condition of their personal protective equipment and ensuring its operational condition.

First Aid

First Aid will be administered on site by the Environmental Monitor / Safety and Training Supervisor. According to the Yukon Workers' Compensation Health and Safety Board (1992), Class "A" hazards were identified for the Clinton Creek Channel Stabilization Project. The requirements for First Aid made available on site are met by an attendant with a Standard First Aid certificate, a # 2 Unit First Aid Kit (St. Johns Standard), a stretcher, and three emergency blankets. In addition to the basic requirements, a spinal board, cervical collars and a Scott Air Pack will also be on site. In case of an accident, a casualty will be

transported to Dawson City, Yukon or depending on weather conditions, to the nearest nursing station via rotor wing. Emergency phone numbers are provided in the ERP. Every incident requiring First Aid will be recorded in an accident report.

Fires

The fire safety program includes fire prevention, fire protection and fire fighting.

1. As a preventative measure there will be no fires or burning of rubbish at the work site.
2. A person discovering a fire will report the incident to the Project Superintendent.
3. Fire extinguishers will be located on site and in each supervisor's vehicle.
4. Smoking will not be permitted in hazardous areas and care will be exercised in the use of smoking materials in non-restricted areas.
5. The current National Fire Code of Canada shall govern the handling, storage and use of flammable liquids such as gasoline. Flammable liquids such as gasoline will be stored in approved safety cans.
6. Disposal of flammable liquids will be in accordance with all applicable environmental regulations.

Personal Protective Equipment

1. Workers will use protection appropriate to the potential type and level of exposure. The protective equipment will be fitted to cold weather conditions and meet CSA, ANSI, and NIOSH standards and guidelines.
2. Team members will be made aware that the equipment alone does not eliminate the hazard. If the equipment fails, exposure will occur, as such, hazard awareness will be a paramount component of the field program.
3. All equipment will be properly fitted and maintained in a clean and serviceable condition.
4. If at any time during the project the protective equipment is damaged, then the team member will remove, dispose and replace the damaged item.
5. Before entering asbestos work area, instruct workers and visitors in use of respirators, dress, showers, entry and exit from asbestos work areas, and all aspects of work procedures and protective measures. Instruction shall be provided by Competent Person as defined by Occupational Health and Safety Act.
6. **Respirators:** Workers shall wear non-powered half-face respirators with high efficiency (HEPA) cartridge filters. Provide approved respirators to visitors. Replace filters daily or test according to manufacturer's specifications and replace as indicated. Respirators

shall be acceptable to Occupational Health Branch of Ministry of Labour. Provide instruction to users in use of respirators, including qualitative fit testing. No user shall wear facial hair, which affects seal between respirator and face. Maintain respirators in proper functioning and clean condition, or remove from Site.

7. **Protective Clothing:** Provide workers and visitors with full body disposable coveralls with integral hoods. Once coveralls are worn in asbestos work area, treat as asbestos contaminated waste and dispose of appropriately. Workers and visitors shall also wear other protective apparel as required by construction regulations (e.g. safety boots, hard hats, gloves, etc.).
8. Before entering asbestos work area(s) remove street clothes in clean change room and put on respirator with new or tested filters. Proceed to the equipment and access room where the workers shall dress in work clothing, clean coveralls and head covers before entering the asbestos work area. Store street clothes, uncontaminated footwear, towels etc. in clean change room.
9. Persons leaving asbestos work area(s) shall remove gross contamination from clothing. Proceed to equipment and access room of the decontamination trailer and remove all work clothing, except the respirator. Place contaminated worksuit in receptacles for disposal with other asbestos contaminated materials or store as directed for re-use. Footwear, clothing, hardhats, protective eye wear, etc., shall be left in equipment and access area to dry for later use. Clean respirator to ensure that visible contamination is removed. Still wearing respirator proceed to the wash-up room.
10. Once in the wash-up room, thoroughly wash hands, arms and face with soap and water proceed to the clean room, still wearing respirator.
11. Once in the clean room, re-dress in clean (street) clothes and footwear.
12. When leaving the work site for the day, keep respirators on for the duration of the ride back to the Contractor's camp site and have a shower immediately upon arrival to remove all asbestos fibres from the body and hair. Remove filters and dispose of in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator. Respirators shall be put on prior to entering the equipment and access room at start of next shift. If re-entry to asbestos work area is to take place after having left for eating, drinking, or smoking, follow procedures in 9. above.
13. Upon completion of work in asbestos area(s), dispose of footwear as contaminated waste or clean before removing from equipment and access area, or carry in sealed plastic bag to next contaminated site.
14. All equipment used in the asbestos work area(s) shall be decontaminated by thorough washing before leaving the site.

Environmental Monitoring/Sampling

1. The employer shall ensure any required medical examinations are completed in accordance with the Yukon Health and Safety Act.
2. Air samples will be taken from commencement of work until completion in asbestos work area(s) with NIOSH 7400 procedures, or with Fibrous Aerosol Monitor.
3. Co-operate in collection of air samples, including requiring workers to wear sampling pumps for up to half shift periods. Workers shall exercise care not to damage air sampling equipment.
4. An MSA Escort Elf portable sampling pump is used to draw air through a 25 mm, 0.8 um pore size, cellulose ester filter at a constant flow rate for a sufficient period of time to collect a representative sample of air for personnel in the work area. The air sample(s) are then retrieved and sent to a qualified laboratory for analysis by Phase Contrast Microscopy (PCM).
5. If air monitoring shows airborne fibre levels exceed 10X the time-weighted average exposure criteria (TWAEC) of 0.1 fibres per cubic metre of air (f/cc) for personal exposure, then workers will be required to use powered air purifying respirators (PAPRs) with full-face piece and HEPA filters.
6. All sampling results will be kept on site and made available to workers for their review.

Head Protection

Head protection against impact blows will be provided when required in the form of a protective hat with a liner, which will be able to resist penetration and absorb the shock of a blow. The hat will meet CSA standard Z94.1.

Foot Protection

For protection against falling or rolling objects, sharp objects, wet, slippery surfaces workers will use appropriate insulated safety shoes or boots. Safety shoes will be sturdy, have an impact-resistant toe and meet CSA Standard Z195 or ANSI standards. In case of an emergency spill, team members responding will wear protective boot covers.

Eye and Face Protection

When required, protection will be based on the kind and degree of hazard present. Available equipment will include goggles, safety glasses, and face shield. The eye protectors will meet the requirements of CSA Z94.3 or ANSI standards.

Ear Protection

To avoid exposure to high noise levels disposable phone earplugs or earmuffs will be made available.

Respiratory Protection

It is anticipated that exposure to harmful concentrations of air contaminants may result from temporary or emergency conditions. In such a scenario, the exposed team members will wear protective respiratory equipment to prevent breathing air contaminated with harmful dusts (including asbestos), fumes, gases and vapours. The selection of protective respirators equipment will be made according to the guidance of NIOSH or MSHA or ANSI Practices for Respiratory Protection and will include Air Purifying Respirator with HEPA cartridge and chemical cartridge.

Arm and Hand Protection

Absorption of chemicals, cuts and burns are examples of hazards associated with arm and hand injuries. Insulated rubber gloves and leather gloves will be provided for protection from these hazards. These gloves will conform to CSA and ANSI standards.

Body Protection

Full body hooded chemical-resistant disposable coveralls will be made available for emergency response. A variety of other protective clothing including vests, jackets, aprons and insulated coveralls will be used by team members.

EMERGENCY RESPONSE PLAN

This Emergency Response Plan (ERP) includes actions to be taken to reduce the impact of spillage for release of, or substantial threats of release of hazardous materials and non-aqueous phase liquids from barrels and other containers encountered during drilling and test pit excavation. A list of emergency contacts, including those for medical emergencies and emergency reporting are given below.

Project Management:

Brett Hartshorne (INAC)	(867) 667-3268
HAN Construction Ltd.	(867) 993-5520
Gil Robinson (UMA Engineering)	on-site
Yukon Fuel and oil Spills Report Line:	(867) 667-7244
Dawson City, Community Nursing Station:	(867) 993-4444
Ambulance: Dawson City, Yukon	(867) 993-4444 or 1-800-661-0408
Trans North Helicopters	(867) 993-5494 or 668-2177
Fireweed Helicopters	(867) 993-5700
Resource Management Officer (RMO):	
Todd Pilgrim	(867) 993-5468
RCMP Dawson City, Yukon:	(867) 993-5555 or 667-5555

INCIDENT: HAZARDOUS MATERIAL OR NONAQUEOUS PHASE LIQUID SPILL

The response measures include:

1. Contain spill source and prevent from spreading.
2. Air monitor for explosive or toxic gases. If a hazardous condition is found, the appropriate protective equipment will be used.
3. Mobilize spill control kit. The kit will include:
    - Personal protective equipment
    - Recovery drum
    - Absorbent material
    - Hand shovel
    - Small pail for scooping up liquid
    - Plastic sheeting
4. Recover spill and contaminated material and place in recovery drum.
5. Ensure spill is secure.
6. Implement a decontamination procedure before any employee or equipment leaves the area of potential hazardous exposure.
7. Transport recovery drum to temporary storage area. A polyethylene drop sheet will be secured to the ground at the temporary storage area
8. The sorting, packaging, transportation and disposal of all hazardous materials and waste encountered will be in accordance to all applicable regulations including the TDGA and CEPA.
9. Prepare spill report.
10. Call the Yukon Fuel and Oil Spill Report Line.

INCIDENT: SERIOUS INJURY

1. Call for help.
2. Assess hazards at the site; if necessary make area safe.
3. Initial First Aid.
4. Evacuate casualty to the nursing station in Dawson City, Yukon
5. Prepare report.

INCIDENT: FIRES

1. A person discovering a fire will report the incident to the Project Manger.
2. Fire suppression equipment will be made available. If a fire is not promptly extinguished, the RMO in Dawson City, Yukon will be notified immediately.

Appendix B – Air Monitoring Results

PAT:

THIS IS "TABLE 10" FROM "OCCUPATIONAL HEALTH & SAFETY HANDBOOK - YUKON W.C.B.

I'M ASSUMING THE UNITS FOR BOTH COLUMNS IS FIBRES/mL.

TABLE 10
Mineral Dusts

(Each substance must comply with at least one of the relevant requirements as determined by the air sampling technique used).

Substance	Permissible Concentrations 8 hour limit (Fibres/ml)	(Fibres per mL)[a] 15 minute Limit
Asbestos:		
Amosite	0.2	2
* Chrysotile	* 0.5	5
Crocidolite	0.1	—
Tremolite	0.5	5
Talc (fibrous)	0.5	5

	Permissible Concentration (8-hr. Limit) Column I KONIMETER[b] (Particles/mL)	Column II IMPINGER[c] (mmppcf)	Column III RESPIRABLE MASS[d] (mg/m³)
Substance:			
Silica:			
Quartz, crystalline	300	(e)	(g)
Christobalite	150	(f)	(½ quartz value)
Trydymite	150	(f)	(½ quartz value)
Silica, fused or flour	300	(e)	(quartz value)
Trippoli	300	(e)	(quartz value)
Silica, amorphous	300	20	2
Diatomaceous earth	300	20	1.5
Silicates:			
Mica	—	20	—
Mineral wood fibre	—	—	10
Perlite	—	30	
Portland Cement	—	30	—
Soapstone	—	20	—
Talc (nonasbestos form)	—	20	—
Graphite	—	20	—
Coal	—	—	2
	44		

SAMPLE
A1 - Ø
A2 - 0.0075
A3 - 0.0054
fibres/mL.
A4 - 0.0113
A5 - 0.0102

SEP 13 '02 10:48 780 439 4434 PAGE.001

Phone:
(780) 438-5522
1-800-661-7645
Fax:
(780) 438-0396

NORWEST LABS

9938 - 67 Avenue
Edmonton, AB T6E 0P5

W O (Surrey) : 191709
P. O. No. :
Date Sampled :
Date Received : Sept 11, 2002
Date Completed : Sept 13, 2002

ANALYSIS REPORT

Analysis Requested: FIBRE COUNT

Client:	Date received:	Sept 12, 2002
	Sample Type:	Filter
	No. of Sample:	2
	Project:	

ANALYSIS RESULTS

File No.	W.O. No.	Description	Vol.(L)	Fibres/mm²	Fibers/filter	Fibers /cc
02FC2679	191709-1	A-4	480	14.0	5,400	0.0113
02FC2680	191709-2	A-5	480	12.7	4,900	0.0102

COMMENTS: Detection limit 7 fibres/ mm²

Please note: When interpreting the results for compliance/non compliance purposes please refer to NIOSH Method 7400
(Issue 2, 4th Edition, NIOSH Manual of Analytical Methods, 1994/08/15).

ANALYTICAL PARAMETERS:
Method Used: NIOSH Method 7400
Methodology: Phase Contrast Microscope

Analysis Performed by: *Irene Z. Walewski*, B. Sc. Chem. of

WALTECH ASSOCIATES
Safety Management and Analytical Services
603, Burgess Close, Edmonton, AB T6R 1Z7
Phone: 434-9784 Fax: 434-9784

09/13/2002 18:56 780-439-4434 WALTECH ASSOCIATES PAGE 01

Phone:
(780) 438-5522
1-800-661-7645
Fax:
(780) 438-0396

NORWEST LABS

9938 - 67 Avenue
Edmonton, AB T6E 0P5

4440 - ~~24 of~~ 042-02

W O (Surrey.) : 191262
P. O. No. :
Date Sampled :
Date Received : Sept 9,2002
Date Completed : Sept 12, 2002

ANALYSIS REPORT

Analysis Requested: FIBRE COUNT

Client:	Date received: Sept 10, 2002 Sample Type: Filter No. of Sample: 3 Project:

ANALYSIS RESULTS

File No.	W.O. No.	Description	Vol (L)	Fibres/mm² *	Fibers/filter	Fibers /cc
02FC2645	191262-1	A – 1 (Blank)	-	(1.9)	-	-
02FC2646	-2	A - 2	590	11.5	4,400	0.0075
02FC2647	-3	A - 3	500	7.0	2,700	0.0054

COMMENTS: * Blank corrected

Please note: When interpreting the results for compliance/non compliance purposes please refer to NIOSH Method 7400
(Issue 2, 4th Edition, NIOSH Manual of Analytical Methods, 1994/08/15).

ANALYTICAL PARAMETERS:
Method Used: NIOSH Method 7400
Methodology: Phase Contrast Microscope

cc: H. Lobenson
Orig - Our file

Analysis Performed by: *Irene Z. Walewski*, B. Sc. Chem. of

WALTECH ASSOCIATES
Safety Management and Analytical Services
603, Burgess Close, Edmonton, AB T6R 1Z7
Phone: 434-9784 Fax: 434-9784

AWL002(0)

Phone:
(780) 438-5522
1-800-661-7645
Fax:
(780) 438-0396

NORWEST LABS
9938 - 67 Avenue
Edmonton, AB T6E 0P5

W O (Surrey) : 193512
P. O. No. :
Date Sampled :
Date Received : Sept 19, 2002
Date Completed : Sept 24, 2002

ANALYSIS REPORT

Analysis Requested: FIBRE COUNT

Client:	Date received:	Sept 23, 2002
	Sample Type:	Filter
	No. of Sample:	1
	Project:	Clinton Creek

ANALYSIS RESULTS

File No.	W.O. No.	Description	Vol.(L)	Fibres/mm²	Fibers/filter	Fibers /cc
02FC2986	193512-1	A-6 sample ID 742282	157.5	4.46	1717.1	0.0109

COMMENTS: Detection limit 7 fibres/ mm²

Please note: When interpreting the results for compliance/non compliance purposes please refer to NIOSH Method 7400
(Issue 2, 4th Edition, NIOSH Manual of Analytical Methods, 1994/08/15).

ANALYTICAL PARAMETERS:
Method Used: NIOSH Method 7400
Methodology: Phase Contrast Microscope

Analysis Performed for:

WALTECH ASSOCIATES
Safety Management and Analytical Services
603, Burgess Close, Edmonton, AB T6R 1Z7
Phone: 434-9784 Fax: 434-9784

Appendix C – Letter of Advice From Department of Fisheries and Oceans

Fisheries and Oceans | Pêches et Océans

Habitat and Enhancement Branch
Fisheries and Oceans Canada
100-419 Range Road
Whitehorse Yukon
Y1A 3V1
Fax 867-393-6737

Your file Votre référence

Our file Notre référence

Sept 6, 2002

Waste Management Program
345-300 Main Street
Whitehorse YT
Y1A 2B5
Attn Brett Hartshorne

Re: **Clinton Creek Channel Stabilisation Project – Amendment to August 16 Letter of Advice**

A template used to prepare the August 16, 2002 letter of advice provided to you had an error. One of my colleagues with a sharper eye than mine found it and brought it to my attention.

The error is found in the second-to-last paragraph, which reads:

"Please also note that this letter of advice does allow the deposit of a deleterious substance into waters frequented by fish and does not release you from the responsibility for obtaining any approvals that may be required under other federal legislation, or the legislation of any other relevant government."

Please accept the following paragraph as being valid as advice pursuant to the *Fisheries Act* and consider it to be an amendment to the original Letter of Advice:

"Please also note that this letter of advice does **not** allow the deposit of a deleterious substance into waters frequented by fish and does not release you from the responsibility for obtaining any approvals that may be required under other federal legislation, or the legislation of any other relevant government."

My apologies for any difficulty that this oversight on my part may have caused you.

Sincerely,

Al von Finster
Resource Restoration Biologist

Canada

The siphon will consist of one or more pipes ranging in diameter from 200 to 300 mm, what ever may be required to maintain an adequate flow in the channel. A spillpad will be constructed at the downstream end of the siphon to prevent any erosion of the channel bed. The spill pad will be constructed using gabion baskets, clean rock and geotextile. This spill pad will be maintained as required during construction. Upon completion of the work, natural flow will be introduced into the stabilized channel by maintaining the siphon flow until the dam at the outlet is removed. If the level of the lake is below the invert of the outlet at this time the siphon will be allowed to flow into the new channel until the lake recovers sufficiently to begin flowing over the outlet.

3. Increasing Final Lake Elevation:
We also discussed the potential for increasing the elevation of the outlet from Hudgeon Lake by about 300 millimetres. The only concern from a geotechnical view is that the increased water elevation may increase the potential for piping conditions to develop in the channel bed and channel side slopes. All efforts will be made to raise the outlet by approximately 300 millimetres, provided that the stability of the outlet is not compromised.

4. Fish Salvage:
A fish salvage operation will be conducted to retrieve any fish in the creek construction area prior to adjustments to the flow. This will be accomplished by anesthetizing fish in an area approximately 200 metres downstream from the outlet of Hudgeon Lake. (Electrofishing techniques will be implemented if the anesthetizing operation is not successful.) The fish will be appropriately transported to an area downstream of the construction. An experienced team, lead by Mr. Pat Roach of DIAND, will be conducting this operation.

Please review this information. If you have any further questions, or require any clarification, please contact me directly.

Thank you for your input and continuing efforts on this project.

Sincerely,

Brett Hartshorne, Manager

attached: UMA Drawing 4

cc: Pat Roach - DIAND
Gil Robinson - UMA Engineering Ltd.

4440-041-01

Indian and Northern Affairs Canada / Affaires indiennes et du Nord Canada

Waste Management Program
345 - 300 Main Street
Whitehorse, Yukon
Y1A 2B5
Phone: 867-667-3268
Fax: 867-667-3271
e-mail: hartshorneb@inac.gc.ca

August 16, 2002

Department of Fisheries and Oceans
100 - 419 Range Road
Whitehorse, Yukon
Y1A 3V1
Attn: Mr. Al Von Finster

TO:
Mr. Gil Robinson
UMA Engineering Ltd.
Winnipeg
FAX: 204-453-9167

FROM:
Brett Hartshorne
DIAND - Waste Management
Whitehorse

Gil:
Copy for your records.

Regards,

VIA FAX: 867-393-6737

Page ONE of THREE

Re: G. Robinson
Orig - Gen. File

Dear Mr. Von Finster:

Re: Clinton Creek Asbestos Mine - Clinton Creek Channel Stabilization Project

DIAND - Waste Management Program is planning to undertake a channel stabilization project on Clinton Creek at the outlet of Hudgeon Lake. We wish to provide, for your review, the following information in addition to the Project Description.

As discussed with you in Dawson City, Yukon on July 24, 2002 the following changes to the design of the short-term channel stabilization works for Clinton Creek will be incorporated:

1. Draw-Down Reduction Weir:
The draw-down reduction weir has been shifted in the upstream direction to provide a 1.0 metre horizontal run between the drawdown reduction weir and the first 0.5 metre step. (A drawing of a typical gabion drop structure is attached.) The end sill of each structure will be relocated during construction such that it is at least 1.0 metre upstream of the downstream end of the gabion structure. This will help to reduce the erosion potential of the channel rip rap placed immediately downstream of each drop structure.

2. Flow During Construction:
We also discussed how the flow from Hudgeon Lake will be handled during construction. Construction of the drop structures will require that the flow be diverted around the work site for a distance of up to 150 metres. This will require that the outlet be dammed off and the flow maintained using a siphon pipe. The objective will be to start the siphon prior to damming off the outlet in order to maintain continuous flow in the channel.

../2

If the harmful alteration, disruption or destruction of fish habitat occurs as a result of a change in the project plans, or because of a failure to properly implement the measures outlined in your plans and this letter, contravention of section 35(1) of the Fisheries Act could occur. Section 35(1) the states:

> "No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat."

This Letter of Advice is intended to provide recommendations to ensure that the proposed works are conducted and completed in manner that avoids adverse impacts to fish and fish habitat. It is not an authorization pursuant to s. 35(2) to conduct works that will result in a HADD.

Please also note that this letter of advice does allow the deposit of a deleterious substance into waters frequented by fish and does not release you from the responsibility for obtaining any approvals that may be required under other federal legislation, or the legislation of any other relevant government.

We would request that you notify us when work will commence and that a copy of this letter be kept on site while works are in progress. If you have any questions concerning the measures listed, or should there be any changes to the proposed work, please contact me directly at 393-6721, email vonfinstera@pac.dfo-mpo.gc.ca

Sincerely,

Al von Finster
Resource Restoration Biologist

Copy: J. Duncan, YSC;
B. van Dijken, YSC;
Dawson RRC;
Vince Fraser, TdHFN;
GY Fisheries;
DFO C&P

4440-041-01

Fisheries and Oceans / Pêches et Océans

Habitat and Enhancement Branch
Fisheries and Oceans Canada
100-419 Range Road
Whitehorse Yukon
Y1A 3V1
Fax 867-393-6737

TO:
Gil Robinson
UMA Engineering Ltd.
Winnipeg, Manitoba
Fax: 204-453-9167

FROM:
Brett Hartshorne
DIAND - Waste Management
Whitehorse, Yukon

P.1 of 2

Gil:
For your information.

Regards,

Brett

cc: G. Robinson
Orig. - Gen. File

August 16, 2002

Waste Management Program
345-300 Main Street
Whitehorse YT
Y1A 2B5
Attn Brett Hartshorne

Re: **Clinton Creek Channel Stabilisation Project**

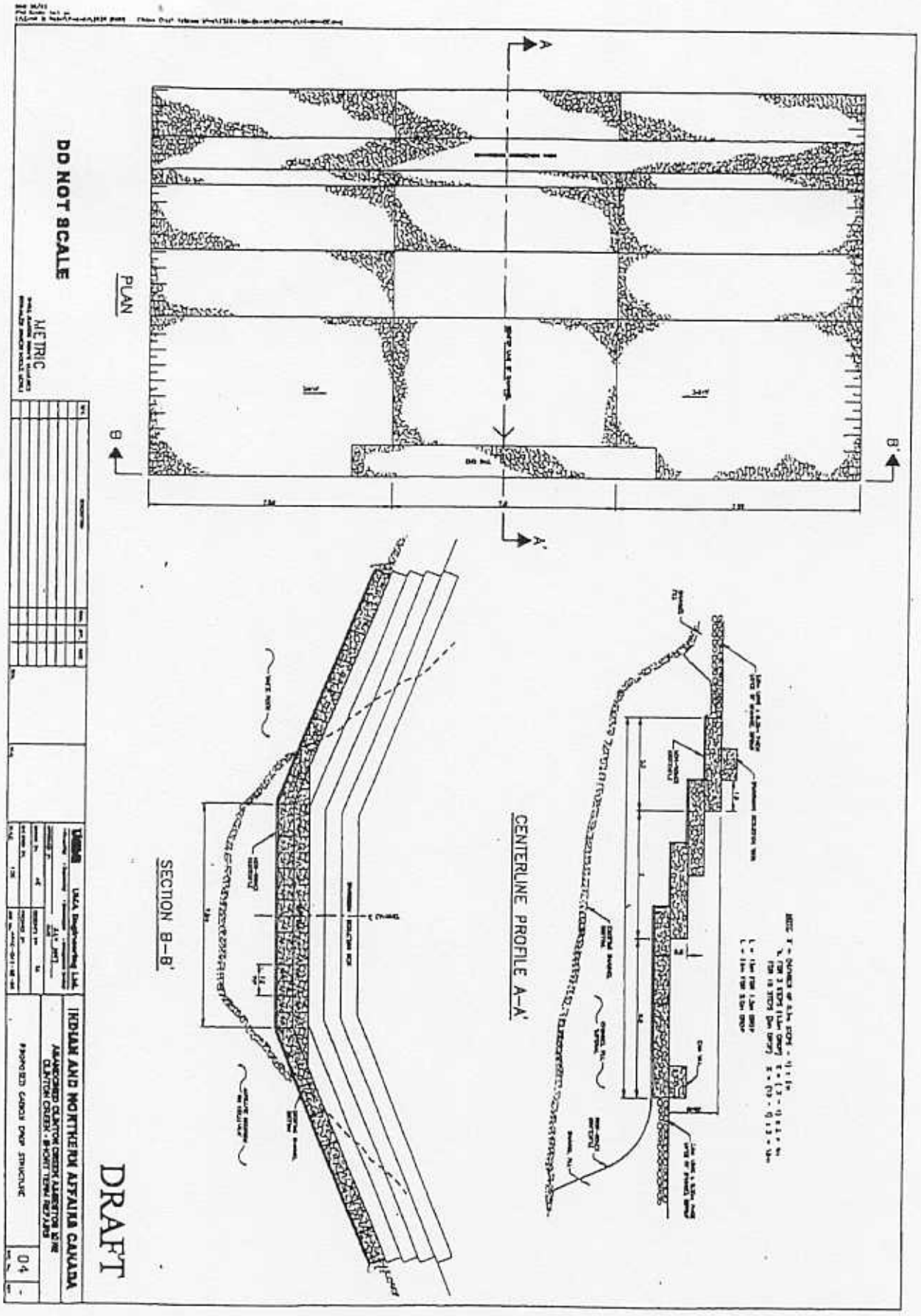
Fisheries and Oceans Canada (DFO) has received your proposal to stabilize the channel of Clinton Creek below Hudgeon Lake. The project is described in the May 2002 INAC Abandoned Clinton Creek Asbestos Mine Environmental Liability Report, the August 2002 Project Description for Abandoned Clinton Creek Asbestos Mine Creek Channel Stabilization and in your letter of August 16, 2002 to myself providing clarification on components of the project. Where there is any difference between any of these documents, the most recent document is considered to be the proposal for the work or undertaking concerned.

Provided you implement your proposal, as set out in the documents noted above and in accordance with the advice given below, it is our opinion that the plan as proposed is adequate to protect fish and fish habitat.

Our advice is:

- That the closing of the existing channel of Clinton Creek, construction of the stabilized channel, and the opening of the stabilized channel be done in such a manner as to minimize the release of sediment to downstream waters;
- That all deleterious substances and specifically lubricants, coolants and fuels be used, transferred and stored in such a manner that they are not and do not become deposited in fish bearing waters;
- That DFO is immediately contacted should there be any unexpected circumstances which may result in the harmful alteration of fish habitat as a result or consequence of the project. Contact is to be myself at ph. 393-6721, email vonfinstera@pac.dfo-mpo.gc.ca

Canada


DO NOT SCALE
METRIC
PLAN
SECTION B-B'
CENTERLINE PROFILE A-A'
DRAFT
INDIAN AND NORTHERN AFFAIRS CANADA
ABANDONED CLINTON CREEK ASBESTOS MINE
CLINTON CREEK - SHORT TERM REPAIRS
PROPOSED GARCH DAM STRUCTURE
04

Appendix D – Weekly Project Reports

• Consulting • Engineering • Construction • Management Services

UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 **fax** (204) 475-3646 **web** www.umagroup.com

Weekly Project Report

Project:	Clinton Creek Asbestos Mine Clinton Creek Channel Stabilization (Stage 1)	**Report No**.	01
Client:	Indian and Northern Affairs Canada	**Week Ending:**	August 31, 2002
Contractor:	**HAN Construction Ltd.**	**Job No.**	**4440 042 02 01**
Location:	Clinton Creek Mine Site, Yukon Territory	**Client Ref.**	INAC

WEATHER Hi. Low Precip	**WORK FORCE:**		**WORK SCHEDULE:**
SUN.	CREWS:	PERSONS:	TOTAL DAYS n/a
MON.			
TUES.	EQUIPMENT:		DAYS THIS WEEK: 4
WED. Not recorded this week.	Caterpillar D7 dozer	Operators = 1	
THURS.	Caterpillar 320L excavator		DAYS TO DATE: 4
FRI.	Caterpillar 966C loader		
SAT.			

1. PROGRESS

Equipment Mobilization:
D7 dozer: - mobilized to bridge at 40 Mile river on August 27
966C loader: mobilized to site on August 27, no chargeable hours until September 3
320L excavator mobilized to site on August 30, no chargeable hours until September 3.
Cook shack mobilized on August 29.
Bunk house mobilized on August 30.
Wash shack mobilized on August 31.

August 28 and 29: Scrub out the road from 40 Mile bridge to the mine site with D7 dozer.
August 30: Created ford crossing on Clinton Creek downstream of the old mine site bridge. Pat Roach (INAC) on site.

Start setting up construction camp on west side of Wolverine Creek.

2. CONSTRUCTION PROBLEMS AND CONCERNS:

Clinton Creek flow is high, estimated to be about 2.5 to 3.0 m^3/sec. Locals indicate lots of rain over the month of August.

3. ACCIDENTS AND PROPERTY DAMAGE:

None to report.

4. SITE INSTRUCTIONS PROVIDED AND EXTRA WORK ORDERS:

Contractor started site prep in advance of UMA Engineering arriving on site.

5. INSPECTION AND PHOTOGRAPHS:

None.

6. TESTS PERFORMED:

None.

7. MATERIAL RECEIVED ON SITE:

None.

DISTRIBUTION:

REPORTED BY: Gil Robinson, M.Sc., P.Eng.
Geotechnical Engineer

• *Consulting* • *Engineering* • *Construction* • *Management Services*

UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
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Weekly Project Report

Project:	Clinton Creek Asbestos Mine Clinton Creek Channel Stabilization (Stage 1)	**Report No**.	02
Client:	Indian and Northern Affairs Canada	**Week Ending:**	September 7, 2002
Contractor:	**HAN Construction Ltd.**	**Job No.**	**4440 042 02 01**
Location:	Clinton Creek Mine Site, Yukon Territory	**Client Ref.**	INAC

WEATHER	Hi.	Low	Precip
SUN.	Not recorded		
MON.	Not recorded		
TUES.	Not recorded		
WED.	Not recorded		
THURS.	18	4	0
FRI.	5	1	Rain
SAT.	10	2	Showers

WORK FORCE:	
CREWS:	PERSONS:
1	2
EQUIPMENT:	
Caterpillar D7 dozer	Operators = 3
Caterpillar 320L excavator	
Caterpillar 966C loader	
Kenworth tandem truck	

WORK SCHEDULE:	
TOTAL DAYS	n/a
DAYS THIS WEEK:	6
DAYS TO DATE:	10

1. PROGRESS

Tandem truck mobilized to site on September 4.

Setting up construction camp on west side of Wolverine Creek, finished on September 7.

5 days aggregate screening, September 3 to 7.
Approximate material quantities produced to the end of September 7 are:

- gabion fill and channel rip rap: 540 cubic metres
- 75mm and under: 540 cubic metres
- oversize (>200mm): 80 cubic metres

Contractor is working 10 hour days (08:00 to 18:30 hrs with 0.5 hour lunch break).

2. CONSTRUCTION PROBLEMS AND CONCERNS:

aggregate source: the majority of the loose rock at the toe of the outcrop at Wolverine Creek has been used, material quantities produced at this point are not adequate. John Mitchell indicated that a rock driller was in Dawson City and could likely do a single blast for about $10,000 to $15,000, if required. The gravel source at Mickey Creek was checked and did not appear feasible for the production of gabion fill (high percentage of fines). Upon inspecting the quarry site at Wolverine Creek, there is a good supply of loose rock on top of the outcrop that can be reached via an existing access road. This source proved to be adequate for this job.

Hudgeon Lake is still quite high (elevation 411.4 metres), flows at the outlet are visibly lower than those observed by Pat Roach on August 30.

3. ACCIDENTS AND PROPERTY DAMAGE:

None to report.

4. SITE INSTRUCTIONS PROVIDED AND EXTRA WORK ORDERS:

Dig test pits along the alignment of the diversion pipe to ensure there are no large pockets of boulders that would prevent excavation of the trench for the diversion pipe. (no boulders encountered in test pits).

5. INSPECTION AND PHOTOGRAPHS:

Digital photographs taken to record progress of the work, including baseline photographs of original conditions.

6. TESTS PERFORMED:

Air Sampling for asbestos fibres. Samples A1, A2, and A3 taken on 5 September 2002. Samples shipped via air to Norwest Labs in Surrey, B.C.

7. MATERIAL RECEIVED ON SITE:

September 6: gabions (17 bundles of 30 baskets = 510), gabion mat (1) and geotextile (7 rolls of ARMTEC 350), stainless steel staples for gabions, pneumatic stapling guns (2) delivered to site.

DISTRIBUTION:

REPORTED BY: Gil Robinson, M.Sc., P.Eng.
Geotechnical Engineer

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UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 **fax** (204) 475-3646 **web** www.umagroup.com

Weekly Project Report

Project:	Clinton Creek Asbestos Mine Clinton Creek Channel Stabilization (Stage 1)	**Report No**.	03
Client:	Indian and Northern Affairs Canada	**Week Ending:**	September 14, 2002
Contractor:	**HAN Construction Ltd.**	**Job No.**	**4440 042 02 01**
Location:	Clinton Creek Mine Site, Yukon Territory	**Client Ref.**	INAC

WEATHER	Hi.	Low	Precip
SUN.	15	3	0
MON.	16	-3	0
TUES.	9	2	0
WED.	5	-3	0
THURS.	8	-3	0
FRI.	12	0	0
SAT.	15	-4	0

WORK FORCE:	
CREWS:	PERSONS:
1	2
EQUIPMENT:	
Caterpillar D7 dozer	Operators = 3
Caterpillar 320L excavator	
Caterpillar 966C loader	
Kenworth tandem truck	

WORK SCHEDULE:	
TOTAL DAYS	n/a
DAYS THIS WEEK:	5.5
DAYS TO DATE:	15.5

1. PROGRESS

Diversion Pipe:
- shape area along alignment of the diversion pipe.
- Trench excavation for diversion ditch finished on September 11 (3.5 days with D7 and 320L excavator).
- CMP (600mm diam.) installed in trench September 11 and 12 (1.5 days with 2 laborers, 966C loader and 320L excavator).
- Inlet to diversion pipe finished on September 13, including backfilling and compacting 18 metres of the pipe and trench immediately downstream of the inlet (0.5 days).

Haul gabion fill and 75mm down gravel from quarry site to the work site at the lake outlet.
Gabion baskets being assembled individually and in groups of 3.
Stockpile argillite (waste rock) on both sides of the outlet for use in constructing the cofferdam.
Contractor will not be working from noon on September 13 to noon on September 15.

2. CONSTRUCTION PROBLEMS AND CONCERNS:

Hudgeon Lake still quite high at the beginning of the week. Levels reduced significantly by the end of the week after the two culvert inlets were cleaned out.

Bud McAlpine visited the site as he was concerned about using CMP for the diversion pipe. He felt that the couplers would leak significantly and lead to erosion of the trench base.

The grade of the diversion pipe was reduced from 2.5% to 1.5% to reduce the amount of cut required. The spoil material was placed up on the valley side due to a lack of area available for stockpiling on the creek side of the excavation.

Diversion pipe tested for about 1 hour on September 13. Additional rock was placed in the diversion pipe spillway. Water velocities at the diversion pipe outlet are quite high and more rock may have to be placed in the spillway as the flow in the pipe increases. This requirement will be evaluated on an ongoing basis. The pipe couplers were leaking a bit and there may be a need to place some check dams in the trench to prevent water from running down the trench and eroding the trench base or undercutting the side slopes.

3. ACCIDENTS AND PROPERTY DAMAGE:

None to report.

4. SITE INSTRUCTIONS PROVIDED AND EXTRA WORK ORDERS:

Clean out both culverts at the lake outlet to help draw down the lake level (September 8). The south most culvert was blocked and flow improved greatly after cleaning out the inlet.

D7 dozer temporarily finished with site work mid-afternoon on September 11, asked that wash out in the road up to the mill site be repaired. Dozer off until September 15.

5. INSPECTION AND PHOTOGRAPHS:

Digital photographs taken to record progress of the work, including baseline photographs of original conditions.

6. TESTS PERFORMED:

Air Sampling for asbestos fibres. Samples A4 and A5 taken on 8 September 2002. One air pump was mounted directly on the D7 dozer. Samples shipped via air to Norwest Labs in Surrey, B.C.

7. MATERIAL RECEIVED ON SITE:

September 10: 30 pieces of 600m diameter CMP and couplers were delivered to the work site. The pipe was borrowed from Yukon Territory Government Highways Department.

DISTRIBUTION:

REPORTED BY: Gil Robinson, M.Sc., P.Eng.
Geotechnical Engineer

• *Consulting* • *Engineering* • *Construction* • *Management Services*

UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 **fax** (204) 475-3646 **web** www.umagroup.com

Weekly Project Report

Project:	Clinton Creek Asbestos Mine Clinton Creek Channel Stabilization (Stage 1)	**Report No**.	04
Client:	Indian and Northern Affairs Canada	**Week Ending:**	September 21, 2002
Contractor:	**HAN Construction Ltd.**	**Job No.**	**4440 042 02 01**
Location:	Clinton Creek Mine Site, Yukon Territory	**Client Ref.**	INAC

WEATHER	Hi.	Low	Precip
SUN.	19	-4	0
MON.	15	-4	0
TUES.	12	-5	0
WED.	8	4	Rain
THURS.	8	-4	0
FRI.	5	0	0
SAT.	13	-2	0

WORK FORCE:	
CREWS:	PERSONS:
1	2
EQUIPMENT:	
Caterpillar D7 dozer	Operators = 3
Caterpillar 320L excavator	
Caterpillar 966C loader	
Kenworth tandem truck	
Compactor – Ingersoll Rand SP-54	On-site September 15

WORK SCHEDULE:	
TOTAL DAYS	n/a
DAYS THIS WEEK:	5.5
DAYS TO DATE:	21

1. PROGRESS

Contractor not working from noon on September 13 to noon on September 15.

September 15:
Cofferdam placed across outlet of Hudgeon Lake on September 15 around 14:00 hrs.
Road repairs on mine access road east of Wolverine Creek undertaken.
Remove deleterious material (logs/trees) and debris (pipes) from the creek channel.

September 16:
Remove two CMP's from the lake outlet.
Pump water from pond between cofferdam and lake outlet to facilitate fish salvage.
Down time associated with fish salvage was about 4 or 5 hours today.

September 17:
D7 working on road east of Wolverine Creek.
Clean up deleterious material from section of creek where construction to take place.
Move boulders that may interfere with the drop structure or outlet channel.
Place and tamp 75mm down material around the boulders to fill in the voids around the boulders and to prepare the foundation for the drop structure.

September 18: - rain day. Site too wet to work after overnight rainfall.

September 19:
Place blanket drain along creek bed where the lowest level of the drop structure will rest.
Start placing channel fill material (colluvium) to form the channel side slopes.

September 20:
Construct three check dams in the diversion pipe trench.
Construct channel side slopes for the lower level of the drop structure (tier #1).
Trim north side slope of the lowest level (tier #1) of the drop structure.

September 21:
Place, connect and fill approximately 15 gabion baskets on lower level of drop structure (tier #1)

2. CONSTRUCTION PROBLEMS AND CONCERNS:

966C loader broke down for 1 day starting around 14:00 hrs on September 15.

September 17:
Discussed the importance of soil compaction with George Abbermeth (site superintendant) and how the longevity of the drop structure depends upon good compaction.

Lake level rising about 4 cm per day which should give about 20 working days before the lake level reaches the high water mark.

Seepage encountered along the toe of the waste rock pile at the location of the lowest level of the gabion drop structure. Preferred solution, as discussed with Ken Skaftfeld of UMA Engineering, is to construct a blanket drain below the lower level (tier #1) of the drop structure using 75mm and over rock and geotextile filter cloth.

September 19:
Water leaking from the diversion pipe couplers is increasing as the flow increases with rising lake levels. Check dams made of compacted argillite and colluvium to be constructed in the ditch and water to be pumped out as required to prevent sloughing of the side slopes.

3. ACCIDENTS AND PROPERTY DAMAGE:

None to report.

4. SITE INSTRUCTIONS PROVIDED AND EXTRA WORK ORDERS:

Diversion pipe must be flowing before cofferdam can be placed.
Cofferdam to be built at least 600mm above the high water mark (elev. 412.2m) visible on the lake shoreline.
Overflow pipe (400mm diam.) in the cofferdam to be placed 200mm below the high water level.
Cofferdam to be compacted in 200mm lifts once the top of the dam is about 600 to 900mm above the existing water surface.
Small check dams to be placed around either side of the diversion pipe couplers to prevent erosion of the trench sideslopes and bottom.

September 19:
Instructions regarding construction of blanket drain. Excavate to a depth approximately 600mm below grade for Tier #1, place a layer of geotextile, fill ith +/- 400mm of rock, place a second layer of geotextile, then use 75mm down gravel to bring the foundation up to grade.

5. INSPECTION AND PHOTOGRAPHS:

Digital photographs taken to record progress of the work, including baseline photographs of original conditions.

September 15: Cofferdam does not show any signs of seepage.
September 19: One small seepage location in the cofferdam noticed near the south end of the dam.
September 21: outlet (spillway) from diversion pipe is holding up well., Approximately 10 days of water storage in the lake at the present rate of lake rise (4 cm per day).

6. TESTS PERFORMED:

Air Sampling for asbestos fibres. Last sample A6 taken on 15 September 2002. Air pump was mounted directly on the D7 dozer. Sample shipped via air to Norwest Labs in Surrey, B.C.

Fish salvage completed by Pat Roach (INAC) and assistant following placement of the cofferdam. 3 Arctic Grayling salvaged and returned to Hudgeon Lake.

7. MATERIAL RECEIVED ON SITE:

None.

DISTRIBUTION:

REPORTED BY: Gil Robinson, M.Sc., P.Eng.
Geotechnical Engineer

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UMA Engineering Ltd.
1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 **fax** (204) 475-3646 **web** www.umagroup.com

Weekly Project Report

Project:	Clinton Creek Asbestos Mine Clinton Creek Channel Stabilization (Stage 1)	**Report No**.	05
Client:	Indian and Northern Affairs Canada	**Week Ending:**	September 28, 2002
Contractor:	**HAN Construction Ltd.**	**Job No.**	**4440 042 02 01**
Location:	Clinton Creek Mine Site, Yukon Territory	**Client Ref.**	INAC

WEATHER	Hi.	Low	Precip
SUN.	13	-2	0
MON.	12	-8	0
TUES.	10	-7	Trace
WED.	?	4	0
THURS.	12	0	0
FRI.	10	0	0
SAT.	11	-2	0

WORK FORCE:	
CREWS:	PERSONS:
1	3 (1 new on September 24)
EQUIPMENT:	
Caterpillar D7 dozer	Operators = 3
Caterpillar 320L excavator	
Caterpillar 966C loader	
Kenworth tandem truck	
Compactor – Ingersoll Rand SP-54	

WORK SCHEDULE:	
TOTAL DAYS	n/a
DAYS THIS WEEK:	7
DAYS TO DATE:	29

1. PROGRESS

September 22:

Drop Structure: Placed, connected and filled 30 gabion baskets to finish off tier #1 and the end sill.

Start rough grading channel upstream of drop structure and the cofferdam (D7 dozer).
Pumping water from the diversion pipe trench.

September 23:
Drop Structure: grade base and side slopes for tier #2. Place and connect 17 gabions, filled 7 baskets.

Continue rough grading of the side slopes upstream of the drop structure.
Place 3 meter wide layer of channel rip rap at the downstream end of drop structure.

September 24:
Drop structure: Place and connect remaining 13 gabion baskets in tier #2. Fill 23 gabion baskets. Backfill behind tier #2. Grade base and side slopes for tier#3.

1 new laborer started today (Darren). 1 laborer (Shannon) off for one or two days.

September 25:
Drop structure: - place and connect 30 gabion baskets for tier #3.

Screening balance of rock stockpile at Wolverine Creek (producing gabion fill and 75mm down gravel).
Prepare channel downstream of drop structure #1 for placement of rip rap to be used in the transition between the drop structure and the existing channel.

Salvage boulders out of the waste rock pile for use in the creek channel and along the top of slope of the new channel.

September 26:
Drop Structure: Fill baskets in tier #3.

September 27:
Drop structure: backfill behind tier #3, grade base and side slopes for tier #4. Place approximately 23 baskets for tier #4.

September 28:
Drop structure: - fill tier#4 gabions. Place baskets for drawdown reduction weir.

Start grading channel side slopes upstream of the drop structure.

Wolverine Creek Outlet: Place boulders at and below the downstream end of the two culverts forming the outlet.

2. CONSTRUCTION PROBLEMS AND CONCERNS:

September 24: Informed George (site superintendent) that we would not be building the second drop structure due to concerns with the weather, budget and lake levels.

September 25: Brett Hartshorne (INAC) and John Mitchell (HAN Construction) visited the site to discuss whether or not we should be constructing a second drop structure this year. Given the type of weather that can be experienced in early October, it was agreed upon that the risks associated with trying to complete a second drop structure in the first 10 days of October are too high.

Lake levels only rose about 1 cm in the last 24 hours indicating that the diversion pipe is carrying a good portion of the water entering the lake.

September 26: Pneumatic staple gun used for connecting the gabion baskets is not functioning properly. A replacement gun was to have already been sent out from Edmonton this past Monday but was not sent. A replacement gun will be sent via air freight, won't be on-site until Sunday at noon.

3. ACCIDENTS AND PROPERTY DAMAGE:

None to report.

4. SITE INSTRUCTIONS PROVIDED AND EXTRA WORK ORDERS:

September 22: - Werner Liebau (INAC) requested that more hose be added to the discharge end of the pump being used to dewater the diversion pipe trench. This was requested to prevent erosion of the creek side slopes.

September 23: - D7 dozer off until further notice as there will be no dozer work until we are ready to remove the cofferdam and diversion pipe.

Additional work to be completed in lieu of not building a second drop structure this year includes: upgrading the outlet from Wolverine Creek. This work requires placing boulders around the two CMP's and restoring the width of the main road above.

5. INSPECTION AND PHOTOGRAPHS:

Digital photographs taken to record progress of the work, including baseline photographs of original conditions.

Check gabion basket connections as required.

September 25: Tony Polyk and Frank Patch from INAC – Water Resources visited the site. No concerns were expressed about the work that was being carried out. Leo van Kellsberg and Eric Bell (DFO) visited the site and did not express any concerns about the work that was being carried out.

6. TESTS PERFORMED:

None.

7. MATERIAL RECEIVED ON SITE:

None.

DISTRIBUTION:

REPORTED BY: Gil Robinson, M.Sc., P.Eng.
Geotechnical Engineer

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1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada
tel (204) 284-0580 **fax** (204) 475-3646 **web** www.umagroup.com

Weekly Project Report

Project:	Clinton Creek Asbestos Mine Clinton Creek Channel Stabilization (Stage 1)	**Report No.**	06
Client:	Indian and Northern Affairs Canada	**Week Ending:**	October 5, 2002
Contractor:	**HAN Construction Ltd.**	**Job No.**	**4440 042 02 01**
Location:	Clinton Creek Mine Site, Yukon Territory	**Client Ref.**	INAC

WEATHER	Hi.	Low	Precip
SUN.	6	-2	0
MON.	6	-4	0
TUES.	3	-3	Trace
WED.	?	-1	Trace
THURS.	0	-3	Trace
FRI.	0	-8	0
SAT.	?	?	?

WORK FORCE:	
CREWS:	PERSONS:
1	2
EQUIPMENT:	
Caterpillar D7 dozer	Operators = 3
Caterpillar 320L excavator	
Caterpillar 966C loader	
Kenworth tandem truck	
Compactor – Ingersoll Rand SP-54	

WORK SCHEDULE:	
TOTAL DAYS	n/a
DAYS THIS WEEK:	7
DAYS TO DATE:	36

1. PROGRESS

September 29:
Drop Structure: Finish tier #4 of drop structure including the drawdown reduction weir.

Grading of outlet upstream of the drop structure.
Transport boulders from on top of the waste rock pile down to the outlet. Boulders to be used as a barrier along the south side of the channel to discourage people from driving across the channel, other than at the ford crossing.
Layout geotextile and gabion mat approximately 25 metres upstream of the drop structure.
Dewater the low area on the downstream side of the cofferdam to allow for final grading of the channel sideslopes.

September 30:
Finish gabion mat installation.
Finish ford crossing construction.
Finish placing the 3m wide layer of channel rip rap just upstream of the drop structure.
Finish placing rip rap along the top edges of the drop structure gabions.

October 1:
Final grading of channel between gabion mat and the drop structure.
Final grading of the channel between the ford crossing and the cofferdam.
Final grading of waste rock pile along south side of the channel.
Remove overflow pipe from the cofferdam.
Continue with work to upgrade the outlet at Wolverine Creek – place boulders and restore road to full width.
D7 Dozer working today, was not working since September 24.
Leftover geotextile (4 rolls of ARMTEC 350) and gabions (370 baskets) shipped back to Dawson City for storage at the DIAND Regional Services storage area in Callison Industrial Area.

October 2:
Place line of boulders along the top of the channel slope to discourage people from driving across the gabions.
Place rip rap along the upper edges of the gabion mat and the gabions (north side).
Breach cofferdam at 10:30 am. Finish removing cofferdam early afternoon.

Diversion pipe:
- Shutdown the diversion pipe (mid-afternoon).
- Inlet backfilled and compacted.
- Couplers removed and 6 segments of pipe removed from the trench.

October 3:
Remove remaining CMP segments from the diversion pipe trench and start backfilling and compacting the trench.
Final grading of the borrow area.
Start decommissioning the Contractor's camp.
Compactor (Ingersoll-Rand SP54) hauled back to Dawson City.

October 4:
Finish backfilling the diversion ditch trench and final grading of the area on the north side of the channel.
Finish upgrade of the Wolverine Creek outlet.
Continue with camp decommissioning.
Start road repair work between 40 Mile River and Wolverine Creek. Approximately 10 locations where repairs required.
D7 dozer done at the end of October 4.
CMP used for diversion pipe shipped back to YTG in Dawson City.

October 5:
Finish road repair work.
Shutdown and start demobilizing the camp.

2. CONSTRUCTION PROBLEMS AND CONCERNS:

Replacement (backup) pneumatic staple gun received on September 29 is not working properly, staples partially closing before trigger pressed.

3. ACCIDENTS AND PROPERTY DAMAGE:

None to report.

4. SITE INSTRUCTIONS PROVIDED AND EXTRA WORK ORDERS:

Let George (site superintendent) know that we will need to leave the diversion pipe in operation during cofferdam removal to help dilute any sediment that may result from breaching the cofferdam. The time required before shutting off the diversion pipe will depend on the amount of sediment being generated. In addition, the cofferdam can't be removed past 15:00 hours. This is required to allow for 2 or 3 hours daylight during which the performance of the new channel can be monitored.

Diversion ditch must be backfilled and compacted to minimize the potential for the development of a seepage path from the lake.

Approximately 10 locations on the main road need repairs ranging from backfilling to drainage work. These locations shown to the Site Superintendent.

5. INSPECTION AND PHOTOGRAPHS:

Digital photographs taken to record progress of the work, including baseline photographs of original conditions.

Check gabion basket and gabion mat connections as required.

6. TESTS PERFORMED:

None.

7. MATERIAL RECEIVED ON SITE:

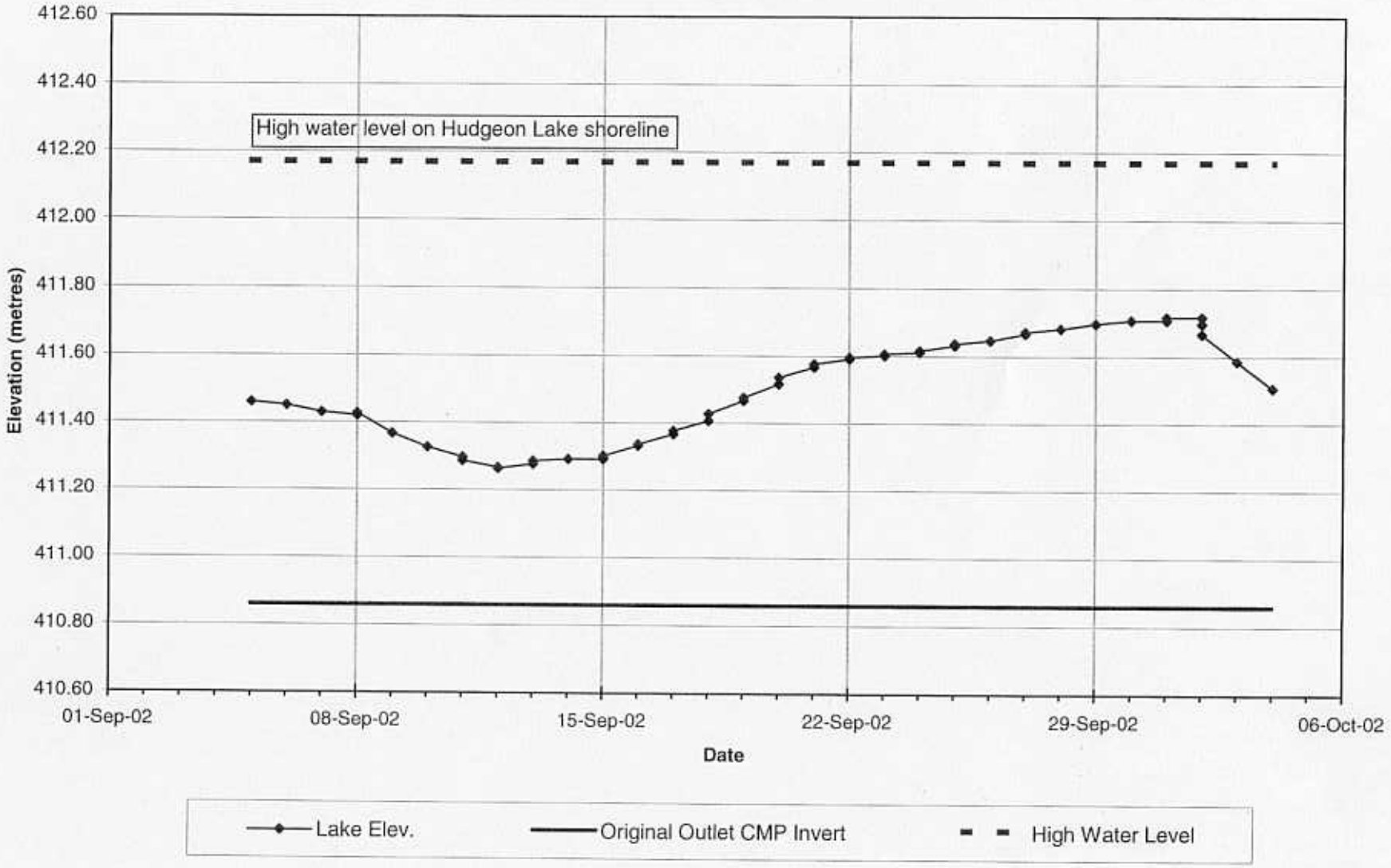
None.

DISTRIBUTION:

REPORTED BY: Gil Robinson, M.Sc., P.Eng.
Geotechnical Engineer

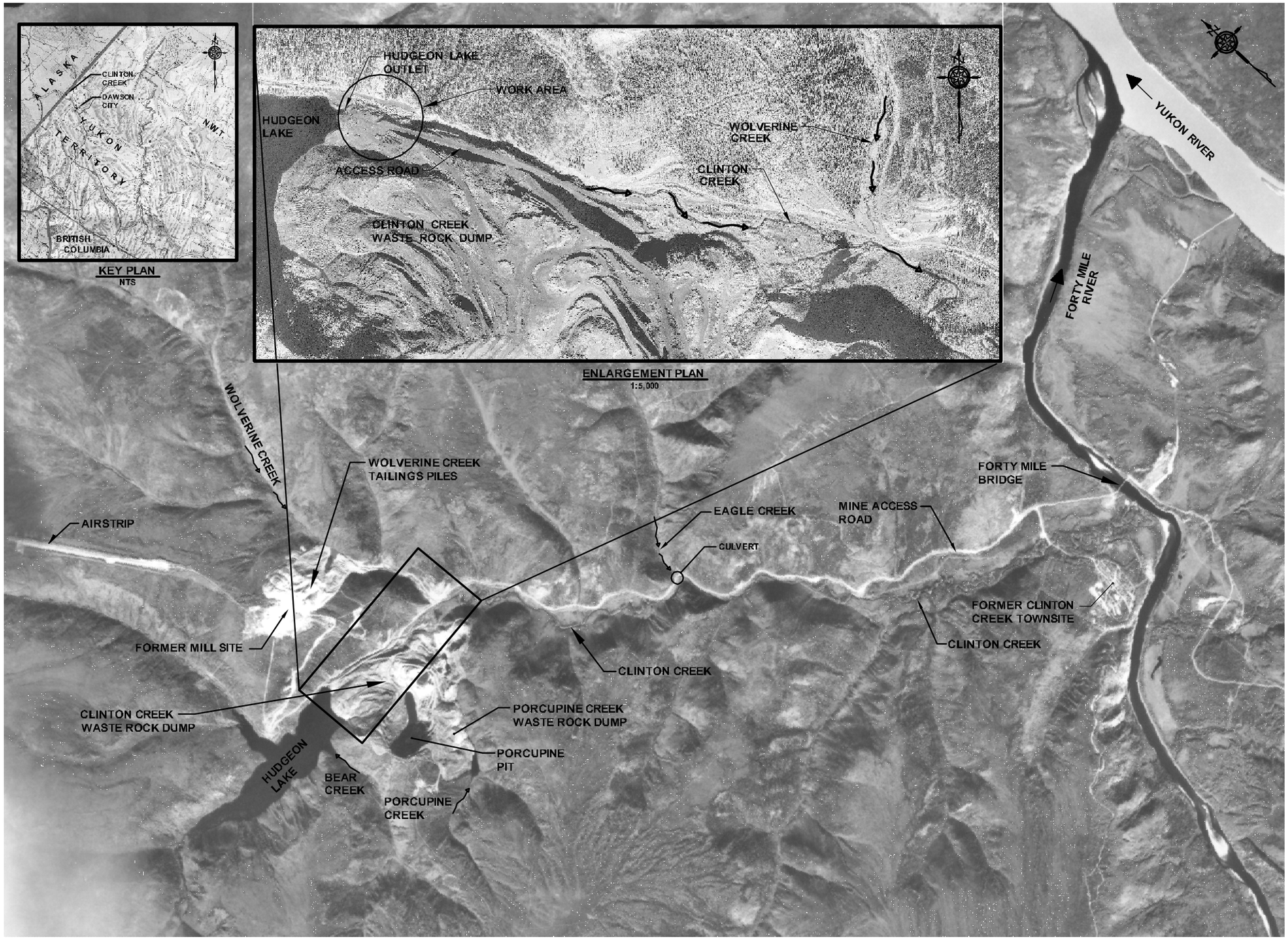
Appendix E – Hudgeon Lake Levels

Clinton Creek Short Term Stabilization Project - September / October 2002
Water Levels in Hudgeon Lake



Clinton Creek Short Term Stabilization Project
Events Affecting Water Levels In Hudgeon Lake

Date	Time	Event
6-Sep-02		showers AM, rain afternoon, showers evening
8-Sep-02	morning	clean out the two culverts at the lake outlet (one culvert almost completely blocked)
13-Sep-02	11:00 to 12:00	diversion pipe (600mm diameter CMP, 180 m long at 1.5% grade) opened up for trial run
15-Sep-02	13:30	diversion pipe running
15-Sep-02	14:00	cofferdam in place, no flow over outlet
18-Sep-02		rain overnight and in the early am
24-Sep-02		rain showers in the evening
25-Sep-02		rain showers
2-Oct-02	10:45	cofferdam at Hudgeon Lake outlet opened, diversion pipe still running
2-Oct-02	15:00	approximate time that the diversion pipe was closed off.



HALF SIZE REDUCTION

Date of Photography: Aug. 17, 1988

REV.	DESCRIPTION	DWN.	APP.	DATE
A	RECORD DRAWING / REPLOTTED	LJV		28Apr03

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CHECKED BY: GR	CHECKED BY:
SCALE: APPROX. 1:20,000	JOB No. 4440-042-02-01

INDIAN AND NORTHERN AFFAIRS CANADA

ABANDONED CLINTON CREEK ASBESTOS MINE
CLINTON CREEK CHANNEL STABILIZATION - STAGE 1

LOCATION PLAN

DWG. No. 01 | REV. A

APR 28/03 10:56:58 1=1 PS
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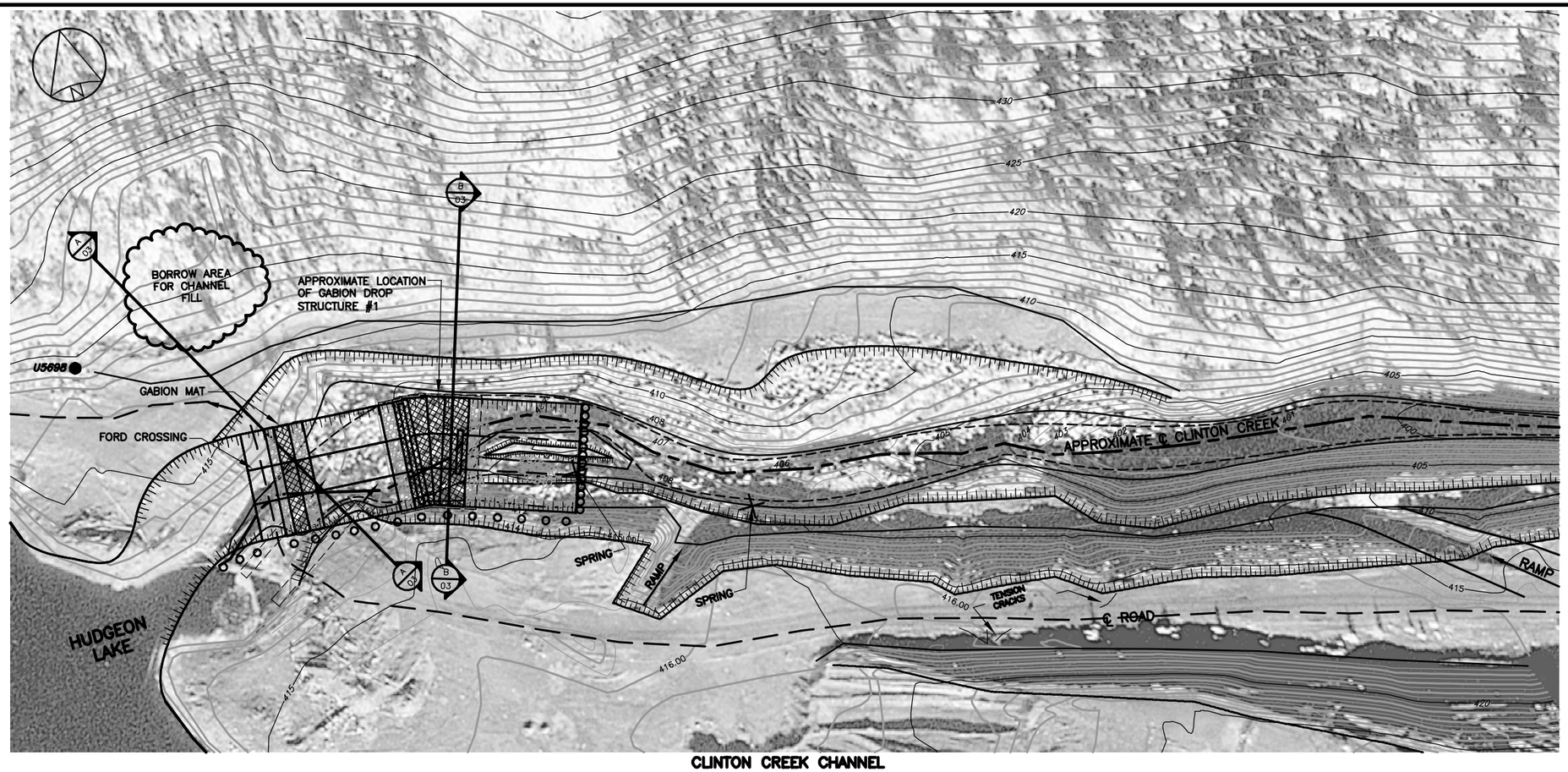
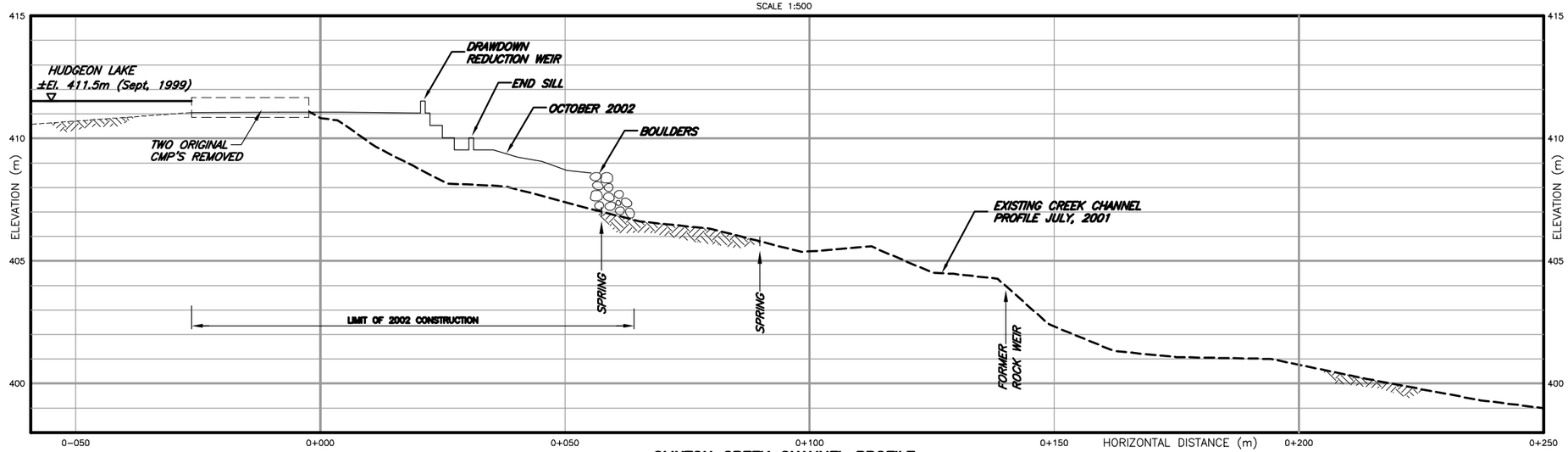


CLINTON CREEK CHANNEL

SCALE 1:500



CLINTON CREEK CHANNEL PROFILE

VER. SCALE 1:100
HOR. SCALE 1:500

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INDIAN AND NORTHERN AFFAIRS CANADA

ABANDONED CLINTON CREEK ASBESTOS MINE
CLINTON CREEK CHANNEL STABILIZATION - STAGE 1

HUDGEON LAKE OUTLET AND CLINTON CREEK

DWG. No. 02 — REV. A

NAD 83 UTM Zone 7
Photography Date: September 1999

NOV 28/02
Plot Scale: 1=1
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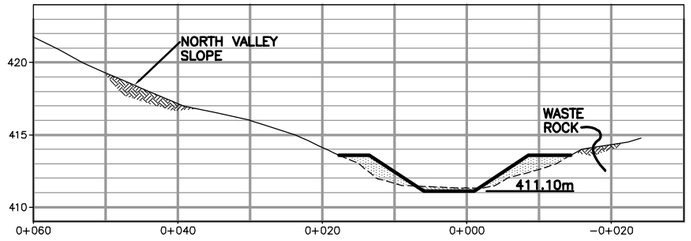

CROSS SECTION A/02
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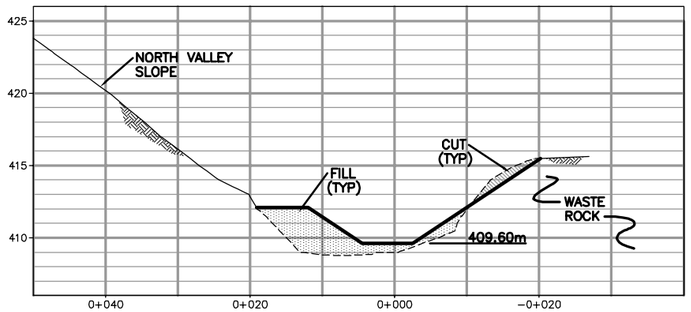

CROSS SECTION B/02
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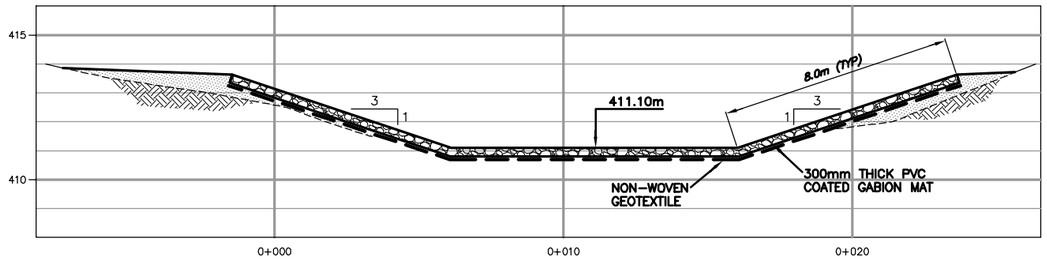

CHANNEL SECTION AT HUDGEON LAKE OUTLET 1/06
SCALE 1:100

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INDIAN AND NORTHERN AFFAIRS CANADA

ABANDONED CLINTON CREEK ASBESTOS MINE
CLINTON CREEK CHANNEL STABILIZATION - STAGE 1

CROSS SECTIONS

DWG. No. 03 — REV. A

AUG 12/02
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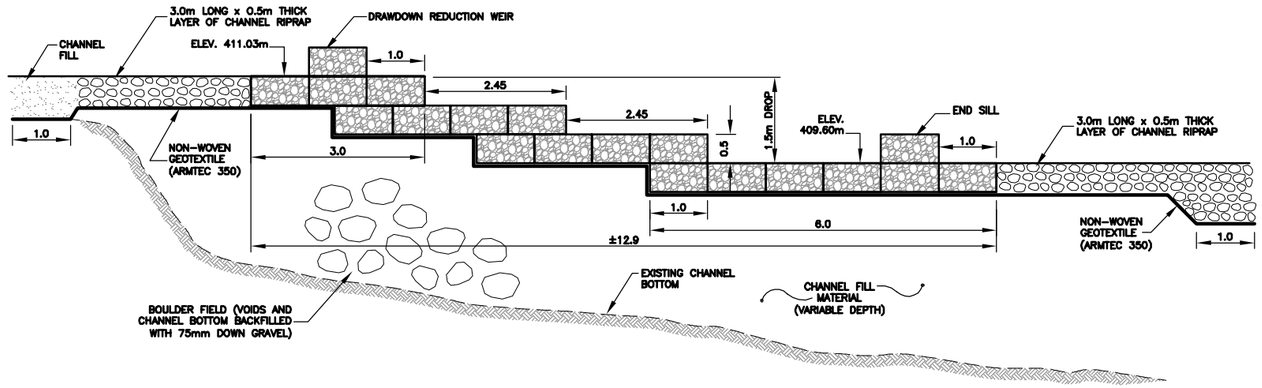
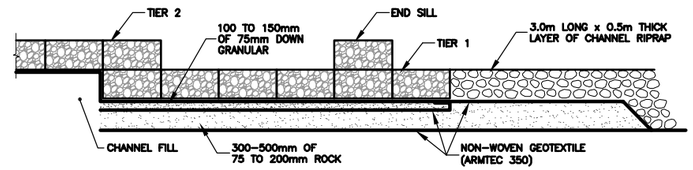
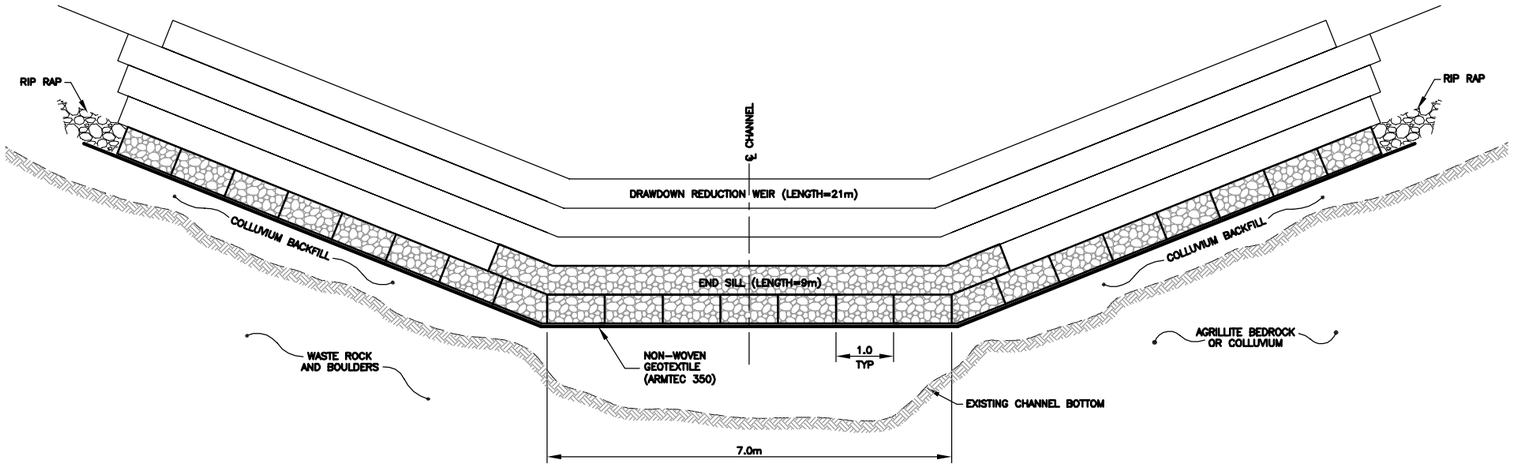


CENTERLINE PROFILE A–A' / 05



DETAIL OF BLANKET DRAIN CONSTRUCTED UNDER THE FLOOR OF TIER #1



SECTION B–B' / 05

REV.	DESCRIPTION	DWN.	APP.	DATE
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METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

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SCALE: 1:50	JOB No. 4440-042-02-01

INDIAN AND NORTHERN AFFAIRS CANADA

ABANDONED CLINTON CREEK ASBESTOS MINE
CLINTON CREEK CHANNEL STABILIZATION - STAGE 1

DROP STRUCTURE #1 DETAILS

DWG. No. 04 | REV. A

APR 28/03
Plot Scale: 1=1 PS
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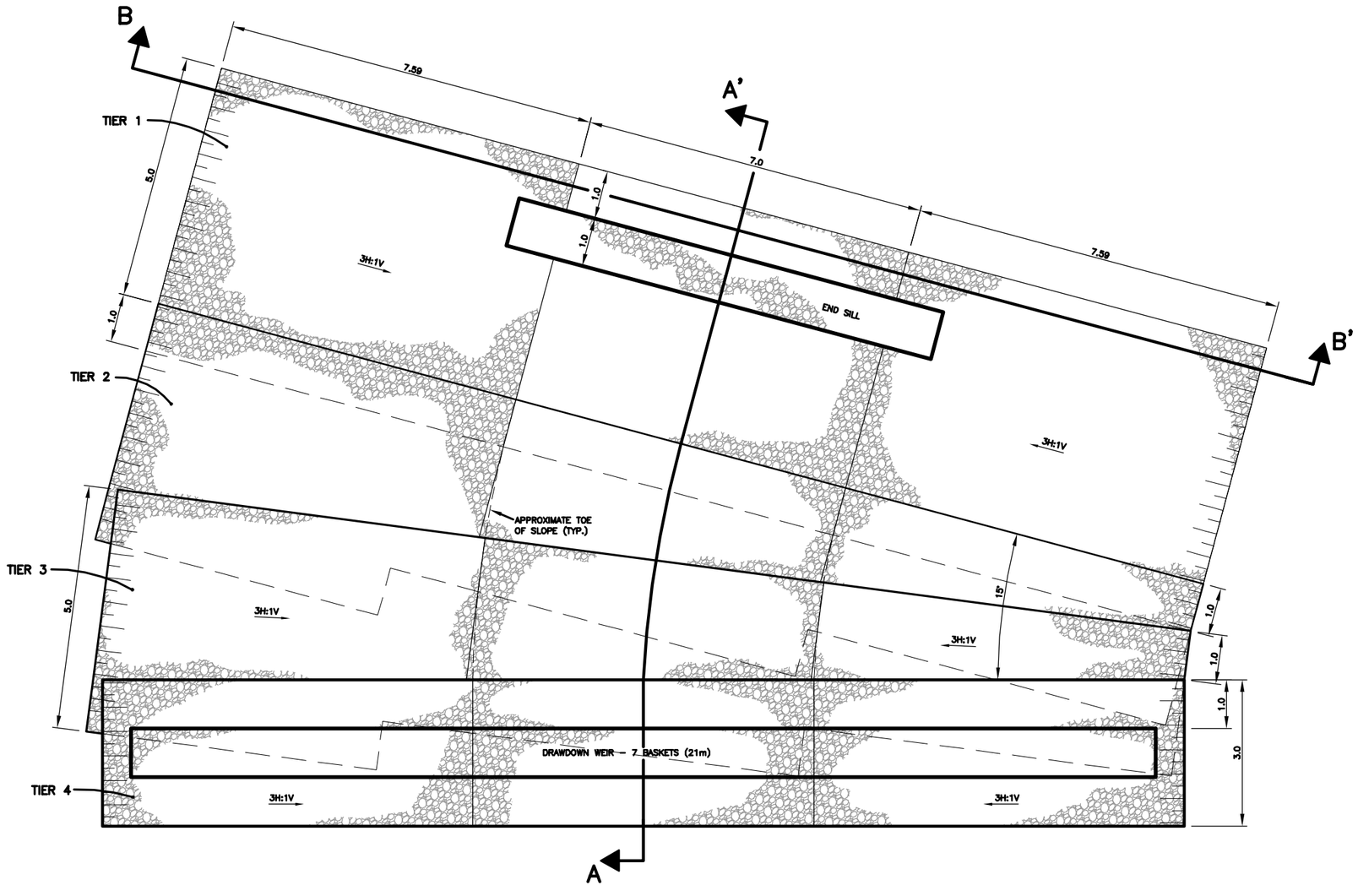
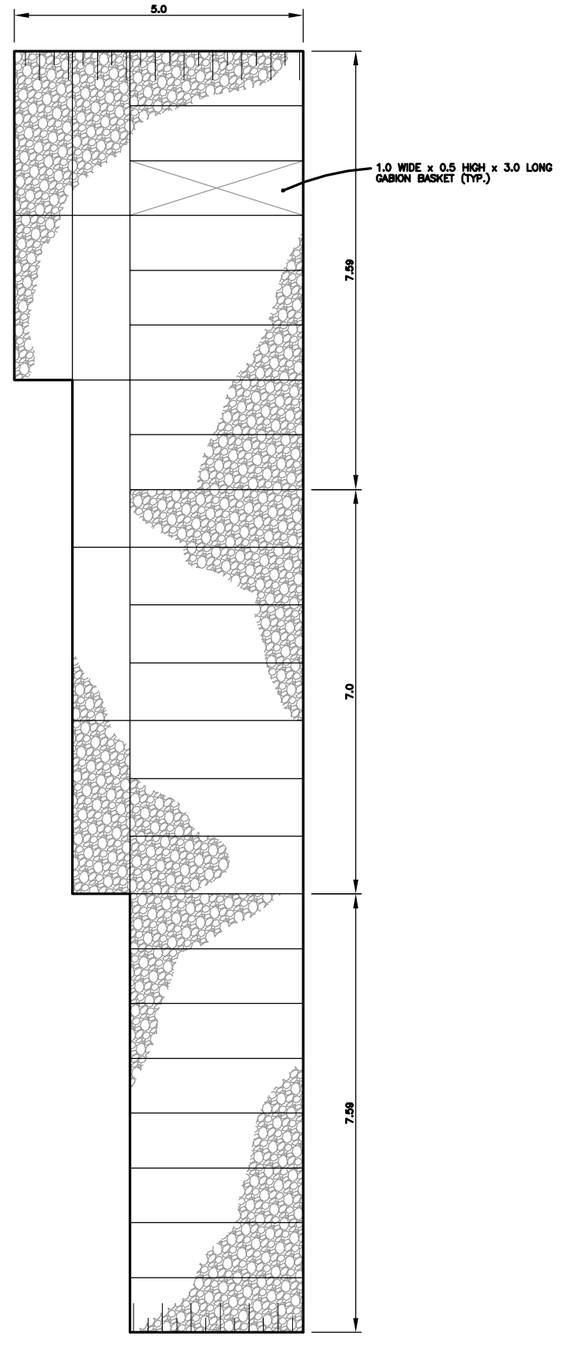


PLAN



TIERS 2 & 3 PLAN

APR 28/03
Plot Scale: 1=1 ps
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METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

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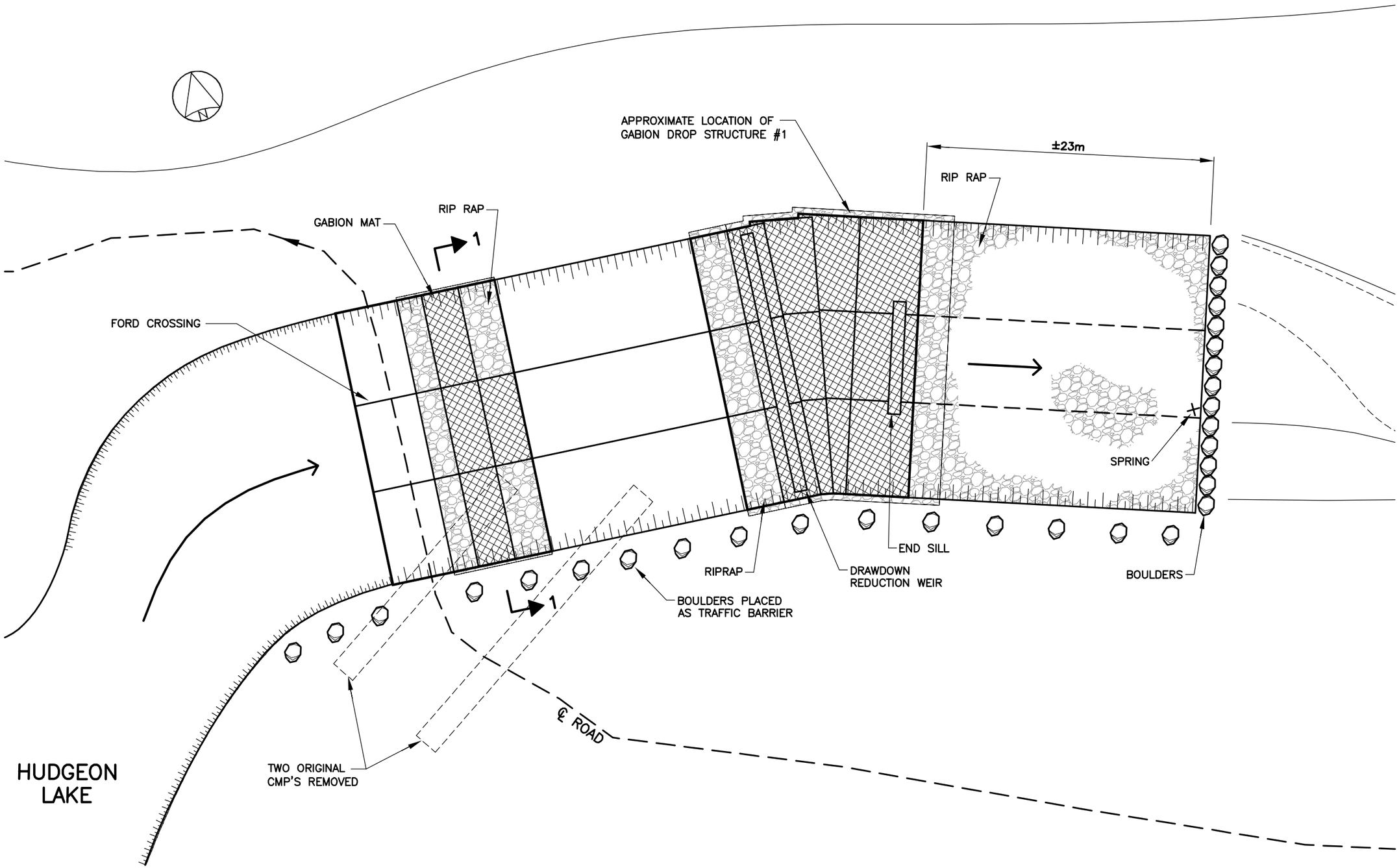
INDIAN AND NORTHERN AFFAIRS CANADA

ABANDONED CLINTON CREEK ASBESTOS MINE
CLINTON CREEK CHANNEL STABILIZATION - STAGE 1

DROP STRUCTURE NO. 1 — PLAN VIEW

DWG. No. 05 | REV. A



LEGEND

- RIP RAP AREAS
- GABIONS

REV.	DESCRIPTION	DWN.	APP.	DATE
	RECORD DRAWING	LJV		28Apr03

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SCALE: 1:150	JOB No. 4440-042-02-01

INDIAN AND NORTHERN AFFAIRS CANADA

ABANDONED CLINTON CREEK ASBESTOS MINE
CLINTON CREEK CHANNEL STABILIZATION - STAGE 1

HUDGEON LAKE OUTLET AND DROP STRUCTURE #1
PLAN VIEW

DWG. No. 06 — REV. -

AUG 12/02
Plot Scale: 1=1
Plot By: pp
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