Specification for the Fresh Water Intake Causeway

Tahera Diamond Corporation

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SRK Project Number 1CT004.009

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Jericho Diamond Project
Specification for the Fresh Water Intake Causeway

1. General

1.1 Location of Work

The work is located adjacent to the south shore of Carat Lake, approximately 200 m west of the mouth of Stream C1, as shown on Drawing 1CT004.06 – W1, Rev. A.

1.2 Scope of Work

The work shall consist of the supply of all plant, labour, materials, surveying, supervision and everything necessary to construct the fresh water intake causeway, as indicated on Drawing 316996-SK-P-1000, Rev. P1, and install the intake well, as indicated by Alternative 2 on Drawing 316996-SK-P-1000, Rev. P1.

1.3 Description of the Work

The fresh water intake causeway will be constructed in order to provide water for the Jericho kimberlite processing plant and potable camp water. The causeway will be constructed of clean coarse rock fill and will extend approximately 90 m into Carat Lake. A steel intake well will be installed within the rock fill. The intake well will be comprised of a vertical section, the base of which will be located in a minimum 4m depth of water to allow operation under the ice during winter, and an approximately horizontal section that will extend beyond the limits of the rock fill. A stainless steel fish screen will be set at the end of the intake pipe. Further details regarding the intake well are provided in the notes on Drawing 316996-SK-P-1000, Rev. P1.

The construction will be undertaken in two phases. The first phase will be undertaken while there is ice on Carat Lake and will consist of the placement of the outer limit of the causeway fill and the installation of the intake well, as shown by Alternative 2 on Drawing 316996-SK-P-1000, Rev. P1. The second phase will be undertaken after the ice, at the south shore of the lake, has melted and will consist of the placement of additional fill to link the first phase portion of the causeway with the end of the access road at the south shore of Carat Lake.

The related work that is excluded from this specification consists of the construction of the housing over the pump well and the installation of the piping system that will connect to the intake well.

1.4 Design of the Causeway and Intake Well

1.4.1 Causeway Location and Design Concept

The location of the causeway and general design concepts were developed prior to the submission of the FEIS. As a result of input from the Department of Fisheries and Oceans (DFO) over the course of the permitting process, the location and design concept were modified. In addition, the basic design of the intake well was modified. The original design

was based on a vertical intake well and a well screen surrounded by the causeway rock. This design was modified, per the DFO design preference, to include a horizontal section of pipe that extended from the vertical well to the outside of the rock fill. A fish screen, conforming to DFO end-of pipe design guidelines, is planned for the end of the horizontal intake pipe.

1.4.2 Intake Well Location and Depth of Water

The intake well was sited in order to provide an adequate depth of water to ensure that fresh water could be drawn from Carat Lake, independent of the formation of ice on the lake surface or low lake levels. The top of the causeway was set to provide a suitable freeboard (about 2 m) above the typical lake level to allow for wave action and unusual fluctuations in lake level. Based on regional information regarding ice thickness, the typical maximum ice thickness was taken to be 2 m. The zone required below the ice was taken to as 2-3 m in order to allow for the possibility of low lake levels, the pipe diameter (0.9m) and an adequate separation between the pipe and the lake bottom to prevent the movement of sediment into the intake pipe.

1.4.3 Intake Well

The well and pipe details were designed by Hatch based on the projected water demand requirements (Drawing 316996-SK-P-1000, Rev. P1) and conventional engineering design criteria.

1.4.4 Fish Screen

The fish screen at the end of the intake pipe was designed on the basis of a document written by DFO in 1995 entitled “Freshwater intake end-of-pipe fish screen guideline”.

1.5 Available Bathymetry and Lake Bed Sediment Data

The existing bathymetric data for Carat Lake as a whole is approximate. In preparation for the causeway construction, detailed bathymetric data was recently obtained along the proposed location of the causeway. An ice auger was used to drill holes through the ice at regular intervals and confirm the depth to lake bottom at each of these auger hole locations.

During the execution of the bathymetric survey, the thickness of lake bed sediments was measured and found to be minimal.

1.6 Causeway Materials

1.6.1 Waste Rock

Clean, non acid generating (NAG), run-of-mine granitic waste rock obtained from the development of the open pit will be used in the construction of the causeway. Select granitic waste rock, which is somewhat finer than the average run-of-mine granitic waste rock, will be used immediately adjacent to the intake well. The contractor will be responsible for developing, hauling and placing all waste rock.

1.6.2 Pipe and Screen

Information on the piping and the stainless steel fish screen is provided on the Drawing 316996-SK-P-1000, Rev. P1. The contractor will be responsible for providing and installing the materials required for the intake well.

1.7 Project Supervision

A Tahera Diamond Corporation (TDC) representative will supervise the construction of the causeway.

2. Causeway Construction

2.1 First Phase Construction

The first phase of construction will be undertaken in May 2005, when there is ice of sufficient thickness on Carat Lake to support construction equipment. The construction sequence is described below.

1. The endpoint of the causeway will be finalized based on the requirement that the intake well be installed where there is a minimum 4 m depth of water.
2. A hole will be cut in the ice in order to open an area in the ice that is large enough to complete the first phase of causeway construction and intake well installation.
3. The intake well, including both the vertical section and the horizontal section with the stainless steel fish screen attached, will be assembled on land or on the ice.
4. Based on the lake bottom bathymetry, steel bracing supports will be welded onto the underside of the horizontal pipe section at two or three locations to allow the horizontal pipe section invert to be set a minimum 0.5 meters above the lake bottom.
5. Excavators will use a system of slings to pick up the intake well and place it into the defined location.
6. Select waste rock, gravel and sand will be delivered to the work area and placed around the base of the vertical section and the horizontal sections of the intake well.
7. The causeway fill will be raised using run-of-mine waste rock except for immediately adjacent to the vertical section of the intake well where appropriately sized waste rock will be used.
8. The rock fill around the pipe will be raised to an elevation approximately to the level of the ice through the opening.

2.2 Second Phase Construction

The second phase of construction will be undertaken during the summer of 2005, when the ice at the shore of Carat Lake has melted and any ice remaining on the lake has melted sufficiently that it does not impede the safe and proper placement of causeway fill in the lake. The construction sequence is described below.

1. Starting from the shoreline, the balance of the causeway fill will be constructed by hauling and end-dumping run-of-mine waste rock.
2. The causeway fill placed in summer will connect to the fill placed in May and will then be expanded to the west to develop an area that conforms to the final fill surface

at Elev. 469m. Finer crushed material will be placed on top of the causeway to provide a road surface.

2.3 Environmental Controls

The following measures will be undertaken as environmental controls:

- The waste rock will be mined from an area of the pit development where the overburden has been removed. The rock will be visually inspected by the TDC inspector on a periodic basis to establish that it is free of till and overburden materials. Unclean rock will be rejected for use in the construction of the causeway.
- Should the first phase of construction indicate the need, the construction in the summer will be complemented by the use of a silt curtain in order to reduce TSS and control sedimentation as necessary.
- Periodic measures of the TSS in Carat Lake will be undertaken during both phases of construction.

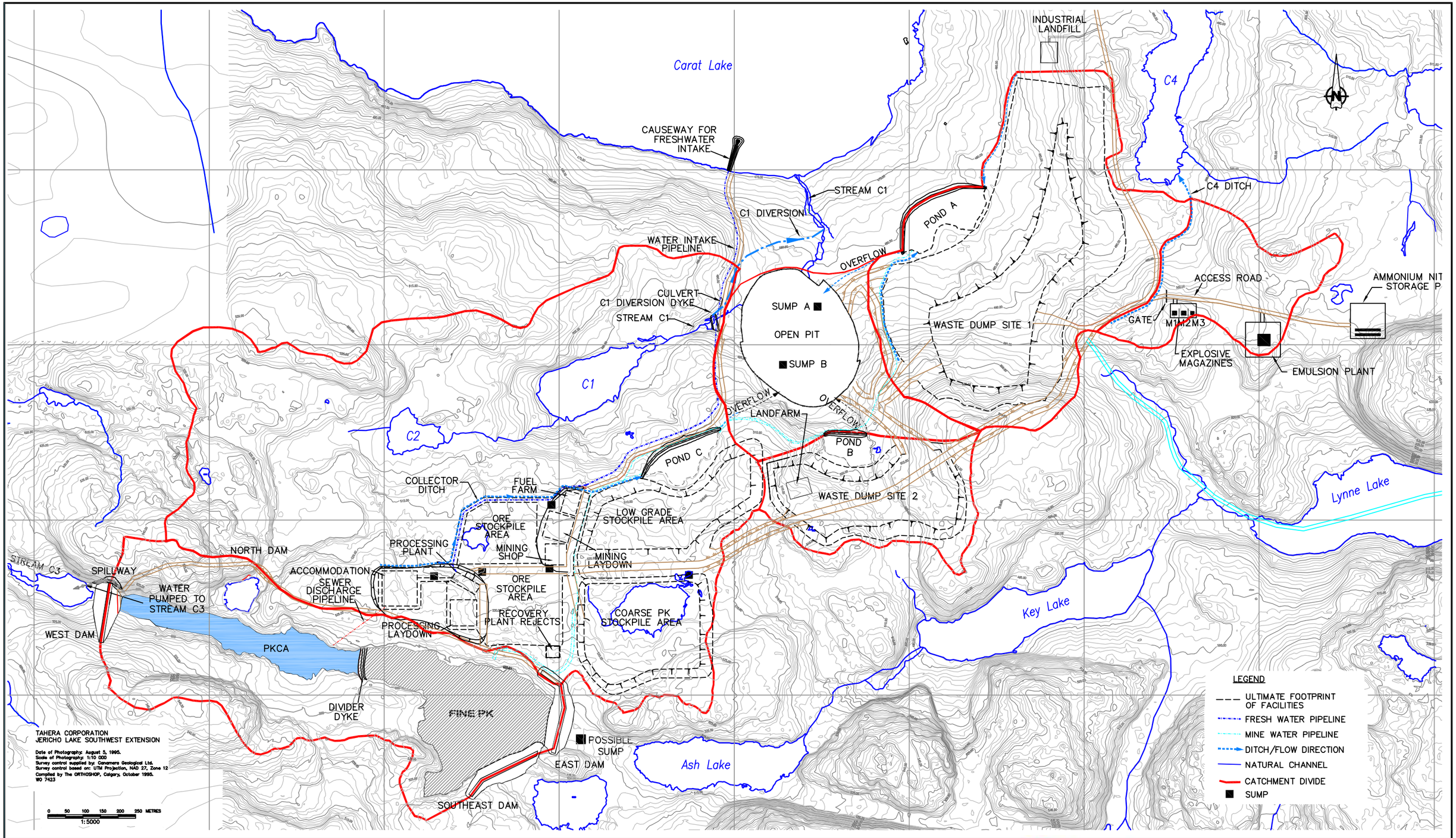
3. Construction Schedule

Figure 1 provides the schedule for the proposed construction of the fresh water intake causeway.

This technical specification "**Fresh Water Intake Causeway Specifications**", has been prepared by SRK Consulting (Canada) Inc.

Cameron C. Scott, P.Eng.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
C.C. SCOTT
LICENSEE
N.W.T.



DRAWING NO.	DRAWING TITLE
DRAWING W-6	PRELIMINARY LAYOUT OF CAUSEWAY AND SECTIONS
DRAWING W-5	PRELIMINARY LAYOUT OF PONDS B AND C CROSS SECTIONS AND DETAILS
DRAWING W-4	PRELIMINARY LAYOUT OF POND A CROSS SECTIONS AND DETAILS
DRAWING W-3	C1 DIVERSION DETAILS
DRAWING W-2	C1 DIVERSION PLAN AND SECTIONS

REFERENCE DRAWINGS

NO.	DESCRIPTION	CK'D	APP'D	DATE

REVISIONS

REV.	ISSUE PURPOSE	AUTH. BY	DATE
A	WATER LICENSE APPLICATION	CCS	JULY 2004

ISSUE AUTHORIZATION

WATER LICENSE APPLICATION

SRK Consulting Engineers and Scientists

DESIGNED BY: CCS	DRAWN BY: JM
DATE: JULY 2004	DATE: JULY 2004
CHECKED BY: CCS	DISCIP. ENGR.
DATE: JULE 2004	DATE:
PROJ. MGR:	PROJ. ENGR.
DATE	DATE

SRK PROJECT NUMBER: 1CT004.06

Tahera Diamond Corporation

JERICHO PROJECT

LAYOUT OF WATER MANAGEMENT FACILITIES

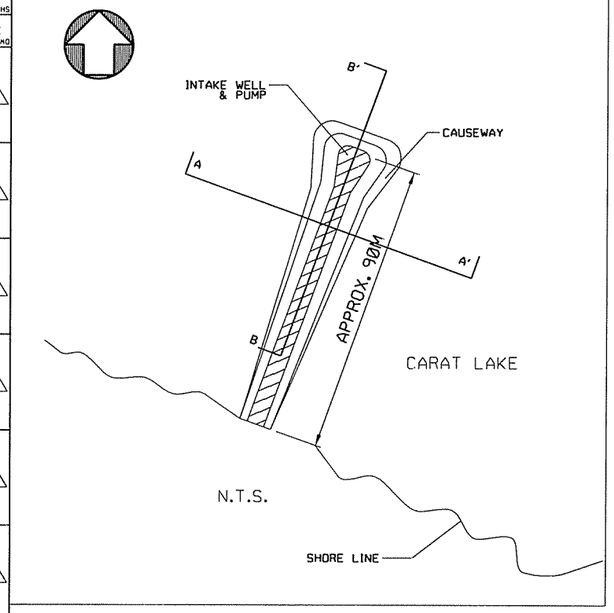
DRAWING NUMBER: 1CT004.06 – W1

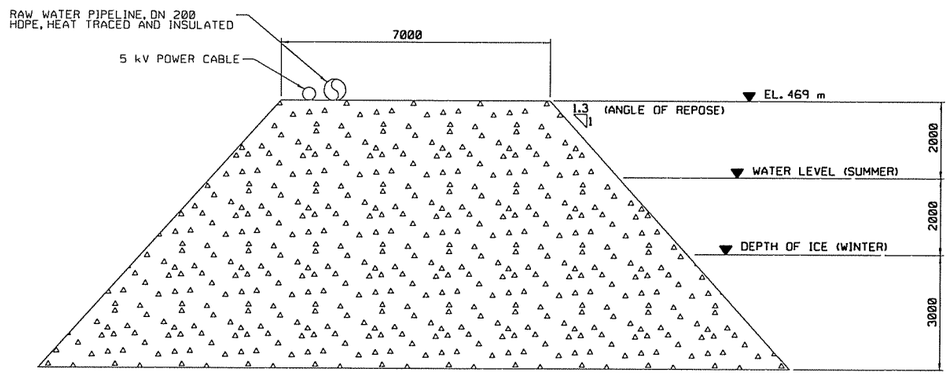
REV.: A

FILE NAME: P:\Tahera Corp (Lytton minerals)\Mapping and Drawings-2004 dwgs\general-figures(2004)\figure8A-.pwrt

SHEET NO.

DWG NO. 316996-SK-P-1000





CAUSEWAY SECTION A-A'

NTS

NOTES:

1- FISH SCREEN DESIGN BASED ON DEPARTMENT OF FISHERIES AND OCEANS "FRESHWATER INTAKE END-OF-PIPE FISH SCREEN GUIDELINE" -1995 AND THE FOLLOWING CRITERIA:

A) FISH SWIMMING MODE: SUBCARANGIFORM

B) WATER INTAKE DESIGN FLOWRATES:
1. 50 M3/HR (CONTINUOUS AVERAGE)
2. 100 M3/HR (INSTANTANEOUS MAXIMUM)

C) REQUIRED AREA, BASED ON 50 M3/HR
1. OPEN SCREEN AREA: 0.13 SQ.M
2. EFFECTIVE SCREEN AREA: 0.22 SQ.M.

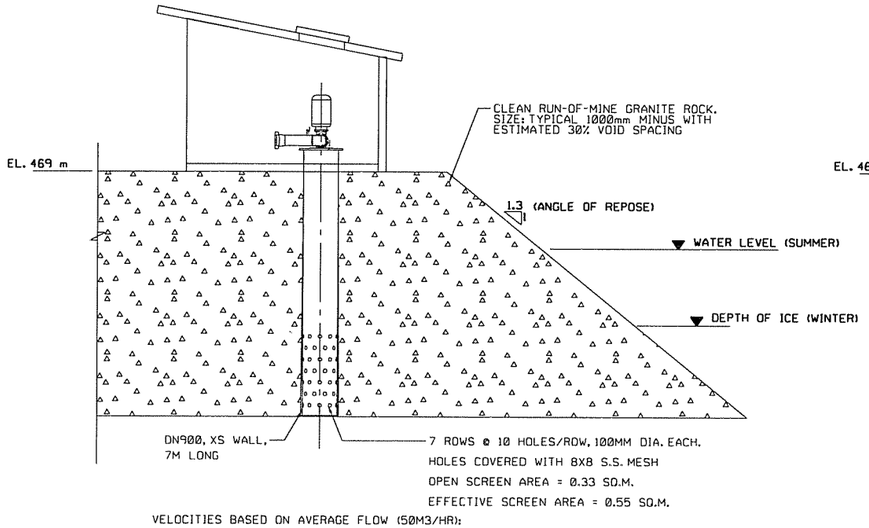
D) REQUIRED AREA, BASED ON 100 M3/RH
1. OPEN SCREEN AREA: 0.26 SQ.M.
2. EFFECTIVE SCREEN AREA: 0.43 SQ.M.

E) FOR ACTUAL PHYSICAL EFFECTIVE AND OPEN SCREEN AREAS, REFER TO NOTES ON EACH ALTERNATIVE SECTION.

F) SCREEN MATERIAL: 8x8 STAINLESS STEEL ALLOY MESH. ALL PIPE OPENINGS TO BE WRAPPED WITH MESH AND SECURED WITH S.S. SELF-TAPPING SCREWS AS REQUIRED.

G) SCREEN MAINTENANCE TO BE DONE MANUALLY, EITHER BY BACK-FLUSHING THE INTAKE OR BY PHYSICALLY REMOVING TRAPPED DEBRIS.

H) PUMP: WEIR/FLOWAY 10 JKM, 6 STAGES, 50 HP MOTOR

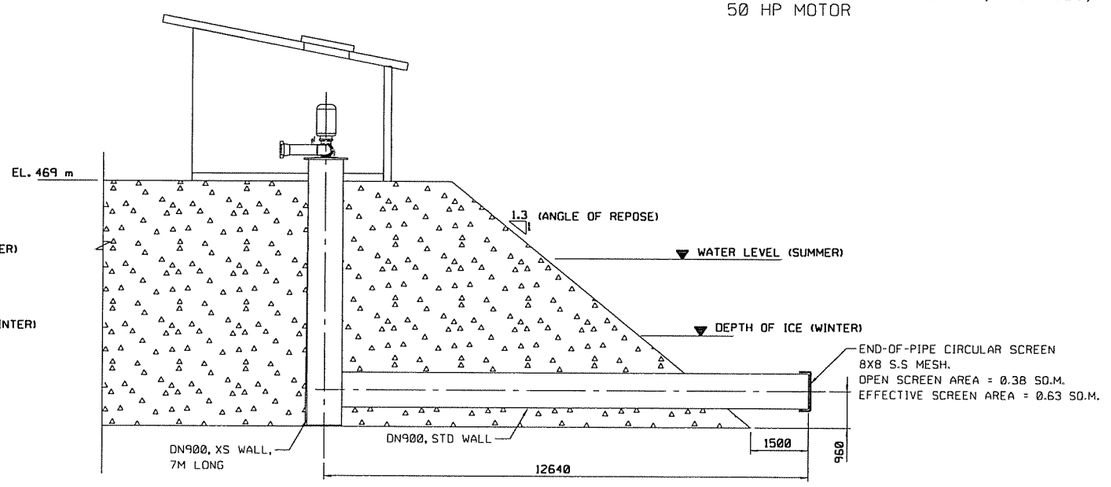


VELOCITIES BASED ON AVERAGE FLOW (50M3/HR):

A) AT SCREEN: 0.046 M/S
B) AT EDGE OF ROCKS:
1. WINTER CONDITIONS: 0.000125 M/S
2. SUMMER CONDITIONS: 0.000075 M/S

CAUSEWAY AND INTAKE WELL - SECTION B-B'

ALTERNATIVE 1



VELOCITY BASED ON AVERAGE FLOW (50M3/HR):

A) AT SCREEN: 0.037 M/S

CAUSEWAY AND INTAKE WELL - SECTION B-B'

ALTERNATIVE 2

FOR WATER LICENSE APPLICATION

INCH 10 20 30 40 50 60 70 80 90 100 MILLIMETRE

DRAWING NO. | DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK. APPR.	DATE
P2	REVISED WITH CLIENT'S COMMENTS	JCH	23/11/84

REVISIONS

STAMP

REV.	ISSUE FOR	AUTH. BY	DATE
P2	INFORMATION	JCH JCP	23/11/84

ISSUE AUTHORIZATION

HATCH

DESIGNED BY	J.-C. PARADIS
DATE:	23/11/84
CHECKED BY	
DATE:	
PROJ. DEV. COORD.	
DATE:	
PROJECT MGR.	
DATE:	
DRAWN BY	J.-C. PARADIS
DATE:	23/11/84
DISCIPLINE ENG.	
DATE:	
PROJECT ENG.	
DATE:	

TAHERA DIAMOND CORPORATION

PROJECT TITLE: JERICHO DIAMOND PROJECT

CARAT LAKE WATER INTAKE
PLAN AND SECTIONS
FOR LICENSE APPLICATION

HA PROJECT NO. 316996

SCALE: N.T.S. | DWG NO.: 316996-SK-P-1000 | SHEET NO. | REV.: P2

Table 1: Construction Schedule for Fresh Water Intake Causeway

	Task	January 2005				February 2005				March2005				April 2005				May 2005				June 2005			
		Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4
1	**Procurement and delivery of materials**																								
2	**Bathymetric survey, sediment depth check with ice auger**																								
3	**First Phase of Construction**																								
3.1	Cut ice, place pipe & initial lift of fill																								
3.2	Raise fill																								
3.3	Inspect & confirm only "clean" waste rock is used																								
3.4	Assess suspended sediment load																								
4	**Second Phase of Construction**																								
4.1	Build causeway from shore																								
4.2	Inspect & confirm only "clean" waste rock is used																								
4.3	Assess suspended sediment load																								