

May 4, 2011

Yukon Zinc Corp.  
Suite 701 - 475 Howe Street  
Vancouver, British Columbia  
V6C 2B3

**Mrs. Pamela O'Hara**  
**VP Environment and Community Affairs**

Dear Mrs. O'Hara:

**Wolverine Project - 2010 Civil Works**  
**Addendum to Starter Tailings Storage Facility – 2009 Civil Works**  
**Construction Summary Report**

**1. INTRODUCTION**

In 2009 construction on the Wolverine Project Starter Tailings Storage Facility (TSF) was substantially completed, as detailed in the Klohn Crippen Berger Ltd. (KCB) report titled *Starter Tailings Storage Facility- 2009 Civil Works Construction Summary Report* (KCB 2010). At that time there remained some outstanding construction items, which were completed in 2010. The items completed in 2010 included:

***Starter Dam Spillway***

In 2009, excavation work was completed on the Starter Dam Spillway but no other work was done while KCB was on site. To complete construction of the spillway, the following task was carried out:

- A 1200 mm diameter culvert was installed through the dam crest.

***Seepage Collection Dam***

The as-built alignment of the Mine Access Road is upstream of the design location of the Seepage Collection Dam. In order to use the existing Mine Access Road as the Seepage Collection Dam the following work was carried out:

- The road culverts at the location of the seepage pond were removed;
- The dam underdrain pipes were extended through the Mine Access Road to Go Creek; and

- The road crest adjacent to the seepage pond was raised to minimum elevation 1286.5 m.

### ***Reclaim Pumps***

The reclaim pump barge system was installed.

### ***Instrumentation***

Seven piezometers, two inclinometers, and three survey monuments were installed.

This addendum documents the civil works construction for the tailings facility and related infrastructure for the Yukon Zinc Corporation (YZC) Wolverine Project undertaken in 2010. See Drawing D-4001 for the tailings facility general arrangement. This letter should be read in conjunction with the KCB 2010 Construction Summary Report.

Photos of the 2010 construction work are shown in Appendix I.

## **2. STARTER DAM SPILLWAY**

Since the starter dam spillway is temporary until the ultimate dam is constructed YZC and KCB agreed to route the starter spillway flows to the upstream ditch adjacent to the Mine Access road rather than through culverts under the road to the downstream environment. As such, no culverts were installed through the Mine Access road.

A 1200 mm diameter corrugated steel culvert was installed at the spillway crest invert level to convey spillway flows under the dam crest perimeter access road. See Drawing D-4011. The spillway design called for three 1200 mm diameter culverts to pass the design flow of 8.2 m<sup>3</sup>/s (as discussed in *Tailings and Related Infrastructure Design and Construction Plan, Ver. 2009-02*, KCB, 2009). A single 1200 mm diameter culvert has the capacity to pass approximately 3 m<sup>3</sup>/s before the headwater overtops the dam. The design flow was based on the 10,000-yr, 30-day storm, assuming no surface water diversions. The original design was conservative and it is not required that additional culverts be installed at this time due to the short life of this structure.

Since the current configuration will not pass the conservative design flood without overtopping the dam, the pond level should be monitored weekly, as described in the *Wolverine Project Tailings Storage Facility Operation, Maintenance and Surveillance Manual* (YZC, 2010). If the water level reaches the spillway invert level during a storm event it is recommended that YZC be prepared to take the following actions:

- Breach the dam perimeter road at the spillway to allow its full capacity flow;
- Place riprap in the spillway to prevent erosion. The riprap should meet the following size criteria:  $D_{100}= 300$  mm,  $D_{50}= 200$  mm,  $D_{15}= 120$  mm.

This spillway will be decommissioned when the dam is raised to its ultimate height.

The 2010 starter dam spillway was constructed and monitored by YZC.

### **3. SEEPAGE COLLECTION DAM**

The Mine Access Road was adapted to act as a seepage collection dam as follows (see Drawing D-4004):

1. The impoundment underdrain pipes were extended south and run through the Mine Access Road for release to the environment. No QC data was gathered on the bedding of these pipes; however they are temporary and are to be cut back to the dam toe, decommissioned and grouted upon raising the dam to the ultimate height.
2. Two culverts through the Mine Access Road at the seepage collection pond were removed.
3. The Mine Access Road was raised to elevation 1286.5 m in compacted lifts with sand and gravel fill from an onsite borrow source.
4. Two 850 mm diameter culverts were installed through the Mine Access Road at upstream invert elevation 1285.1 m to provide emergency spillway release from the seepage collection pond.

Since the tailings impoundment is lined, negligible water collected behind the seepage collection dam is expected to be seepage from the impoundment. Any collected water will be pumped back into the impoundment. As such the seepage collection dam is considered a low risk structure.

The Seepage Collection Dam work was constructed and monitored by YZC.

#### 4. TAILINGS AND RECLAIM LINES

On the upstream face of the starter dam a floating barge system was installed by YZC as designed by Wardrop. Drawings from Wardrop are shown in Appendix III. The LLDPE geomembrane liner was protected during installation by an 80 mil HDPE strip, and carefully inspected for damage by YZC field staff following the installation.

Tailings and reclaim pipelines were installed, consisting of 8-inch diameter HDPE pipes. As-built alignments for the tailings and reclaim pipelines are shown on Drawing D-4002.

#### 5. INSTRUMENTATION

Seven vibrating wire piezometers, two inclinometers, and three slope survey pins were installed in the starter dam between September 15 and September 20, 2010. Installation details are presented in Table 5.1. The instrument locations are shown on Drawing D-4014.

**Table 5.1 Starter TSF Instrumentation Installed in 2010**

INSTRUMENT ID	COORDINATES		PIEZOMETER TIP EL. (m)	SURVEY MONUMENT ELEVATION (m)	SOIL UNIT
	N (m)	E (m)			
PZ10-01	6808270.6	442510.2	1282.4	N/A	Foundation
PZ10-02F	6808325.6	442531.8	1290.7	N/A	Foundation
PZ10-02D	6808325.6	442531.8	1298.2	N/A	Dam Fill
PZ10-03F	6808310.7	442502.4	1283.2	N/A	Foundation
PZ10-03D	6808310.7	442502.4	1290.6	N/A	Dam Fill
PZ10-04F	6808280.7	442434.3	1284.1	N/A	Dam Fill
PZ10-04D	6808280.7	442434.3	1291.5	N/A	Foundation
IN10-01	6808270.6	442510.2	N/A	N/A	Foundation
IN10-02	6808241.8	442440.4	N/A	N/A	Foundation
SM10-02	6808319.0	442517.5	N/A	1306.2	Dam Fill
SM10-03	6808307.2	442495.1	N/A	1306.0	Dam Fill
SM10-04	6808295.6	442472.7	N/A	1306.0	Dam Fill

The 2” diameter inclinometers casings were installed in the foundation to 20 m depth just downstream of the starter dam toe, such that upon the final dam raise they will be able to monitor slope movement to the crest of the ultimate dam. Initial readings on all instruments will be taken in spring 2011 following the ground thaw. Thereafter monitoring frequency will be as laid out in the YZC Operations, Maintenance and Surveillance Manual.

The vibrating wire piezometers (Model VW2100-0.35) and inclinometers (MEMS Digital System, Model IC32003) were procured from RST Instruments. The specifications are given in Appendix II.

## 6. OUTSTANDING WORK

Outstanding work remaining to complete the TSF Construction includes:

- Install a pump in the seepage collection pond to return seepage to TSF. This will be completed in 2011. See Wardrop Drawing HS-13-106 for Seepage Pump Float Barge Design.
- Install three additional survey pins along the dam crest. In original designs six survey pins were specified. Three were installed in 2010. The remaining pins will be installed in 2011.
- Collect initial readings on inclinometers. These will be taken in spring, 2011.

Yours truly,

**KLOHN CRIPPEN BERGER LTD.**



Harvey McLeod, P.Eng. (Yukon)  
Project Manager

HM/LC:dl

Attach. Appendix I – Selected Photos (Sept. 2010)  
Appendix II – Instrumentation Specifications (from RST Instruments)  
Appendix III – Wardrop Design Drawings  
Drawings

## **APPENDIX I**

### **Selected Photos (Sept. 2010)**



**Photo 1 Completed Starter Spillway**



**Photo 2 Seepage Collection Pond Area**



**Photo 3 Completed Seepage Collection Dam**



**Photo 4 Seepage Collection Dam Spillway Inlet**



**Photo 5 Reclaim Barge**



**Photo 6 Vibrating Wire Piezometers**



**Photo 7 Instrumentation Installation Drilling**



**Photo 8 Vibrating Wire Piezometer taped to casing**

## **APPENDIX II**

### **Instrumentation Specifications (from RST Instruments)**



# Vibrating Wire Piezometers



The RST Vibrating Wire Piezometer provides excellent long-term accuracy, stability of readings and reliability under demanding geotechnical conditions. Vibrating Wire Piezometers are the electrical piezometers of choice as the frequency output of VW devices is immune to external electrical noise, and able to tolerate wet wiring common in geotechnical applications.

The vibrating wire piezometer senses pressure by means of a metal diaphragm attached to a vibrating wire element. When pressure is applied to the diaphragm, its deflection is sensed by the vibrating wire element – i.e. the tension in the wire is reduced, and the resonant frequency of the vibrating wire is changed as a result. The vibrating wire is induced to vibrate, and then the resonant frequency is measured via an electromagnetic coil circuit. The resulting frequency is precisely related to the pressure.

The frequency signal is exceptionally immune from cable effects, including length (to several kilometers), splicing, resistance, noise pickup, and moisture. The vibrating wire coil circuit contains no semiconductor devices and has built-in ionized gas discharge device protection against transient damage. As a result, the vibrating wire piezometer provides excellent reliability in typical geotechnical situations – i.e. long outdoor cables buried in saturated soil.

The piezometer is equipped with a standard sintered stainless steel porous filter to prevent soil particles from contacting the diaphragm. A thermistor is built into the piezometer body to permit temperature measurement and temperature compensation of the piezometer. Standard construction is all stainless steel. RST vibrating wire piezometers are shipped with extremely tough polyurethane-jacketed foil-shielded cable for maximum endurance in field conditions.

## operating principle

Vibrating Wire Piezometers contain a high tensile steel wire with a fixed anchor at one end and are attached to a diaphragm at the other end. The wire is electrically plucked, with the resonant frequency of vibration proportional to the tension in the wire. This frequency induces an alternating current in a coil, which is detected by the readout unit and can then be converted to a pressure.



### RST Instruments Ltd.

200 - 2050 Hartley Ave.  
Coquitlam, BC  
Canada V3K 6W5

Telephone: 604 540 1100  
Facsimile: 604 540 1005  
Toll Free: 1 800 665 5599



[info@rstinstruments.com](mailto:info@rstinstruments.com)

[www.rstinstruments.com](http://www.rstinstruments.com)

## applications

Assessing performance and investigating stability of earth fill dams and embankments.

Slope stability investigations.

Monitoring water levels in wells and standpipes.

Monitoring pressures behind retaining walls and diaphragm walls.

Monitoring pore pressures during fill or excavation.

Monitoring pore pressure in land reclamation applications.

## features

Field proven reliability and accuracy.

Will tolerate wet wiring common in geotechnical applications.

Immune from external electrical noise.

Signal transmission of several kilometers.

Cable lengths may be changed without affecting the calibration.

High accuracy, i.e. a low pressure vented model will measure water level changes as small as 0.05 mm (0.02 in.).

Thermistor for temperature measurement is standard.

Negligible displacement of pore water during the measurement process.

Hermetically sealed, stainless steel construction.

Heavy case to minimize reading errors caused by overburden pressure.

Data logger compatible.

Integral lightning protection.



specifications + ordering info

# Vibrating Wire Piezometers



## vibrating wire piezometer specs

DESCRIPTION	SPECIFICATION
Over range	2 X F.S.
Resolution	0.025% F.S. minimum
Accuracy	0.1% F.S.
Operating Temperature	-20 to 80°C (-4 to 176°F)
Diaphragm Displacement	<0.001 cc at F.S.
Thermal Zero Shift	<0.05% F.S./°C
Materials	Hermetically sealed stainless steel housing
Thermistor Type	NTC 3K Ohms @ 25°C
Thermistor Interchangeability	±0.2°C
Thermistor Resolution	0.1°C
Filter	50 micron sintered filter. (High air entry alumina filter 1, 3, 5 Bar available)

## vibrating wire piezometer options

- Heavy-duty bodies for embankment use.
- Push-in drive points for soft soils
- High air entry ceramic filters to exclude air
- Low range and vented piezometers
- Titanium construction for use with corrosive fluids
- Multi-point/mixed type sensor strings
- Kevlar® reinforced cable

## optional equipment

- VW2106 Vibrating Wire Readout
- Dataloggers
- Terminal stations
- Electrical cable
- Cable splice kits
- Installation geotextile and socks
- Increased lightning protection

## electrical cable specs

PART #	DESCRIPTION
EL380004	Two twisted pairs cable with polyurethane jacket.

Other types of cables, depending on site conditions and atmospheric reference requirements, are available upon request. These include vented, FEP, PVC, polyurethane, and armored varieties.

## ordering info

PART #	DESCRIPTION	PRESSURE RANGE	DIMENSION
VW2100	Standard model for general applications.	0.35, 0.7, 1.0, 2.0, 3.0 MPa	19 mm Ø X 130 mm
VW2100-HD	Heavy duty piezometer for direct burial in fills and large dam embankments.	1.0, 2.0 3.0, 5.0, 7.5, 10 MPa	25.4 mm Ø X 146 mm
VW2100-XHD	Heavy duty piezometer for direct burial in fills and large dam embankments.	1.0, 2.0 3.0, 5.0, 7.5, 10 MPa	38.1 mm Ø X 146 mm
VW2100-HHP	High pressure transducer with NPT port.	5.0, 7.5, 10, 25, 50, 75, 100 MPa	25.4 x 143 mm
VW2100-DP	Drive point model with CPT adapter.	0.07, 0.175, 0.35, 0.7, 1.0, 2.0, 3.0, 5.0, 7.5 MPa	33 mm Ø X 432 mm
VW2100-L	Low Pressure, unvented.	70, 175 kPa	25 mm Ø X 133 mm
VW2100-LV	Low Pressure vented.	70, 175 kPa	25 mm Ø X 133 mm
VW2100-M	Miniature version – 17.5 mm diameter.	0.35, 0.7, 1.0, 2.0, 3.0 MPa	17.5 mm Ø X 133 mm
VW2100-MM	Micro-miniature version – 11.1 mm diameter.	0.35, 0.7 MPa	11.1 mm Ø X 165 mm

High temperature models and metallic cable are available by special order. High temperature ranges include: 0 to 100°C; 0 to 150°C; and 0 to 200°C.

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innovation in  
geotechnical  
instrumentation

DIGITAL  
MEMS  
INCLINOMETER  
SYSTEM

ALSO FEATURING

**inclinanalysis™**  
digital inclinometer analysis software



**wireless**

communication & digital technology

the evolution of  
inclinometer systems

**MEMS**  
TILT & INCLINATION  
SERIES

# DIGITAL MEMS INCLINOMETER SYSTEM



wireless communication & digital technology

**CERTIFIED RUGGED**



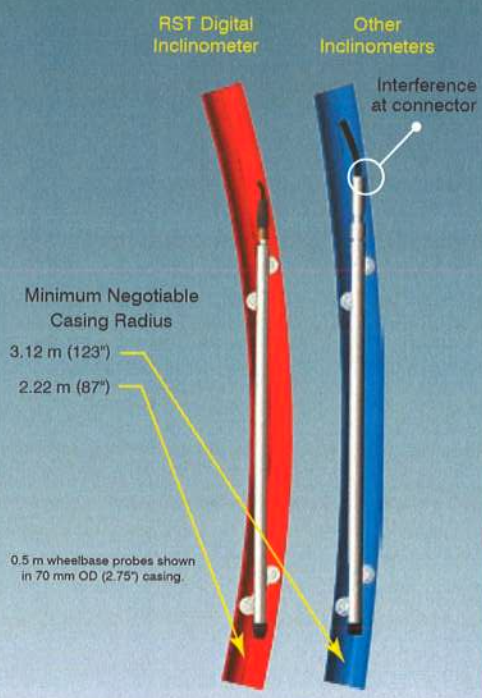
## industry leading MEMS technology

**The Digital MEMS Inclinometer System** from RST Instruments represents a major advance in the evolution of inclinometer systems. By utilizing cutting edge MEMS (Micro-Electro-Mechanical Systems) technology, users will be well-equipped with unmatched precision, high thermal stability and rugged durability when compared to older technologies. In addition, an internal 24 bit A/D converter provides digital data return for superb resolution, noise immunity and overall system accuracy that competing inclinometers cannot offer.

The Ultra-Rugged Field PC functions as the data collector. It provides a high-level user interface, industry-leading memory, optional Flash data security, "at-the-borehole" data analysis and comparison to previous data sets, and instant USB synchronization with office computers.

## benefits

- The shortest overall length available for a given base length allows the RST Digital Inclinometer to traverse a smaller radius bend than all other inclinometers.
- A local microcontroller in the probe manages data collection, applies precision digital calibration, and provides a fast settling time which results in very efficient data collection.
- Calibration of the inclinometer is not affected by the cable system and readout unit. Any RST digital inclinometer probe can be used with any approved readout with no additional calibration.
- No-slip, swaged cable marks and casing collar cable grip eliminate the need for a heavy pulley assembly.



## drop it, dunk it and use it

The Ultra-Rugged Field PC is rock solid and field ready for the most extreme environments. Wireless communication between the inclinometer control cable and the Ultra-Rugged Field PC ensures ease of use and reliability since there is no longer any concern with fragile connectors, cable related failure and reliability problems.

## processor, operating system and memory

- 520 Mhz PXA270 processor
- Windows<sup>®</sup> Mobile Operating System
- Bluetooth<sup>™</sup> Wireless Communication
- Internal solid state 512 MB Flash memory (2 million biaxial data sets)
- Compact Flash (Type I or II) and SD/SDHC card slots
- Both USB Host and Client plus 9-pin RS-232
- Real-time clock keeps correct date & time, even without battery

## display

- Active viewing area of 89 mm (3.5 in.) diagonal
- Transflective LCD - brilliant contrast in direct sunlight
- 1/4 VGA, 240 x 320 pixels, selectable for portrait or landscape view
- Sealed, resistive, pressure sensitive touchscreen
- On-board stylus
- Backlit LCD

## power

- Rechargeable, lightweight Li-Ion battery pack, 14 W-h (nom.)
- 20 hour battery life on single charge (4 to 6 hrs. charge time)
- Battery easily changed in the field without tools
- 12 V vehicle power unit connector for charging or direct power unit
- Intelligent battery notifier

## environmental

- Operating temperature: -30 to 55°C (-22 to 130°F)
- Waterproof and dustproof, IP67
- Shockproof\*: multiple drops from 1.5 m (5 ft.)
- MIL-STD-810F: water, humidity, sand and dust, vibration, altitude, shock, high temperature, low temperature, temperature shock

(\*1) tested from drops onto concrete through temperatures ranging from -30 to 50°C (-22 to 122°F)  
 Microsoft<sup>®</sup> Windows is a registered trademark of the Microsoft Corporation. Bluetooth trademark is owned by Bluetooth SIG, Inc. © Eburco BPS, Inc. 2004  
 RST Instruments Ltd. reserves the right to modify products and specifications without notice. Inclinalyzer<sup>™</sup> is a registered trademark of RST Instruments Ltd. ICB002P

**SPECIFICATIONS**

INCLINOMETER	METRIC SYSTEM	IMPERIAL SYSTEM
Wheelbase	0.5 m	24 in
Probe diameter	25.4 mm	1.00 in
Probe length (including connector)	710 mm	28.0 in
Probe weight	1.4 kg	3.0 lbs
Probe material	Stainless steel	Stainless steel
Full-scale range (other ranges available)	30 degrees	30 degrees
Data resolution	0.005 mm per 500 mm	0.00002 ft per 2 ft
Memory	> 1,000,000 readings	> 1,000,000 readings
Repeatability	±0.002°	±0.002°
System Accuracy	±2 mm per 25 m	±0.1 in. per 100 ft
Axis alignment	Digitally nulled	Digitally nulled
Temperature rating	-40 to +70°C	-40 to +158°F

**CABLE**

Cable diameter	6.35 mm	0.25 in
Cable weight	1.2 kg / 30 m	2.6 lbs / 100 ft
Cable tensile strength	5.89 kN	1300 lbs
Cable jacket	Polyurethane	Polyurethane
Cable stretch (suspended in 61 m dry borehole)		7.62 mm    0.3 in

**CABLE CONNECTOR**

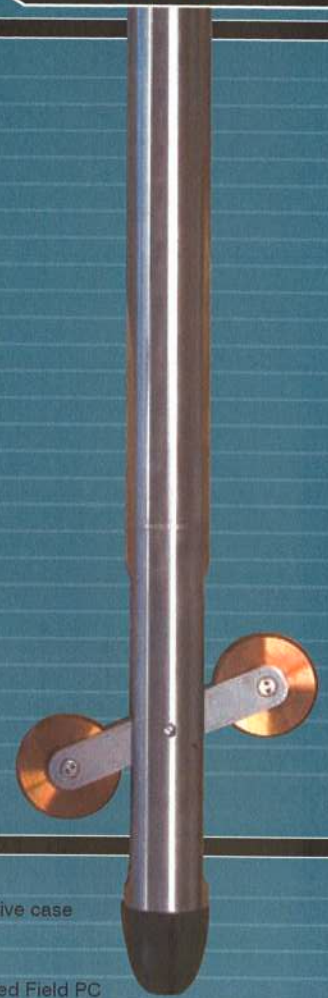
Connector material made of 316 stainless steel.

Rating for underwater use, with wet connection at 5000 ft. (1524 m) in salt water.

Includes a molded urethane rubber strain relief to enhance cable durability at the connector entrance.

**CABLE REELS**

Up to 100 m cable reel diameter	300 mm	12 in
101 to 225 m cable reel diameter	380 mm	15 in
+225 m cable reel diameter	460 mm	18 in
Reel weight with 75 m (246 ft.) cable	5 kg	11 lbs



**ORDERING INFO**

**SYSTEMS - Metric**

IC32003	30 m complete system with 0.5 m probe
IC32005	50 m complete system with 0.5 m probe
IC32075	75 m complete system with 0.5 m probe
IC32010	100 m complete system with 0.5 m probe
125, 150, 200, 250, 300 m and longer systems available	

**SYSTEMS - Imperial**

IC32110	100 ft complete system with 2 ft probe
IC32115	150 ft complete system with 2 ft probe
IC32120	200 ft complete system with 2 ft probe
IC32130	300 ft complete system with 2 ft probe
400, 500, 600, 800, 1000 ft and longer systems available	

**OPTIONAL SYSTEM ACCESSORIES**

IC35805	Dummy Probe 0.5 m wheelbase - METRIC
IC35802	Dummy Probe 2 ft wheelbase - IMPERIAL
IC32705	Digital MEMS Inclinometer Spiral Sensor (see separate brochure)
IC35600	RST Inclinanalysis™ - Digital Inclinometer Analysis Software

Horizontal MEMS Inclinometer (probe available in custom lengths in Metric and Imperial units - see separate brochure).

**INCLUDED SYSTEM COMPONENTS**

- MEMS Digital Inclinometer probe with protective case
- Ultra-Rugged Field PC
- Reel with case and spare battery
- AC charger (universal voltage) for Ultra-Rugged Field PC
- Rechargeable Li-Ion battery for Ultra-Rugged Field PC
- USB cable for Ultra-Rugged Field PC
- User documentation CD for for Ultra-Rugged Field PC
- Screen protector for Ultra-Rugged Field PC
- Silicone spray for probe/cable connectors
- Data collection & transfer software
- 12V automobile adapter
- 70 & 85 mm cable grips



**rst**  
INSTRUMENTS

# inclinalysis™

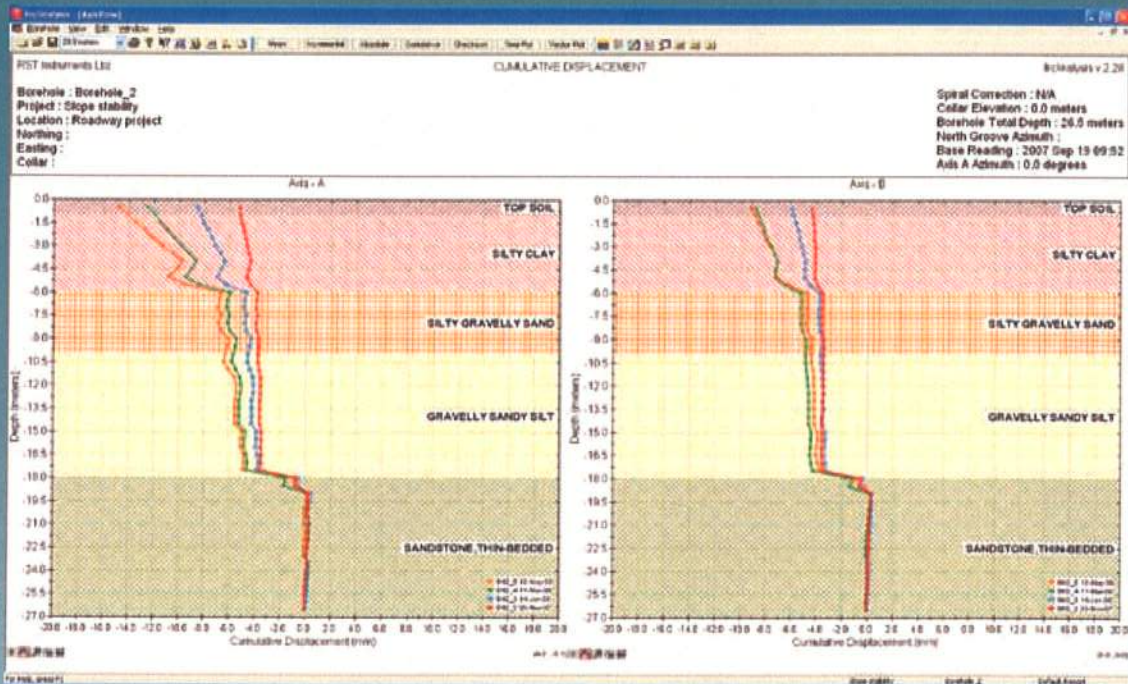
digital inclinometer analysis software

## the perfect pair

The RST Digital MEMS Inclinometer System and Inclinalysis™ Software offer a powerful combination for quick and efficient reduction of large volumes of inclinometer data. Data can be analyzed and presented quickly in a variety of formats.

RST Inclinalysis™ Software is powerful, yet easy to use. Plotting, manipulating data and printing are all only a few clicks away. Menu and plot functions are designed to be intuitive making the program very easy to learn. Designed to complement the Digital MEMS Inclinometer System, data is organized in a standard file structure which makes importing data seamless between Inclinalysis™ and the Ultra-Rugged Field PC.

- Plot data at the click of a button. View several plots simultaneously across the screen. Ability to save multiple reports for a single borehole.
- Create custom plot titles and change graph properties. Change reading units instantly to millimeters, metres, inches or feet. Specify top or bottom data reference. Correct for bias-shift.
- Import inclinometer data in a variety of formats from different manufacturers including spiral data.
- Create vector plots displaying change in magnitude and direction, and time plots to assess the rate of movement at a particular depth or in a specific movement zone. Instant visual data validation by plotting checksum data.
- Display data in tabular format and compare directly to plots. Take direct measurements off any plot.
- Menu and plot functions are designed to be intuitive and easy to learn. Cascade windows to display multiple plots and tabular data on the same screen.



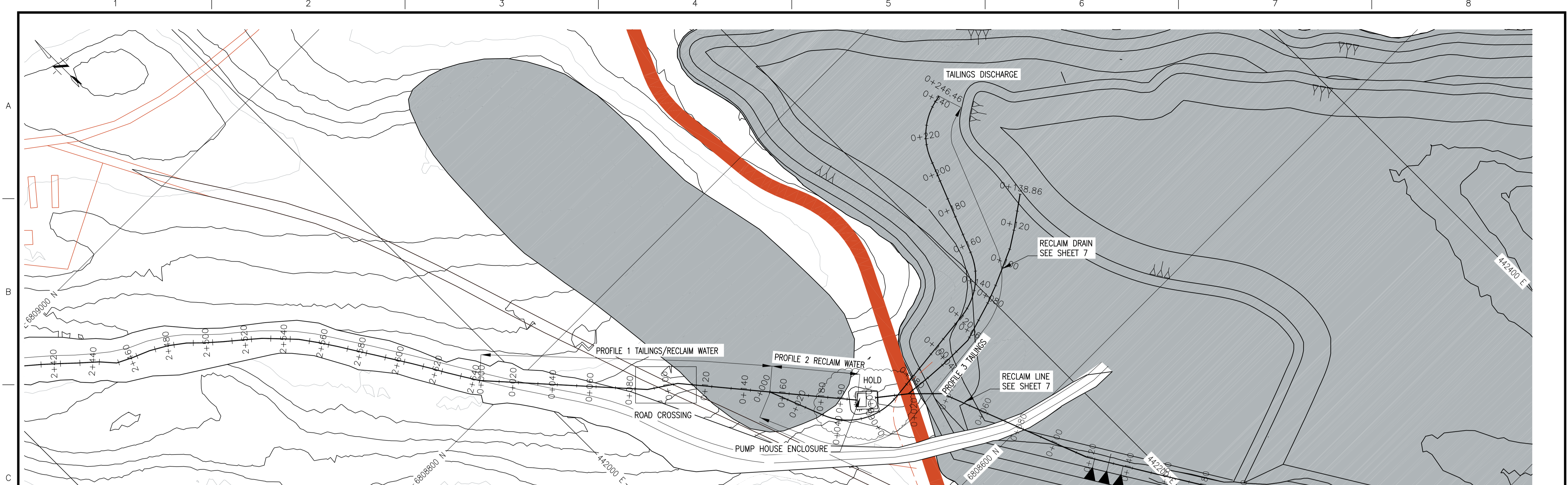
RST Instruments Ltd.  
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 Coquitlam, BC  
 V3K 6W5 Canada  
**Tel: 604-540-1100**  
**Fax: 604-540-1005**  
**Toll Free (North America): 1-800-665-5599**  
**e-mail: [info@rstinstruments.com](mailto:info@rstinstruments.com)**

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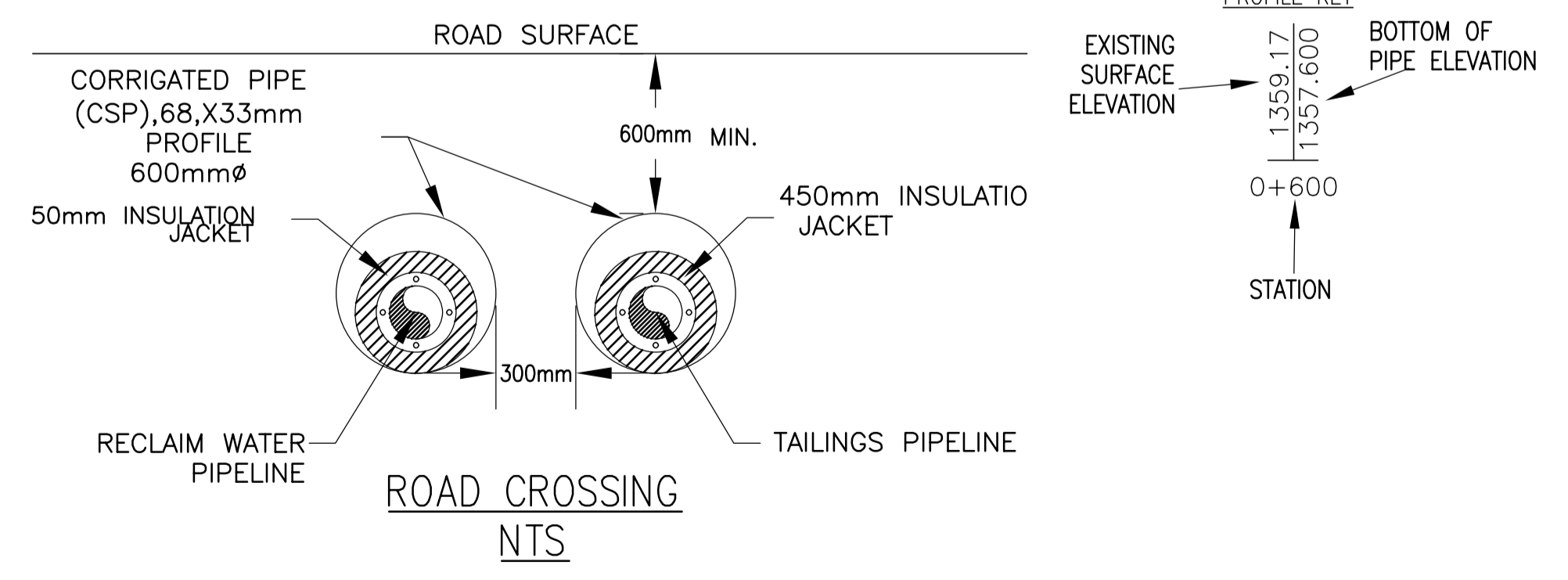
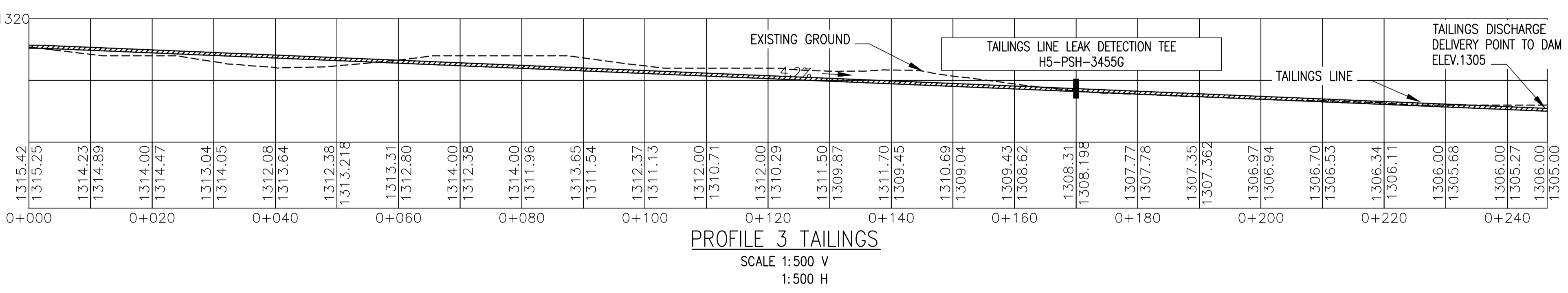
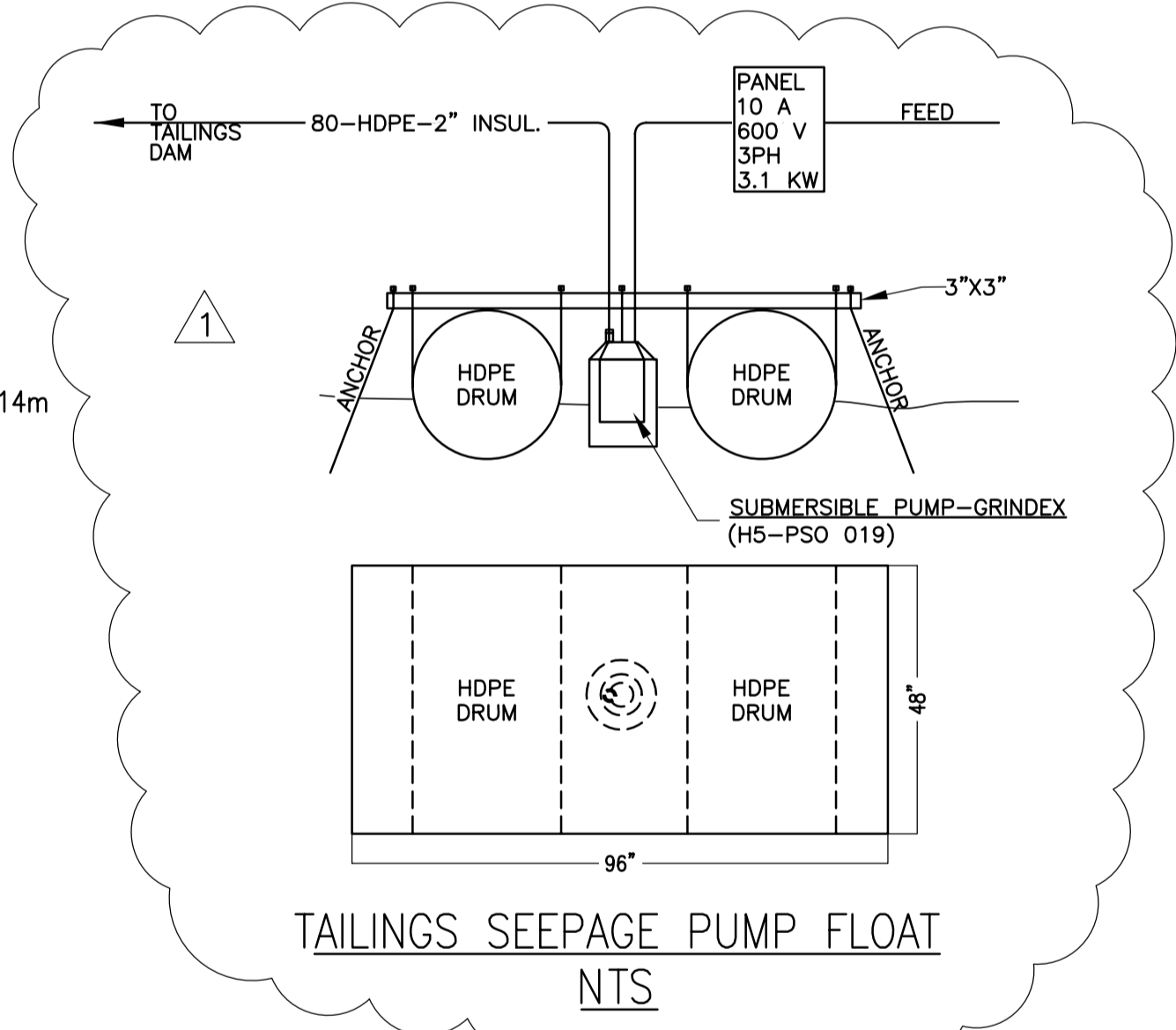
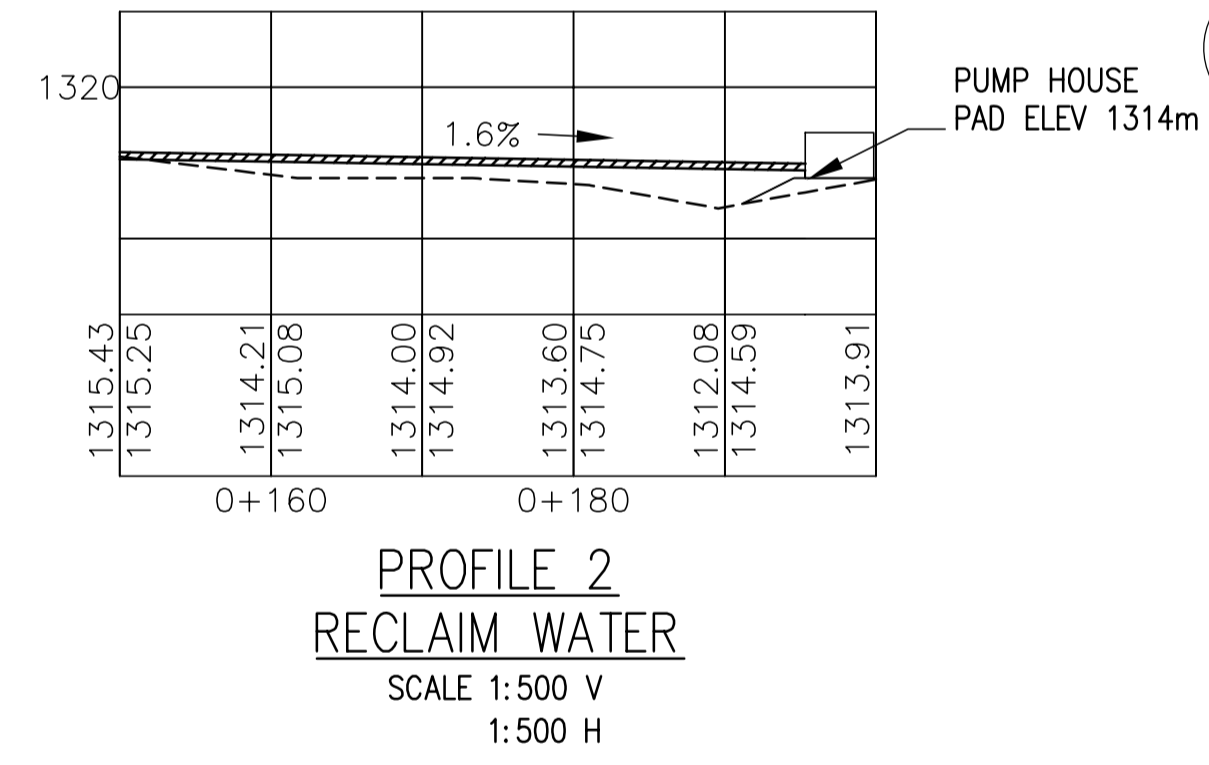
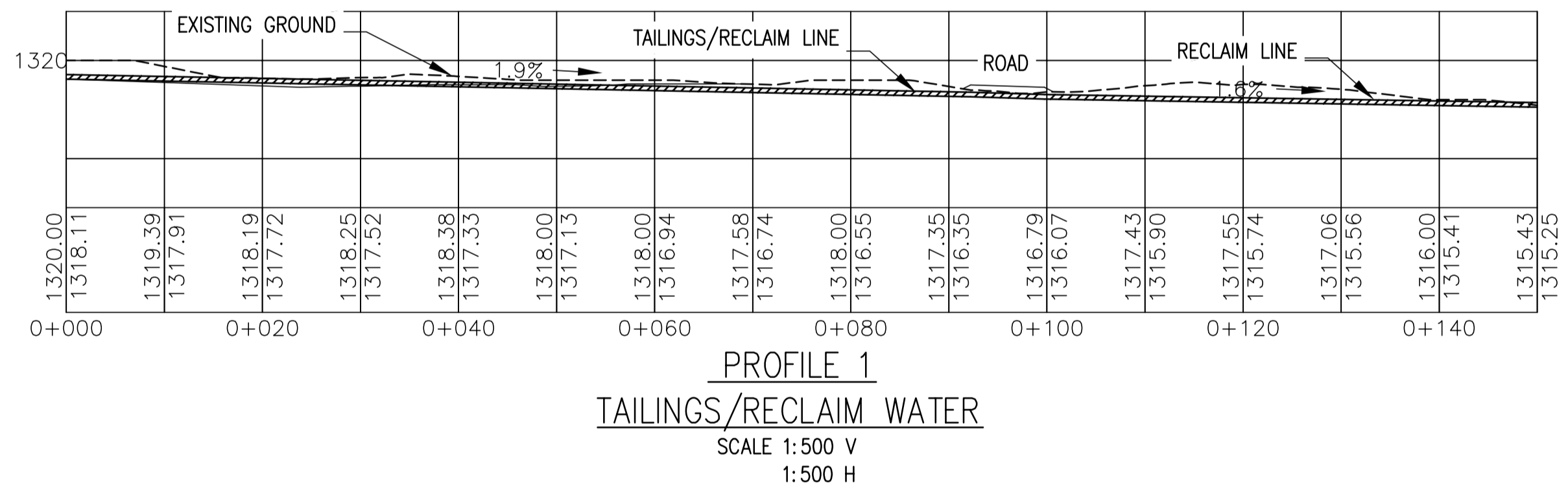
Certified System  
 ISO 9001

## **APPENDIX III**

### **Wardrop Design Drawings**



PLAN  
SCALE 1:1000



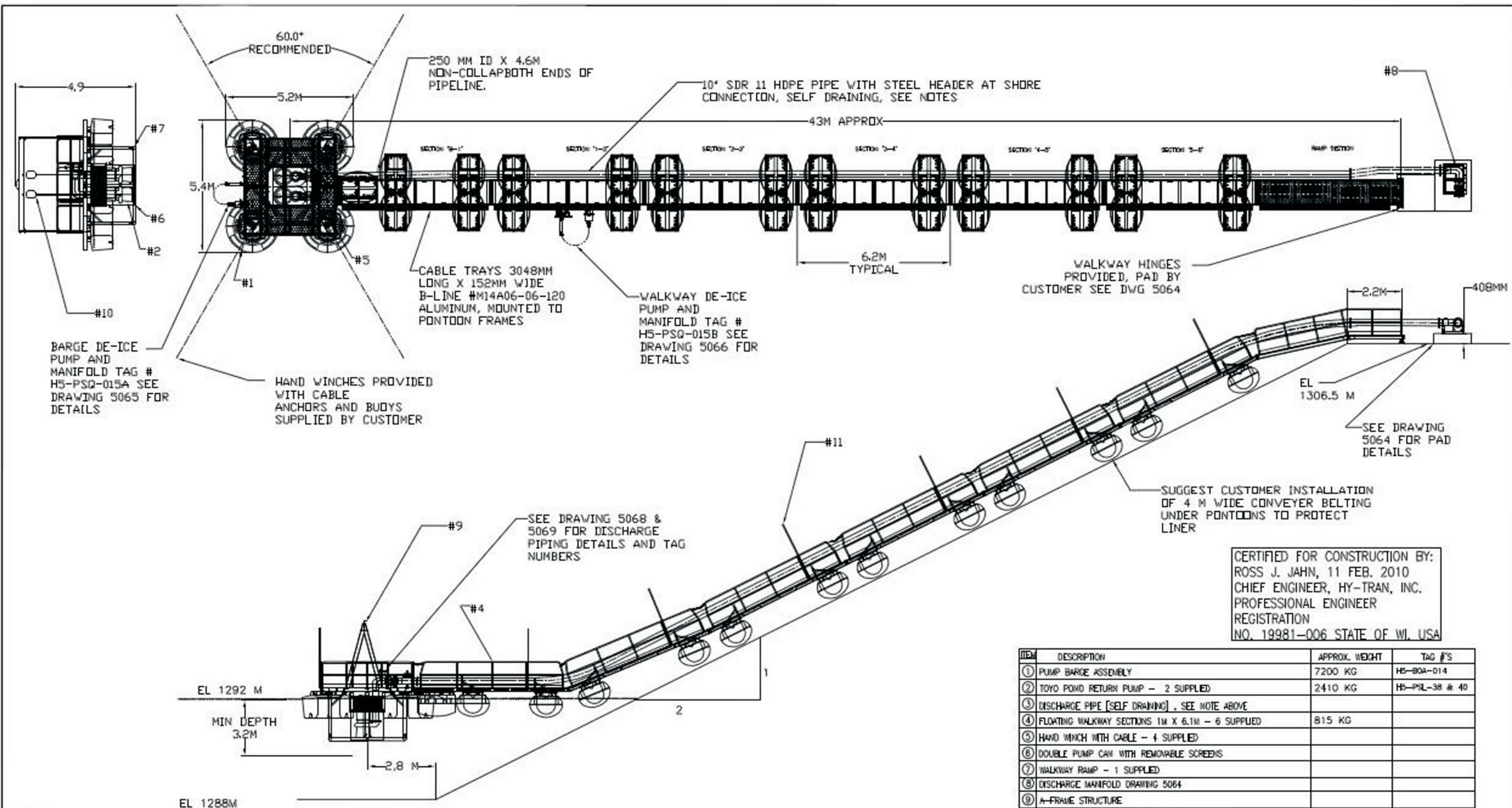
F	THE INFORMATION CONTAINED ON THIS DRAWING HAS BEEN PREPARED SOLELY FOR THE OWNER FOR USE ON THIS PROJECT AND IS COPYRIGHTED. ANY UNAUTHORIZED USE OF THIS INFORMATION IS A BREACH OF COPYRIGHT AND WILL BE PURSUED AS SUCH. USE OF THE INFORMATION ON THIS DRAWING IN WHOLE OR IN PART OTHER THAN FOR THE INTENDED PURPOSE IS AT THE SOLE RISK OF THE USER.	
	DWG. NO.	REFERENCE DRAWINGS

CLIENT	PROJ. NO.	PROJ. NAME	PROCESS	INSTR.	PIPING	MACH.	SITING	SERVICES	ARCH.	LAYOUT	REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
											1	1	ISSUED FOR CONSTRUCTION--SEEPAGE PUMP DETAIL	21MAY10	SV
											0	1	ISSUED FOR CONSTRUCTION	22OCT09	AF
											B	1	ISSUED FOR APPROVAL	09OCT09	JPR

SECTION:	PIPING
SCALE:	AS SHOWN
DATE:	
DESIGN. BY:	MW
DATE:	10AUG09
DRAWN BY:	MW
DATE:	11AUG09
CHECK. BY:	AF
DATE:	14AUG09
APP. BY:	JMcA

TITLE			
WOLVERINE PROJECT (EP)			
TAILINGS AND RECLAIM PIPELINE			
PIPELINE PROFILE			
SHEET 6 OF 7			
FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
H513106.DWG	08526302.00	H5-13-106	1

09/08/19 08:30



BARGE DE-ICE PUMP AND MANIFOLD TAG # H5-PSQ-015A SEE DRAWING 5065 FOR DETAILS

HAND WINCHES PROVIDED WITH CABLE ANCHORS AND BUOYS SUPPLIED BY CUSTOMER

250 MM ID X 4.6M NON-COLLAPBOTH ENDS OF PIPELINE.

10" SDR 11 HDPE PIPE WITH STEEL HEADER AT SHORE CONNECTION, SELF DRAINING, SEE NOTES

CABLE TRAYS 3048MM LONG X 152MM WIDE B-LINE #M14A06-06-120 ALUMINUM, MOUNTED TO PONTOON FRAMES

WALKWAY DE-ICE PUMP AND MANIFOLD TAG # H5-PSQ-015B SEE DRAWING 5066 FOR DETAILS

WALKWAY HINGES PROVIDED, PAD BY CUSTOMER SEE DWG 5064

SEE DRAWING 5068 & 5069 FOR DISCHARGE PIPING DETAILS AND TAG NUMBERS

SUGGEST CUSTOMER INSTALLATION OF 4 M WIDE CONVEYER BELTING UNDER PONTOONS TO PROTECT LINER

CERTIFIED FOR CONSTRUCTION BY:  
ROSS J. JAHN, 11 FEB. 2010  
CHIEF ENGINEER, HY-TRAN, INC.  
PROFESSIONAL ENGINEER  
REGISTRATION  
NO. 19981-006 STATE OF WI, USA

NOTES:  
- ALL DIMENSIONS IN METERS OR MM.  
- ALL SHORE CONNECTIONS ARE BY THE CUSTOMER, SEE 5064 FOR REQUIREMENTS.  
- CABLE TRAYS AND HOSE SUPPORT BETWEEN SHORE AND BARGE ARE PROVIDED.  
- PUMP DISCHARGE HOSE AT BARGE MUST BE DISCONNECTED BEFORE RAISING PUMPS FOR MAINTENANCE.  
- PIPE LINE WILL BE MADE IN 20 FT [6.1M] FLANGED SECTIONS. LAST SECTION CONNECTED TO HOSE AT SHORE MANIFOLD TO BE FIELD ASSEMBLED TO INSURE PROPER FIT.

RECLAIM WATER FLOAT SYSTEM  
WOLVERINE PROJECT  
PO # E100806

ITEM	DESCRIPTION	APPROX. WEIGHT	TAG #'S
①	PUMP BARGE ASSEMBLY	7200 KG	H5-BOA-014
②	TOYO POND RETURN PUMP - 2 SUPPLIED	2410 KG	H5-PSL-38 & 40
③	DISCHARGE PIPE [SELF DRAINING] . SEE NOTE ABOVE		
④	FLOATING WALKWAY SECTIONS 1M X 6.1M - 6 SUPPLIED	815 KG	
⑤	HAND WINCH WITH CABLE - 4 SUPPLIED		
⑥	DOUBLE PUMP CAN WITH REMOVABLE SCREENS		
⑦	WALKWAY RAMP - 1 SUPPLIED		
⑧	DISCHARGE MANIFOLD DRAWING 5064		
⑨	A-FRAME STRUCTURE		
⑩	CHAIN HOISTS FOR PUMP SUPPORT [2 INCLUDED]		
⑪	LITE POLES 1-1/4NPT THREADED END [8 SUPPLIED]		
⑫	TOYO PUMP MOTORS 100 HP		H5-M-038 /040
⑬	DE-ICING PUMPS AND MOTORS 10 HP	64 KG EACH	H5-PSQ-015A/B

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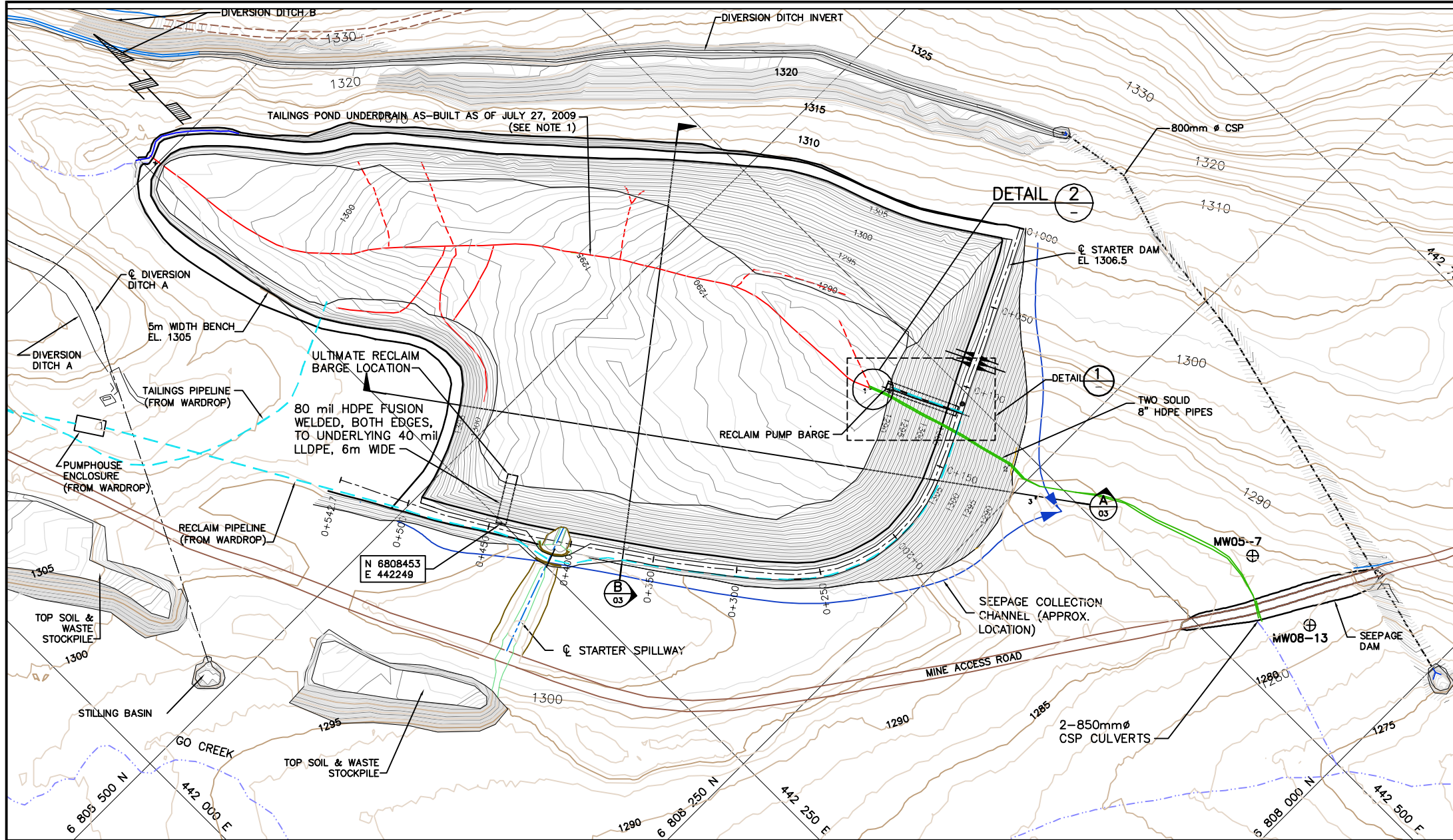
YUKON ZINC  
PUMP/BARGE SYSTEM

**HY-TRAN, INC.** 14 NOV. 2009  
DRAWN BY: **LFK** DRAWING # 5063B  
DUAL TOYO 10" SUBMERSIBLE PUMPS SCALE: N.T.S. REVISED: 25 JAN. 2010

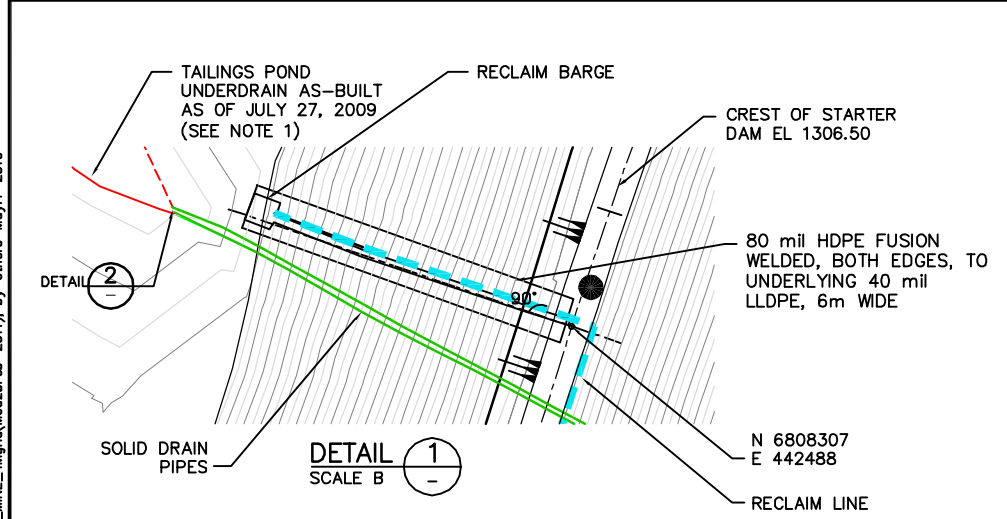
## **DRAWINGS**

- D-4001 Tailings Storage Facility General Site Arrangement**
- D-4002 Tailings Storage Facility Starter Impoundment**
- D-4004 Tailings Storage Facility Seepage Dam Plan and Section**
- D-4011 Tailings Storage Facility Starter Spillway Plan, Profile and Sections**
- D-4014 Instrumentation Plan**

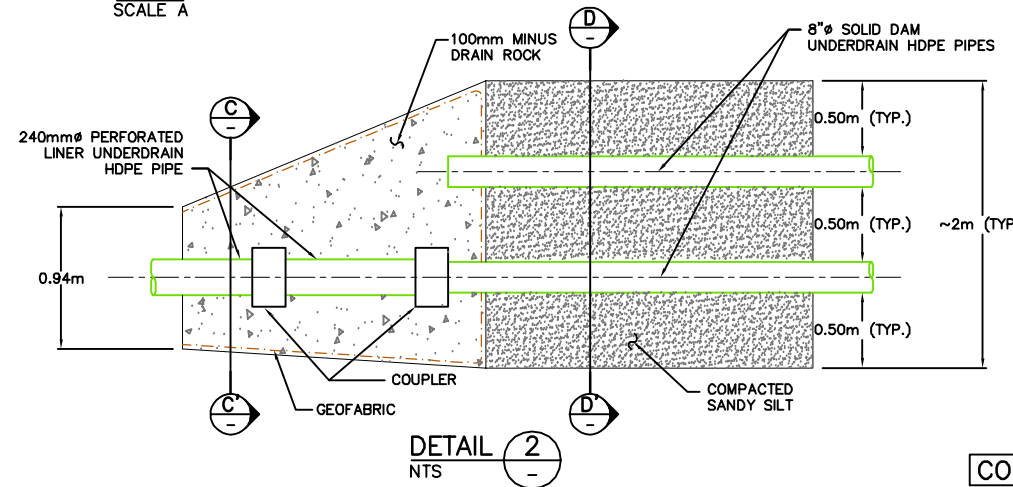




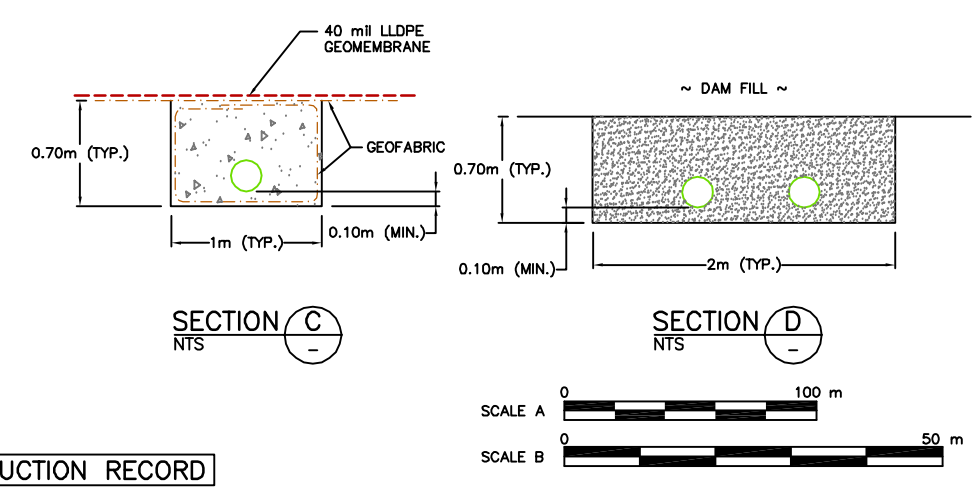
PLAN  
SCALE A



DETAIL 1  
SCALE B



DETAIL 2  
NTS



SECTION C  
NTS

SECTION D  
NTS



DAM - TWO SOLID UNDERDRAIN PIPES							
WEST PIPE				EAST PIPE			
SURVEY POINTS	NORTHING (m)	EASTING (m)	ELEVATION (m)	SURVEY POINTS	NORTHING (m)	EASTING (m)	ELEVATION (m)
1	6808355.00	442461.90	1286.82	1	6808356.00	442462.20	1286.84
2	6808264.06	442488.27	1284.45	2	6808263.98	442489.13	1284.44
3	6808238.83	442485.41	1284.02	3	6808239.14	442486.04	1284.08

LEGEND

- ROADS
- CREEK
- DIVERSION OR COLLECTION DITCH, SPILLWAY
- LINER UNDERDRAIN (240 mm Ø PERFORATED PIPE INSTALLED)
- LINER UNDERDRAIN (NO PIPE INSTALLED)
- MW05-7 GROUNDWATER MONITORING WELL
- SOLID PIPE FROM DAM UNDERDRAIN
- ANCHOR BLOCKS (FROM WARDROP)

NOTES

1. LINER FOUNDATION CONTOURS SURVEYED JULY 26, 2009. BY ACL
2. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC. THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.
3. BASIN VOLUME BELOW EL. 1304.5 = 665,127 m<sup>3</sup>
4. ELEVATIONS ARE GIVEN IN METRES UNLESS OTHERWISE STATED.

CONSTRUCTION RECORD

DWG. NO.	REFERENCE DRAWINGS	PROJECT	PROCESS	CIVIL	MECH.	STRUCT.	PIPING	SERVICES	ELECT.	INSTR.	NO	DESCRIPTION	BY	DATE	PROJECT	PROCESS	CIVIL	MECH.	STRUCT.	PIPING	SERVICES	ELECT.	INSTR.	NO	DESCRIPTION	BY	DATE
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											7	ADDENDUM TO CSR (DRAFT)	LC	MAR 03/11										3	MODIFY EXCAVATION PLAN, RECLAIM PAD	HM	JUL 17/09
											6	CONSTRUCTION RECORD	LC	MAY 12/10										2	ADDED CURVE TABLE	JL	MAY 26/09
											5	DRAFT CONSTRUCTION RECORD	JL	MAR 5/10										1	ISSUED FOR CONSTRUCTION	DK	MAR 13/09
											4	ISSUED FOR TENDER	DK	FEB 04/09										0	ISSUED FOR TENDER	DK	FEB 04/09

SECTION:	SCALE:	DATE
DESIGN. BY LC	SCALE: 1:100	MAY 12/10
DRAWN BY YKL	CHECK. BY HM	MAY 12/10
APP. BY: HM		

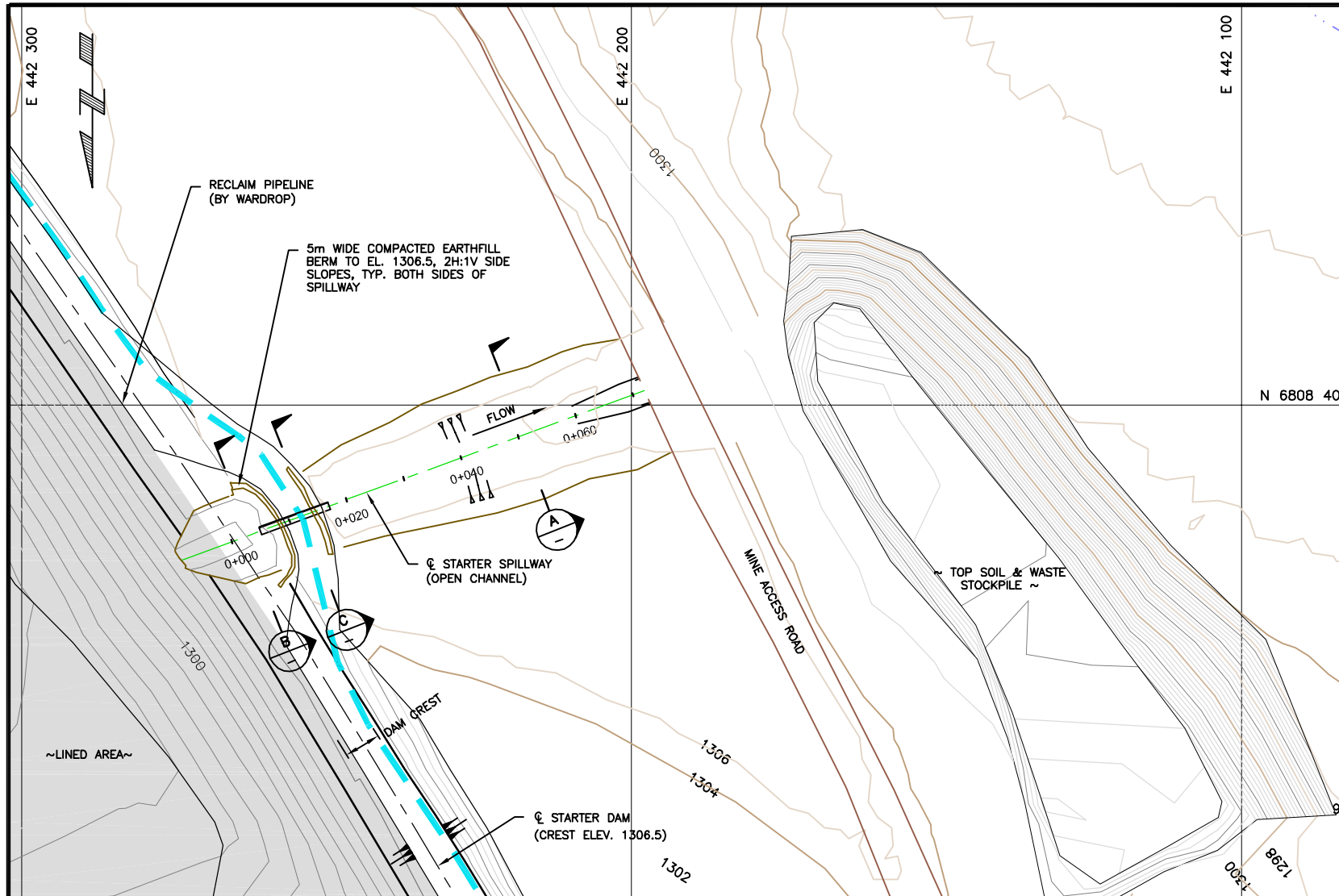
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PROJECT NUMBER: M09234A05  
DRAWING NUMBER: D-4002  
REV: 8

YukonZinc  
WOLVERINE PROJECT

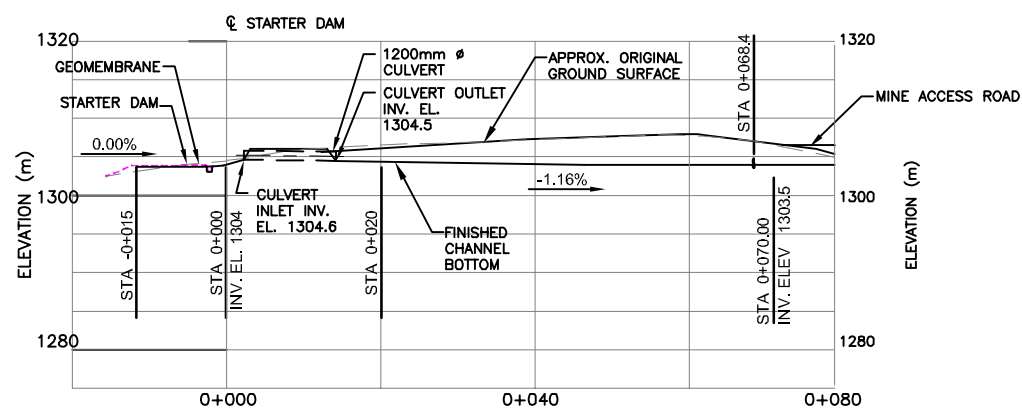
TAILINGS STORAGE FACILITY  
STARTER IMPOUNDMENT

Time: 13:12:51  
 Date: 4/20/2011  
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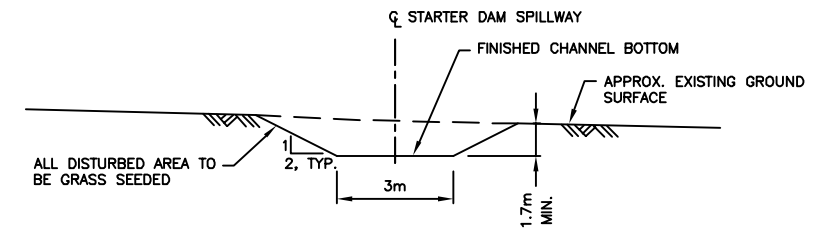




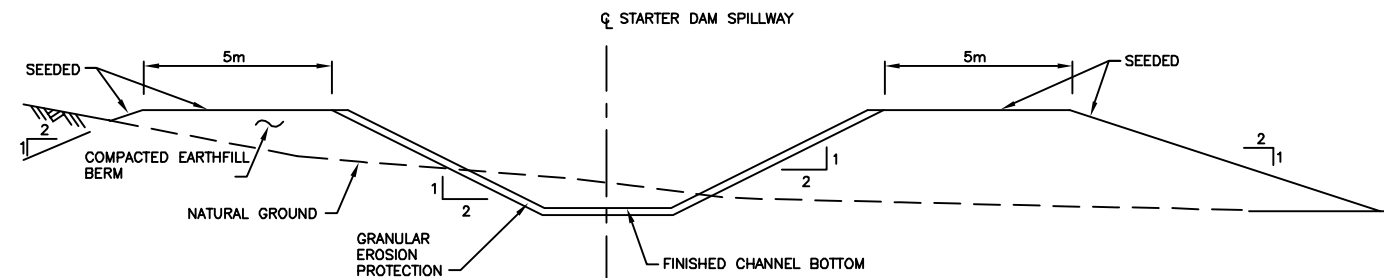
PLAN  
SCALE A



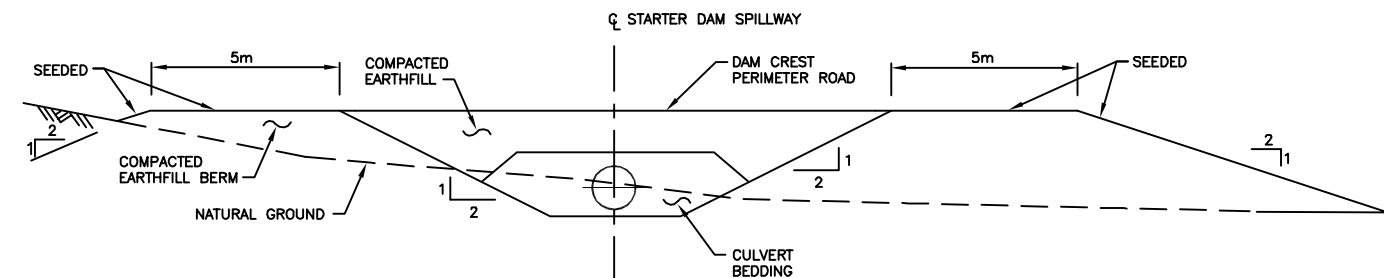
PROFILE - STARTER SPILLWAY  
SCALE A



TYPICAL GRASS LINED SECTION (A)  
NOT TO SCALE



TYPICAL RIPRAP LINED SECTION (B)  
NOT TO SCALE



TYPICAL CULVERT SECTION (C)  
NOT TO SCALE

NOTES

- FOR GENERAL SITE ARRANGEMENT, SEE DWG. D-4001.
- INVERT ELEVATIONS SHOWN ARE TO FINISHED CHANNEL BOTTOM.
- RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.

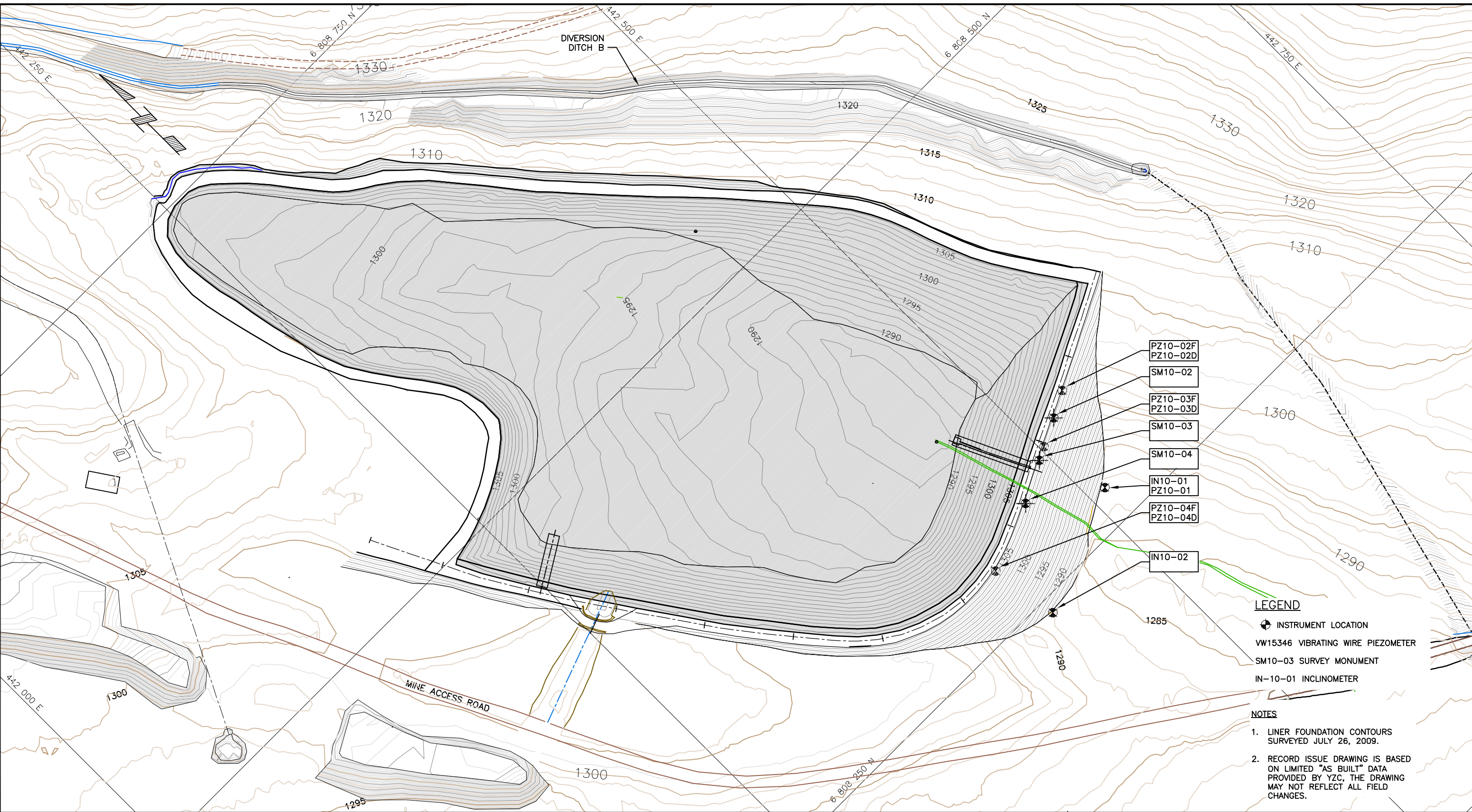
CONSTRUCTION RECORD



AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA STATEMENTS, CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.		PROJECT: PROCESS: CIVIL: MECH: SERVICE: PIPING: SERVICES: ELECT: INSTR:		5 ADDENDUM TO CSR (FINAL) NO DESCRIPTION ISSUE/REVISIONS		LC MAY 4/11 BY DATE		PROJECT: PROCESS: CIVIL: MECH: STRUCT: PIPING: SERVICES: ELECT: INSTR:		4 ADDENDUM TO CSR (DRAFT) 3 CONSTRUCTION RECORD 2 DRAFT CONSTRUCTION RECORD 1 ISSUED FOR CONSTRUCTION 0 ISSUED FOR TENDER		LC MAR 03/11 LC MAY 12/10 JL MAR 5/10 MD MAR 13/09 MD FEB 04/09		SECTION: SCALE: DATE: DESIGN. BY: LC DRAWN BY: KL CHECK. BY: HM APP. BY: HM		FILENAME: PROJECT NUMBER: M09234A05 DRAWING NUMBER: D-4011 REV: 5		 <b>WOLVERINE PROJECT</b> TAILINGS STORAGE FACILITY STARTER SPILLWAY PLAN, PROFILE AND SECTIONS	
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 Xrefs: CONT\_MINE\_Mgmt(Mar25-2010)



- LEGEND**
- INSTRUMENT LOCATION
  - VW15346 VIBRATING WIRE PIEZOMETER
  - SM10-03 SURVEY MONUMENT
  - IN-10-01 INCLINOMETER

- NOTES**
1. LINER FOUNDATION CONTOURS SURVEYED JULY 26, 2009.
  2. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.



**CONSTRUCTION RECORD**

DWG. NO.	REFERENCE DRAWINGS	PROJECT	PROCESS	CIVIL	MECH.	STRUCT.	PIPING	SERVICES	ELECT.	INSTR.	NO.	DESCRIPTION	BY	DATE	PROJECT	PROCESS	CIVIL	MECH.	STRUCT.	PIPING	SERVICES	ELECT.	INSTR.	NO.	DESCRIPTION	BY	DATE	SECTION:	FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.	
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																												DRAWN BY: KL	MAY 12/10				
																												CHECK BY: HM					
																												APP. BY: HM	MAY 12/10				



**YukonZinc**  
 WOLVERINE PROJECT  
 TAILINGS STORAGE FACILITY  
 INSTRUMENTATION