

**KLOHN CRIPPEN**

September 30, 2004

Deloitte & Touche Inc.
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Mr. Doug Sedgwick

Dear Mr. Sedgwick:

**Anvil Range – Rose Creek Liquefaction Evaluation
Site Investigation Summary****1. INTRODUCTION**

This purpose of this letter is to be a basis for our telephone discussion on October 4, 2004. This memo summarizes the site investigation conducted at the Anvil Range Mining Complex located in Faro, Yukon between August 16 and September 4, 2004 and the interpretation of Becker Penetration Test (BPT) data. Results are preliminary and will be superseded by our report.

2. SITE INVESTIGATION

The site investigation program consisted of primarily of open-end and closed-end Becker Penetration Test (BPT) holes. Two standpipe piezometers were also installed from the crest of the Intermediate Dam to the top of the drain. The closed-end BPTs were conducted to determine the penetration resistance or density of the soil and the open-end BPTs were conducted mainly to determine soil stratigraphy and to retrieve samples. Figure 1 shows the BPT test hole locations and Table 1 summarizes the details of the BPTs. A pair of open and closed-end BPTs (BPT04-14 and BKS04-14) was conducted at the Cross Valley Dam for calibration purposes. Three conventional standard penetration tests were also conducted at BKS04-14.

The methods proposed by Sy (1991) and Harder (1988) were used to interpret the BPT blow count data and to convert them to equivalent Standard Penetration Test (SPT) N_{60} values. Details of the Harder and Sy methods are given in Appendix I. The equivalent SPT (N_1)₆₀ are commonly used to assess the liquefaction resistance of sand and gravelly soils using the procedure proposed in Youd et al. (2001).

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Table 1 Details of Becker Penetration Tests

BPT Hole	Open/Closed-End Becker	Dam	Max. Test Depth (m)	Surface Elevation amsl (m)	Remarks
BPT04-01	Closed-end Becker	Intermediate	7.9	1031.1	Could not penetrate fill beyond 7.9 m
BKS04-01	Open-end Becker	Intermediate	36.9	1031.1	-
BPT04-02	Closed-end Becker	Secondary	24.2	1051.7	-
BKS04-02	Open-end Becker	Secondary	27.3	1051.5	-
BPT04-03	Closed-end Becker	Secondary	43.0	1049.9	-
BKS04-03	Open-end Becker	Secondary	43.3	1049.9	Piezometer installed
BPT04-04	Closed-end Becker	Secondary	37.6	1051.0	-
BKS04-04	Open-end Becker	Secondary	40.2	1050.9	-
BPT04-05	Closed-end Becker	Intermediate	24.0	1031.0	-
BKS04-06	Open-end Becker	Intermediate	13.1	1049.1	Piezometer installed
BKS04-07	Open-end Becker	Intermediate	11.9	1049.2	Piezometer installed
BPT04-08	Closed-end Becker	Intermediate	39.9	1031.0	Adjacent to BPT04-05
BPT04-08b	Closed-end Becker	Intermediate	8.8	1031.0	Adjacent to BPT04-08
BPT04-09	Closed-end Becker	Intermediate	33.1	1031.7	-
BPT04-09b	Closed-end Becker	Intermediate	5.8	1031.0	Adjacent to BPT04-09
BKS04-09	Open-end Becker	Intermediate	8.8	1031.7	-
BPT04-10	Closed-end Becker	Intermediate	39.1	1031.1	Adjacent to BPT04-01
BPT04-11	Closed-end Becker	Secondary	13.0	1050.2	-
BKS04-11	Open-end Becker	Secondary	12.8	1050.2	-
BPT04-12	Closed-end Becker	Secondary	14.6	1055.5	-
BKS04-12	Open-end Becker	Secondary	14.6	1055.5	-
BPT04-13	Closed-end Becker	Secondary	12.5	1057.5	-
BKS04-13	Open-end Becker	Secondary	15.7	1057.5	-
BPT04-14	Closed-end Becker	Cross Valley	27.7	1016.0	-
BKS04-14	Open-end Becker	Cross Valley	9.0	1016.0	-

2.1 Becker Penetration Tests (BPT)

The Becker Penetration Tests were conducted by Foundex Explorations Ltd. of Surrey, British Columbia using a truck-mounted model HAV180 Becker hammer drill rig. The closed-end BPT consisted of driving a closed-ended double-walled 170 mm diameter casing into the ground with an ICE 180 double-acting diesel pile hammer having a manufacturer's rated hammer energy of 11 kJ per blow. The following data were recorded during the BPT:

- The number of blows for every 0.3 m of casing penetration.
- Hammer bounce chamber pressures using a computerized data acquisition system. The bounce chamber pressure data are required in the procedure proposed by Harder (1988) to convert BPT blow counts to equivalent standard penetration test (SPT) N-values;

- Dynamic measurements using a pile driving analyzer (PDA) were performed by Robert Miner Dynamic Testing, Inc. of Manchester, Washington on the first two BPTs (BPT04-01 and BPT04-02). The dynamic monitoring data are required in the BPT-SPT N-values interpretation procedure proposed by Sy (1993); and
- Casing friction measurements from pull-up tests. During each casing add-on at 3.0 m intervals, the casing was pulled up and the pull-up tension force was measured with a load cell connected to the top of the casing. The pull-up force is a measure of the skin friction developed on the outside of the Becker casing during the penetration test. The casing friction data are required in the Sy (1993) method to estimate equivalent SPT N-values.

The open-end Becker sampling holes were carried out adjacent to the closed-end BPT holes. In these sampling holes, the casing was driven open-ended with compressed air forced down the annulus of the casing to flush the cuttings up the centre of the inner pipe to the ground surface. Continuous cuttings (soil particles) were collected at the ground surface via a cyclone. Disturbed soil samples were obtained and the subsoil stratigraphy was logged by a Klohn Crippen field engineer.

2.2 Standard Penetration Test (SPT)

Three conventional SPT tests were conducted at drillhole BKS04-14. The SPT consisted of driving a split spoon sampler (51 mm O.D. by 38 mm I.D.) 0.45 m into the subsoil using an automatic trip hammer. The weight of the hammer was 63.5 kg (140 lbs) and the drop height was 0.76 m (30 inches). The SPT was carried out in accordance with ASTM D1586-99 test method. The field blow counts for the sampler penetration of 0.30 m, after an initial seating penetration of 0.15 m, were recorded as the measured N-value.

3. BPT-SPT INTERPRETATION

The Harder and Sy methods were applied to all BPTs. For the Harder method, the measured peak bounce chamber pressures (BCP) were used in the BPT data interpretation. For the Sy method, the measured transferred energies from the PDA, together with the load cell measured casing friction from pull-up tests, were used in the BPT data interpretation. Since PDA measurements were performed only in BPT04-01 and BPT04-02, the transferred energy required to interpret the other BPTs following the Sy procedure was estimated based on the measured energy data at BPT04-01 and BPT04-02 and the measured peak bounce chamber pressure.

Figure 2 shows the variation of BPT blow counts with the bounce chamber pressure and the transferred energy for BPT04-01 and BPT04-02. At these two BPT holes, the

measured transferred energies varied between about 28% and 41%. Based on the energy measurements, constant transferred energy contour lines for 30%, 35% and 40% were drawn on the plot of BPT blow counts versus bounce chamber pressure as shown in Figure 2. These site-specific transferred energy-bounce chamber pressure correlations were subsequently used to estimate the transferred energy of the other BPTs. The estimated transferred energy values between were 20% and 30%.

Figure 3 shows the measured casing friction profiles at all BPT holes. These measured profiles were used in the Sy method.

4. PENETRATION RESULTS

- Figure 4 shows the summary of equivalent $(N_1)_{60}$ profiles obtained from the measured BPT blow counts using the Sy and Harder methods for BPT holes at the Intermediate Dam. Figure 5 shows the same plots for the BPT holes at the Secondary Dam.
- Figure 6 shows the equivalent $(N_1)_{60}$ profiles by Sy and Harder methods at BPT04-10 located in the Intermediate Dam. Previous "SPTs" were conducted at a location BH80-46 (See Figure 7 for the location) close to BPT04-10 by Golder Associates in a mud rotary drill hole using a 76 mm OD sampler. A 63.5 kg hammer and a nominal drop height of 0.76 m (Golder Associates, 1980) were apparently used during testing. The 76 mm OD sampler N-values were converted by Klohn Crippen to the standard SPT N-values (SPTs are normally conducted using 51 mm sampler) using the procedure proposed by Daniel et al. (2004) assuming an energy ratio of 60%. These values are shown in Figure 6 together with the values reported by SRK (2004) that were not corrected for the size of the sampler.
- Figure 8 shows the equivalent $(N_1)_{60}$ profiles by Sy and Harder methods at BPT04-14 located in the Cross Valley Dam. It also shows the three SPTs conducted in the adjacent open Becker hole BKS04-14. An energy ratio of 80% was assumed by Klohn Crippen for the automatic trip hammer used to conduct the SPTs.
- Figure 9 shows the comparison of equivalent $(N_1)_{60}$ by Sy and Harder methods and the SPTs by Golder Associates (1980). The locations of the boreholes conducted by Golder Associates are shown in Figure 7. The $(N_1)_{60}$ values as reported by SRK (2004) are shown on Figure 9a. Some of the SPTs were reportedly conducted using a 76 mm OD sampler by Golder Associates. These values were converted to equivalent SPT values following the procedure proposed by Daniel et al. (2003). The converted SPT $(N_1)_{60}$ values are shown in Figure 9b.

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5. PRELIMINARY LIQUEFACTION EVALUATION

Comparison of the equivalent SPT N_{60} values from the two approaches indicates that the Sy approach generally gives higher values than those from Harder's method. The difference, as much as 2 to 3 times at certain depths, is mainly attributed to the effects of casing friction that are not explicitly accounted for in the Harder method. As illustrated in Sy (1997), the Harder method has significant casing friction embedded in their empirical BPT-SPT correlation which was developed from sand sites; the magnitude of the casing friction increases with increasing blow counts. Sy (1997) compiled measured casing friction values from various sites, and showed that average casing friction in gravelly sites is generally less than that at sand sites. As shown in Figure 3, the casing friction measured at Rose Creek is relatively low, even lower than the average "gravel" trend line compiled by Sy (1997). Using the Harder approach in gravelly soils with such low casing friction will result in unreasonably low equivalent SPT N_{60} values.

This same issue was noted in several case histories documented in Sy et al (1995) and Yan and Sy (2002). We consider that the equivalent SPT N_{60} values estimated by the Sy procedure are more reasonable than the Harder's values.

Yours truly,

KLOHN CRIPPEN CONSULTANTS LTD.



Bryan D. Watts, P.Eng.
Vice President, Mining Environmental Group

TT/AS/BDW:sh

c.c. Cam Scott, SRK

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APPENDIX I: BECKER PENETRATION TEST DATA INTERPRETATION BY SY AND HARDER METHODS

Harder Method

Harder (1988) proposed an empirical BPT-SPT correlation procedure based on standardizing the BPT blowcounts to a constant combustion condition by measuring peak pressures in the bounce chamber of the double-acting diesel hammer used in the BPT. The Harder procedure involves two basic steps. First, the field measured BPT blowcount (N_b) is corrected to a reference full combustion condition using the correction chart as shown on Figure 1a, and secondly, the bounce chamber corrected BPT blowcount (N_{bc}) is used to estimate equivalent SPT N_{60} -value using the correlation curve shown on Figure A.1a. In practice, the Harder procedure has several limitations:

- The Harder reference combustion line A-A, although developed for a turbo-charged AP-1000 drill rig, is specific for the particular drill rig-hammer system used and for the ground conditions encountered in the Harder (1988) correlation study, and is, therefore, not unique. Sy and Campanella (1993) and Sy (1997) illustrated that different reference combustion lines could be derived from the same drill rig at different sites or using different casing sizes at the same site, or from using different drilling rigs.
- The BPT-SPT correlation shown on Figure V-1b was based on test data from three sand and silty sand sites to 15 m depth. Since the Harder approach does not explicitly consider casing friction, it may not be applicable directly to depths greater than 15 m or to gravelly soil sites.

Despite the above limitations, the Harder procedure has been used, mainly in the United States, for the liquefaction assessment of gravelly soils.

Sy Method

An alternative and more fundamental approach to BPT-SPT correlation, based on experimental and numerical studies of the SPT and BPT, was proposed by Sy (1993). In this approach, a Pile Driving Analyzer (PDA) is used during the BPT to determine the energy transferred into the top of the casing, similar to dynamic monitoring of pile driving (ASTM D4945-89). The PDA records force and velocity time histories for each hammer blow and calculates the transferred energy for each blow in real time. The transferred energy is then used to correct the measured field blowcount to a reference

energy of 30% of the manufacturer's rated energy for the ICE 180 hammer used in the Becker system:

$$N_{b30} = N_b \frac{ENTHRU}{30}$$

where N_{b30} is the BPT blowcount normalized to the 30% reference energy level, N_b is the measured Becker blowcount, and ENTHRU is the measured transferred energy expressed as percent of the rated hammer energy of 11.0 kJ for the ICE 180 hammer.

The Sy approach further considers soil friction acting on the Becker casing during driving. The soil friction and its distribution along the casing can be measured during the BPT by casing pull-up tests, or estimated from the PDA stress wave measurement using a signal-matching wave equation analysis program, CAPWAP. The energy-corrected N_{b30} , together with the measured casing friction or shaft resistance value, R_s , is then used to estimate the equivalent SPT N_{60} value from the theoretical BPT-SPT correlation shown on Figure A1.2

The pull-up test consists of pulling the top of the Becker casing during each rod change or casing add-on, and measuring the pull-up force with a tension load cell connected to the top of the casing. Sy (1997) found that this pull-up tension force, although fundamentally different from the compressive soil friction acting on the casing during driving, is comparable to the CAPWAP-estimated casing friction.

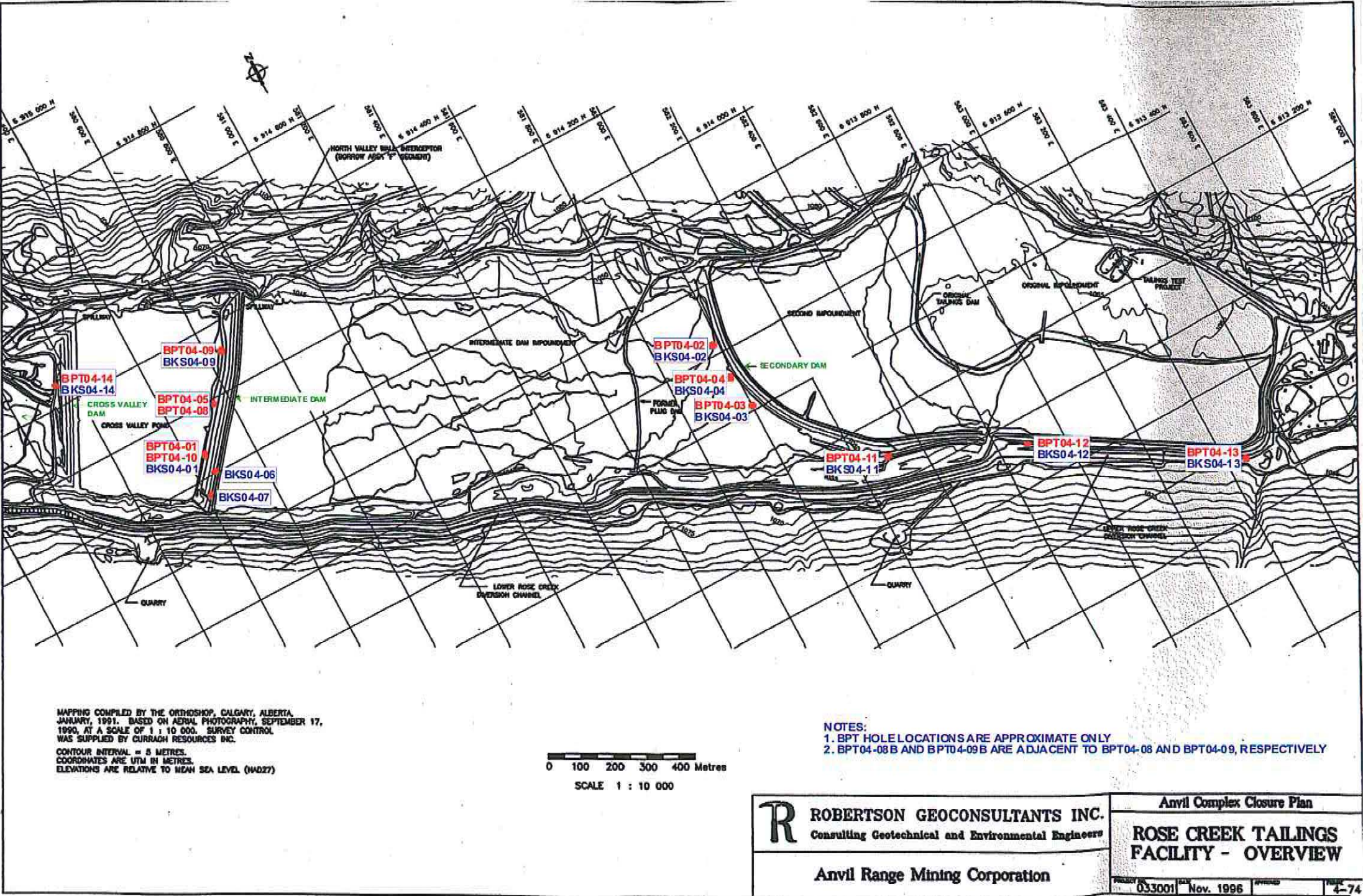


Figure 1 Becker Penetration Test (BPT) Hole Location Plan

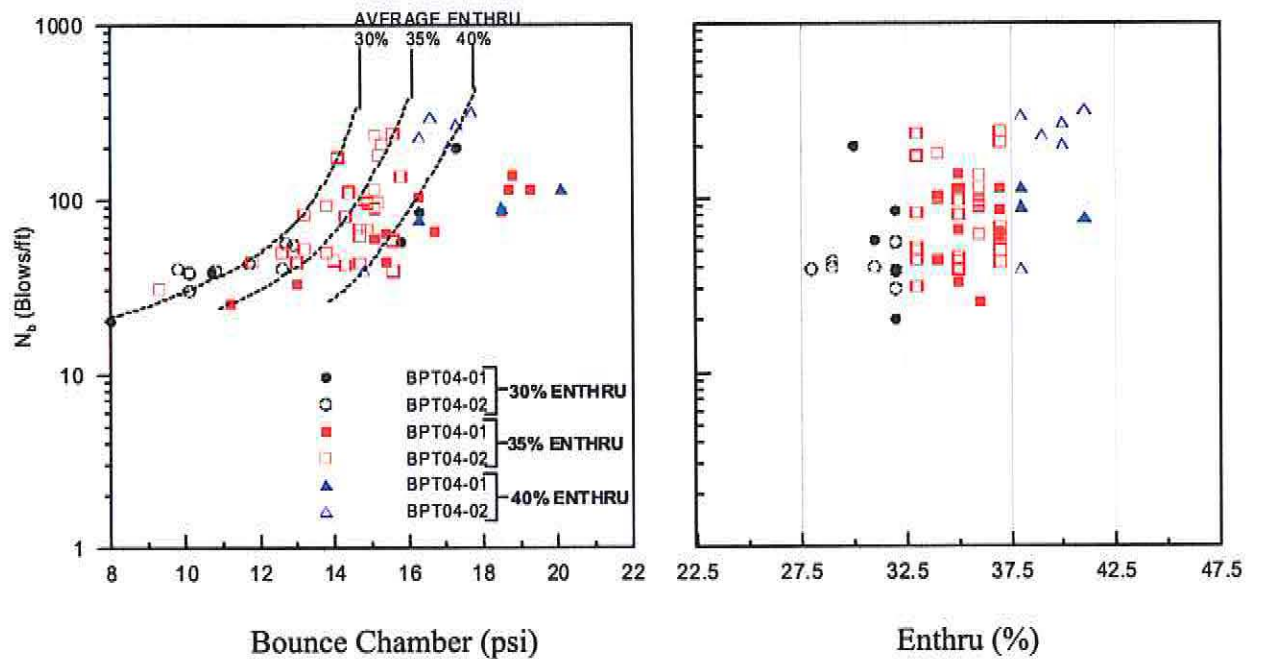


Figure 2 Estimation of ENTHRU based on PDA data from BPT04-01 and BPT04-02

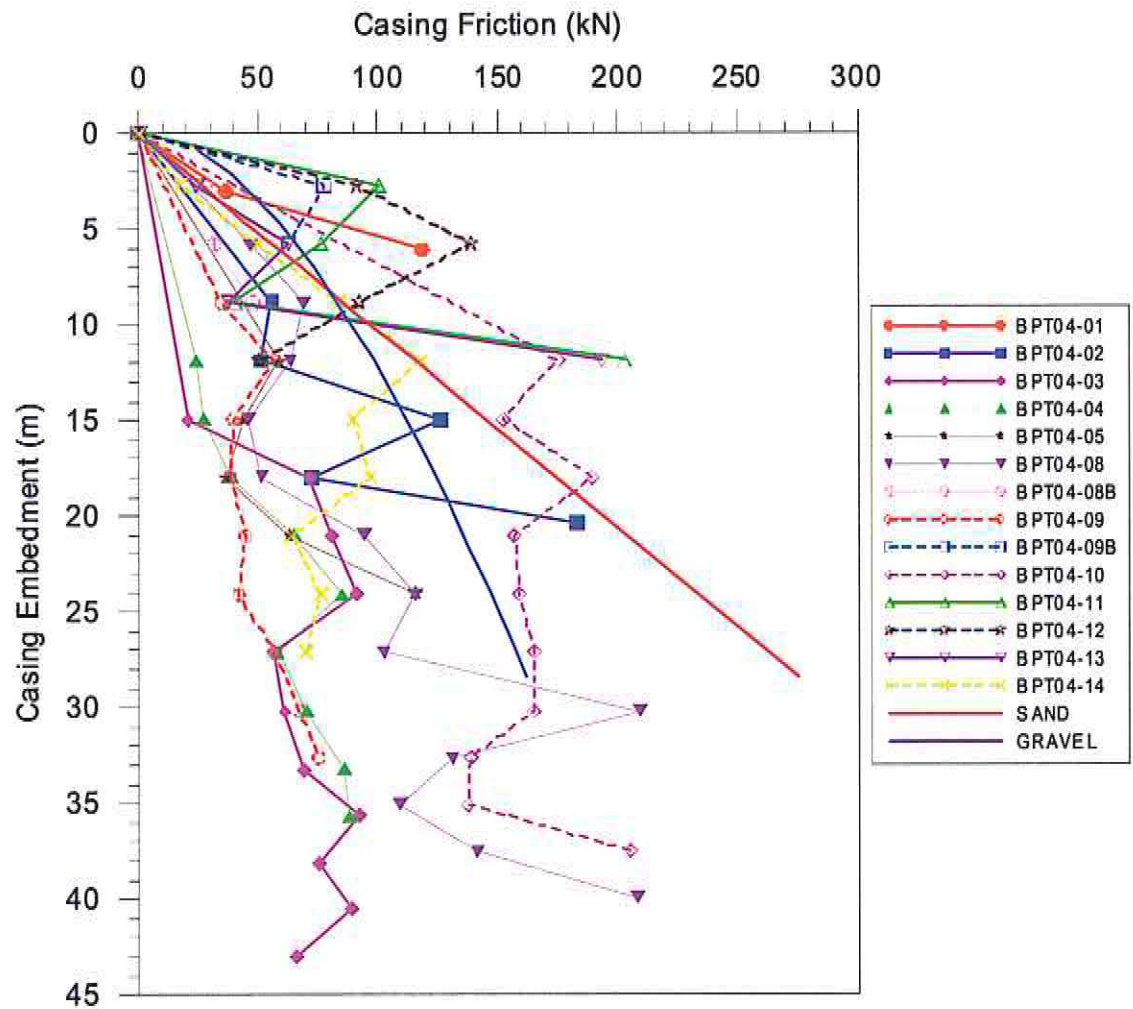


Figure 3 Summary of Measured Casing Friction

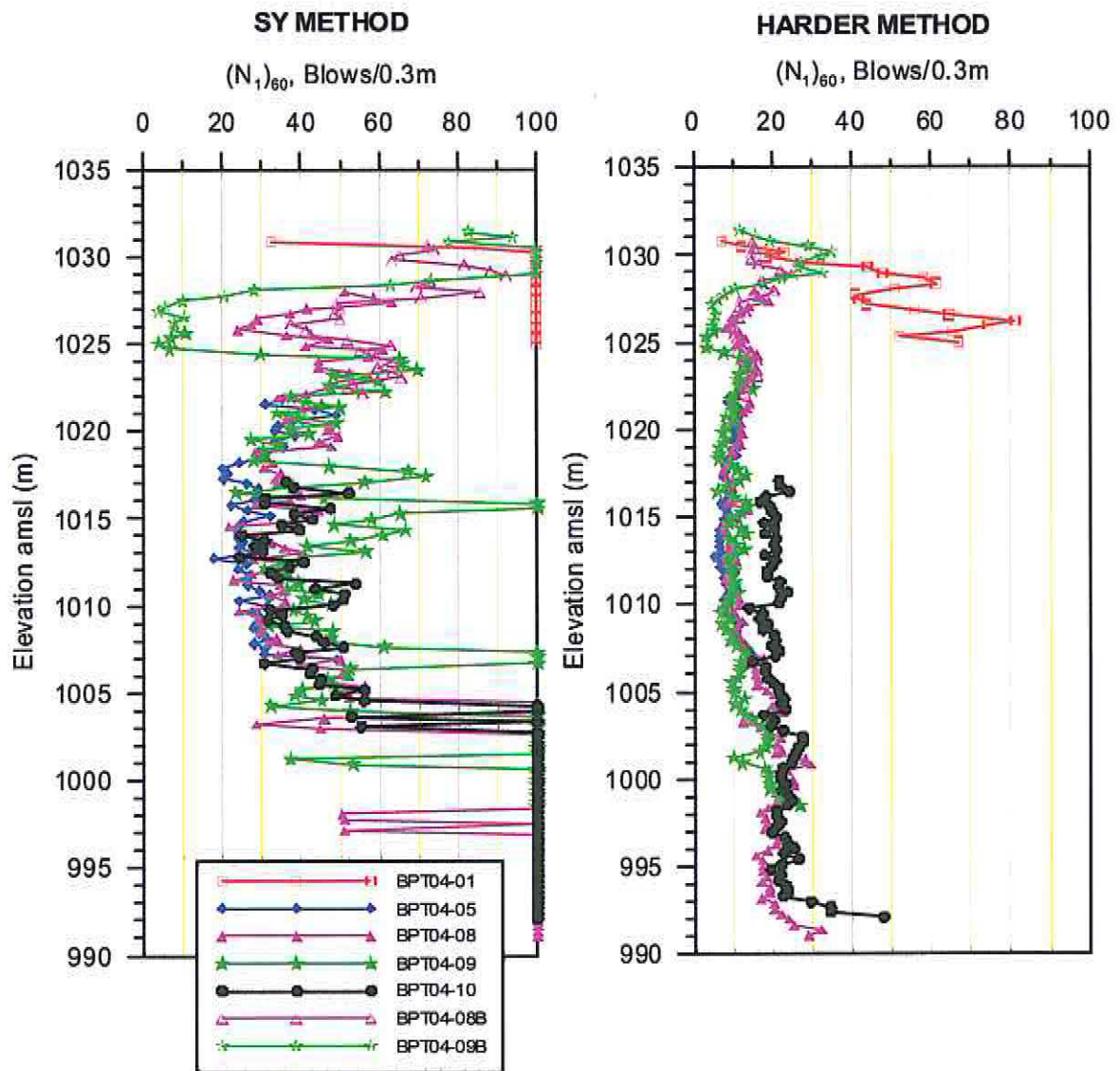


Figure 4 Summary of Equivalent SPT (N_1)₆₀ at the Intermediate Dam by SY and HARDER Methods

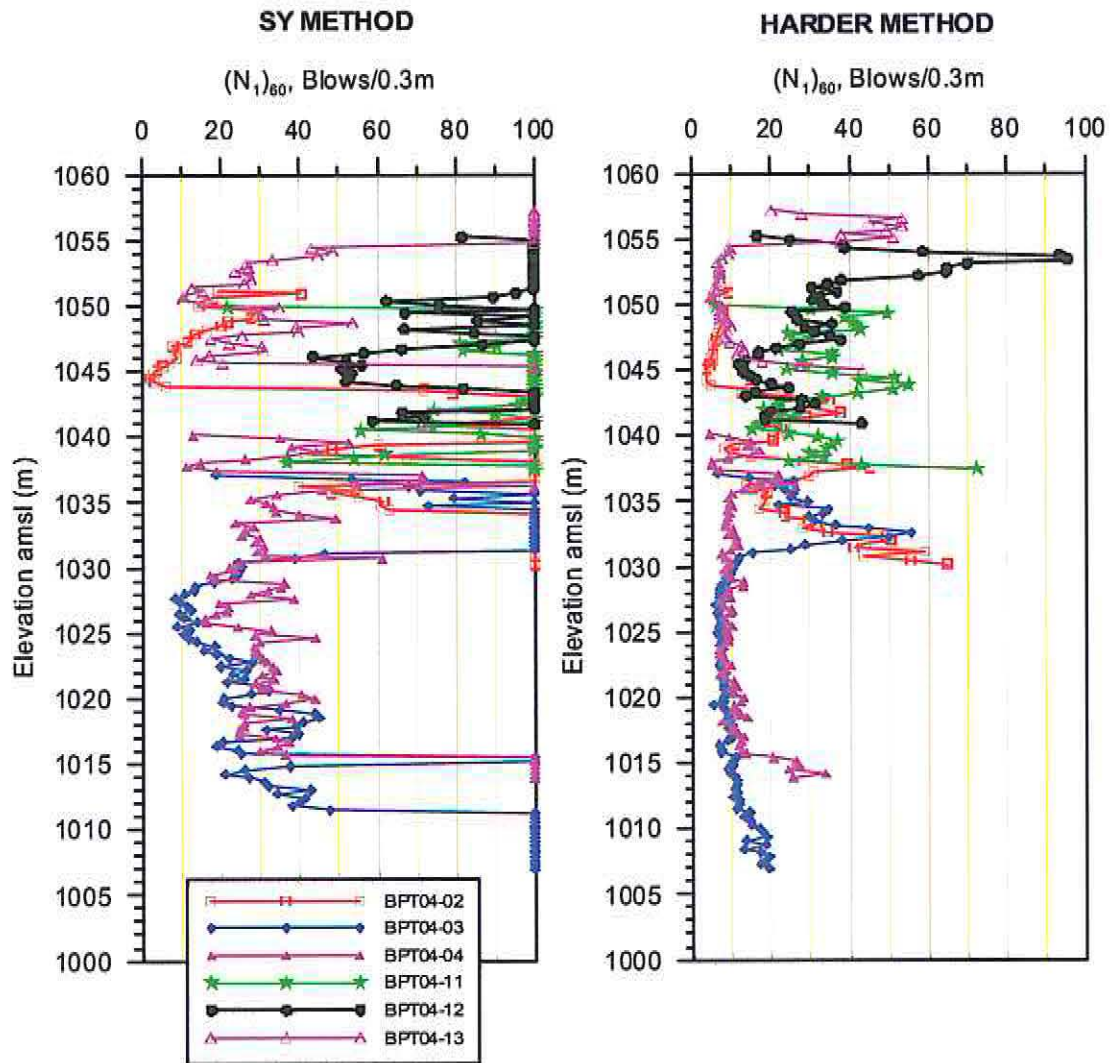


Figure 5 Summary of Equivalent SPT $(N_1)_{60}$ at the Secondary Dam by SY and HARDER Methods

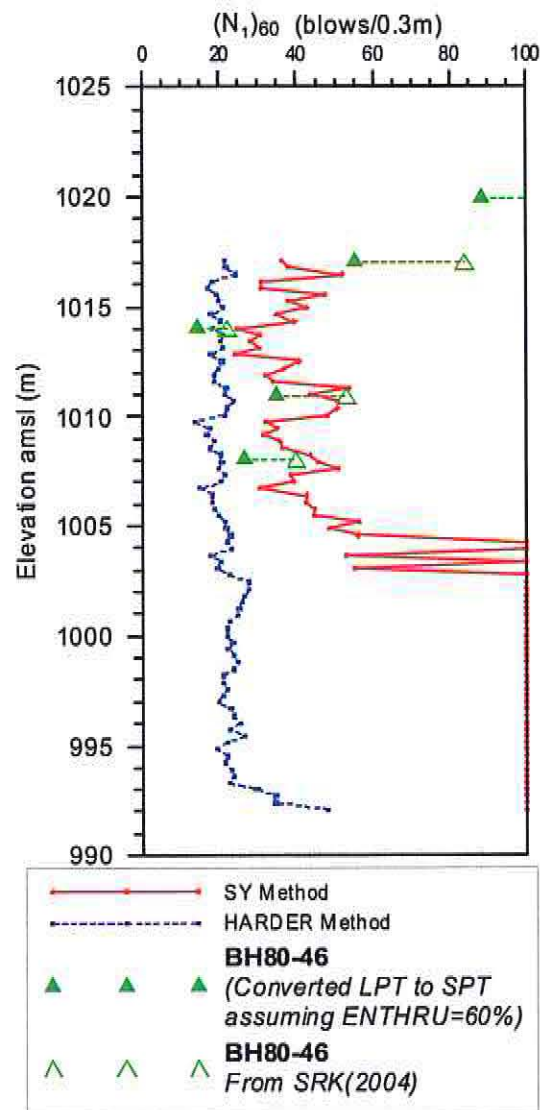


Figure 6 Comparison of Equivalent SPT $(N_1)_{60}$ at BPT04-10 and BH80-46-Intermediate Dam

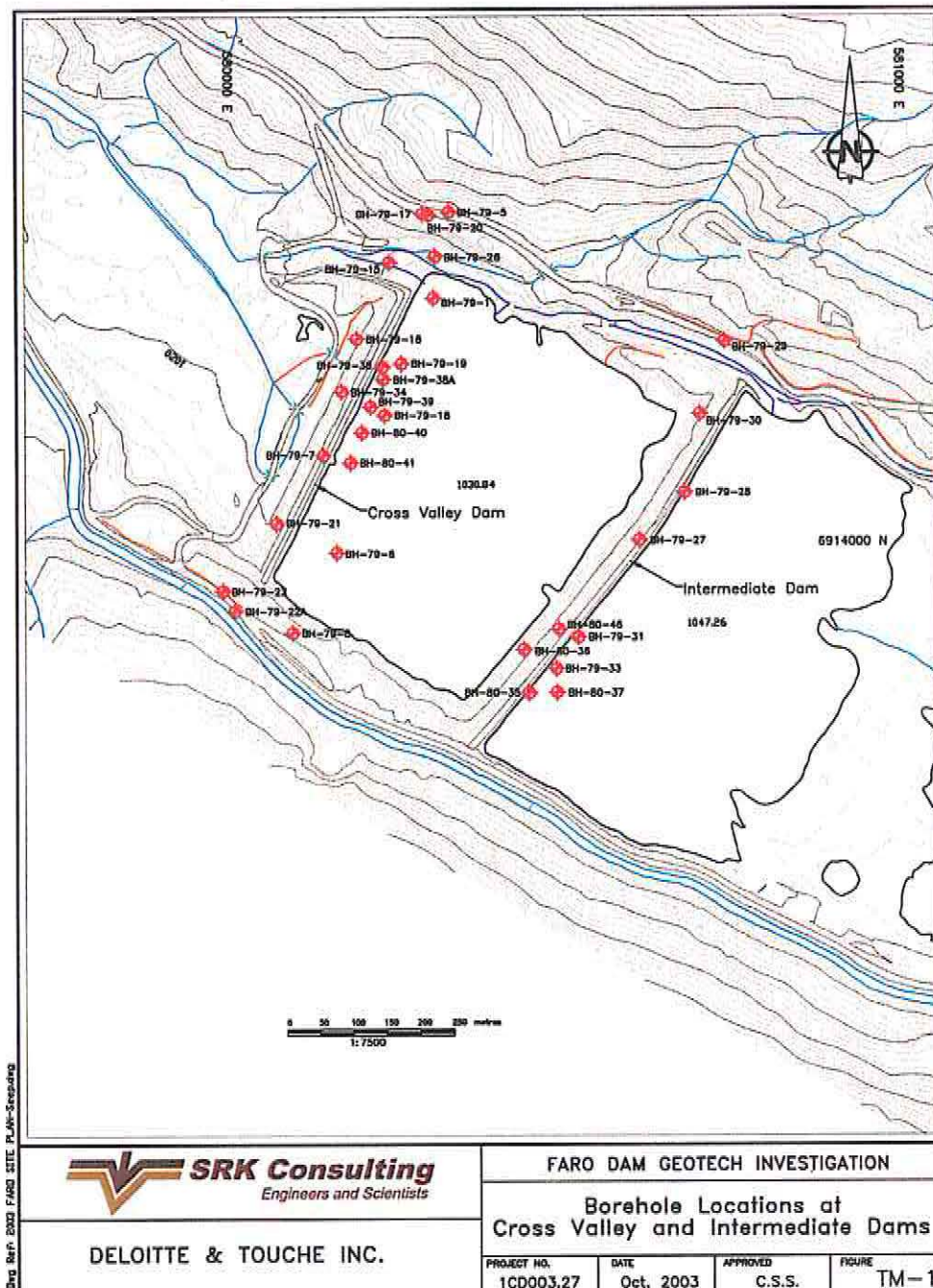


Figure 7 Golder Associates (1980) Borehole Locations at Cross Valley and Intermediate Dam

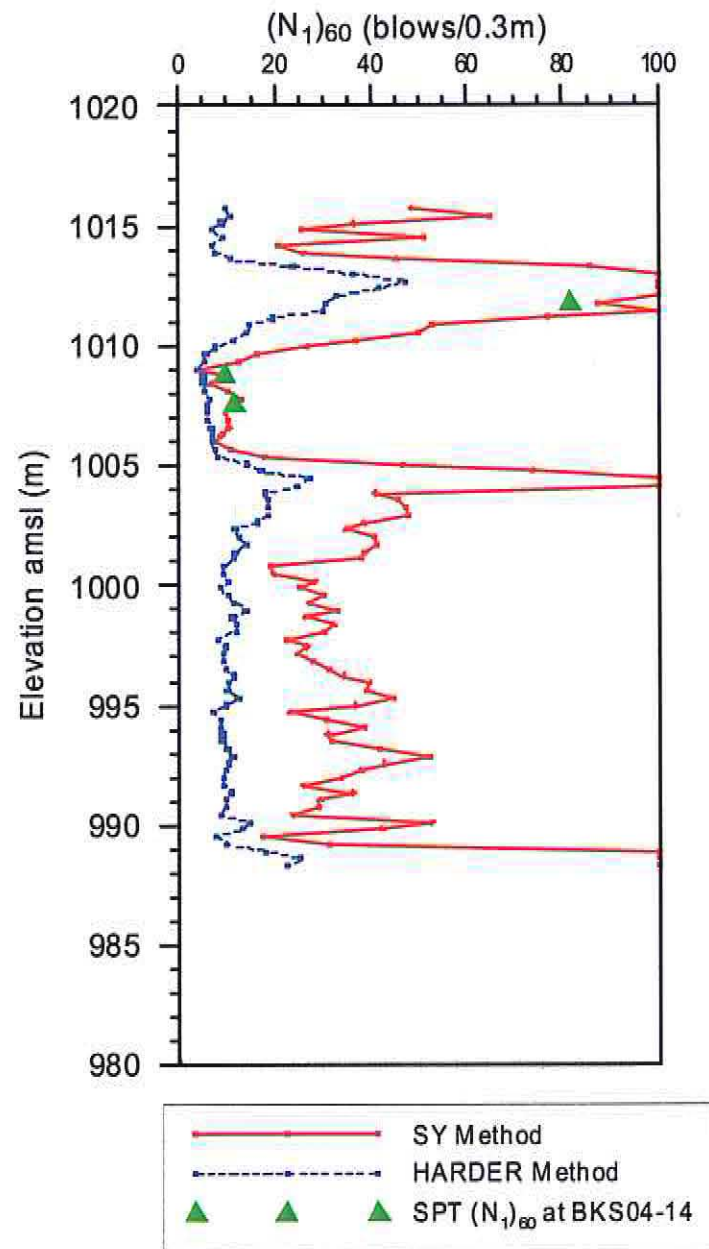


Figure 8 Comparison of Equivalent SPT $(N_1)_{60}$ at BPT04-14 (Close-end Becker) and BKS04-14 (Open-end Becker) – Cross Valley Dam

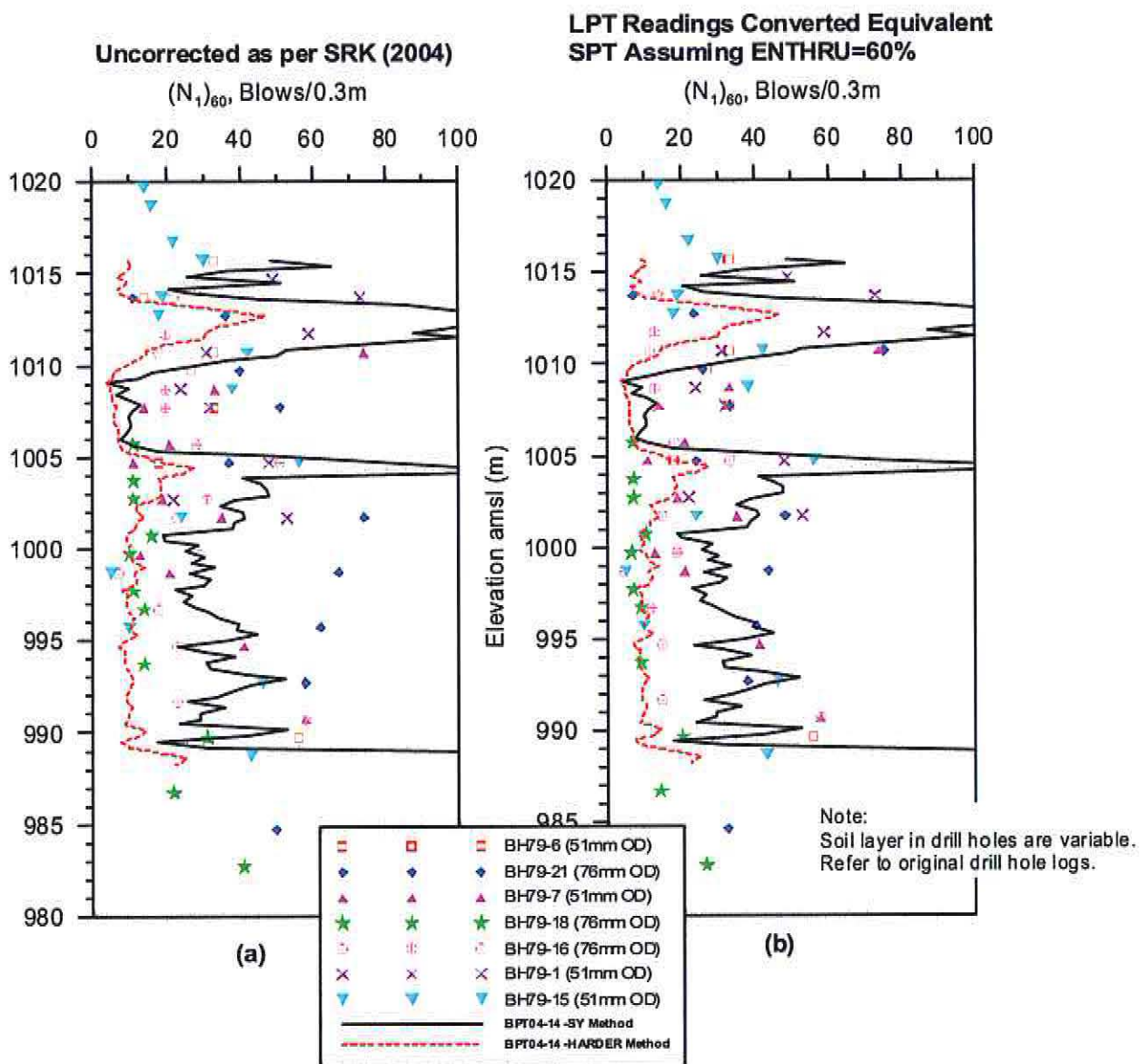


Figure 9 Summary of SPT (N_1)₆₀ at the Cross Valley Dam

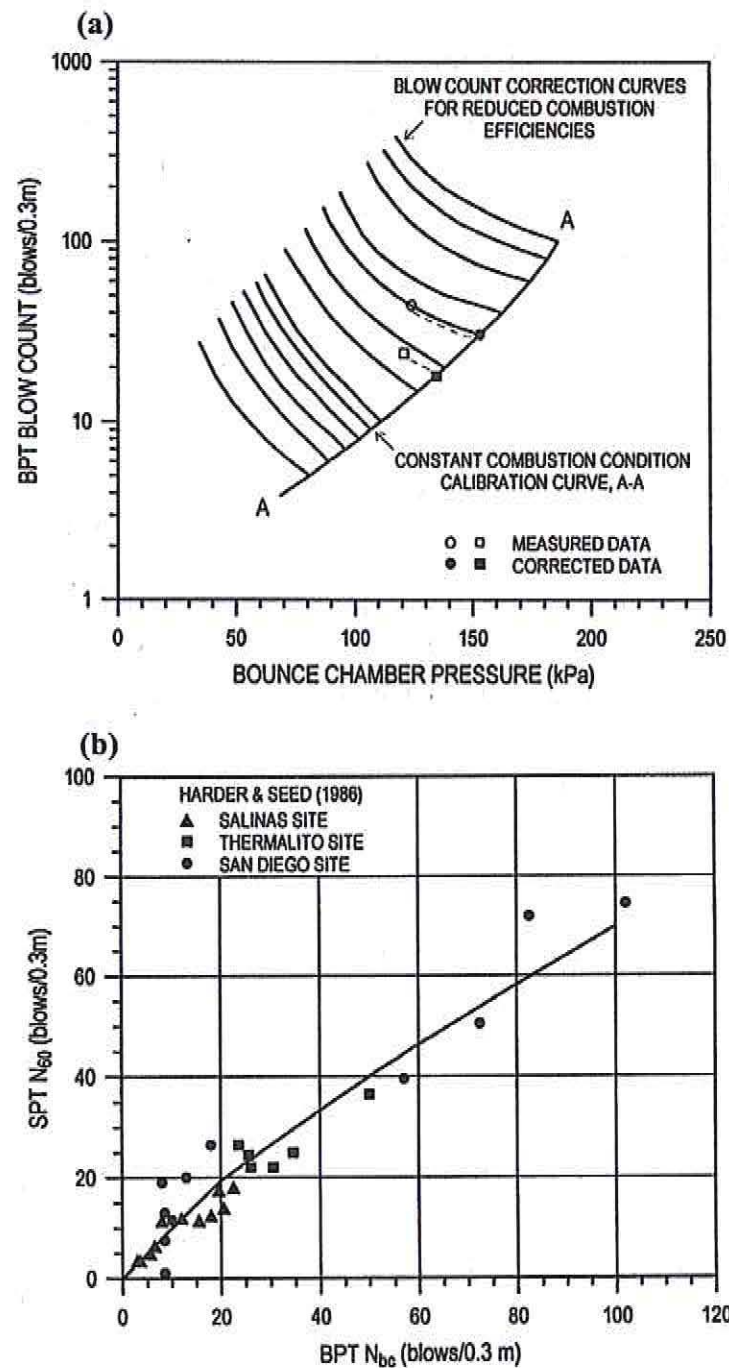


Figure A1.1 Harder's BPT Interpretation Procedure

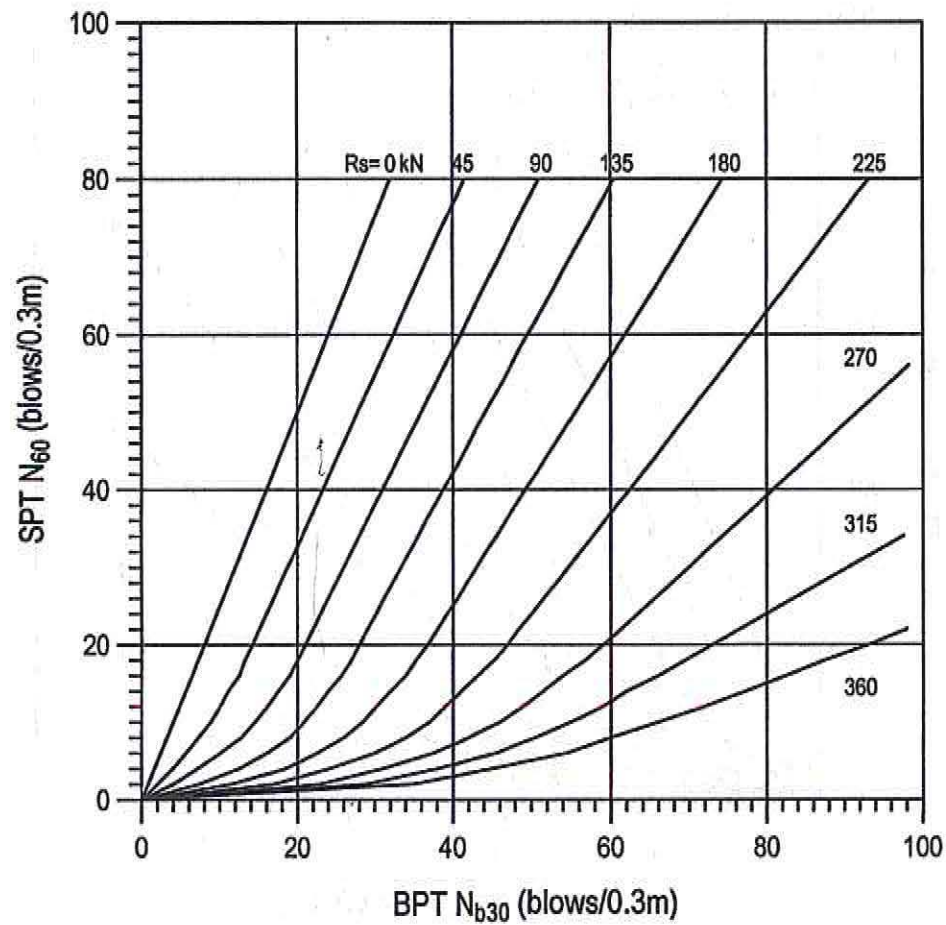





Figure A1.2 Sy's BPT-SPT Correlation

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:  CLOSE ENDED (blows/0.3m)

Hammer Energy: 11 kJ max. rated  OPEN ENDED (blows/0.3m)

● SPT N  BOUNCE PRESS (kPa)

W_p% 20 40 60 80
X L X

STARTED: Aug. 16, 2004 FINISHED: Aug. 17, 2004

DRILL RIG MODEL: Becker HAV-180

GROUND ELEV. (m): 1031.1

COORDINATES (m): N 6913865 E 580451.4

DESCRIPTION OF MATERIALS

SAND AND GRAVEL (SW-GW), fine to coarse, some cobbles, well graded, sub-rounded to sub-angular, brown, moist. [FILL]
- rock in bit from 0.914m to 2.13m.

- water recovery at 2.74m.

- trace silt at 6.10m.

7.6
1023.4 SAND, fine to coarse, silty, some gravel, very wet. [FILL]

8.5
1022.5 SAND AND GRAVEL, fine to coarse, some cobbles, trace silt, sub-rounded, brown, wet. [FILL]

9.1
1021.9 SAND, fine to coarse, silty, some gravel, brown, very wet. [FILL]

10.7
1020.4 SAND AND GRAVEL, fine to coarse, some cobbles, trace silt, sub-rounded to sub-angular, brown, wet. [FILL]

13.7
1017.3 - high water yield at 13.72m.
SAND AND GRAVEL, medium to coarse, trace cobbles, brown, wet.

- rust coloured water at 18.90m.

Continued Next Page

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF

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SHEET 1 OF 2

HOLE NO.: BK04-01












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BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:		CLOSE ENDED (blows/0.3m)
Hammer Energy: 11 kJ max. rated		OPEN ENDED (blows/0.3m)
● SPT N		BOUNCE PRESS (kPa)
W _p %	W _o %	W _L %
20	40	60
20	40	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 16, 2004 FINISHED: Aug. 17, 2004	INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180	
					GROUND ELEV. (m): 1031.1	
					COORDINATES (m): N 6913865 E 580451.4	
					DESCRIPTION OF MATERIALS	
21		Grab	12		21.6 1009.4	
22		Grab	13			
23		Grab	14			
24						
25						
26					26.2 1004.9	
27		Grab	15			
28						
29						
30		Grab	16			
31						
32						
33		Grab	17			
34		Grab	18			
35						
36		Grab	19		36.3 994.8	
37					36.9 994.2	
38					End of Becker Drill Hole at 36.9 m	
39					NOTES:	
40					1. Original ground at 13.7m.	
					2. Too dense below 6.1m for closed-Becker to penetrate.	
					3. Closed-Becker located 1.5m away from open-Becker.	
					4. See BPT04-10 for closed-Becker data for 13.7 to 39.0m depth.	



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PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF


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SHEET 2 OF 2


HOLE NO.: BK04-01

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:  CLOSE ENDED (blows/0.3m)

Hammer Energy: 11 kJ max. rated  OPEN ENDED (blows/0.3m)

● SPT N  BOUNCE PRESS (kPa)

W_p% 20 40 60 80
 W%
 W_L%

STARTED: Aug. 31, 2004 FINISHED: Aug. 31, 2004

DRILL RIG MODEL: Becker HAV-180

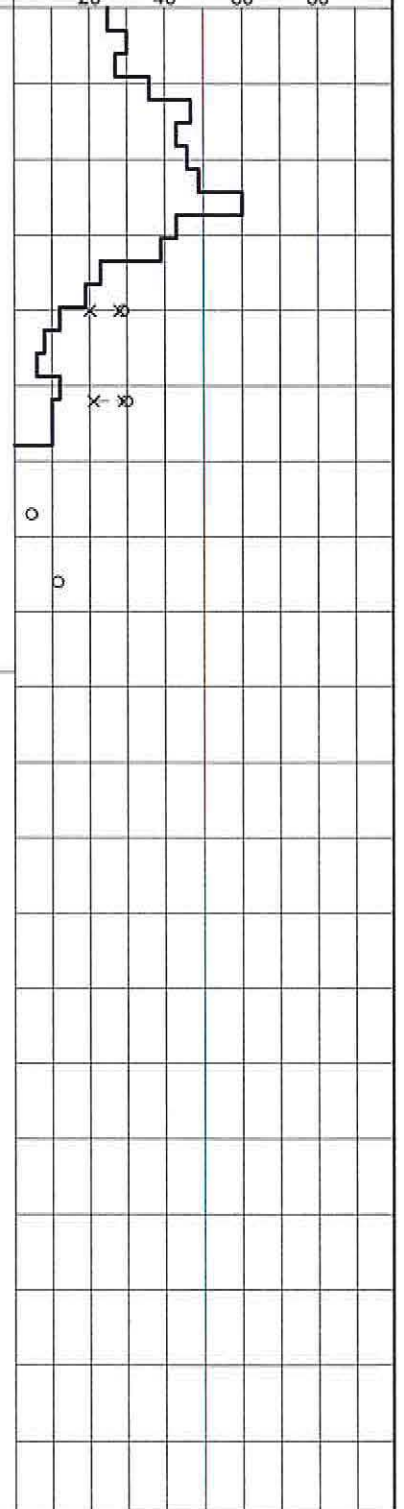
GROUND ELEV. (m): 1031.7

COORDINATES (m): N 6914117 E 580643.3

DESCRIPTION OF MATERIALS

INSTRUMENT
DETAILS

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS
1					SAND AND GRAVEL, some cobbles, trace silt, brown, damp.
2					
3					
4		Grab	1		3.4 - moist at 3.05 1028.3 - water yield. SILT, trace to some sand (fine to medium, angular), brown, moist to wet.
5		Grab	2		
6					5.8 1025.9 SAND AND GRAVEL, sand (fine to coarse, sub-angular), gravel (fine to coarse, sub-angular), some cobbles (fine, sub-angular to sub-rounded).
7		Grab	3		7.3 1024.4 SAND, medium to coarse, sub-angular to rounded, gravelly (fine, sub-rounded), highly permeable.
8		Grab	4		8.8 1022.9
9					End of Becker Drill Hole at 8.8 m
10					NOTES:
11					1. Original ground at 3.4m.
12					2. No BPT data from 5.8 to 8.8m.
13					3. See BPT04-09 for BPT from 5.8 to 33.2m depth.
14					
15					
16					
17					
18					
19					
20					



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PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: FL




CHECKED BY:

SHEET 1 OF 1

HOLE NO.: BK04-09B

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:		CLOSE ENDED (blows/0.3m)
Hammer Energy: 11 kJ max., rated		OPEN ENDED (blows/0.3m)
● SPT N		BOUNCE PRESS (kPa)
W _p % X	W% O	W _L % X
20	40	60
		80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 26, 2004 FINISHED: Aug. 26, 2004	INSTRUMENT	DETAILS
					DRILL RIG MODEL: Becker HAV-180		
					GROUND ELEV. (m): 1049.1		
					COORDINATES (m): N 6913803 E 580454.9		
					DESCRIPTION OF MATERIALS		
1					SAND AND GRAVEL, sand (fine to coarse), gravel (fine to coarse, sub-angular), some cobbles, trace silt, brown, dry. [FILL]		
2							
3							
4							
5							
6					- moist at 5.18m.		
7							
8							
9							
10							
11							
12							
13					13.1 1036.0		
14					End of Becker Drill Hole at 13.1 m		
15					NOTES:		
16					Piezometer Details for BKS04-06(PZ)		
17					Concrete 0 - 0.61m		
18					Cuttings 0.61 - 0.91m		
19					Bentonite Chips 0.91 - 2.4m		
20					Cuttings 2.4 - 10.2m		
					Bentonite Chips 10.2 - 11.8m		
					Sand 11.8 - 13.1m		
					Screen 12.8 - 13.1m		
					- Casagrande Tip Standpipe		
					Water Level Depth Below Ground Surface		
					BK04-06(PZ) Dry		



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




CHECKED BY:

SHEET 1 OF 1

HOLE NO.: BKS04-06(PZ)

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)
● SPT N	 BOUNCE PRESS (kPa)
W _p %	W% W _L %
20	40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

STARTED: Aug. 27, 2004 FINISHED: Aug. 27, 2004
 DRILL RIG MODEL: Becker HAV-180
 GROUND ELEV. (m): 1049.2
 COORDINATES (m): N 6913747 E 580407.6

DESCRIPTION OF MATERIALS

SAND AND GRAVEL, sand (fine to coarse), gravel (fine to coarse, sub-angular to sub-rounded) some cobbles, trace silt, brown, dry. [FILL]

- moist at 4.57m.

11.9
1037.3

End of Becker Drill Hole at 11.9 m

NOTES:

Piezometer Details for BKS04-07(PZ)

Concrete	0 - 0.61m
Bentonite Chips	0.61 - 2.24m
Cuttings	2.24 - 8.69m
Bentonite Chips	8.69 - 10.11m
Sand	10.11 - 11.81m
Screen	11.5 - 11.81m

- Casagrande Tip Standpipe

Water Level Depth Below Ground Surface

BK04-07(PZ) Dry

INSTRUMENT
DETAILS

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF

CHECKED BY:

SHEET 1 OF 1




HOLE NO.: BKS04-07(PZ)



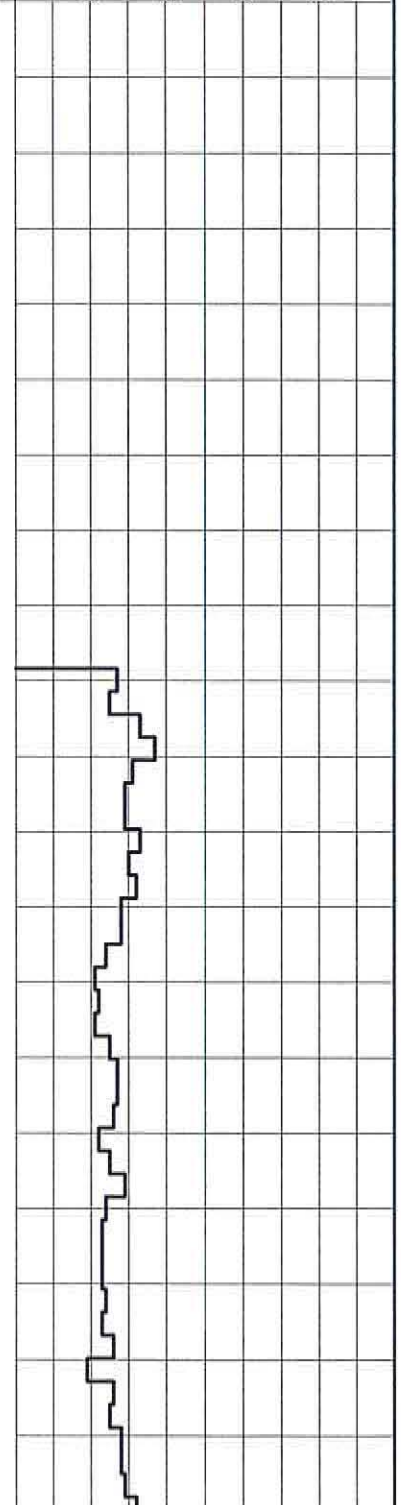
KLOHN CRIPPEN

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)		
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)		
● SPT N	 BOUNCE PRESS (kPa)		
W _p % X	W% O	W _L % X	
20	40	60	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 26, 2004 FINISHED: Aug. 26, 2004	INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180	
					GROUND ELEV. (m): 1031.0	
					COORDINATES (m): N 6913985 E 580547.5	
					DESCRIPTION OF MATERIALS	
1					No open-Becker was conducted. Penetration data for this hole is suspectable to hammer misfiring. This hole was replaced by BPT04-08A,B.	
2						
3						
4						
5						
6						
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11						
12						
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14						
15						
16						
17						
18						
19						
20						



Continued Next Page



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




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SHEET 1 OF 2

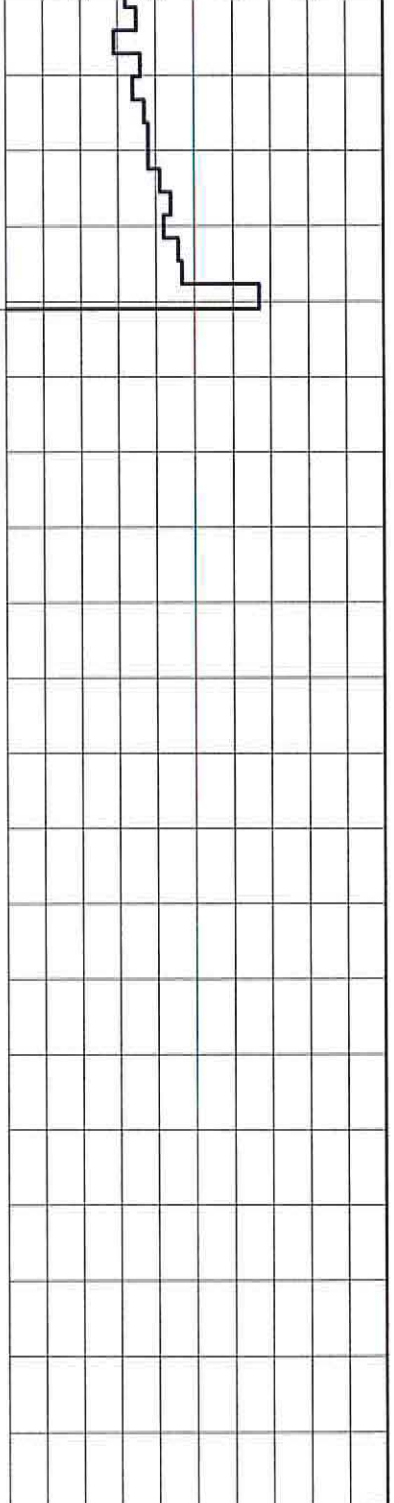
HOLE NO.: BPT04-05

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)		
Hammer Energy: 11 kJ max, rated	 OPEN ENDED (blows/0.3m)		
● SPT N	 BOUNCE PRESS (kPa)		
W _P % X	W% O	W _L % X	
20	40	60	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED:Aug. 26, 2004 FINISHED: Aug. 26, 2004		INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180		
					GROUND ELEV. (m): 1031.0		
					COORDINATES (m): N 6913985 E 580547.5		
					DESCRIPTION OF MATERIALS		
21							
22							
23							
24					24.1 1006.9	End of Becker Drill Hole at 24.1 m	
25					NOTES:		
26					1. Drilling stopped at 24.1m due to mechanical problems.		
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




CHECKED BY:

SHEET 2 OF 2

HOLE NO.: BPT04-05

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

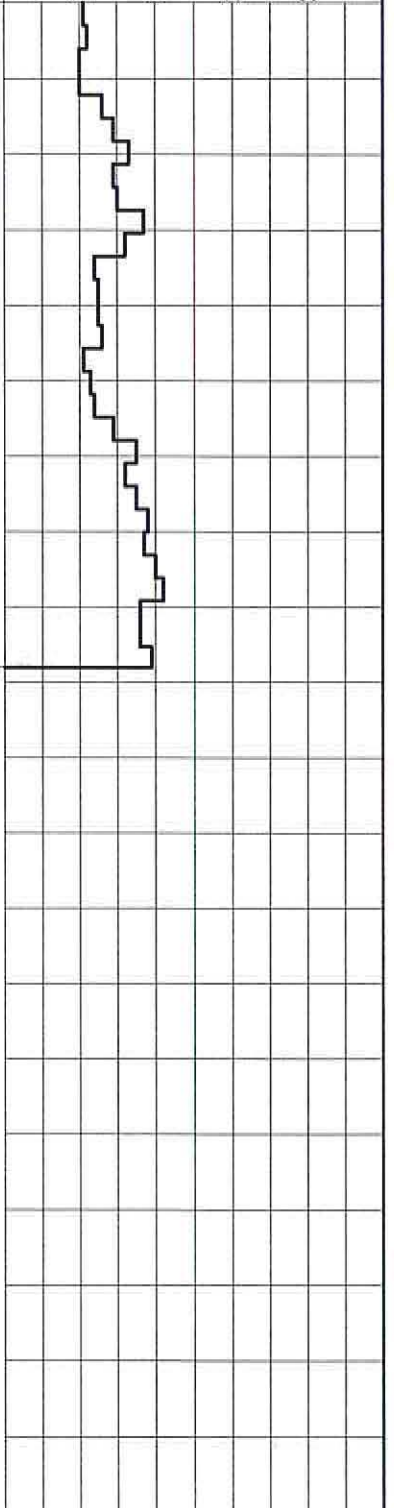
Casing O.D.:		CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated		OPEN ENDED (blows/0.3m)	
● SPT N		BOUNCE PRESS (kPa)	
W _P %	W%	W _L %	
X	O	X	
20	40	60	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 31, 2004 FINISHED: Aug. 31, 2004	INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180	
					GROUND ELEV. (m): 1031.0	
					COORDINATES (m): N 6913985 E 580547.5	
					DESCRIPTION OF MATERIALS	

No open-Becker conducted.

8.8
1022.2

End of Becker Drill Hole at 8.8 m



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: FL




CHECKED BY:

SHEET 1 OF 1

HOLE NO.: BPT04-08B

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)
• SPT N	 BOUNCE PRESS (kPa)
W _p % X	W% O
20	40 60 80
W _L % X	

DEPTH (m)

SPT BLOWS
PER 0.15m

SAMPLE TYPE

SAMPLE No.

SYMBOL

STARTED: Aug. 29, 2004 FINISHED: Aug. 30, 2004

DRILL RIG MODEL: Becker HAV-180

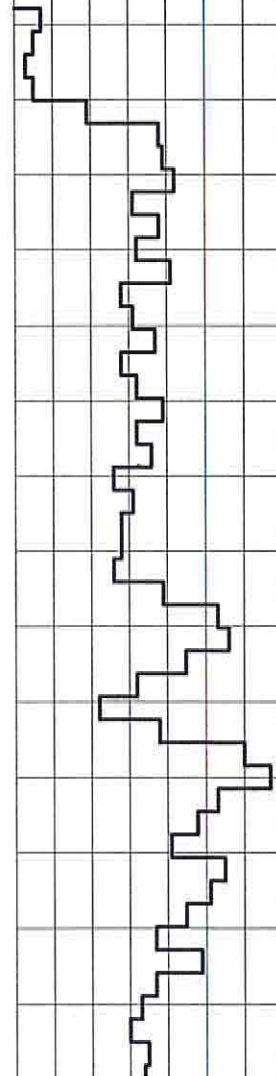
GROUND ELEV. (m): 1031.7

COORDINATES (m): N 6914117 E 580643.3

DESCRIPTION OF MATERIALS

INSTRUMENT
DETAILS

See BK04-09B for soil description and BPT data for 0 to 8.8m.



Continued Next Page



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




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SHEET 1 OF 2

HOLE NO.: BPT04-09A

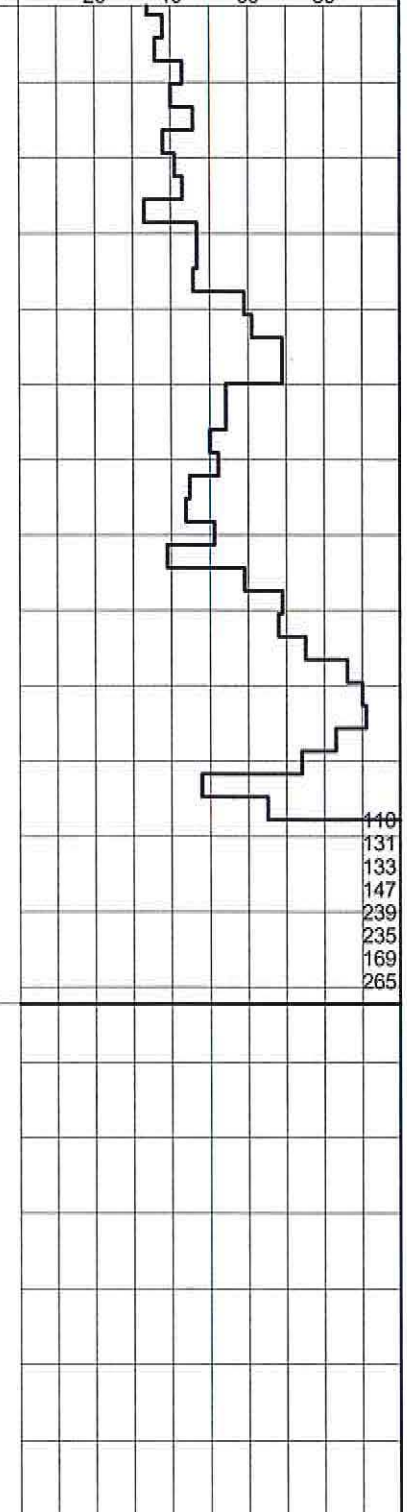
BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)	
● SPT N	 BOUNCE PRESS (kPa)	
W _p % X	W% ○	W _L % X
20	40	60
		80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 29, 2004 FINISHED: Aug. 30, 2004	INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180	
					GROUND ELEV. (m): 1031.7	
					COORDINATES (m): N 6914117 E 580643.3	
					DESCRIPTION OF MATERIALS	

21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33					33.2 998.5	
34					NOTES: 1. No BPT data from 0 to 5.8m. 2. See BK04-09B for lithology from 0 to 8.8m, and BPT data from 0 to 5.8m.	
35						
36						
37						
38						
39						
40						



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




CHECKED BY:

SHEET 2 OF 2

HOLE NO.: BPT04-09A

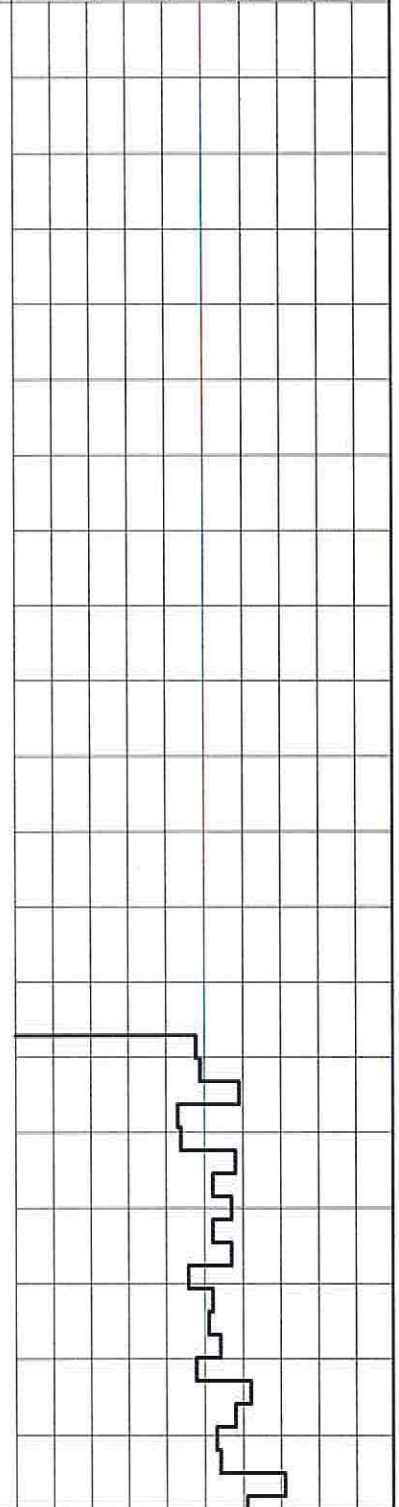
BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)	
● SPT N	 BOUNCE PRESS (kPa)	
W _P % X	W% O	W _L % X
20	40	60
80		

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 30, 2004 FINISHED: Aug. 31, 2004	INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180	
					GROUND ELEV. (m): 1031.1	
					COORDINATES (m): N 6913865 E 580451.4	
					DESCRIPTION OF MATERIALS	

This hole was drilled to obtain BPT data below 14m or the base of compacted fill to supplement BK04-01.



Continued Next Page



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: FL


CHECKED BY:


SHEET 1 OF 2


HOLE NO.: BPT04-10

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:  CLOSE ENDED (blows/0.3m)

Hammer Energy:  OPEN ENDED (blows/0.3m)

● SPT N  BOUNCE PRESS (kPa)

W_p% W_o% W_L%

20 40 60 80

INSTRUMENT
DETAILS

STARTED: Aug. 30, 2004 FINISHED: Aug. 31, 2004

DRILL RIG MODEL: Becker HAV-180

GROUND ELEV. (m): 1031.1

COORDINATES (m): N 6913865 E 580451.4

DESCRIPTION OF MATERIALS

DEPTH (m)

SPT BLOWS
PER 0.15m

SAMPLE TYPE

SAMPLE No.

SYMBOL

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

119
122
113
109
104
101

118
116
111
101
116
129
117

143
125
143
126
143
153
178
191
200
114

107
127
136
124
209
279
282
324

NOTES:

1. See BK04-01 for soil description.
2. BPT04-10 located 1.5m away from BK04-01.

39.0
992.1

End of Becker Drill Hole at 39.0 m



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: FL




CHECKED BY:

SHEET 2 OF 2

HOLE NO.: BPT04-10

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)		
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)		
● SPT N	 BOUNCE PRESS (kPa)		
W _P % X	W% O	W _L % X	
20	40	60	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 28, 2004 FINISHED: Aug. 28, 2004	INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180	
					GROUND ELEV. (m): 1031.0	
					COORDINATES (m): N 6913985 E 580547.5	
DESCRIPTION OF MATERIALS						

No open-Becker conducted.

Continued Next Page



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




CHECKED BY:

SHEET 1 OF 2

HOLE NO.: BPT04-08A

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:		CLOSE ENDED (blows/0.3m)
Hammer Energy: 11 kJ max. rated		OPEN ENDED (blows/0.3m)
• SPT N		BOUNCE PRESS (kPa)
W _p % X	W% O	W _i % X
20	40	60
		80

DEPTH (m)

SPT BLOWS
PER 0.15m

SAMPLE TYPE

SAMPLE No.

SYMBOL

STARTED: Aug. 28, 2004 FINISHED: Aug. 28, 2004

DRILL RIG MODEL: Becker HAV-180

GROUND ELEV. (m): 1031.0

COORDINATES (m): N 6913985 E 580547.5

DESCRIPTION OF MATERIALS

INSTRUMENT
DETAILS

21
22
23
24
25
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34
35
36
37
38
39
40

100
119
114
121
191
213
133
147
160
165
131
114
100
155
153
113
122
124
132
117
123
130
188
128
161
158
152
179
280
329
386

NOTES:

1. BPT data from 0 to 8.8m was collected during BPT04-08B.
2. An alternate set of BPT data for this location is shown on BPT04-05.
3. BPT04-05, BPT04-08, and BPT04-08B are within 3.0m of each other.

El. 991.1

End of Becker Drill Hole at 39.9 m



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Intermediate Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF


CHECKED BY:


SHEET 2 OF 2


HOLE NO.: BPT04-08A

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:  CLOSE ENDED (blows/0.3m)

Hammer Energy: 11 kJ max. rated  OPEN ENDED (blows/0.3m)

● SPT N  BOUNCE PRESS (kPa)

W_p% W% W_L%

20 40 60 80

STARTED: Aug. 18, 2004 FINISHED: Aug. 19, 2004

DRILL RIG MODEL: Becker HAV-180

GROUND ELEV. (m): 1051.5

COORDINATES (m): N 6913434 E 581979.4

DESCRIPTION OF MATERIALS

INSTRUMENT DETAILS

[TAILINGS]

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

SPT BLOWS
PER 0.15m

SAMPLE TYPE

SAMPLE No.

SYMBOL

Grab

1

Grab

2

Grab

3

Grab

4

Grab

5

Grab

6

8.2
1043.3 SAND AND GRAVEL (SW-GW), fine to coarse, cobbly, well graded, sub-angular to sub-rounded, grey, wet.

- rock in bit from 10.97 to 12.5m, poor recovery.

12.5
1039.0 SAND, fine to coarse, some silt, brown, wet.

- too wet to recover sample.

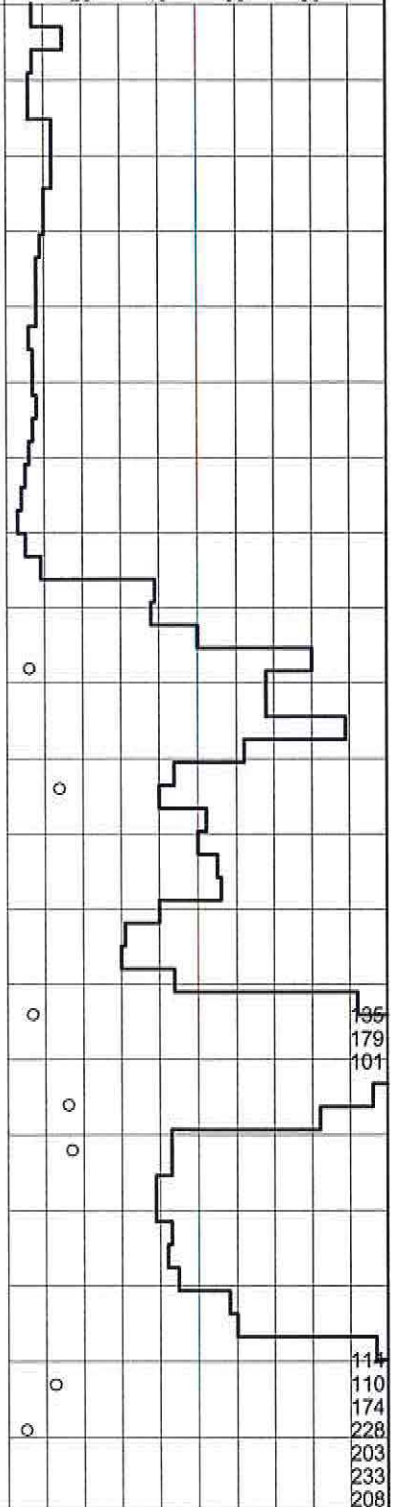
13.4
1038.1 - loose zone from 12.5 to 13.41m.
SAND AND GRAVEL, fine to coarse, some cobbles.

14.6
1036.9 - loose zone at 14.63m.
SAND, fine to coarse, some silt, brown, wet.

15.2
1036.3 SAND AND GRAVEL (SW-GW), fine to coarse, some cobbles, well graded, sub-rounded to sub-angular, grey, wet.

18.3
1033.2 GRAVEL, sandy, very stiff. [TILL?]

- no water return at 18.9m, material moist and brown.



Continued Next Page



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




CHECKED BY:

SHEET 1 OF 2

HOLE NO.: BK04-02A

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:		CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated		OPEN ENDED (blows/0.3m)	
● SPT N		BOUNCE PRESS (kPa)	
W _p % X	W% O	W _L % X	
20	40	60	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 22, 2004 FINISHED: Aug. 23, 2004
					DRILL RIG MODEL: Becker HAV-180
					GROUND ELEV. (m): 1049.9
					COORDINATES (m): N 6913220 E 582003.2
					DESCRIPTION OF MATERIALS

INSTRUMENT
DETAILS

[TAILINGS]

- No BPT data collected from 0 to 12.8m.

12.8

1037.1 SAND AND GRAVEL, fine to coarse, some cobbles, trace silt, sub-angular to angular, grey, wet.

Grab

1

Grab

2

- boulder (Gneiss) from 15.8 to 16.8m.

16.8

1033.1 SAND, fine to medium, silty, some cobbles, angular, brown, wet.

Grab

3

17.7

1032.2 SAND AND GRAVEL, fine to coarse, some cobbles, trace silt, sub-rounded, grey, wet.

- high water yield.
- silty from 18.9 to 19.8m.

Continued Next Page

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF

CHECKED BY:

SHEET 1 OF 3




HOLE NO.: BK04-03(PZ)



KLOHN CRIPPEN









































BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:		CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated		OPEN ENDED (blows/0.3m)	
● SPT N		BOUNCE PRESS (kPa)	
W _P %	W%	W _L %	
20	40	60	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED:Aug. 22, 2004 FINISHED: Aug. 23, 2004
					DRILL RIG MODEL: Becker HAV-180
					GROUND ELEV. (m): 1049.9
					COORDINATES (m): N 6913220 E 582003.2
					DESCRIPTION OF MATERIALS

INSTRUMENT
DETAILS

21		Grab	4		- grey, loose, high water yield.		
22					- silty from 21.9 to 22.6m.		
23					- silty from 23.5 to 23.8m.		
24					- silty from 23.5 to 23.8m.		
25		Grab	5				
26							
27							
28							
29		Grab	6		- rust coloured water at 29m.		
30							
31							
32		Grab	7		- compacted material, low water yield from 32.6 to 34.1m.		
33							
34					- loose, grey, high water yield at 34.4m.		
35							
36					- flat, elongated gravel from 36 to 37.8m.		
37		Grab	8				
38							
39		Grab	9		- boulder from 39.3 to 39.6m.		
40					- some silt, broken rock fragments		

Continued Next Page



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF


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SHEET 2 OF 3


HOLE NO.: BK04-03(PZ)

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:  CLOSE ENDED (blows/0.3m)

Hammer Energy: 11 kJ max. rated  OPEN ENDED (blows/0.3m)

● SPT N  BOUNCE PRESS (kPa)

W_p% W% W_L%
 X P O X
 20 40 60 80

STARTED: Aug. 22, 2004 FINISHED: Aug. 23, 2004

DRILL RIG MODEL: Becker HAV-180

GROUND ELEV. (m): 1049.9

COORDINATES (m): N 6913220 E 582003.2

DESCRIPTION OF MATERIALS

from 39.6 to 40.8m.

- cobbly from 41.8 to 43m.

43.3
1006.6

End of Becker Drill Hole at 43.3 m

NOTES:

1. No closed-Becker data from 0 to 12.8m.
2. Original ground at 12.8m.
3. Closed-Becker located 1.5m away from open-Becker.

Piezometer Details for BK04-03(PZ)

Cave In/Cuttings 0 - 38.7m
 Bentonite 38.7 - 41.1m
 Filter Sand 41.1 - 43m
 Screen 43 - 43.3m

- Casagrande Tip Standpipe

INSTRUMENT
DETAILS

Grab

10

SYMBOL



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




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SHEET 3 OF 3

HOLE NO.: BK04-03(PZ)

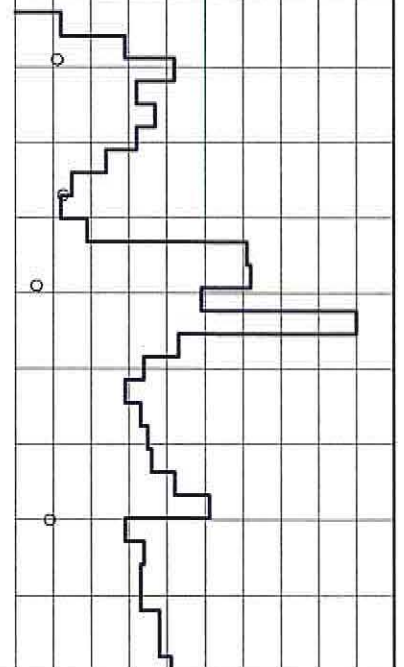
BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:		CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated		OPEN ENDED (blows/0.3m)	
● SPT N		BOUNCE PRESS (kPa)	
W _P % X	W% ○	W _L % X	
20	40	60	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 24, 2004 FINISHED: Aug. 25, 2004	INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180	
					GROUND ELEV. (m): 1050.9	
					COORDINATES (m): N 6913324 E 581983.8	
					DESCRIPTION OF MATERIALS	
1					[TAILINGS]	
2					- No BPT data collected from 0 to 11.3m	
3						
4						
5						
6						
7						
8						
9						
10						
11						
12					11.6 1039.3 SAND AND GRAVEL, sand (fine to coarse), gravel (fine to coarse, angular to sub-angular), some cobbles (sub-rounded to sub-angular), trace silt, brown, wet.	
13		Grab	1		- high water yield.	
14		Grab	2		- some silt at 13.7m.	
15					- gravel, sub-rounded, trace silt.	
16		Grab	3			
17						
18					- some silt from 18.3 to 18.9m.	
19						
20		Grab	4			

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KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF


CHECKED BY:


SHEET 1 OF 3


HOLE NO.: BK04-04

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:  CLOSE ENDED (blows/0.3m)

Hammer Energy: 11 kJ max. rated  OPEN ENDED (blows/0.3m)

● SPT N  BOUNCE PRESS (kPa)

W_p% W_o% W_L%

20 40 60 80

STARTED: Aug. 24, 2004 FINISHED: Aug. 25, 2004
























DRILL RIG MODEL: Becker HAV-180

GROUND ELEV. (m): 1050.9

COORDINATES (m): N 6913324 E 581983.8

DESCRIPTION OF MATERIALS

INSTRUMENT
DETAILS

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
21		Grab	5		- some silt from 22.6 to 23.2m.	
22						
23						
24		Grab	6			
25						
26						
27					- some silt from 26.8 to 28m.	
28		Grab	7			
29						
30					- some silt from 30.2 to 31.1m.	
31		Grab	8			
32					- bit pushing boulder at 31.5m. - dense at 31.7m - cobbly from 32 to 32.6m.	
33		Grab	9			
34		Grab	10		- rock jammed in bit at 33.2m.	
35					- some silt from 34.1 to 35m.	
36		Grab	11		- cobbly, sub-angular from 34.7 to 35.7m.	
37						
38		Grab	12		35.7 1015.2 SAND, fine to medium, some silt, some gravel, gap-graded, brown, wet.	
39					36.6 1014.3 SAND AND GRAVEL, some cobbles, trace to some silt, sub-angular to angular, grey, wet. [TILL?]	
40		Grab	13			
		Grab	14		38.7 1012.2 SILT.	
		Grab	15			

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KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




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SHEET 2 OF 3

HOLE NO.: BK04-04

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)	
● SPT N	 BOUNCE PRESS (kPa)	
W _p % X	W% O	W _i % X
20	40	60
80		

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Aug. 24, 2004 FINISHED: Aug. 25, 2004	INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180	
					GROUND ELEV. (m): 1050.9	
					COORDINATES (m): N 6913324 E 581983.8	
					DESCRIPTION OF MATERIALS	
41					40.2 1010.7 End of Becker Drill Hole at 40.2 m	
42					NOTES:	
43					1. Original ground at 11.6m.	
44					2. No BPT data from 0 to 11.3m.	
45					3. Open-Becker located 1.5m away from closed-Becker.	
46						
47						
48						
49						
50						
51						
52						
53						
54						
55						
56						
57						
58						
59						
60						



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




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SHEET 3 OF 3

HOLE NO.: BK04-04






BECKER TEST HOLE LOG

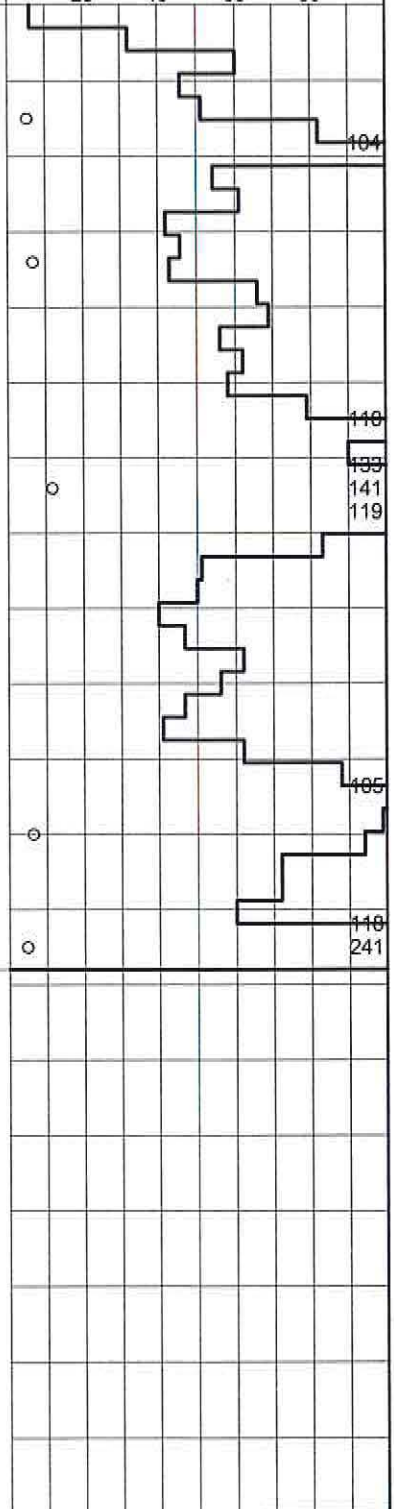
BECKER PENETRATION TEST

Casing O.D.:		CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated		OPEN ENDED (blows/0.3m)	
● SPT N		BOUNCE PRESS (kPa)	
W _P % X	W _V % ○	W _L % X	
20	40	60	80

STARTED: Sep. 1, 2004 **FINISHED:** Sep. 1, 2004
DRILL RIG MODEL: Becker HAV-180
GROUND ELEV. (m): 1050.2
COORDINATES (m): N 6912892 E 582293.6
DESCRIPTION OF MATERIALS

INSTRUMENT
DETAILS

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	DESCRIPTION OF MATERIALS
1		Grab	1		SAND AND GRAVEL, sand (fine to coarse, angular), gravel (fine to coarse, sub-angular to sub-rounded), trace to some silt. [FILL] - soft zones appear to be mainly sand. - boulder at 1.83m.
2					
3		Grab	2		- water yield at 2.44m; silty, greyish brown water. SAND AND GRAVEL, sand (fine to coarse), gravel (fine to coarse, sub-rounded), cobbly (fine to coarse, sub-rounded), trace silt, brown. - soft zone at 3.35m.
4					
5					
6		Grab	3		- cobbles or boulder at 4.27m.
7					
8					
9					
10					
11		Grab	4		GRAVEL (fine to coarse, angular), sandy (angular), cobbly (sub-angular), some silt.
12					
13		Grab	5		ROCK, flaky, smooth, grey, easy to break, no water yield.
14					
15					
16					
17					
18					
19					
20					



End of Becker Drill Hole at 12.8 m
 NOTES:

1. Original ground at 2.5m.
2. Open-Becker located 1.5m away from closed-Becker.



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: FL




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SHEET 1 OF 1

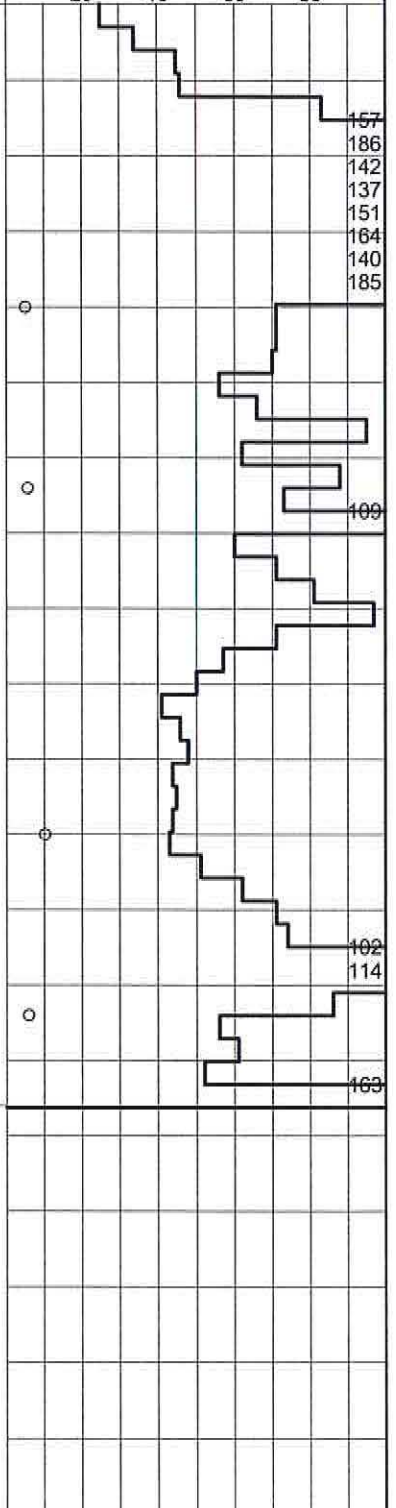
HOLE NO.: BK04-11

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:		CLOSE ENDED (blows/0.3m)
Hammer Energy: 11 kJ max. rated		OPEN ENDED (blows/0.3m)
● SPT N		BOUNCE PRESS (kPa)
<div><div>W_p%</div><div>W%</div><div>W_L%</div><div><div>20</div><div>40</div><div>60</div><div>80</div></div></div>		

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Sep. 1, 2004 FINISHED: Sep. 2, 2004 DRILL RIG MODEL: Becker HAV-180 GROUND ELEV. (m): 1055.5 COORDINATES (m): N 6912727 E 582691.7 DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
1					SAND AND GRAVEL, some silt, light brown, dry. [FILL]	
2					- boulder at 1.37m.	
3					- boulder and cobbles from 1.98 to 2.74m.	
4		Grab	1		3.7 1051.8 SAND AND GRAVEL, sand (medium to coarse, angular to sub-angular), gravel (fine to coarse, angular to sub-rounded), trace silt, highly permeable, brown.	
5						
6		Grab	2			
7						
8					- boulder from 7.62 to 8.23m.	
9					- very tight, dark brown water; high yield at 8.23m.	
10					- bit pushing big rock at 8.53m.	
11					- brown water at 8.84m.	
12					- pushing big rock at 9.45m.	
13		Grab	3		10.7 1044.8 - silty water at 10.36m. SAND, coarse, angular, gravelly, fine, highly permeable.	
14					- trace silt at 12.2m.	
15		Grab	4		13.1 1042.4 ROCK, angular, hard pieces, some silt, low water yield.	
16					14.6 1040.9 End of Becker Drill Hole at 14.6 m	
17					NOTES:	
18					1. Original ground at 3.7m.	
19					2. Open-Becker located 1.5m away from closed-Becker.	
20						



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: FL




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SHEET 1 OF 1

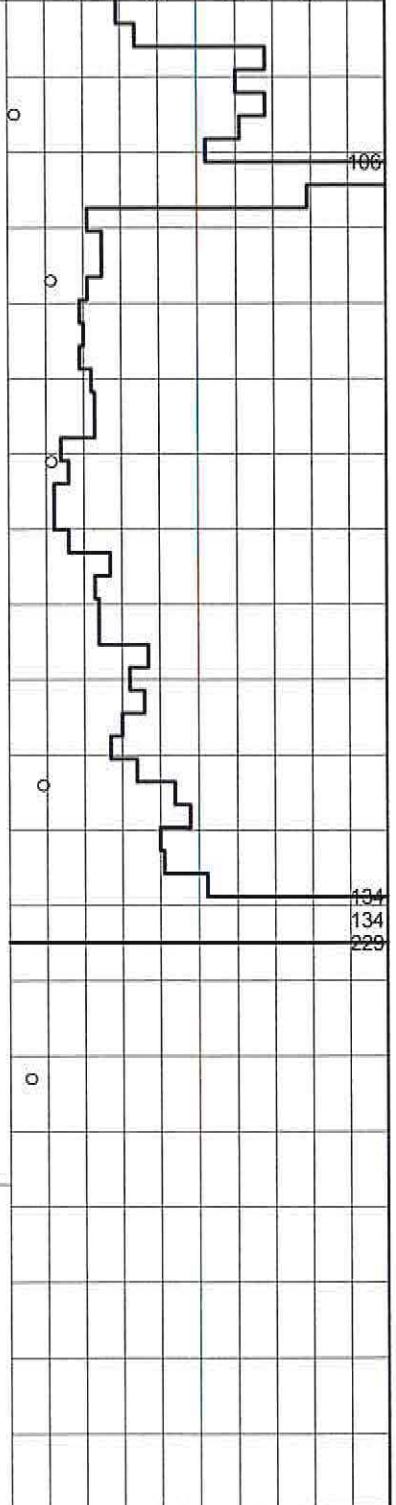
HOLE NO.: BK04-12

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:		CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated		OPEN ENDED (blows/0.3m)	
● SPT N		BOUNCE PRESS (kPa)	
W _P %	W%	W _L %	
20	40	60	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Sep. 2, 2004 FINISHED: Sep. 2, 2004	DRILL RIG MODEL: Becker HAV-180	GROUND ELEV. (m): 1057.5	COORDINATES (m): N 6912379 E 583261.3	DESCRIPTION OF MATERIALS	INSTRUMENT DETAILS
1		Grab	1						SAND AND GRAVEL, sand (fine to medium), gravel (fine to coarse, angular), some cobbles, trace to some silt, brown, dry. [FILL]	
2										
3										
4		Grab	2		3.4				SAND, medium to coarse, some gravel to gravelly (fine, sub-angular to sub-rounded), some cobbles. - water yield, brown at 3.96m.	
5										
6		Grab	3						- reddish brown water at 5.79m.	
7										
8										
9										
10										
11		Grab	4		11.6				ROCK, weathered, flaky pieces, some sand, some silt, brownish grey, no water yield.	
12					1045.9					
13									- bedrock at 15.7m.	
14										
15		Grab	5							
16					15.7				End of Becker Drill Hole at 15.7 m	
17					1041.8				NOTES:	
18									1. Original ground at 3.4m.	
19									2. Open-Becker located 1.5m away from closed-Becker.	
20									3. Closed-Becker stopped at 12.5m due to v. dense ground.	



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: FL




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SHEET 1 OF 1

HOLE NO.: BK04-13

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)	
● SPT N	 BOUNCE PRESS (kPa)	
W _p % X 20	W% O 60	W _L % X 80

INSTRUMENT
DETAILS

STARTED: Aug. 19, 2004 FINISHED: Aug. 19, 2004
 DRILL RIG MODEL: Becker HAV-180
 GROUND ELEV. (m): 1051.5
 COORDINATES (m): N 6913434 E 581979.4
 DESCRIPTION OF MATERIALS

DEPTH (m)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

SPT BLOWS
PER 0.15m

SAMPLE TYPE

SAMPLE No.

SYMBOL

Open hole only to 23.5m with BPT from 23.5 to 24.4m.
 Purpose of hole was to determine whether refusal in
 BK04-2A was due to a boulder or dense soil.

Continued Next Page



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




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SHEET 1 OF 2

HOLE NO.: BPT04-02B

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)	
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)	
• SPT N	 BOUNCE PRESS (kPa)	
W _P % X	W _V % O	W _L % X
20	40	60
80		

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED:Aug. 19, 2004 FINISHED: Aug. 19, 2004		INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180		
					GROUND ELEV. (m): 1051.5		
					COORDINATES (m): N 6913434 E 581979.4		
					DESCRIPTION OF MATERIALS		
21							
22							
23							
24							
25					24.4		
26					1027.1	End of Becker Drill Hole at 24.4 m	
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							

24.4
1027.1

End of Becker Drill Hole at 24.4 m

244
247
342



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Secondary Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: RF




CHECKED BY:

SHEET 2 OF 2

HOLE NO.: BPT04-02B

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:  CLOSE ENDED (blows/0.3m)
 Hammer Energy: 11 kJ max. rated  OPEN ENDED (blows/0.3m)
 • SPT N  BOUNCE PRESS (kPa)

W_P% W% W_L%
 X X X
 20 40 60 80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED: Sep. 3, 2004 FINISHED: Sep. 3, 2004	INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180	
					GROUND ELEV. (m): 1016.0	
					COORDINATES (m): N 6914256.3 E 580146.7	
					DESCRIPTION OF MATERIALS	
1					SAND AND GRAVEL. [FILL]	
2					- water yield at 1.52m. - lost water at 1.83m	
3					2.1 1013.9 SAND AND GRAVEL, sand (fine to coarse, sub-rounded), gravel (fine to coarse, sub-rounded), trace to some silt.	
4		Grab	1		- water yield at 3.7m.	
5	24,27,27	SPT	2			
6					5.8 1010.3 SAND, fine, grey.	
7					7.3 1008.7 SILT AND SAND, fine sand, low plasticity, grey.	
8	2,3,4	SPT	3			
9	2,4,5	SPT	4		9.0 1007.0 No open-Becker beyond 9m.	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Continued Next Page



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Cross Valley Dam

PROJECT: Rose Creek Site Investigation

LOCATION: Anvil Range Mine, Yukon

LOGGED BY: FL




CHECKED BY:

SHEET 1 OF 2

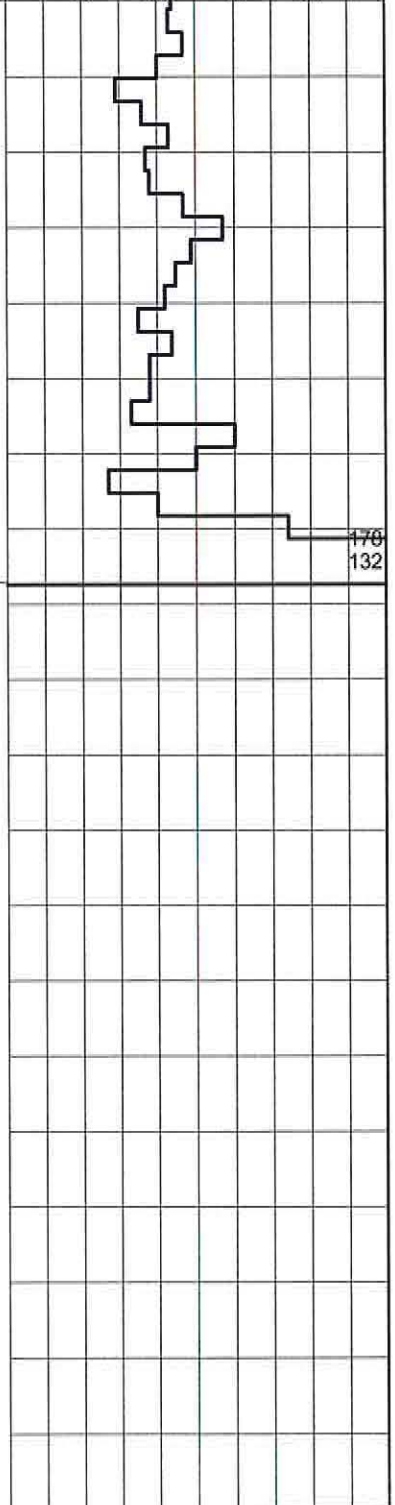
HOLE NO.: BK04-14

BECKER TEST HOLE LOG

BECKER PENETRATION TEST

Casing O.D.:	 CLOSE ENDED (blows/0.3m)		
Hammer Energy: 11 kJ max. rated	 OPEN ENDED (blows/0.3m)		
● SPT N	 BOUNCE PRESS (kPa)		
W _p % X	W _v % O	W _L % X	
20	40	60	80

DEPTH (m)	SPT BLOWS PER 0.15m	SAMPLE TYPE	SAMPLE No.	SYMBOL	STARTED:Sep. 3, 2004 FINISHED: Sep. 3, 2004		INSTRUMENT DETAILS
					DRILL RIG MODEL: Becker HAV-180		
					GROUND ELEV. (m): 1016.0		
					COORDINATES (m): N 6914256.3 E 580146.7		
					DESCRIPTION OF MATERIALS		
21							
22							
23							
24							
25							
26							
27							
28					27.7 988.3	End of Becker Drill Hole at 27.7 m	
29					NOTES:		
30					1. Original ground at 2.1m.		
31					2. Open-Becker located 1.5m away from closed-Becker.		
32					3. No open-Becker beyond depth of 9m.		
33							
34							
35							
36							
37							
38							
39							
40							



27.7
988.3

End of Becker Drill Hole at 27.7 m
NOTES:

1. Original ground at 2.1m.
2. Open-Becker located 1.5m away from closed-Becker.
3. No open-Becker beyond depth of 9m.



KLOHN CRIPPEN

PROJECT NO.: M09237 A01 - Cross Valley Dam

PROJECT: Rose Creek Site Investigation

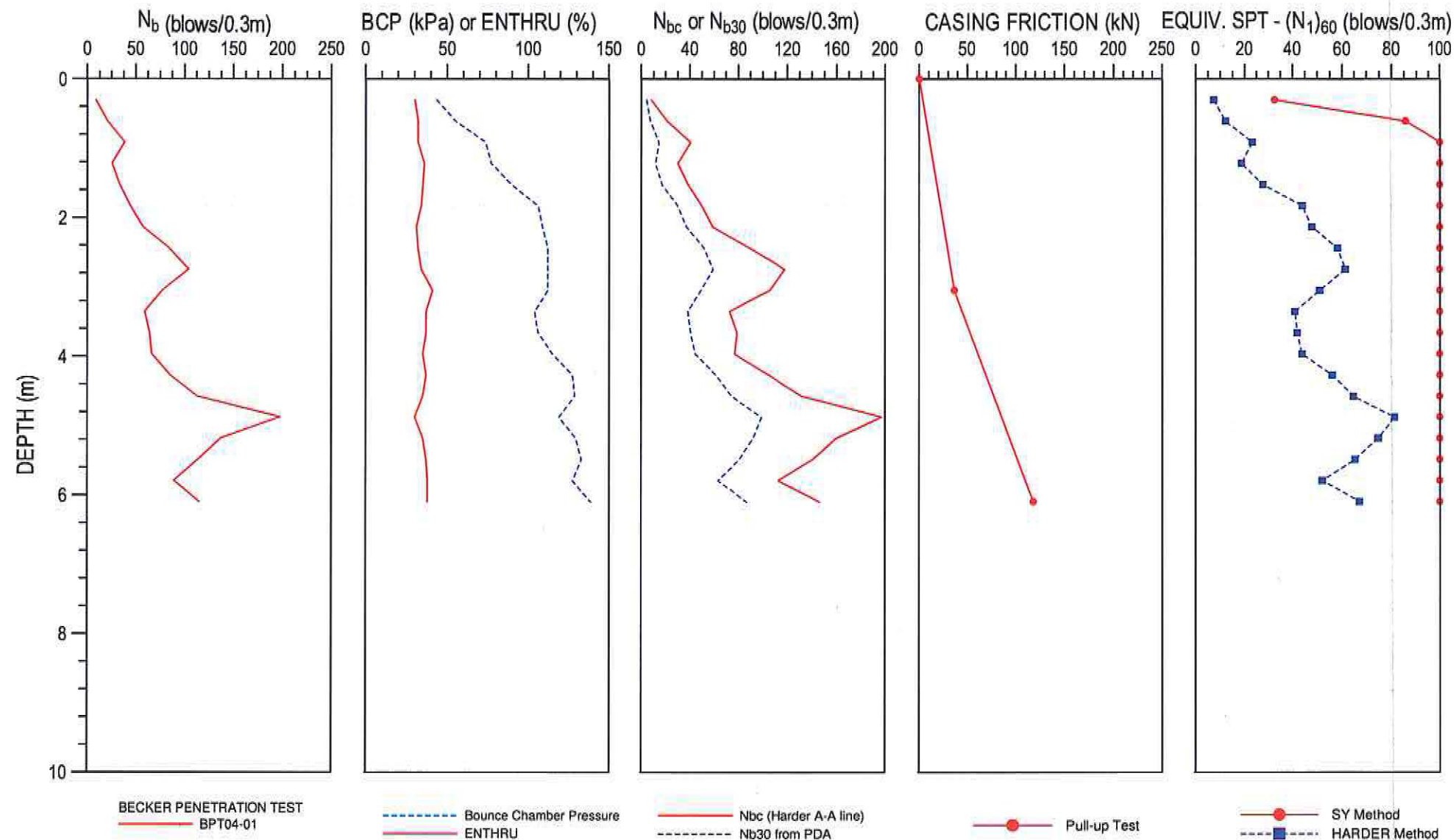
LOCATION: Anvil Range Mine, Yukon

LOGGED BY: FL

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SHEET 2 OF 2

HOLE NO.: BK04-14

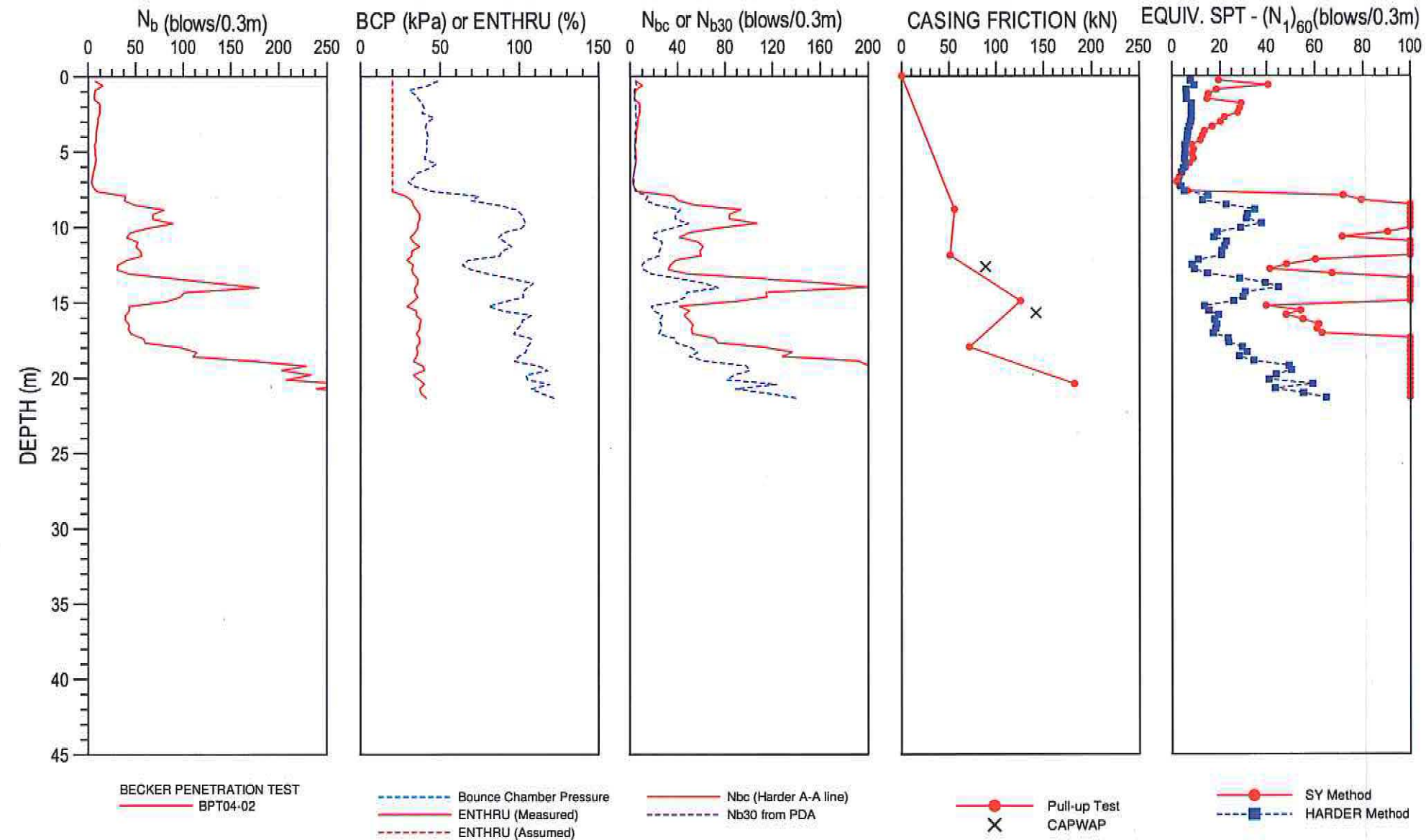


LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N_{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N_{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N_{bc} , to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, N_{b30} , and measured or computed shaft resistance to account for soil friction effect

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			BPT DATA INTERPRETATION FOR BPT04-01
		PROJECT NO. M 09237 A01	FIGURE NO. 01

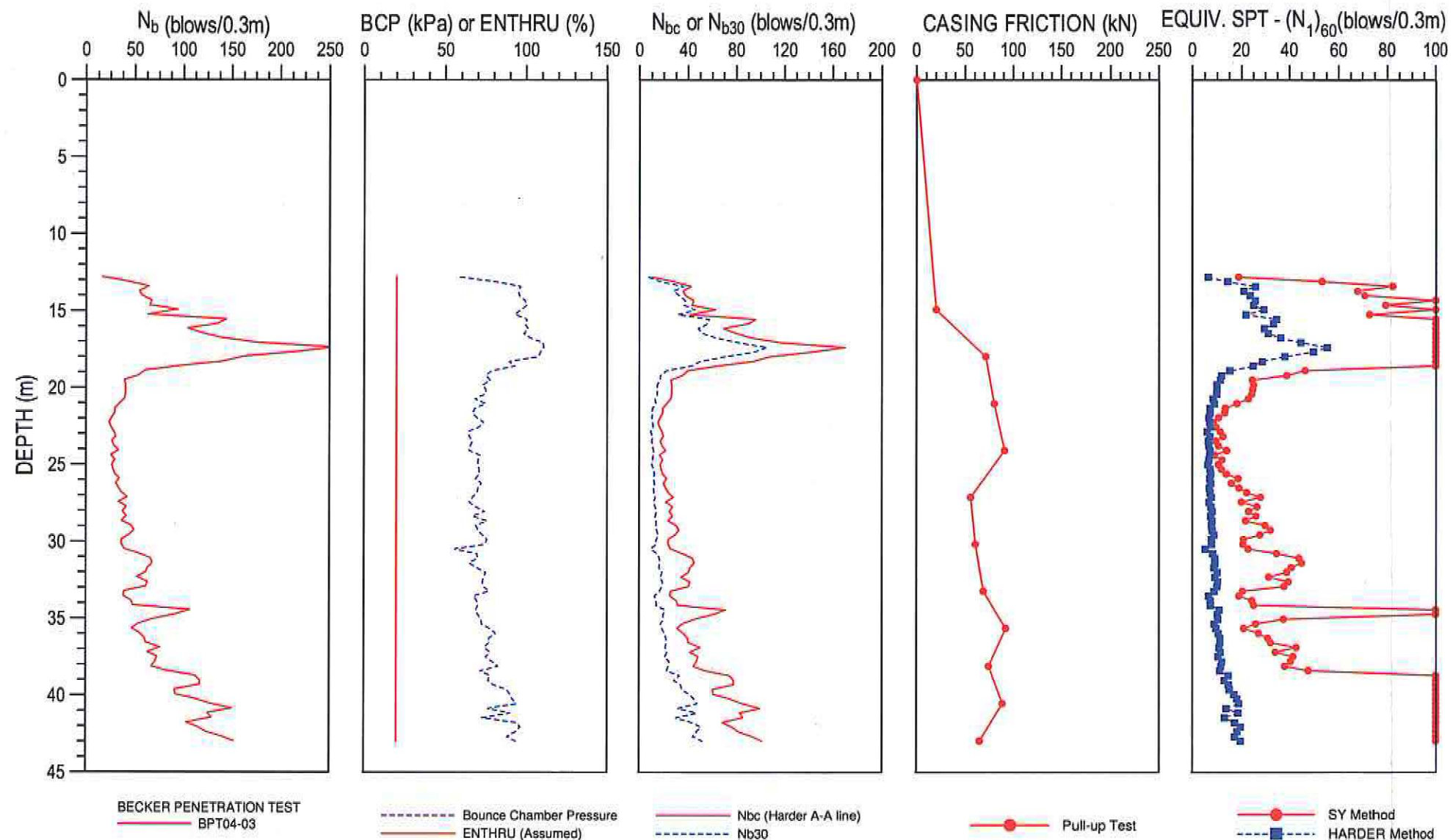


LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N_{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N_{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1985) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N_{bc} , to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, N_{b30} , and measured or computed shaft resistance to account for soil friction effect

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CLIENT		TITLE
DELOITTE TOUCHE		BPT DATA INTERPRETATION FOR BPT04-02
KLOHN CRIPPEN		PROJECT NO. M 09237 A01
		FIGURE NO. 02

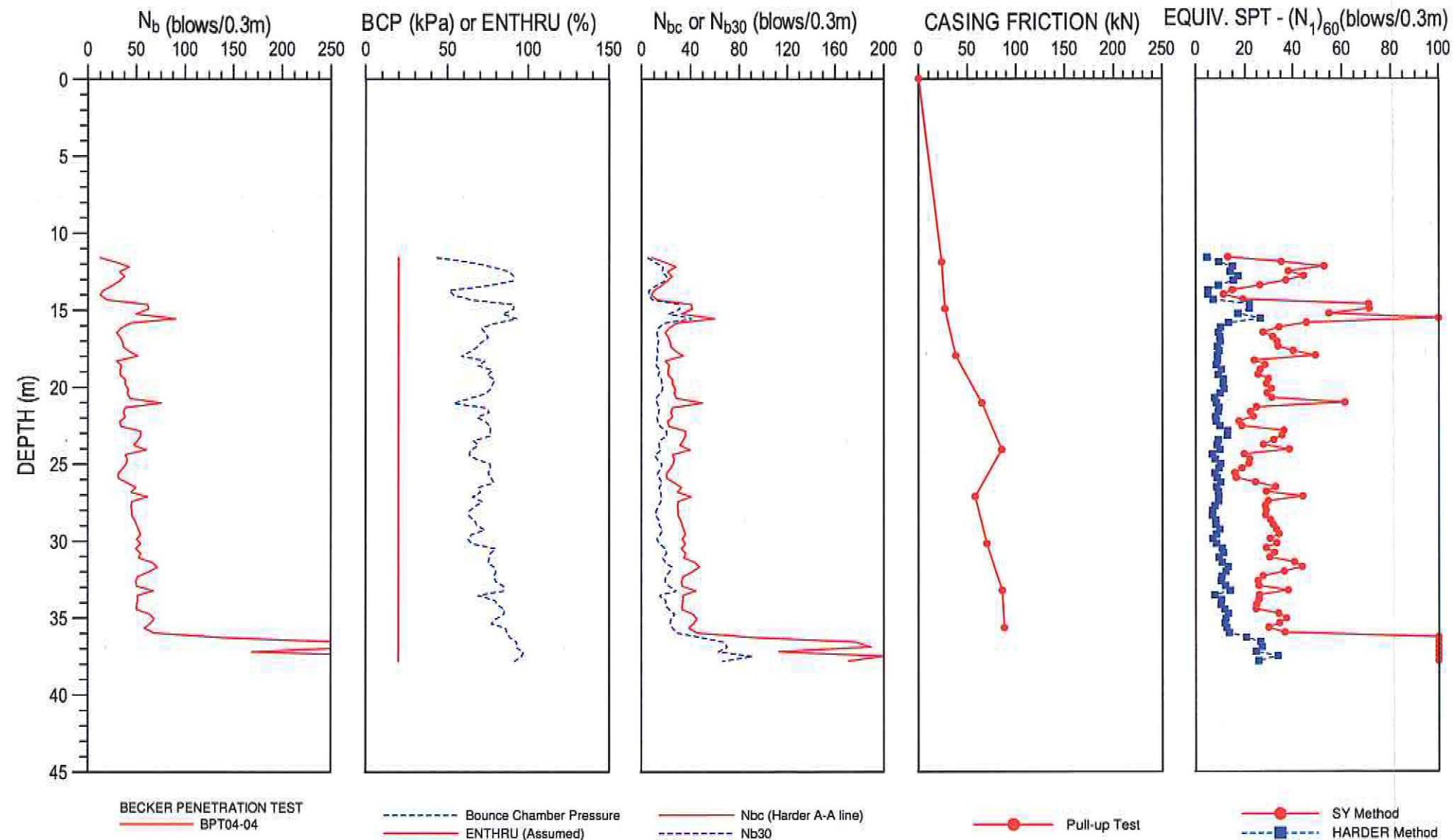


LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N_{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N_{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N_{bc} , to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, N_{b30} , and measured or computed shaft resistance to account for soil friction effect

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				TITLE	
				BPT DATA INTERPRETATION FOR BPT04-03	
				PROJECT NO.	FIGURE NO.
				M 09237 A01	03



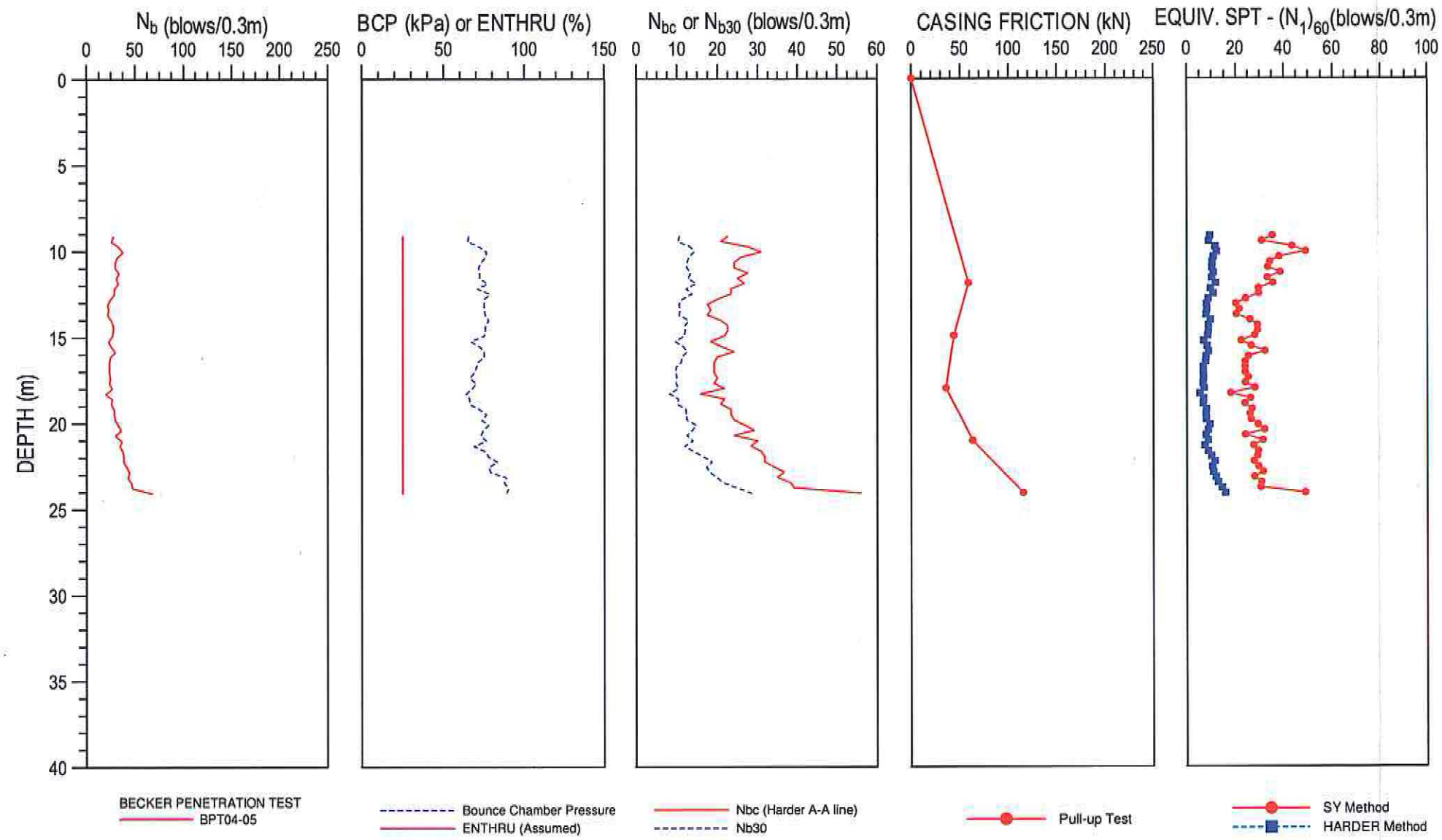
LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N_{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N_{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N_{bc} , to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, N_{b30} , and measured or computed shaft resistance to account for soil friction effect

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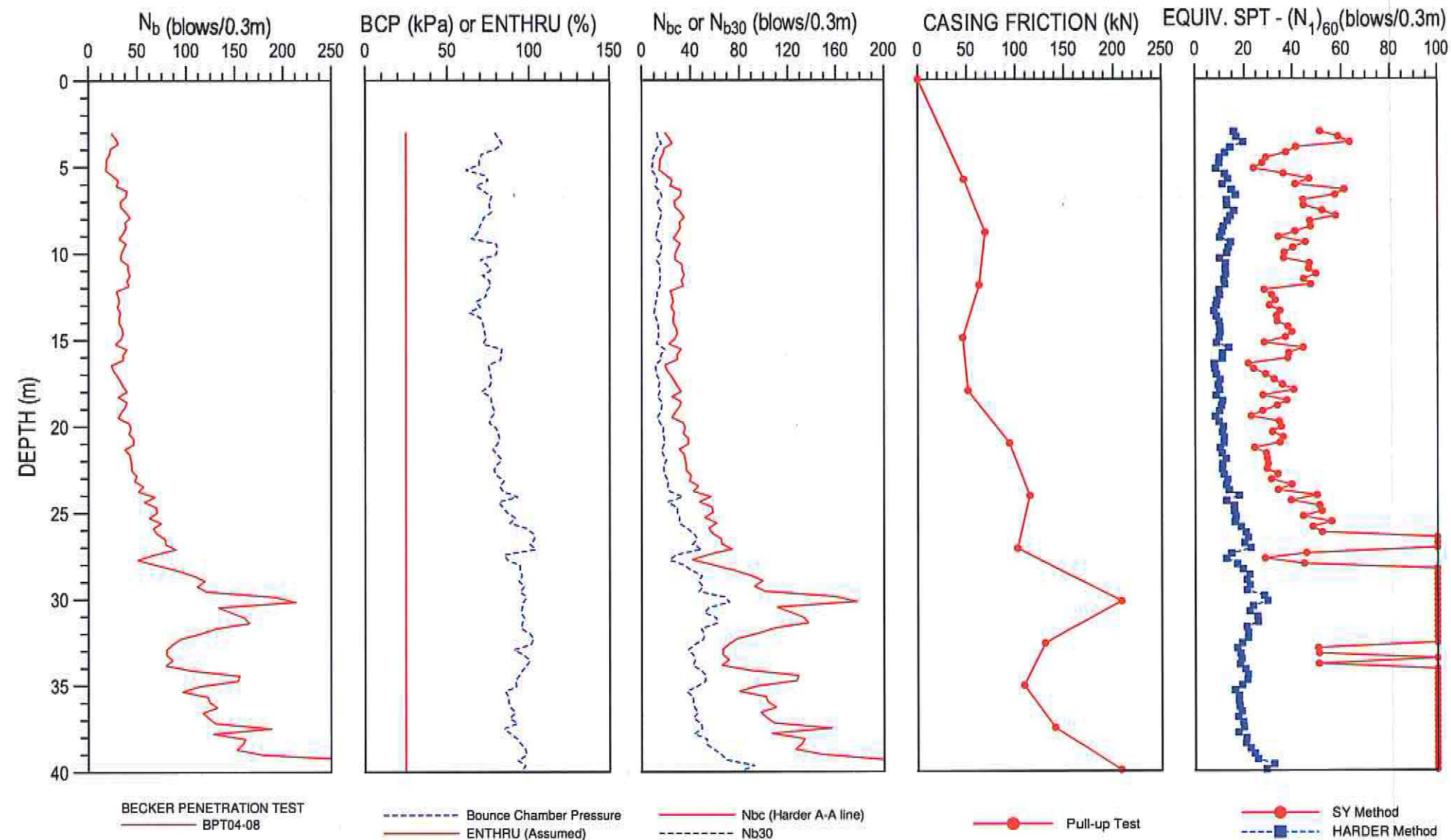
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	DELOITTE TOUCHE	TITLE	BPT DATA INTERPRETATION FOR BPT04-04
		PROJECT NO.	M 09237 A01
		FIGURE NO.	04



LEGEND	
N _b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N _{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N _{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N _{bc} , to the equivalent SPT N ₆₀
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N ₆₀ using the corrected blow count, N _{b30} , and measured or computed shaft resistance to account for soil friction effect

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				TITLE	
		 KLOHN CRIPPEN		BPT DATA INTERPRETATION FOR BPT04-05	
				PROJECT NO.	M 09237 A01
				FIGURE NO.	05



LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
Nbc	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
Nb30	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, Nbc, to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, Nb30, and measured or computed shaft resistance to account for soil friction effect

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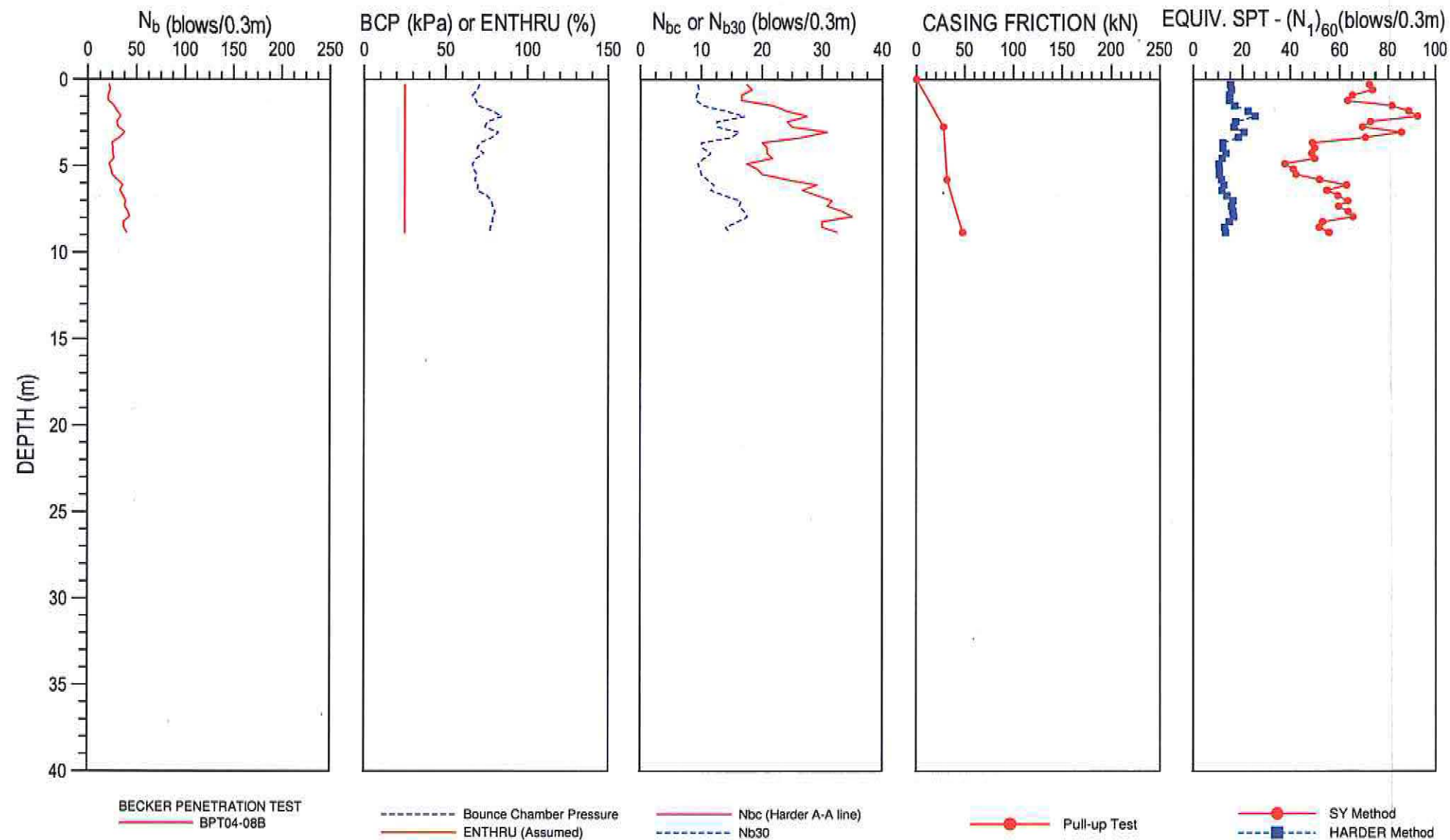
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KLOHN CRIPPEN

PROJECT	ROSE CREEK TAILINGS LIQUEFCACTION	
TITLE	BPT DATA INTERPRETATION FOR BPT04-08	
PROJECT NO.	M 09237 A01	FIGURE NO. 08



LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
Nbc	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
Nb30	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, Nbc, to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, Nb30, and measured or computed shaft resistance to account for soil friction effect

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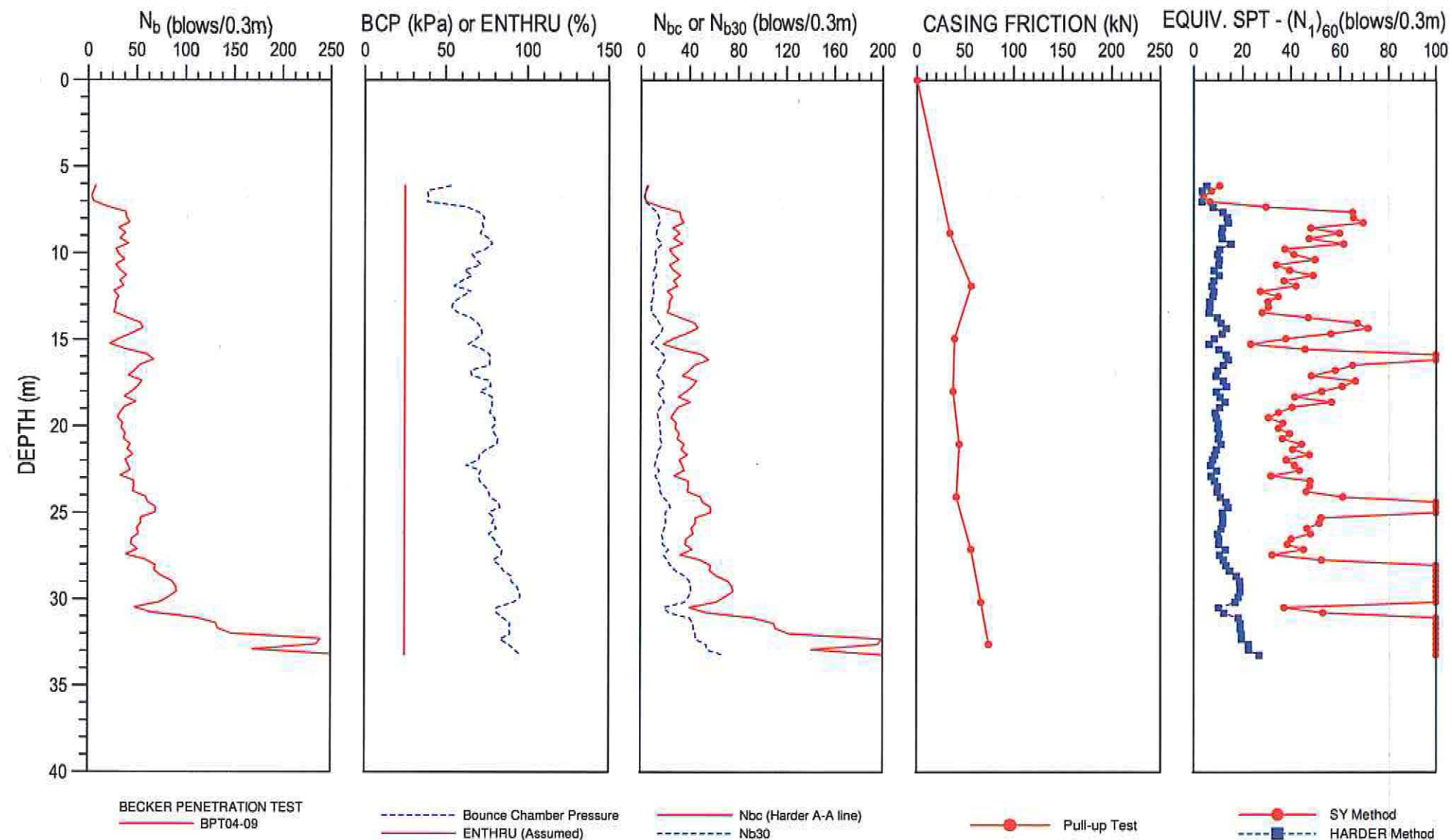
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PROJECT	ROSE CREEK TAILINGS LIQUEFICATION		
TITLE	BPT DATA INTERPRETATION FOR BPT04-08B		
PROJECT NO.	M 09237 A01	FIGURE NO.	08B



LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
Nbc	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
Nb30	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, Nbc, to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, Nb30, and measured or computed shaft resistance to account for soil friction effect

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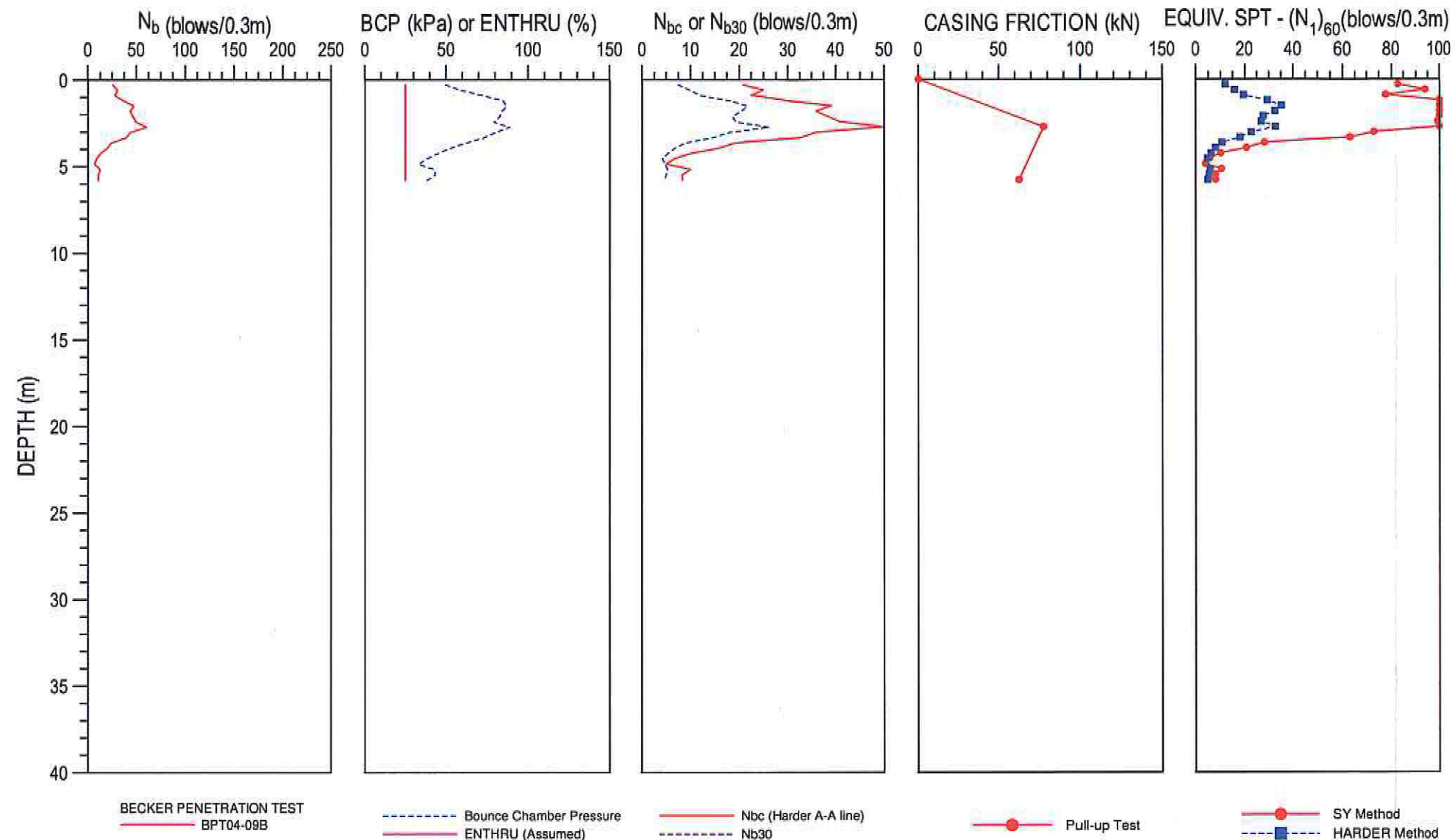
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PROJECT
ROSE CREEK TAILINGS LIQUEFICATION

TITLE
BPT DATA INTERPRETATION FOR BPT04-09

PROJECT NO.
M 09237 A01

FIGURE NO.
09

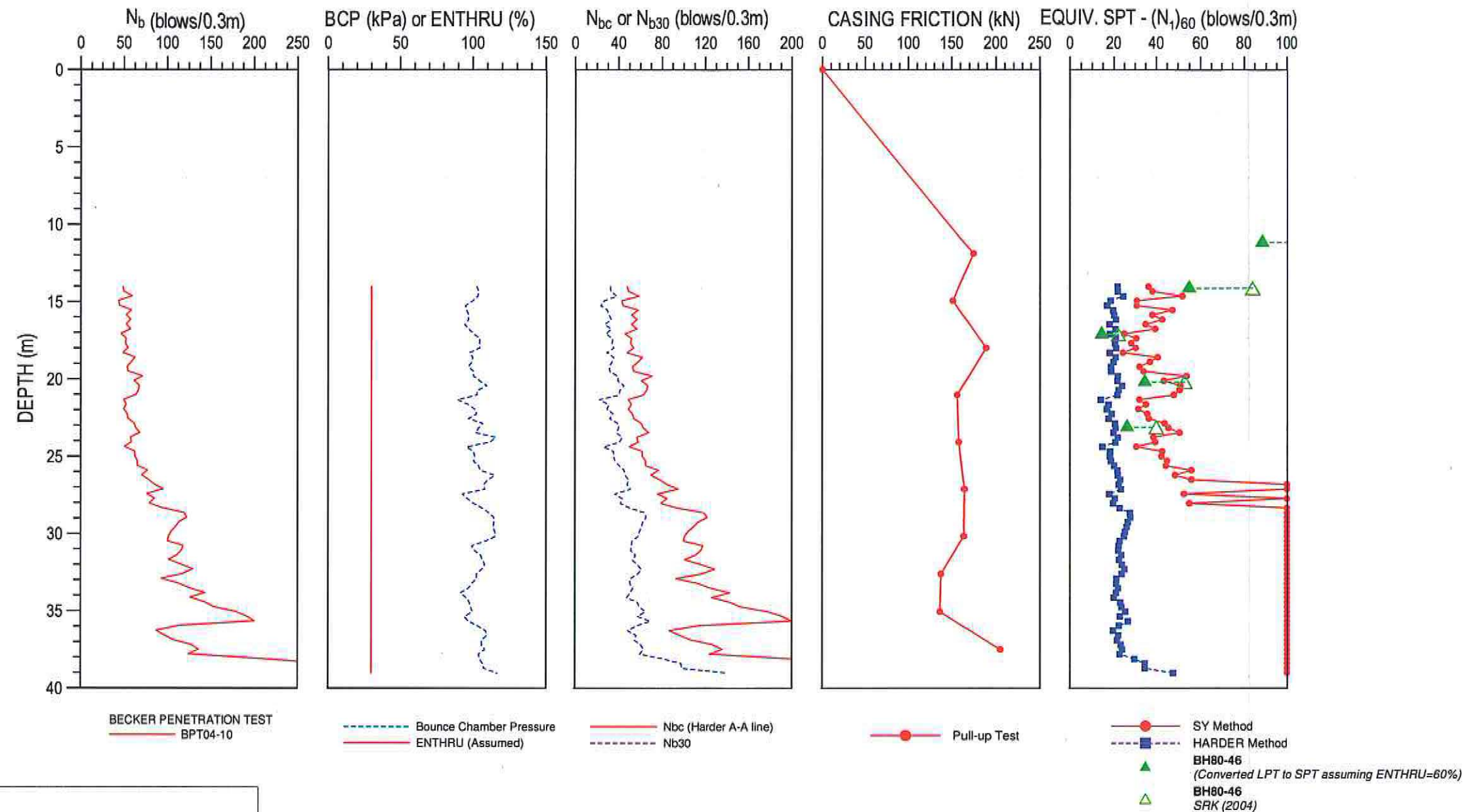


LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N_{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N_{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N_{bc} , to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, N_{b30} , and measured or computed shaft resistance to account for soil friction effect

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				TITLE	
				BPT DATA INTERPRETATION FOR BPT04-09B	
				PROJECT NO:	M 09237 A01
				FIGURE NO:	09B



LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N_{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N_{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N_{bc} , to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, N_{b30} , and measured or computed shaft resistance to account for soil friction effect

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TITLE

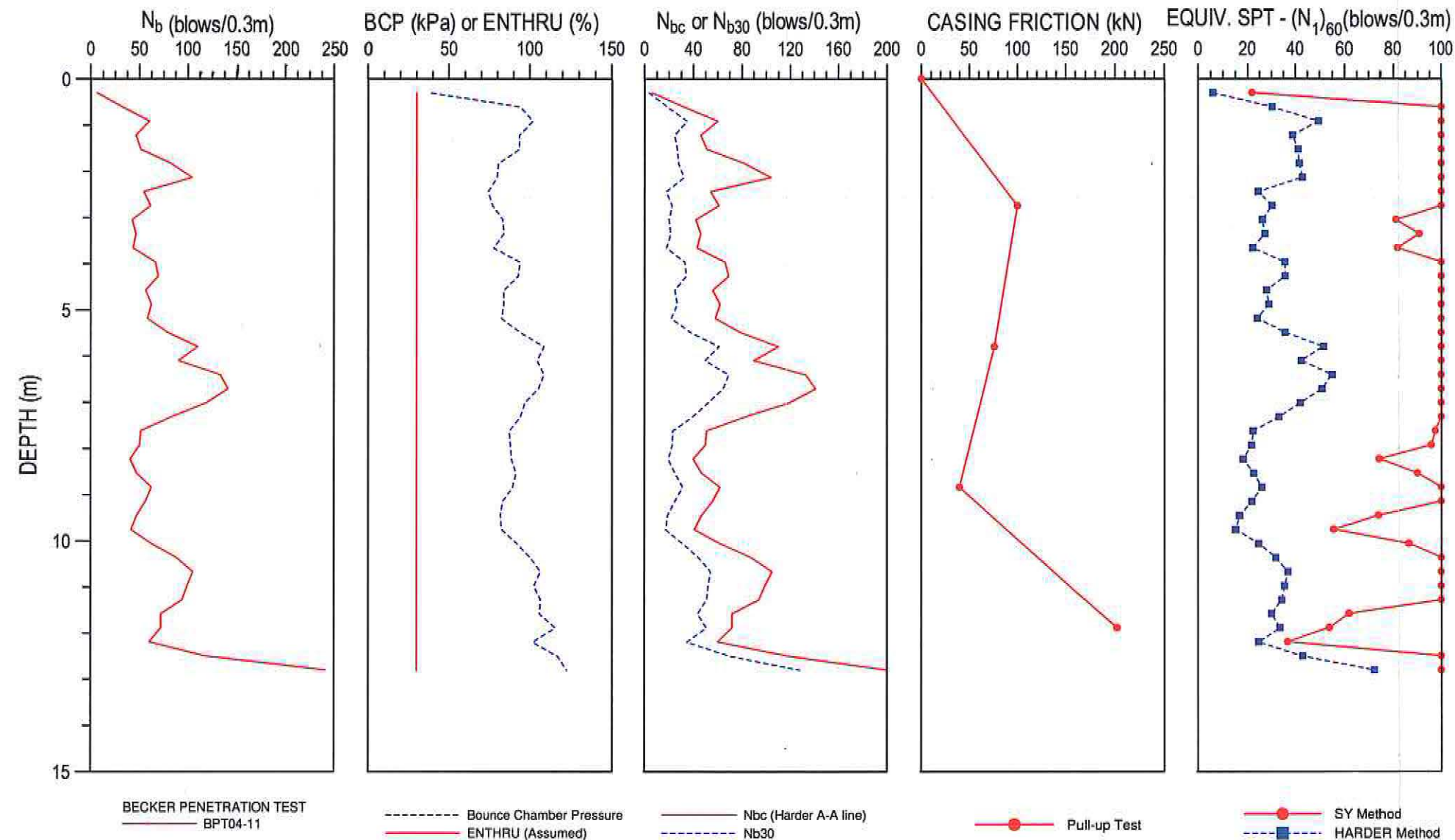
BPT DATA INTERPRETATION FOR BPT04-10

PROJECT NO.

M 09237 A01

FIGURE NO.

10



LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N_{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N_{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N_{bc} , to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, N_{b30} , and measured or computed shaft resistance to account for soil friction effect

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PROJECT

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TITLE

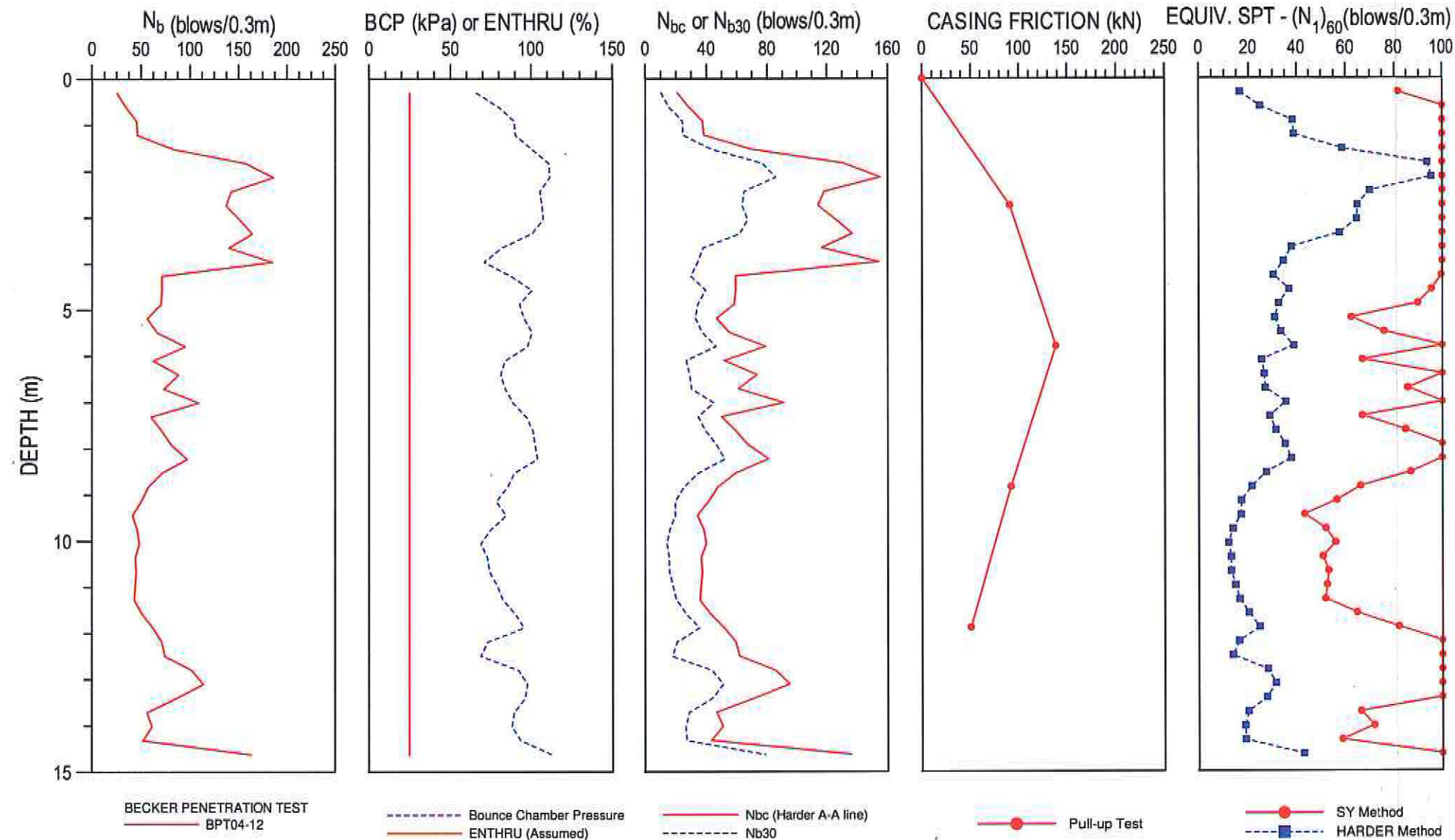
BPT DATA INTERPRETATION FOR BPT04-11

PROJECT NO.

M 09237 A01

FIGURE NO.

11



LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N_{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N_{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N_{bc} , to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, N_{b30} , and measured or computed shaft resistance to account for soil friction effect

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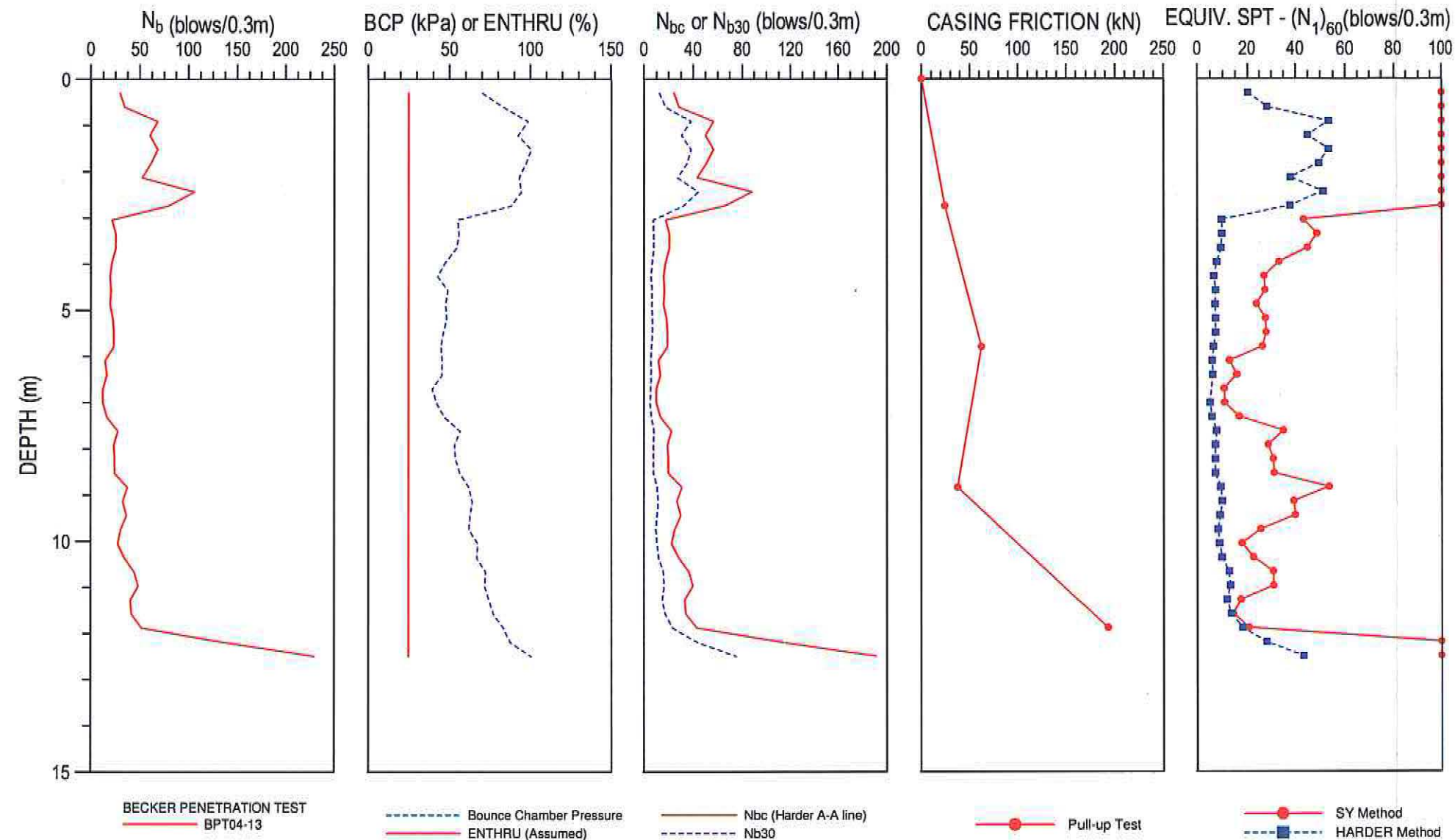


PROJECT
ROSE CREEK TAILINGS LIQUEFICATION

TITLE
BPT DATA INTERPRETATION FOR BPT04-12

PROJECT NO.
M 09237 A01

FIGURE NO.
12



LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
Nbc	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
Nb30	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, Nbc, to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, Nb30, and measured or computed shaft resistance to account for soil friction effect

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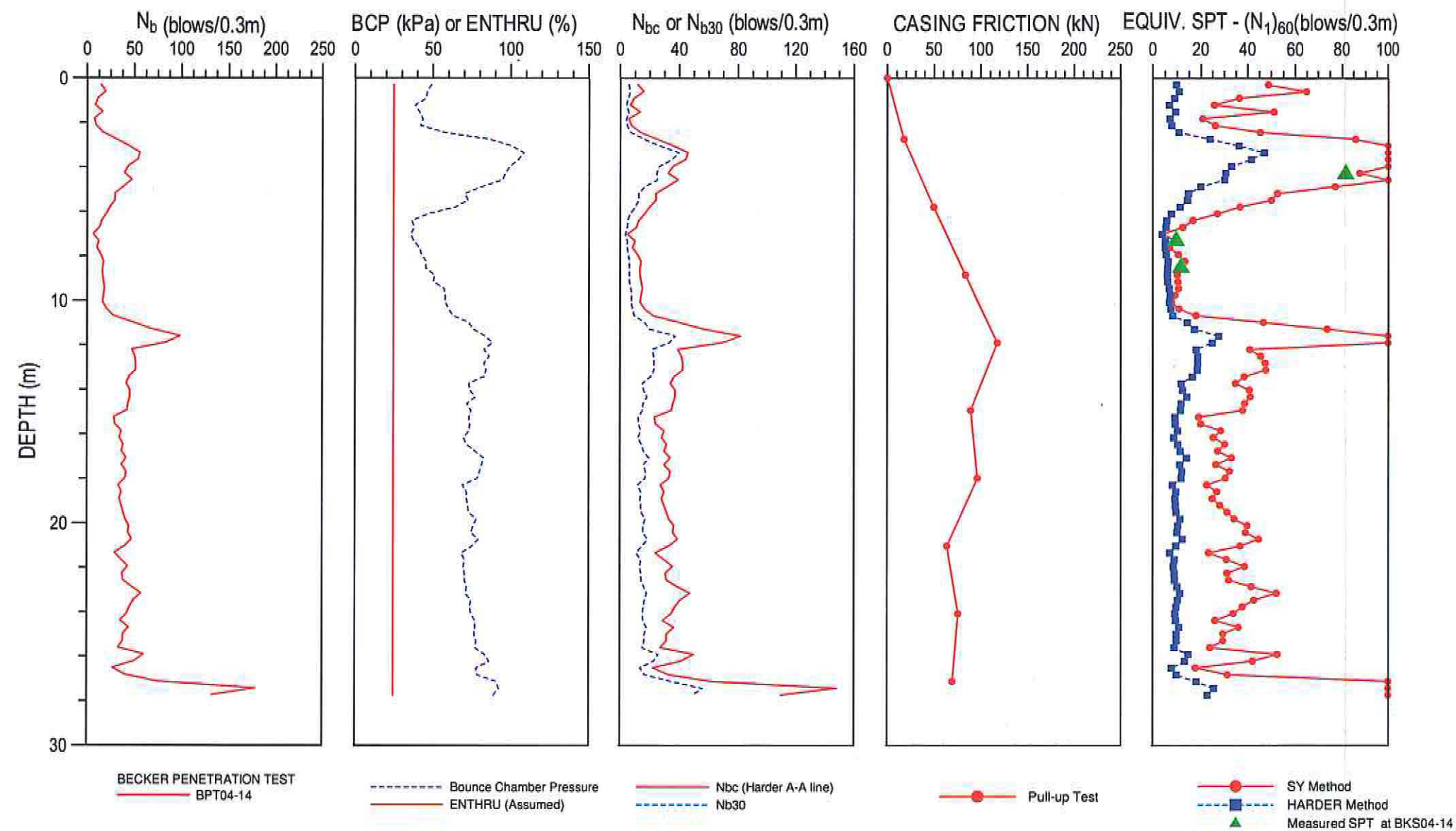
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PROJECT	ROSE CREEK TAILINGS LIQUEFICATION	
TITLE	BPT DATA INTERPRETATION FOR BPT04-13	
PROJECT NO.	M 09237 A01	FIGURE NO. 13



LEGEND

N_b	Measured BPT blow counts per 0.3 m
ENTHRU	Measured transferred energy as % of hammer rated energy
BCP	Measured bounce chamber pressure
N_{bc}	Corrected BPT blow counts to a constant combustion condition using Harder rating curve (1986)
N_{b30}	Corrected BPT blow counts to 30% reference energy of the rated energy for the ICE 180 hammer
HARDER method	Seed and Harder (1986) method for standardizing measured BPT blow counts to a constant combustion condition using measured bounce chamber pressures and correlation of the corrected blow count, N_{bc} , to the equivalent SPT N_{60}
SY Method	SY (1993) method for correcting measured BPT blow counts to the 30% reference energy level and estimation of the equivalent SPT N_{60} using the corrected blow count, N_{b30} , and measured or computed shaft resistance to account for soil friction effect

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PROJECT

ROSE CREEK TAILINGS LIQUEFICATION

TITLE

BPT DATA INTERPRETATION FOR BPT04-14

PROJECT NO.

M 09237 A01

FIGURE NO.

14