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LEGACY PARKW

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January 26, 2002

DEPARTMENT OF TRANSPORTATION

Mr. Greg McDonald Utah Geologic Survey 1594 W. North Temple Salt Lake City, UT 84116

Re: Snowbasin Exploratory Boring Information

Dear Greg:

As you requested, I have copied the information relating to the exploratory borings for which Leslie Heppler in the UDOT Geotechnical Division, transferred the core samples to the UGS.

In reviewing the Snowbasin Materials Report (3/99) prepared by our final geotechnical consultant on the project (Landslide Technology/Portland, OR), in additional to Borings B-205 and B-209 that you indicated you had received core samples for, I felt that all 7 borings drilled by them in the vicinity of the alignment might be useful for your records; so included are the logs for Borings B-203 through B209. Also provided are the two site plans showing the borehole locations, the Overall Site Plan showing their relative locations along the alignment, and the core sample photographs for the specific borings (3 photos of each).

Lastly, regarding the associated lab testing you requested. I have provided the text of the Laboratory Testing section, and the individual lab summary table that addresses the tests performed for Borings B-205 and B-209. As you can see, it appears that the only lab tests performed on the two borings consisted of an expansion/reactivity test, and 5 pointload tests. However, the Plasticity Chart and other lab testing information that I've provided on other explorations may be of some general use in relation to those two borings.

Hope this information is of use to you.

Sincerely,

in

Jim Higbee Geotechnical Oversight Engineer

Leslie Heppler cc:

4. LABORATORY TESTING

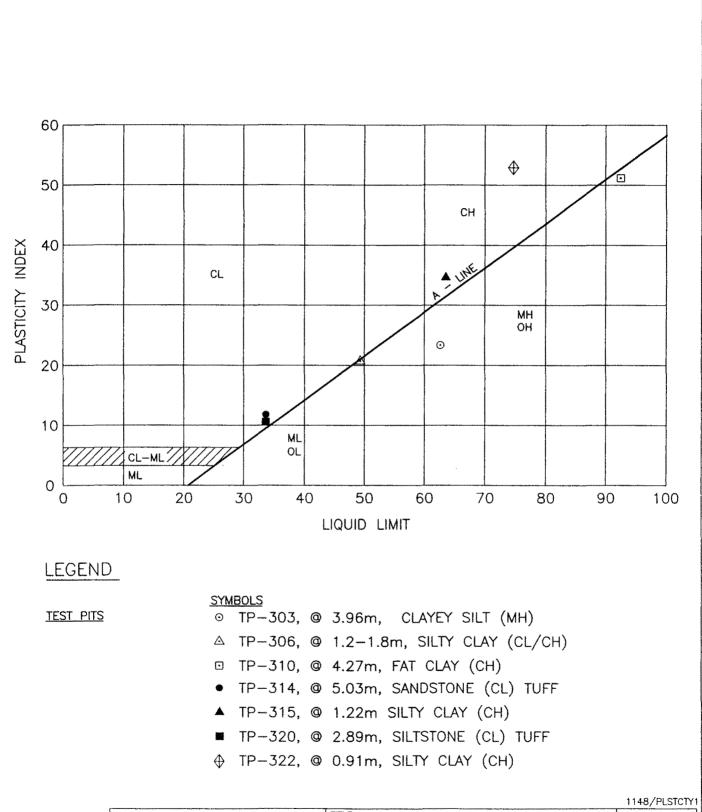
Laboratory testing was performed on samples taken from the field borings and test pits. The results of those tests are shown on the Summary Boring Logs and the Summary Test Pit Logs and within this appendix. Samples obtained from the exploratory borings and test pits were visually re-examined in the laboratory to confirm the field classifications. In addition to visual classification, other classification tests included: natural moisture contents, plastic and liquid limits (Atterberg Limits) on selected soil and tuff samples, and pocket penetrometer in the overburden materials. The bedrock core was tested by performing point Load Strength Index testing, slake durability and ethylene glycol testing for expansive clays/claystone. The slake durability testing was performed by the Oregon Department of Transportation Materials Laboratory in Salem, Oregon. All of the other testing was accomplished in Landslide Technology's own laboratory.

Laboratory testing performed by REI (which has been made available) is contained in Appendix B. Tests included Atterberg Limits, gradation analyses, pH/corrosivity, R-value, consolidation, unconfined compressive strength, direct shear strength, swell-consolidation, and permeability.

Additional laboratory test results are contained in Appendices C, D and E for Cache Road and the intersection area at Trappers Loop Highway.

4.1. Atterberg Limits

Atterberg Limits tests were performed on eight samples taken from the test pits and were determined in general accordance with ASTM D 423 Standard Test Method. Liquid limit, plastic limit and plasticity index values are shown on the Summary Test Pit Logs, in the "Summary of Laboratory Tests" table, and plotted on the Plasticity Chart (Fig. 4-1).



	Landslide Technology	TITLE	PLASTICITY CHART	DATE MAR 1999 JOB NO. 1148
	10250 S.W. Greenburg Rd. Portland, OR 97223	JOB	SNOWBASIN ACCESS ROAD WEBER COUNTY, OREGON	FIG. 4-1

4.2. Slake Durability Tests

A total of three slake durability tests were performed on samples of the Norwood Tuff bedrock to determine their slake durability classification. Slake durability index is the percentage, by dry mass, of a collection of rock pieces retained on a No. 10 sieve after two cycles of oven drying and 10 minutes of soaking in water with standard tumbling and abrasion action. The slake durability tests were performed by the Oregon Department of Transportation Materials Laboratory in Salem, Oregon on three composite samples:

- Sample A silty sandstone pieces taken from TP-314, TP-319 and TP-322.
- Sample B slightly clayey, sandy siltstone pieces taken from TP-320 and TP-323.
- Sample C slightly sandy, clayey siltstone pieces taken from TP-316 and TP-325.

The test results are summarized below:

Sample	Water Content	Slake Durability, Id
A: Silty SANDSTONE	5%	49.9%
B: Sandy SILTSTONE	20.9%	0.1%
C: Clayey SILTSTONE	21.2%	20.4%

TABLE 4-1 Slake Durability Test Results

The slake durability index is a means to compare the relative weathering resistance of clay-bearing rocks. It is also an indication of the possibility for slaking upon being exposed to air and to alternating cycles of wetting and drying. The index is also used to assess the durability of the rock when used in structural fills and may be represented as follows (Gamble):

Slake Durability Id	Classification
< 98%	Very high durability
95-98%	High durability
85-95%	Medium high durability
60-85%	Medium durability
30-60%	Low durability
< 30%	Very low durability

The test results indicate the tuff rock materials to have very low to low durability. There may be layers of more resistant rock which were not tested. However, it should be anticipated that the tuff, in general, would not be durable and would need special treatment if exposed in steep cut slopes or used in embankment fills.

4.3. Expansive/Reactive Clay Test

Reactive clay minerals such as montmorillonite have a crystalline structure with an affinity for water that can create excessive volume change within the parent rock. Ethylene glycol is one of the materials that reacts with the swelling clays of the montmorillonite group to form an organo-clay complex having a larger basal spacing than that of the clay mineral itself. A sample of stone containing swelling clay of the montmorillonite group will be expected to undergo expansive breakdown upon soaking in ethylene glycol. If such a breakdown occurs, it may be expected that similar breakdown may occur if similar rock is exposed, for longer times, to wetting and drying or freezing and thawing in a saturated condition.

The test procedure was done in general accordance with Corps of Engineers, CRD-C 148-69, "Method of Testing Stone for Expansive Breakdown on Soaking in Ethylene Glycol." Three samples were subjected to ethylene glycol soaking. The samples consisted of:

- claystone taken from boring B-205;
- sandstone taken from boring B-206; and
- a composite sample consisting of decomposed tuff taken from test TP-314, S-2, and clayey silt (decomposed tuff) taken from test pit TP-316, S-2.

The samples from B-205, B-206 and TP-314 had little to no reaction after soaking. The sample from TP-316 did undergo expansive breakdown upon soaking in ethylene glycol. This latter test may indicate the presence of swelling clay of the montmorillonite group; however, it should be noted that the clayey silt could experience the same behavior after prolonged soaking in water. Based on the test results from the slake durability tests (section 4.2), some of the materials present at the site are not durable. Considering this, and observations from the ethylene glycol soaking, the materials tested above may need special treatment if exposed in steep cut slopes or used in embankment fills.

4.4. Point Load Tests

A total of 11 point load strength index tests were performed on the bedrock tuff core samples. The point load strength index is an indicator of strength obtained by subjecting a rock specimen to an increasingly concentrated point load, applied through a pair of truncated, conical platens, until failure. The failure load is used to calculate the point load test strength index and to estimate the uniaxial compressive strength of the rock core sample. All tests were performed diametral (load applied along the axis of the diameter) with the core samples length/diameter ratio greater than one. It should be noted that the load applied to the tuff cores was in the direction of the laminations present in the rock. Testing was performed in accordance with the procedures of ASTM D 5731-95. The test results are presented in Table 4-2.

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					Estim Unia: Compre Stren	xial essive
Boring No.	Depth (m)	Rock Type	Point Load Strength Index Is (MPa)	Size-corrected Point Load Strength Index Is(50) (MPa)	(MPa)	(psi)
B-205	16.52-16.73	Tuff	0.084	0.105	2.625	380
B-205	19.23-19.45	Claystone Tuff	0.068	0.087	2.175	320
B-206	13.99-14.11	Claystone Tuff	0.077	0.097	2.425	350
B-206	15.09-15.24	Claystone Tuff	0.083	0.105	2.625	380
B-206	16.67-16.82	Sandstone Tuff	0.104	0.132	3.300	480
B-208	13.72-13.87	Tuff	0.081	0.096	2.400	350
B-208	15.70-15.85	Claystone Tuff	0.064	0.080	2.000	290
B-208	16.70-16.89	Tuff	0.101	0.127	3.175	460
B-209	14.94-15.12	Siltstone Tuff	0.038	0.048	1.200	170
B-209	15.45-15.61	Siltstone Tuff	0.069	0.087	2.175	320
B-209	16.67-16.86	Siltstone Tuff	0.141	0.178	4.450	650

TABLE 4-2 Point Load Test Results

Note: All rock cores were classified according to relative hardness as "Extremely Soft" or "Very Soft" in accordance with the ODOT Soil and Rock Classification Manual.

4.5. Summary of Test Results

Table 4-3 summarizes the test results obtained by Landslide Technology for samples of overburden materials and Norwood Tuff. For "Type of Test": W = Natural Moisture Content, LL = Liquid Limit moisture content, PL = Plastic Limit moisture content, PI = Plasticity Index (LL-PL), and PP = Pocket Penetrometer, approximate unconfined compressive strength (Q_{u}).

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TABLE 4-3 **Summary of Laboratory Tests**

Boring/ Test Pit Sample No. Type of No. (depth, m) Material Test* Results B-205 R-2 (16.52–16.73) Tuff Point Load 2.6 MPa **B-205** R-4 (19.23-19.45) **Claystone Tuff** Point Load 2.2 MPa B-206 Point Load R-1 (13.99-14.11) **Claystone Tuff** 2.4 MPa B-206 R-2 (15.09-15.24) **Claystone** Tuff Point Load 2.6 MPa B-206 R-3 (16.67-16.82) Sandstone Tuff Point Load 3.3 MPa B-207 S-5 (6.6 - 7.2)SANDY CLAY (CL) W 23% (10.8 - 10.9)W B-207 S-8B CLAYEY SAND (SC) 12% B-207 S-8A (10.7 - 10.8)SANDY CLAY (CL) W 19% W B-207 S-16 (19.8)Sandstone Tuff 11% B-207 S-19 (22.9 - 23.1)**Claystone Tuff** W 15% B-208 S-3 (3.1 - 3.7)SILTY CLAY (CL) W 22% S-6 **B-208** (6.1 - 6.7)SILTY CLAY (CL) W 25%S-9 W **B-208** SILTY CLAY (CL) 23% (9.1 - 9.8)S-12A (12.2-12.6) CLAY (CL) W 22% B-208 W Tuff B-208 S-12B (12.6-12.8) 21% R-1 (13.72-13.87) Tuff Point Load 2.4 MPa **B-208** Point Load B-208 R-2 (15.70-15.85) **Claystone Tuff** 2 MPa **B-208** Point Load 2 MPa R-3 (16.70-16.89) Tuff **B-209** Siltstone Tuff Point Load 1.2 MPa R-4 (14.94–15.12)

Siltstone Tuff

Siltstone Tuff

(cont'd)

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B-209

B-209

R-4 (15.45-15.61)

R-5 (16.67-16.86)

Landslide Technology

2.2 MPa

4.5 MPa

Point Load

Point Load

1148

ELEV.	DEPTH IN METERS	MATERIAL DESCRIPTION	SA	MPLES	GROUND WATER	Pt	ENETR	ATI	DARD ON TE R 0.30			LEG	END
	E E E E E E E		NO.	S.P.T.	DEPTH				30 4				0.051 m S.P.T.
1		SANDY CLAY (CL) MEDIUM STIFF, red—brown, gravelly, sandy clay (TILL)					, 		- · - ·				SAMPLE
ĺ			1	22	, I	Ŀ	· · · ·					*	SAMPLE NOT RECOVERED
[П		:	·		· ·			 , ,	0.076 m THIN WAL
			2	21	2	·	· .•			• •			SAMPLE
				24	2	÷	1:	V	•••			1	PITCHER SAMPLE
949	2.9		1	zz 50/	3		11	T				X	IMPERVIOUS SEAL
		CLAYEY GRAVELS (GC), DENSE with Quartzite COBBLES and BOULDERS in matrix of medium	4	0.10m		·			• •	· · .	≯-		WATER LEVEL
		stiff to stiff red-brown, slightly gravelly, slightly	6	30			. I			/.			PIEZOMETER TIP
		sandy to sandy clay (TILL)		۴ 1	*	•	. .		*				
			6	2259/ 0.20m	5		. •		• •	$\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{$	>▲ -•	- -•,	- NATURAL
947	5.3		┨	20	5	·			<u> </u>				WATER CONTENT
		SANDY CLAY (CL), STIFF to VERY STIFF, occasional boulders and cobbles, red-brown	'	20	c		: 17						PLASTIC LIN
		(TILL)	8	17	6	·	· •		• •			•	WATER CONTENT
				22			1		· ·				
					. 7	•	· · h	T	• •			NOT	ŁS
			9	17	_				•••				TERIAL DESCRIPTION D INTERFACES ARE
				44	8	·		T	• •			INT	ERPRETIVE AND
									•••				GRADUAL.
943	9,1	Bottom of Boring: 9.1 meters	1		9	·							TER LEVEL IS FOR
							· · ·		· ·			MA	Y VARY WITH TIME
					10			1	• •				YEAR.
							· · ·		• •	•			
					11			1	• •				
									• •				
					12	•			• •				
									•••				
					13		•		• •				
									• •				
					14	·		1	• •				
									•••				
					15	·			• • •				
									• •				
					16	· ·		T					
									•••				
					17	·							
									•••				
					18		• • •						
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					19	·		1				l	
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					20			\uparrow	• •				
					21		· · ·		••• •••	•••			
0.01	L		<u> </u>	1.1	<u> </u>	<u></u>	TITLE				L	<u> </u>	1148/BORLOG DATE
		PC Explorations RT 1/27/99 FINISH 1/27/99	Lar	n dslide	v			MN				IG LO	DG FEB 1999
		RT <u>1/27/99</u> FINISH <u>1/27/99</u> TECHNIQUE <u>0.127m O.D. TUBEX</u>		hnolog	y reenburg f 97223		100			3-2		ROAD	JOB NO. 1148
		1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +	TUZ2		reenourg i	.						00.00	

Ξũ		1		GROUND	STANDARD		T
DEPTH IN METERS	MATERIAL DESCRIPTION		MPLES	WATER	PENETRATION TEST BLOWS PER 0.305 m		LEGEND
<u>E E E E E E E E E E E E E E E E E E E </u>	SURFACE ELEV. (m) 1956 SANDY CLAY (CL), medium stiff, red-brown, gravelly (TILL)		S.P.T.	DEPTH			0.051 m S.P.T. SAMPLE * SAMPLE NOT RECOVERED
	becomes VERY STIFF at 2.2 meters	2 3 4	10 14 32 15	2			U 0.076 m THIN WALL SAMPLE PITCHER SAMPLE IMPERVIOUS SEAL WATER LEVEL
	zone of gravels at 4.6 meters	[18 20	4 5			PIEZOMETER TIP
1950 5.6	SANDY CLAY (CL), very stiff, light brown-gray, slightly sandy CLAY; trace fine gravel, mottled appearance (TILL)		24 46	6		51%	CONTENT PLASTIC LIMIT WATER CONTENT IN PERCENT
1949 7.0	SANDY CLAY (CL), stiff, gray sandy CLAY; trace gravel, slickensides (SLIDE ZONE?)	9	26	7			NOTES 1. MATERIAL DESCRIPTIONS AND INTERFACES ARE
1947 8.5	SILTY TO FAT CLAY (ML/CH), hard, brown-gray, trace sand (WEATHERED TUFF)	10	51	9		▲	INTERPRETIVE AND ACTUAL CHANGES MAY BE GRADUAL. 2. WATER LEVEL IS FOR DATE SHOWN AND
1946 9.6	Bottom of Boring: 9.6 meters			10			MAL VARY WITH TIME OF YEAR.
				11			
				13			
				14			
				15			
				16 17			
				18			
				19			
				20 21			1148/BORLOG02
DATE STA	PC Explorations ART 1/29/99 FINISH 1/29/99 TECHNIQUE 0.127m O.D. TUBEX	Tec	dslide hnolog	•	SUMMARY BO	02	G LOG DATE FEB 1999 JOB NO.
SYSTEM		Portla	, 3. . G ind, OR	reenburg R 97223	d. JOB SNOWBASIN AC WEBER COUL	CESS NTY, L	ROAD FIC 7 O

ELEV.	ERS N	MATERIAL DESCRIPTION	SA	MPLES	INSTRUM.			LEGEND
	MEP	SURFACE ELEV. (m) 1971	NO.	C.S.	INSTALL.	▲BLOWS PER 0.305 m 0 10 20 30 40		U 0.076m DIA. CAL.
		CLAYEY GRAVEL (GC), very stiff, brown, quartzitic	1			(SEE NOTE 4)		SPLIT SPOON SAMPLE (C.S.) SEE NOTE 3
		gravels (TILL)	1	G		· · · · · · · · · · · · · · · · · · ·		* SAMPLE NOT RECOVERED
					2			G GRAB SAMPLE OF CUTTINGS
1969		CLAYEY GRAVELS (GC)/SILTY GRAVELS (GM), very	2	79		· · · · · · · · · · · · · · · · · · ·		IMPERVIOUS SEAL
		stiff, brown, slightly sandy, moist, w/occasional to scattered cobbles and boulders (TILL)	3	G	, ,			WATER LEVEL
		boulder from 4.34.7 meters			4			PIEZOMETER TIP LIQUID LIMIT
		cobbles, approx. 150 millimeters boulder from 5.5—5.6 meters	4	80	5		_	NATURAL WATER
			5	G				PLASTIC LIMIT
			6	70	6			WATER CONTENT IN PERCENT
			7	G	7			NOTES 1. MATERIAL DESCRIPTIONS AND INTERFACES ARE
1963	7.6	SILTY CLAY (CL), soft to stiff brown, with gravels and cobbles, wet (TILL)	8	29	8			INTERPRETIVE AND ACTUAL CHANGES MAY BE GRADUAL.
1962	8.8	CLAYEY SILT (ML), medium stiff to soft,		G	9			2. WATER LEVEL IS FOR DATE SHOWN AND MAY VARY WITH TIME
1961	9.8	brown, slightly gravelly, sandy, verry wet, with cobbles/boulders (TILL)	10	9				OF YEAR. 3. CALIF. SPLIT SPOON
		SANDY CLAY (CL), medium stiff to stiff,	11	G	10			SAMPLE WAS DRIVEN FOUR 0.305m LENGTHS WITH AN
		brown, slightly gravelly, with quartzite cobbles and boulders (TILL)	12	15	11			AUTO. HAMMER. TEST WAS
			13	G	12			TERMINATED WHEN A BLOW OF 100 PER INCREMENT WAS
			14	24	, ~			REACHED. C.S. BLOW COUNTS SHOWN ARE FOR THE
			15	G	13			SECOND & THIRD 0.305m INCREMENTS.
1957	13.7	CLAYEY GRAVELS (GC) to GRAVELS (GP) dense, red brown, slightly clayey, (TILL)	16	26	14			4. SLOTTED 0.03m DIAMETER PVC STANDPIPE INSTALLED
			17	G	15			TO 36.6m. SLOTTED PVC FROM 30.5 TO 36.6m.
			18	19				5. VIBRATING WIRE (VP) PIEZOMETER SENSOR,
			19	G	16	VP SENSOR WITH		SINCO MODEL 52611020, 50 PSI, ATTACHED TO SINCO
				H	17	TID AT 17 0m	6)	DATA LOGGER MODEL 52613300 AT TOP
			20	G	18	· · · · · · · · · · ·	,	OF BORING. 6. VIBRATING WIRE SENSOR (VP) ATTACHED
1953	18.3	CLAYEY SAND (SC), medium dense, red brown with gravel grades to a gray, slightly silty CLAY	21	26				PVC STANDPIPE AND WRAPPED WITH
1952	19.2	(CL) (TILL)			19			NON-WOVEN GEO- TEXTILE. 7. BORING WAS
		BOULDERS and COBBLES, with quartzite grovels and gray CLAY (TILL)	22	G	20		- 	BACKFILLED WITH 8-10 SAND AND TOP 0.61m SEALED
		(see next page)			21			WITH CONCRETE. 1148/BORLOG05
DRILL	ER	Lang Exploratory Drilling	lon	dslide	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			C LOC EER 1999
11		RT 2/5/99 FINISH 2/9/99		shnolog	у	SUMMARY B B-203 (1 of	
	ING	TECHNIQUE Reverse Circulation, with	1025 Porti	0 S.W. G and. OR	reenburg i 97223			ROAD 510
0.1330	n trico	ne bit and 0.076m California Split Spoon Sampler				WEBER COU	NTY, U	FIG.3-3A

ELEV.	TH IN	MATERIAL DESCRIPTION	s/	AMF	PLES	INST			SA	t sp Mpli	NG			LE	GEND
	₽¥	SURFACE ELEV. (m) 1971	NO		C.S		ALL.	0	_OWS 10 2	0 3	0.305 0 40	m		Н	0.076m DIA. CAL.
		(see previous page for description)		П				~		NO		•			SPLIT SPOON SAMPLE (C.S.) SEE NOTE 3
1950	21.3	CLAYEY GRAVELS (GC), very dense, red-brown						Ľ.	Î.	•		\		*	SAMPLE NOT
		(TILL)	23	G			22		<u> </u>	·		\mathcal{A}			RECOVERED
								ŀ	1.	•] •	• •	·)	\	H	GRAB SAMPLE
1948	22.7		┥	Н	178/									G	OF CUTTINGS
		CLAYEY SAND (SC), very dense, red-brown, angular to subangular, to SAND and GRAVEL	24	B	0.27m		23	<u> </u>	- I	_			T	1	
		(GC) (TILL)												12	IMPERVIOUS SEAL
			25	G			24	·	1.	· ·	• •	·		14	
1947	24.4			Ш			24	·	İ ·	. [.	•••				WATER LEVEL
1947	2.4.4	SILTY SAND (SM), very dense, red-brown, fine	26	B	100/				1.		• •	:	^-		PIEZOMETER TIP
		to medium grained, trace gravel to SAND and			0.13m		25		t						
		GRAVEL (GC) angular to subangular quartzitic	27	' G					į		· ·	:			NATURAL
		with occasional cobbles (TILL)		Ц				•	¦	. .		•			WATER
							26		<u>† </u>						CONTENT
			28	I G				·	ŀ ·	• •	• •	·			- PLASTIC LIMIT
							27		Ļ	·	• •			•	WATER CONTENT
				Н				·	r :	• •	• •	•			IN PERCENT
			29		169/ 0.25m				T	. .		.	T		TES
					0.25m		28		t						ATERIAL DESCRIPTIONS
			30) G					ŀ •	. .					TERPRETIVE AND
			1	Ш			29	·	• 	· .	• •	·			CTUAL CHANGES MAY
		boulders from 28.9-29.8 meters					23		1	.] .	• •				
			31					;	Ľ		•••	.			ATER LEVEL IS FOR
				ΪĬ			30		ļ					M	AY VARY WITH TIME
1940	30.5		4	Н	107/				L I		•••	:			FYEAR.
		CLAYEY SAND (SC), with gravels, white-pink, fine to coarse grained	32		193/ 0.23m		74	•	• •		• •	•	T	1 -	ALIF. SPLIT SPOON AMPLE WAS DRIVEN
1939	31.1		4	Π	0.2000		31		• •				/		OUR 0.305m
		CLAYEY GRAVEL (GC), dense to very dense,	33	G				1	· · · ·		· ·	1	/		ENGTHS WITH AN
		red—brown, quartzie gravels with occasional cobbles (TILL)		Н			32					_/			UTO. HAMMER. EST WAS
									· · · ·		•••	:/			ERMINATED WHEN A
			34	G				1.	· ·	. .	• •	11		-	LOW OF 100 PER
			1				33	T.				1.			ICREMENT WAS EACHED. C.S.
		white SAND and GRAVEL at 33.5 meters	35		42			1 ·	• •		· · ·/	·			LOW COUNTS
		white shirt and signall at 55.5 meters	100	Ĥ	12		34				· · ·				HOWN ARE FOR THE
								·	• •		• •	·			ECOND & THIRD .305m INCREMENTS.
			36	G							• •				LOTTED 0.03m
			1	Н			35			. 1 .					IAMETER PVC
		boulders at 35.1 meters							<i>.</i> .						TANDPIPE INSTALLED 36.6m. SLOTTED
			37	G			36	•	•••	·	· ·				VC FROM 30.5
								•		• •	• •	·		1 1) 36.6m.
1934	36.6	Bottom of Boring: 36.6 meters	+	+					•••		•••	:			BRATING WIRE (VP) IEZOMETER SENSOR.
		, , , , , , , , , , , , , , , , , , ,					37								INCO MODEL
														5	2611020, 50 PSI, ITACHED TO SINCO
							38	•	•••		• •	·			ATA LOGGER MODEL
							50	•	· ·		۰.	•			2613300 AT TOP F BORING.
								:	•••		•••	:		1	BRATING WIRE
															ENSOR (VP) ATTACHED
						1		1	· ·		•••	:		P	VC STANDPIPE AND
			1					•		• •		-			RAPPED WITH ON-WOVEN GEO-
															EXTILE.
									•••		· ·	÷1			ORING WAS
								ļ							ACKFILLED WITH
								:	· · · ·		•••	:		<u>ј</u> т(OP 0.61m SEALED
						1		.		. .	• •			W	ITH CONCRETE. 1148/BORLOG06
L	L		<u> </u>			<u>L</u>		L	TITLE					1	
11	_	Lang Exploratory Drilling			slide						ARY	R	ORIN	GI	OG FEB 1999
DATE	STA	RT <u>2/5/99</u> FINISH <u>2/9/99</u>			nolog	Ŋ			00		203		2 of		
DRILL	ING	TECHNIQUE Reverse Circulation, with	1025	50 :	s.w. G	reenb	urg R	d.	JOB				CESS		1148
11		ne bit and 0.076m California Split Spoon Sampler	Port	land	d, OR	97223	5		-:	WEF	DASIN		VTY, L	коа Лан	^P FIG.3-3b
									L					- 17 18 1	

	H N RSN	MATERIAL DESCRIPTION	SAMPLES	INSTRUM.	STANDARD PENETRATION TEST		LEGEND
ELEV.	METE	SURFACE ELEV. (m) 1960	NO. S.P.T.	INSTALL	BLOWS PER 0.305 m 10 20 30 40		0.051 m S.P.T.
	_	GRAVELLY CLAY (CL), medium stiff to stiff,			(SEE NOTE 3)		SAMPLE
		red—brown, sandy (TILL)	1 6				* SAMPLE NOT RECOVERED
							U 0.076 m THIN WALL
			2 25	2			HIP PITCHER SAMPLE
		seam of black organics at 2.5 meters	3 17				N/
		GRAVEL, COBBLES, BOULDERS	4 20	3-			IMPERVIOUS SEAL
			5 50/				WATER LEVEL
1955	5.3	GRAVEL (GP), dense with white-pink, clayey	⁵ 20.11m	4		>	
		sand matrix, red—brown (TILL)	6 48	5-	1 1 1 j 1 1 1 1 1	·	
			7 32				WATER CONTENT
				6			WATER CONTENT
		VERY HARD from 6.6 to 7.6 meters	8 34				IN PERCENT
				7-			NOTES
1952	7.6	SILTY GRAVEL, (GM) to CLAYEY GRAVELS (GC)	9 30				1. MATERIAL DESCRIPTIONS AND INTERFACES ARE
		sandy, with pockests of sandy clay, and clayey sand, medium dense to dense, red-brown		8-			INTERPRETIVE AND ACTUAL CHANGES MAY
		(TILL)		9-			BE GRADUAL.
			10 19		:+::4		2. WATER LEVEL IS FOR DATE SHOWN AND
				10-	· [· ·] · · · ·		MAY VARY WITH TIME OF YEAR.
							3. SLOPE INDICATOR (SI) CASING (0.07m)
			11 26	11-			INSTALLED TO DEPTH OF 29.2m.
							4. VIBRATING WIRE (VP) PIEZOMETER SENSOR,
		BOULDER from 12 to 12.5 meters	12 50/	12-		X	SINCO MODEL 52611020, 50 PSI,
			0.01m	1 13-			ATTACHED TO SINCO DATA LOGGER MODEL
							52613300 AT TOP OF BORING.
			13* 31	14	· · · · · · · · · · · · · · · · · · ·		5. VIBRATING WIRE SENSOR (VP)
							ATTACHED TO SI CASING WITH 10-20
				15-	<u></u>		SAND AND WRAPPED
		(GC), coarse sands to coarse gravels, with	14*23		:::: 17 ::::		GEOTEXTILE. 6. BORING WAS
		red-brown CLAY from 15 to 18 meters		16-			BACKFILLED WITH CEMENTBENTONITE
				17-	\vdots \vdots \vdots \cdot		TREMIE GROUT.
					TIP AT 17.7m		
				18	SETE NOTES 4 &	5)	
			15 31		1141 411		
				19			1
			16 41	20-	··· \		
1939	20.8	(see description on next page)		21			1148/BORLOG03
		PC Explorations	<u>i</u>		TITLE		DATE
11	-	RT 1/29/99 FINISH 2/4/99	Landslide Technolog	3Y	SUMMARY BOB	DRIN 1 of	GLOG FEB 1999 2) JOB NO.
DRIL	LING	TECHNIQUE 0.127m O.D. TUBEX	10250 S.W. 0 Portland, OR	Greenburg Ro 97223	I. JOB SNOWBASIN AC	CESS	ROAD 1148
SYS	STEM				WEBER COU	NTY, U	FIG. 3-4a

ELEV.	DEPTH IN METERS	MATERIAL DESCRIPTION	SA	MPLES	INST			ION TEST		LEG	END
	ME	SURFACE ELEV. (m) 1960	NO.	S.P.T.	INST	ALL.	▲ BLOWS P 0 10 20	30 40		H	0.051 m S.P.T.
939	20.8	SANDY CLAY (CL), verty stiff to hard, brown and gray, slightly gravelly, Quartzite gravels and	17	31			(SEE	NOTE 3)			SAMPLE
		sand, fine to coarse, subrounded (TILL)				22	· · ·] .		_	*	SAMPLE NOT RECOVERED
										Ŧ	IMPERVIOUS SEAL
			18	55		23				Ĩ₹ ▼	WATER LEVEL
				Π					IT ·		PIEZOMETER TIP
				2 50/		24	· · · .		-11		
935		GRAVEL (GC), medium dense, with clay and	1 19	0.10m			₽ :	· · · · ·		1	WATER NATURAL
		slightly clayey SAND, red-brown, gravel is white-pink quartzite, SAND is fine to medium				25	· ·] ·				CONTENT PLASTIC LIMIT
		grained, (TILL)				26					WATER CONTENT
			20	62/ 0.29m		20	1141	· · · ·			IN PERCENT
				0.23(1)		27	· · · · · ·		41		
			21	60			111	· · · · ·			
						28			X	NOT	ES
											TERIAL DESCRIPTIONS
			22	25	L	29			-	INT	D INTERFACES ARE TERPRETIVE AND
				224			· · · ·	· · · ·			TUAL CHANGES MAY GRADUAL.
						31			-		TER LEVEL IS FOR TE SHOWN AND
1929	30.5	Bottom of Boring: 30.5 meters	1			74	· · · ·	· · · · ·		MA	Y VARY WITH TIME
						31	• • • •		1		OPE INDICATOR (SI)
									_		SING (0.07m) STALLED TO DEPTH
							• • • •			OF	29.2m. RATING WIRE (VP)
										PIE	ZOMETER SENSOR,
							· · · ·			52	611020, 50 PSI, TACHED TO SINCO
									-	DA	TA LOGGER MODEL 613300 AT TOP
										OF	BORING. BRATING WIRE
									-	SE	NSOR (VP) TACHED TO SI
							· · · · ·	· · · ·		CA	SING WITH 10-20 ND AND WRAPPED
								- • • •	1	IN	NON-WOVEN OTEXTILE.
										6. BO	RING WAS
										CE	CKFILLED WITH MENT-BENTONITE
							• • • •		_		EMIE GROUT.
									-		
									-		
									-		
								· · · ·			1148/BORLOGO4
	FP	PC Explorations	<u> </u>	<u>1 </u>	L		TITLE		_ <u>_</u>	<u>.</u>	DATE
		RT 1/29/99 FINISH 2/4/99	Lar	ndslide shnolog	v		SUM	MARY 	BORIN	GL	OG FEB 1999 JOB NO.
		TECHNIQUE 0.127m O.D. TUBEX		iD S.W. G and, OR	-	urg f		-204 OWBASIN			1148
SYS			Portl	and OR	97223	н ¹	1 314	VEBER CC	~~~C33	NUAL	['] FIG.3-4b

EV. H	METERS	MATERIAL DESCRIPTION	SA	MP	LES	INST		SPLIT SPOON SAMPLING BLOWS PER 0.305 m		LEGEND
	3¥	SURFACE ELEV. (m) 2002	NO.	·П	C.S.		* 16	0 10 20 30 40		* SAMPLE NOT
		SANDY CLAY (CL), brown, cobbley (OLD LANDSLIDE DEBRIS)	1	G				(ŞEE NOTE 4)		G GRAB SAMPLE OF CUTTINGS
		cobbles and boulders encountered from 1.5 to 4.0 meters — based on drill action					2			IMPERVIOUS SEAL
			2	G				· · · · · · · · · · ·		WATER LEVEL
				Н			3	· · · · · · · · · · ·		
		brown and gray	3	G			4	· · · · · · · · · · · · · · · · · · ·		LIQUID LIMI NATURAL WATER CONTENT PLASTIC LI
			4	G			5			WATER CONTENT IN PERCENT
		gray with quartzite gravel sized fragments recovered	5	G			6	· · · · · · · · · · ·		
		cobble at 7.2	6	G			7			NOTES
			7	G			8	· · · · · · · · ·		1. MATERIAL DESCRIPTIC AND INTERFACES ARI INTERPRETIVE AND ACTUAL CHANGES MA
93 8		CLAYEY GRAVEL (GC) with cobbles and boulders, red-brown, quartzite gravel-sized fragments		Ц			9	· · · · · · · · · · · · · · · · · · ·		BE GRADUAL. 2. WATER LEVEL IS FOR
		recovered as cuttings (GLACIAL TILL/OLD LANDSLIDE DEBRIS?)	8	G			10			DATE SHOWN AND MAY VARY WITH TIME OF YEAR.
				H			11			3. CORE DRILLED FROM 14.9-19.8m.
990 12	22		9	G			12	-VP SENSOR WITH		4. SLOPE INDICATOR (S CASING (0.07m) INSTALLED TO DEPT 19.8m.
		SANDY CLAY (CL), red-brown, drills softer (OLD LANDSLIDE DEBRIS?)	10	G		ľ	13	TIP AT 12.5m (SEE NOTES 5 & 6)		5. VIBRATING WIRE (VP) PIEZOMETER SENSOR SINCO MODEL 52611020, 50 PSI,
			11	G			14	· · · · · · · · · · · · · · · · · · ·		ATTACHED TO SINCO DATA LOGGER MODEL 52613300 AT TOP OF BORING.
987 1	5.2	EXTREMELY SOFT, (R-0), gray-green, slightly		┝	RECV.		15		RQD	6. VIBRATING WIRE SENSOR (VP) ATTACI TO SI CASING WITH
		weathered, CLAYSTONE, highly fractured, with laminations at approximately 20° from horizontal; SOFT (R1) claystone bed from 17	R- R-	-+-	92 100		16		63 100	10-203 AND WRAPF WITH NON-WOVEN GEOTEXTILE.
		to 18.4 meters	R-	3	100		17		73	7. BORING WAS BACKFILLED WITH CEMENT-BENTONITE GROUT.
				Ĭ			18		,,,	
		HARD CLAY decomposed RO claystone from 18.4 to 19.6 meters	R-	4	100		19		100	
982 19	9.8	Bottom of Boring: 19.8 meters					20	· · · · · · · · · · · · · · · · · · ·	ang tang para dan sebara dara da	
							21	Anne and a state of the state o		1148/BORLO
ATE S	STA	RT 2/3/99 FINISH 2/3/99	Tec	chn	lide volog	-		SUMMARY BI B-20)5	JOB NO.
		TECHNIQUE <u>Reverse Circulation</u> , with icone bit and 0.102m "P" core barrel.	1025 Portl	50 S land	i.w. G , OR	reenb 97223	urg 1 5	Rd. JOB SNOWBASIN AC	CESS	ROAD FIC -

LEV.	DEPTH IN METERS	MATERIAL DESCRIPTION	SA	AM F		INST				SPOON PLING ER 0.305 m		LEGEND
	μñ	SURFACE ELEV. (m) 1996	NO.	·	C.S.				0 10 20		1	* SAMPLE NOT RECOVERED
995		SILTY CLAY (CL) dark brown, silty, occasional gravel, organics	1	G					(SEE N	OTE 4)		G GRAB SAMPLE
330		GRAVELLY CLAY (CL), with occasional cobbles and boulders (quarzite), light gray (OLD LANDSLIDE DEBRIS)	2	G				1	• •	· · · · ·	-	H OF CUTTINGS
				Н				2	• • • •			IMPERVIOUS SEAL
			3	G				3				
		BOULDER from 4-4.6 meters	4	G				4	· · · · ·			LIQUID LIMI NATURAL WATER CONTENT
			5	G				5	* * * *			PLASTIC LIN WATER CONTENT
		relatively soft and wetter from 5.7 to 6.7 meters — based on drilling action	6	G				6	· · · · ·	· · · · ·		IN PERCENT
		COBBLES from 7.3 to 8.5 meters, CLAY includes frequent cobbles and gravels based on		Н				7	, , , , , ,			NOTES
		drilling action could be a CLAYEY GRAVEL (GC)	7	G				8				1. MATERIAL DESCRIPTIO AND INTERFACES ARE INTERPRETIVE AND ACTUAL CHANGES MA BE GRADUAL.
			8	G			-	9	· · · ·	· · · ·		2. WATER LEVEL IS FOR DATE SHOWN AND MAY VARY WITH TIME OF YEAR.
985	11		9	G				1 1	· · · · ·	· · · · ·		3. CORE DRILLED FROM 13.7-17.4m.
		gray clayey, WEATHERED TUFF, dry	10	G			1	12	VP. SEN	SOR WITH		4. SLOPE INDICATOR (S CASING (0.07m) INSTALLED TO DEPT 24.4m.
983		CLAYSTONE, extremely SOFT to VERY SOFT (R-O TO R-1), brown green, slightly weathered, (NORWOOD TUFF), highly fractured, laminations at 30° from horizontal, damp	3	<u>6</u> 6		-		13	TIP AT	12.7m OTES 5 &	6)	5. VIBRATING WIRE (VP) PIEZOMETER SENSOR SINCO MODEL
			R-	- [RECD. 7 100			14			RQD. % 34	52611020, 50 PSI, ATTACHED TO SINCO DATA LOGGER MODEL 52613300 AT TOP OF BORING.
		SOFT (R2), gray slightly weathered	R–	2	100		1	15			-	6. VIBRATING WIRE SENSOR (VP) ATTACK
		SANDSTONE, highly fractured, laminated to thinly bedded 25° from horizontal from15.2 to 16 meters (NORWOOD TUFF)	R-	3	98		-	16			30	TO SI CASING WITH 10-203 AND WRAPF WITH NON-WOVEN GEOTEXTILE.
				┯┦				17				7. BORING WAS BACKFILLED WITH CEMENT-BENTONITE
			13	G				18				GROUT.
			14	G				19		· · · · ·		
				Ц				20	• • • •			
			15	G				21	• • • • • • <i>•</i> •	· · · ·		1148/BORLOG
		Lang Exploratory Drilling			slide	<u>i (</u>	<u> </u>	<u>= '1</u>		MARY B		G LOG FEB 199
RILI	ING	RT <u>2/5/99</u> FINISH <u>2/9/99</u> TECHNIQUE <u>Reverse Circulation, with</u>			n olog s.w. G 1, OR	•	burç 3	, R	d. JOB _{SN}	-206 (OWBASIN A	1 of CCESS	2) JOB NO. 1148
2.13	Sm tr	icone bit and 0.102m "P" core barrel.			<i>α</i> , υπ	41 6L	ب		V V	VEBER COL	INTY, U	FIG.3-6

DEPTH IN	TERS	MATERIAL DESCRIPTION	S/	MPLES	INSTRUM INSTALL.		SAM	SPOON PLING		LEGEND
DE	ž	SURFACE ELEV. (m) 1996	NO	. <u>C.S.</u>		0	10 20	30 40		* SAMPLE NOT RECOVERED
		CLAYSTONE, SOFT (R1), brown/gray, based on cuttings		H		ŀ÷	- (SEE N	OTE 4)		I I
	ľ	cuttings								G GRAB SAMPLE OF CUTTINGS
			16	G	22	· ·				OF CUTTINGS
];	· · ·		•	N.
				Н	23					IMPERVIOUS SEAL
			17	G						WATER LEVEL
			11		24		•••			
972 24	1.4			Ц			· · ·	· · ·	-	
		Bottom of Boring: 24.4 meters			0.5	.	· · ·			
					25	<u>ا</u>	· · ·			WATER
							· · ·		:	CONTENT PLASTIC LIM
						-		<u> </u>		
										WATER CONTENT IN PERCENT
						<u> </u>			·	
						:	· · ·		:	
						.				
						·				NOTES
	- [· · ·			1. MATERIAL DESCRIPTION
										AND INTERFACES ARE
										ACTUAL CHANGES MAY
							· · ·	· · ·	·	BE GRADUAL.
							· · ·		:	2. WATER LEVEL IS FOR DATE SHOWN AND
						.	• • •			MAY VARY WITH TIME OF YEAR.
						·				UF TEAK.
							· · ·			3. CORE DRILLED FROM 13.7-17.4m.
						-			_	
										4. SLOPE INDICATOR (SI) CASING (0.07m)
						Ļ.			·	INSTALLED TO DEPTH
									:	27.700.
							• • •			5. VIBRATING WIRE (VP)
						ŀ				PIEZOMETER SENSOR, SINCO MODEL
										52611020, 50 PSI,
			1			<u> </u>	• • •			ATTACHED TO SINCO DATA LOGGER MODEL
									•	52613300 AT TOP OF BORING.
							~~~~			
							• • •		·	6. VIBRATING WIRE SENSOR (VP) ATTACHI
						·			•	TO SI CASING WITH 10-203 AND WRAPPE
						·	• • •			WITH NON-WOVEN
										GEOTEXTILE.
						<u> </u>				7. BORING WAS BACKFILLED WITH
									·	CEMENT-BENTONITE GROUT.
ł						1:	· · ·			
						<u> </u>	• • •		<u> </u>	
						·			<u>.</u>	
1			ł			<u> </u>				
									•	
				11	<u> </u>	<u> </u>		<u> </u>	<u> </u>	1148/BORLOG
RILLEF	R	Lang Exploratory Drilling	Lor	ndslide			TITLE	MADY		DATE NG LOG FEB 1999
		RT 2/5/99 FINISH 2/9/99	Tec	shnolog	у		SUM R	-206	(2 o	NG LOG <u>FEB 1999</u> f 2) JOB NO.
		TECHNIQUE Reverse Circulation, with	â	-	reenburg i 97223	Rd.			ACCESS	1148
			d n	1 00	07007 °		I SN	INVERNIN	ALLESS	UTAH FIG.3-6

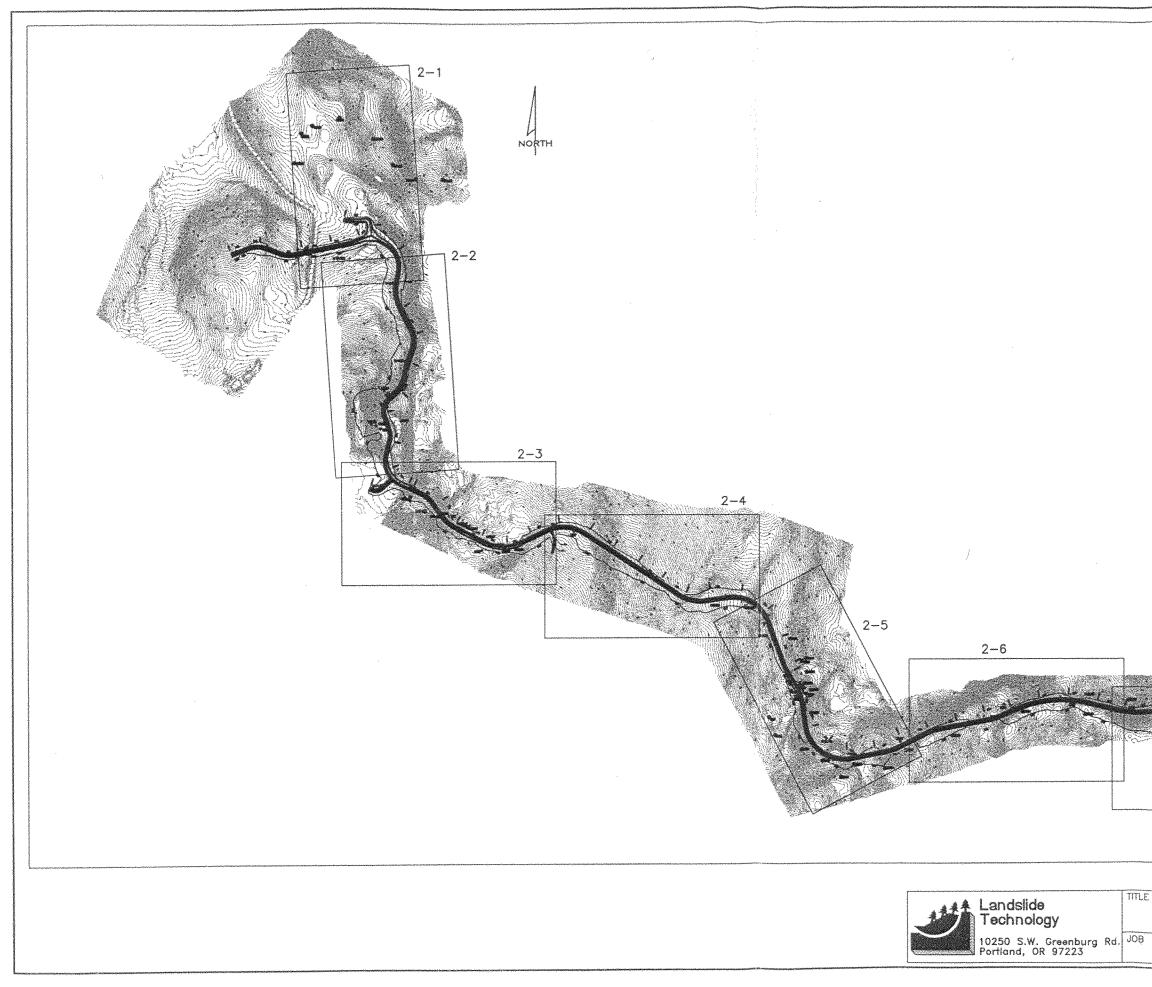
ELEV.	ERS N	MATERIAL DESCRIPTION	ŞA	MPLES	P	STRU		SPLIT SI SAMPL	ING		LEGEND
	MEP	SURFACE ELEV. (m) 1991 CLAYEY SAND (SC), brown, slightly clayey	NO.	C.S.		STAL		▲BLOWS PER 0 10 20 3			0.076m DIA. CAL. SPLIT SPOON SAMPLE (C.S.) SEE NOTE 3
		boulders at 0.9 to 1.4 meters	1	C			$\backslash$	(SEE. NO	TE .5).		* SAMPLE NOT RECOVERED
1989	1.5	CLAYEY GRAVEL (GC); brown, with occasional					1	· · · · ·	• • • •		G GRAB SAMPLE OF CUTTINGS
		quartzite cobbles and boulders (TILL)	2	G			2		· · · ·		IMPERVIOUS SEAL
							3				WATER LEVEL
		cobbles and boulders 3.7-4.6 meters	3	G			4		· · · · ·		PIEZOMETER TIP
		boulders at 5.6-6.6 meters	4	G			5 6		· · · · ·		PLASTIC LIMIT WATER CONTENT IN PERCENT NOTES
1984 1983		SANDY CLAY (CL), stiff to very stiff, brown with gravel	5 6				7	· · · · · · · · · · · · · · · · · · ·			1. MATERIAL DESCRIPTIONS AND INTERFACES ARE INTERPRETIVE AND ACTUAL CHANGES MAY
1300	7.0	slightly clayey, fine to coarse SAND (SC), with gravel, dark brown clay	7	G			8	· · · · · · · · · · · · · · · · · · ·	· · · · ·		BE GRADUAL. 2. WATER LEVEL IS FOR DATE SHOWN AND MAY VARY WITH TIME
		boulders at 8.8 meters					9		· · · · ·		OF YEAR. 3. CALIF. SPLIT SPOON SAMPLE WAS DRIVEN
1980	10.7		8				10		· · · · ·		FOUR 0.305m LENGTHS WITH AN AUTO. HAMMER.
1960	10.7	SILTSTONE, sandy extremely SOFT (R0) to SOFT (R2) weathered (NORWOOD TUFF)	10	⊠100/ 0.04r G			11		· · · · ·		TEST WAS TERMINATED WHEN A BLOW OF 100 PER INCREMENT WAS
			R-	RECD. 1 89	X		12 13	-		I RQD. <b>%</b> 56	REACHED. C.S. BLOW COUNTS SHOWN ARE FOR THE SECOND & THIRD 0.305m INCREMENTS.
							14	···· j · · · ·	· · · · ·		4. CORE DRILLED FROM 12.2-13.6 AND FROM 23.1-25.6m.
		recoverd fine to coarse clayey sand from cuttings, drilled smooth and like tuff	11	G			15		· · · · ·		5. SLOPE INDICATOR (SI) CASING (0.07m) INSTALLED TO DEPTH
		probably inter layered claystone, siltstone and sandstone tuff	12				16		· · · · ·		25.6m. 6. VIBRATING WIRE (VP) PIEZOMETER SENSOR,
		(quartzite gravel/slough)	13 14	100, 0.05r G			17		7.8m [.] [.]	7	SINCO MODEL 52611020, 50 PSI, ATTACHED TO SINCO DATA LOGGER MODEL 52613300 AT TOP OF BORING.
1972		CLAY, smooth drilling	15	G			18 19		· · · · ·		7. VIBRATING WIRE SENSOR (VP) ATTACHED TO SI CASING WITH 10-203 AND WRAPPED WITH NON-WOVEN
1971	19.5	SANDSTONE and CLAYSTONE, cuttings are silty SAND; extremely soft (R0) to very soft (R1) to very soft (R1), weathered to medium weathered, brown (NORWOOD TUFF)	16 17	G 0.08	T		20 21		· · · · ·	<b>A</b>	GEOTEXTILE. 8. BORING WAS BACKFILLED WITH CEMENT-BENTONITE GROUT. 1148/BORLOG10
DATE	STA	RT 2/10/99 FINISH 2/12/99	Төс	idslide hnolo	gy			B-		1 of	G LOG DATE FEB 1999 JOB NO.
		TECHNIQUE <u>Reverse Circulation, with</u> icone bit and 0.102m "P" core barrel	Portle	0 S.W. and, OR	972	223	g R	1 21101	WBASIN AG	CCESS NTY, U	ROAD FIC 7 7

	MATERIAL DESCRIPTION	SAN	IPLES	INSTRI	JM.	SPLIT SPOON SAMPLING		LEGEND	)
CEPTH -		NO.	C.S.	INSTA		▲BLOWS PER 0.305 n 0 10 20 30 40		SPLIT	M DIA. CAL. SPOON SAMPLI
	SANDSTONE and CLAYSTONE, cuttings are silty SAND; extremely soft (R0) to very soft (R1), weathered to medium weathered, brown		-		21	$\begin{array}{c c c c c c c c c c c c c c c c c c c $		SAMP	SEE NOTE 3 LE NOT VERED
	(NORWOOD TUFF) silty SAND in cuttings	18			22			G GRAB	SAMPLE
	slightly sandy CLAY in cuttings	19	100/ 0.10m RECD.9		23		RQD. X	X	RVIOUS SEAL
	SOFT (R2), brown with gray SANDSTONE thinly bedded with inclinations 18' to 22' from horizontal	R-2	81	1	24		68	1222   ▼ WATEI	R LEVEL
						(SEE NOTE 5)	<u> </u>	PIEZO	DMETER TIP
1065 25 6		R-3	100		25		96		NATURAL WATER
1965 25.6	Bottom of Boring: 25.6 meters				26	· · · · · · · · · · · · · · ·		$>$	CONTENT - PLASTIC LIMIT
						· · · · · · · · · · · · · · · · · · ·		IN P	R CONTENT ERCENT
						· · · · · · · · · ·			L DESCRIPTIONS ERFACES ARE
						· · · · · · · · · · ·		INTERPR ACTUAL	ETIVE AND CHANGES MAY
						· · · · · · · · · · · ·			LEVEL IS FOR LEVEL IS FOR
						· · · · · · · · · · ·		OF YEAF	
									SPLIT SPOON WAS DRIVEN
						· · · · · · · · ·		LENGTH AUTO. I	s with an Hammer.
						· · · · · · · · · · ·			AS ATED WHEN A DF 100 PER
ł						· · · · · · · · · · ·		INCREM REACHE	ENT WAS D. C.S.
								SECONE	ARE FOR TH
						· · · · · · · · · · ·		4. CORE D	
						· · · · · · · · · · ·		FROM 2	2.2-13.6 AND 3.1-25.6m.
								CASING INSTALLI	INDICATOR (SI) (0.07m) ED TO DEPTH
						· · · · · · · · ·		25.6m. 6. VIBRATIN PIEZOME	IG WIRE (VP)
								SINCO 1 526110	
						· · · · · · · · · ·	-	DATA LC 526133	DGGER MODEL 00 AT TOP
								OF BOR	
								TO SI C 10-203	ASING WITH
						· · · · · · · · · ·		GEOTEX	
							4		WAS LED WITH BENTONITE
			<u> </u>	<u> </u>					1148/BORLOG
DATE STA	ART 2/10/99 FINISH 2/12/99	Tech	dslide nnolog			SUMMARY E B-207 (	2 of	G LOG 2)	FEB 1999 JOB NO.
	TECHNIQUE <u>Reverse Circulation, with</u> ricone bit and 0.102m "P" core barrel.	10250 Portla	S.W. ( nd, OR	Greenbur 97223	ng R	d. JOB SNOWBASIN A WEBER COL	CCESS JNTY, U	ROAD ITAH	<u>1148</u> FIG.3-7t

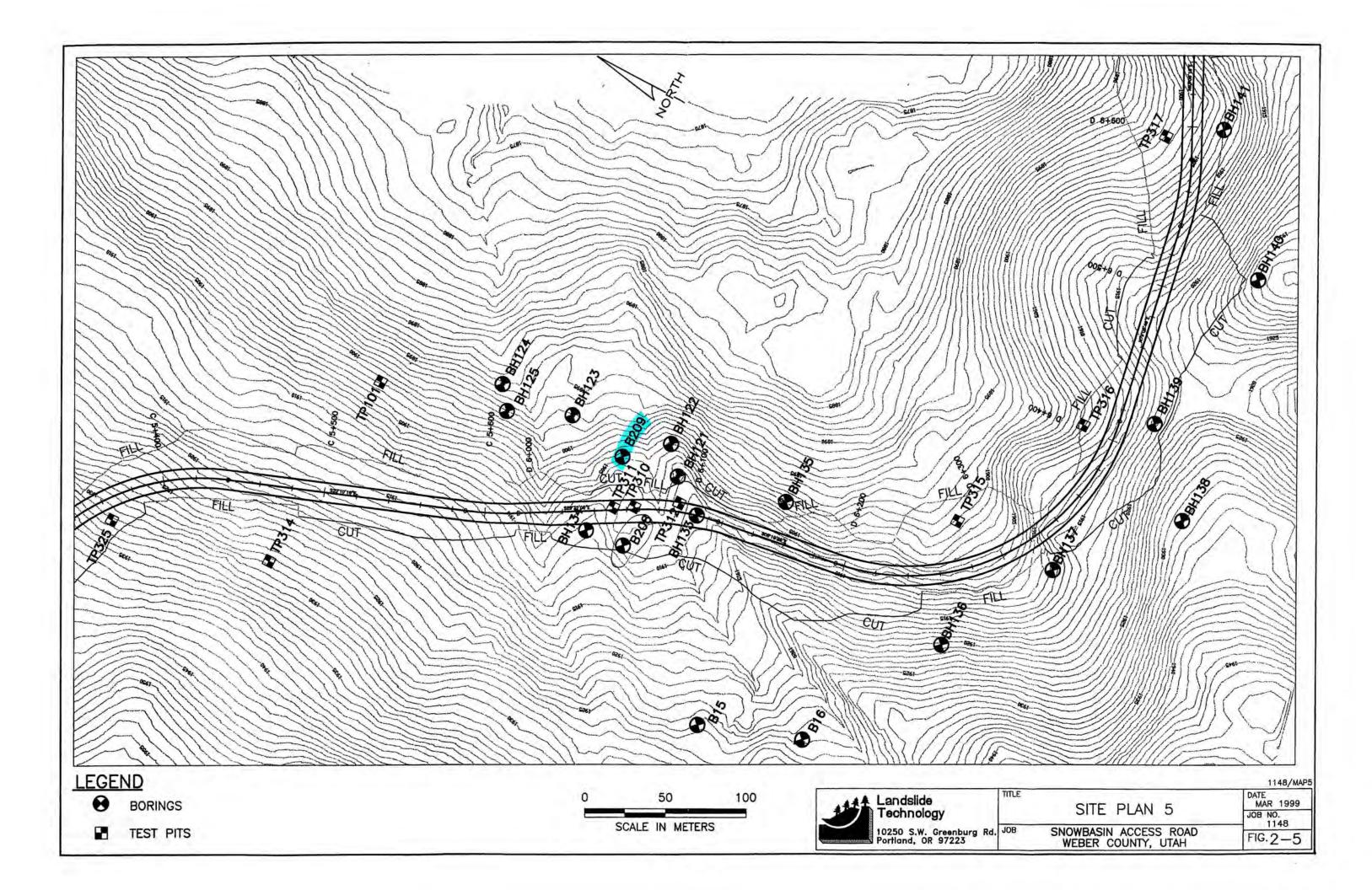
ELEV.	TH IN TERS	MATERIAL DESCRIPTION	SAMPLES	INSTRUM.	LEG	END
ELEV.	DEPTH I METERS	MATERIAL DESCRIPTION SURFACE ELEV. 1907 SILTY CLAY (CL), stiff to very stiff, brown, with cobbles and boulders (scattered and in layers) (OLD LANDSLIDE DEBRIS)	SAMPLES NO. C.S 1 G 2 G 3 16 4 G 5 G 6 31 7 G 8 G	INSTALL.	NOT 1. MATINA 2. WAT MAT	D.076m DIA. CAL. SPLIT SPOON SAMPLE (C.S.) SEE NOTE 3 SAMPLE NOT RECOVERED GRAB SAMPLE OF CUTTINGS IMPERVIOUS SEAL WATER LEVEL PIEZOMETER TIP LIQUID LIMIT NATURAL WATER CONTENT PLASTIC LIMIT WATER CONTENT IN PERCENT
1895 1896		VERY STIFF gray-brown CLAY INTERBEDDED EXTREMELY SOFT (R0) to VERY SOFT (R1), gray-brown, moderately weathered, clayey SILTSTONE and CLAYSTONE; occasional sandy layers, (NORWOOD TUFF)	9 31 10 G 11 G 12 139 R-1 78 R-2 100	10 11 12 13 14 15	 3. CAI SAV FOU LEN AU TES TEF BLC NNC REA BLC SHU SEC CO.3 33 4. COI 13. 5. SLC CAS 70 INS OF 6. VIB	LIF. SPLIT SPOON APLE WAS DRIVEN JR 0.305m IGTHS WITH AN IO. HAMMER. ST WAS RMINATED WHEN A DW OF 100 PER REMENT WAS ACHED. C.S. DW COUNTS DWN ARE FOR THE COND & THIRD 05m INCREMENTS. RE DRILLED 2-17.5m DPE INDICATOR (SI) SING (0.07m) TALLED TO DEPTH 24.4m. RATING WIRE (VP)
		clayey silt with sand—size rock fragments on drill cuttings	R-3 100	16 17 18 19 20 21	90 521 DA 521 0F 7. VIE SE TO 10 10 10 8. BO 8. BO BA CE	ZOMETER SENSOR, CO MODEL 511020, 50 PSI, ACHED TO SINCO [A LOGGER MODEL 513300 AT TOP BORING. IRATING WIRE NSOR (VP) ATTACHED SI CASING WITH -20 AND WRAPPED NON-WOVEN OTEXTILE. RING WAS CKFILLED WITH MENT-BENTONITE EMIE GROUT. 1148/BORLOG12
DATE DRILL	STA .ING	Lang Exploratory Drilling RT <u>2/14/99</u> FINISH <u>2/15/99</u> TECHNIQUE <u>Reverse Circulation</u> , with ficone bit and 0.102m "P" core barrel.	Landslide Technolog 10250 S.W. G Portland, OR	IY	1 of 2) CCESS ROAD	DG FEB 1999 JOB NO.

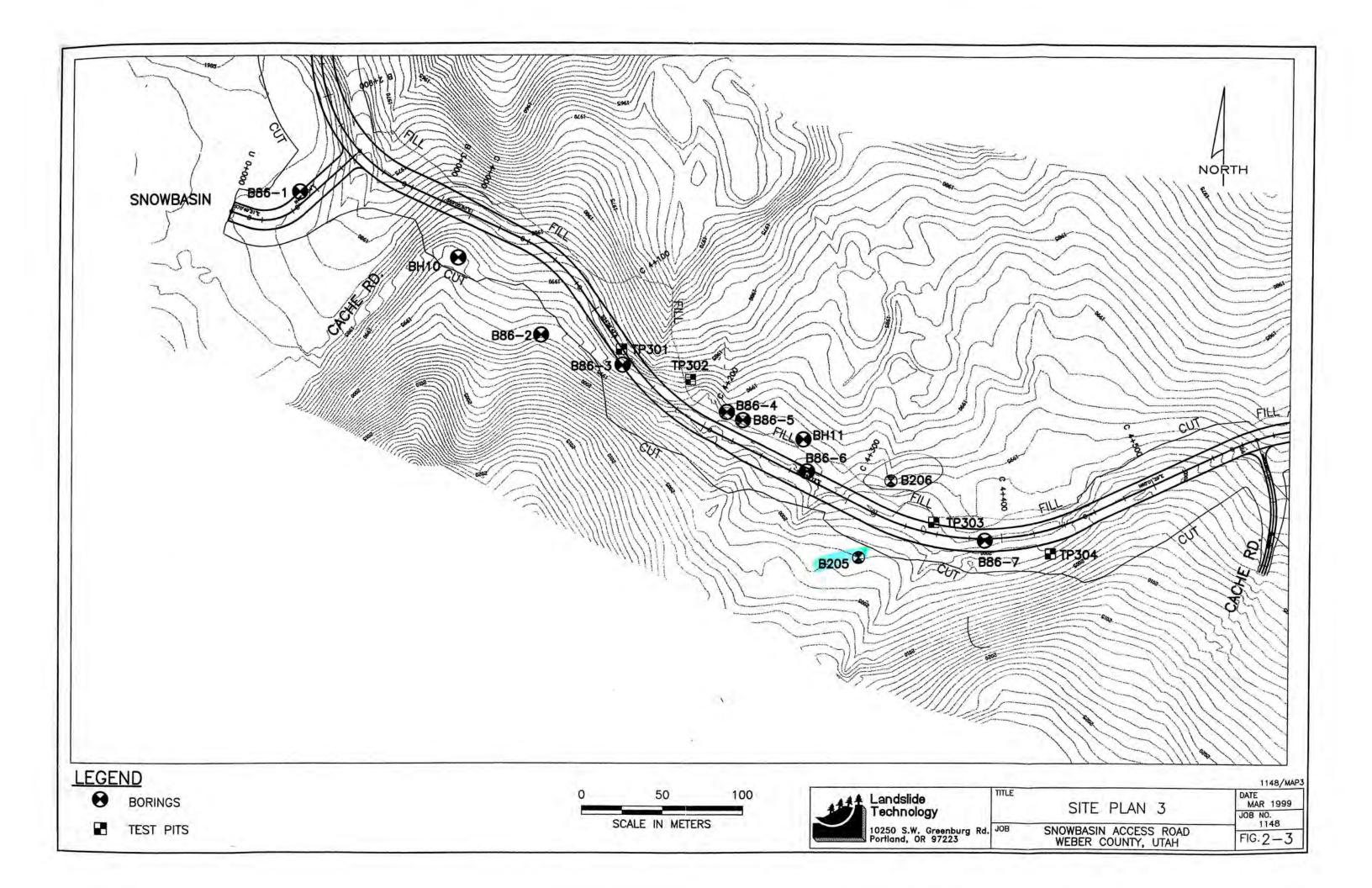
ELEV. HI dag	TERS	MATERIAL DESCRIPTION	ON SA	MPLES	INSTRUM.	SAM	-SPOON PLING ER 0.305 m	LEGEND	<u>k</u>
DEF		SURFACE ELEV. 1907 (continued from previous page)	NO.	C.S.		0 10 20	<u>30 40</u>	SPLIT :	DIA. CAL. SPOON SAMPL
		(continued from previous page)		Π		ŚĘĘ N	IDTE 5)		SEE NOTE 3
			16	G	• 22			* SAMPL RECOV	ERED
					23	· · · ·		G GRAB	SAMPLE TTINGS
			17	G		• • • • •		124	/IOUS SEAL
1883 24	1.4				24	• • • •		WATER	LEVEL
		Bottom of Boring: 24.4 meters			25			PIEZON	IETER TIP
					20	· · · · ·	· · · · ·		- LIQUID LIMIT - NATURAL WATER CONTENT
						, 			- PLASTIC LIMIT
									CONTENT RCENT
						• • • •		NOTES	
						• • • •			DESCRIPTIONS FACES ARE
								ACTUAL CI	IVE AND HANGES MAY
								BE GRADU 2. WATER LEY	
								DATE SHO	
						· · · ·		OF YEAR.	
									WAS DRIVEN
								FOUR 0.3	
						• • • •		AUTO. HA	MMER.
									ED WHEN A
						• • • •		INCREMEN	100 PER NT WAS
						• • • •		REACHED BLOW CC	
						* * * *			RE FOR THE
									INCREMENTS.
								4. CORE DRI 13.2-17.5	
									DICATOR (SI)
						• • • •		CASING (	0.07m) TO DEPTH
								OF 24.4m	<b>.</b>
							• • • •		ER SENSOR,
							· · · ·	SINCO M0 52611020	), 50 PSI,
						• • • •		DATA LOG	TO SINCO GER MODEL
						• • • •		52613300 OF BORIN	) at top IG.
								7. VIBRATING	
								TO SI CA	(VP) ATTACHE SING WITH
								IN NON-	ND WRAPPED WOVEN
								GEOTEXTI 8. BORING	
							• • • •	BACKFILL CEMENT- TREMIE	ED WITH BENTONITE
DRILLEF	R	Lang Exploratory Drilling		delide	<u>I</u>	TITLE		lp	ATE
		RT 2/14/99 FINISH 2/15/99	Tec	hnolog	у		1MARY BU 3-208 (2	RING LOG [ of 2) 기	FEB 1999 DB NO.
		TECHNIQUE Reverse Circulation, with	1025 Porti	0 S.W. G and, OR	reenburg R 97223		IOWBASIN ACC		1148
0.133m	tri	cone bit ond 0.102m "P" core barrel.					WEBER COUN	TY, UTAH	^{IG.} 3-8t

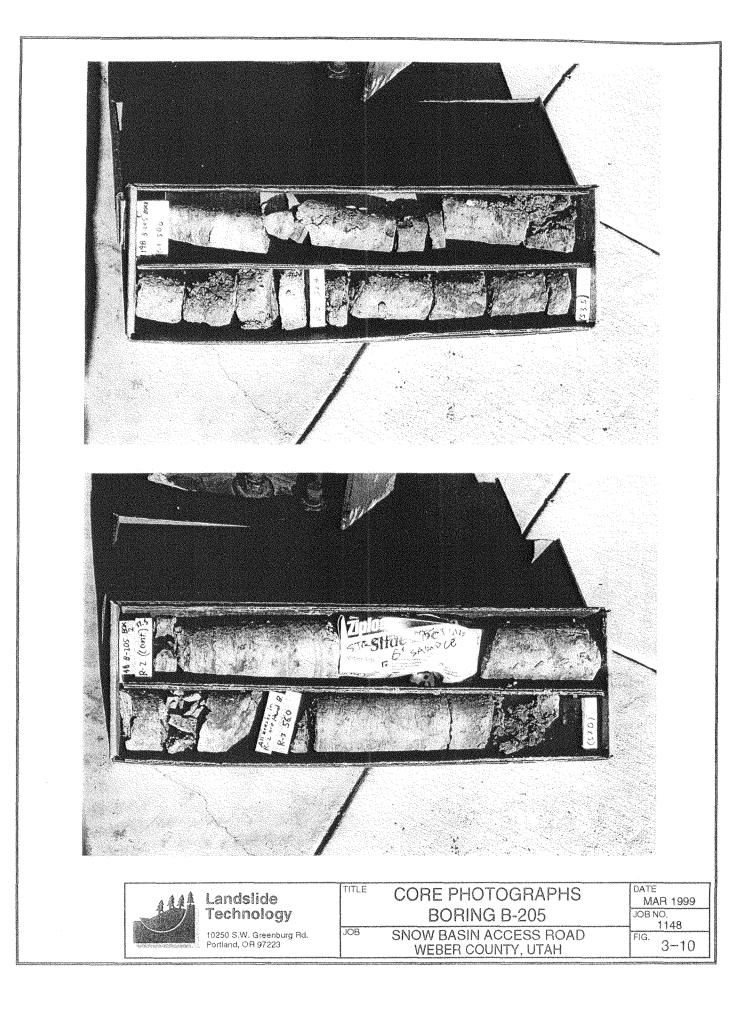
ELEV.	TERS	MATERIAL DESCRIPTION	SAMPLES	INSTRUM.	SPLIT-SPOON SAMPLING		LEGEND
	H H H H H H H H H H H H H H H H H H H	SURFACE ELEV. 1905 SILTY CLAY (CL), stiff to very stiff, brown, with	NO. C.S	INSTALL.	LOWS PER 0.305 m 10 20 30 40		0.076m DIA. CAL. SPLIT SPOON SAMPL (C.S.) SEE NOTE 3
		gravel, cobbles and boulders (scattered and in layers), drills to sand and gravel sized	1 G		(SEE NOTE 5)		C.S.) SEE NOTE 3
		quartzite rock fragments (OLD LANDSLIDE DEBRIS)			· · · · · · · · · · · · · · · · · · ·		G GRAB SAMPLE OF CUTTINGS
			2 G		· · · · · ·   · · · · · ·   · · · · · ·		IMPERVIOUS SEAL
			3 100/		• • • • • • •	<b>Ab</b> -	
			3*0.31m		· · · · · · · ·	T	PIEZOMETER TIP
			4 G	5	· · · · · · · · · · · · · · · · · · ·		LIQUID LIMIT NATURAL WATER CONTENT
			5 G	6			PLASTIC LIMI WATER CONTENT IN PERCENT
			6 0.31m			<b>/</b>	NOTES
			7 G	7 · · ·			1. MATERIAL DESCRIPTIONS AND INTERFACES ARE INTERPRETIVE AND ACTUAL CHANGES MAY BE GRADUAL.
			86	9			2. WATER LEVEL IS FOR DATE SHOWN AND MAY VARY WITH TIME
		increasing rock fragments of weathered, clayey, SILTSTONE, gray-green	9 24	10			OF YEAR. 3. CALIF. SPLIT SPOON SAMPLE WAS DRIVEN FOUR 0.305m
1895 1	10.3	SILTSTONE, extremely SOFT (R0) to VERY SOFT (R1), brown and gray moderately weathered to predominately decomposed	10 G	11	· · · · · · · · · ·		LENGTHS WITH AN AUTO. HAMMER. TEST WAS TERMINATED WHEN A
		(OLD LANDSLIDE DEBRIS)		12	· · · · · · · · ·		BLOW OF 100 PER
			R-1 80	13		RQD. X	REACHED. C.S. BLOW COUNTS SHOWN ARE FOR THI SECOND & THIRD
		gravels and cobbles in clayey silt matrix	R-2 100			0	0.305m INCREMENTS
1891	1	SILTY SAND (SM), gray brown, fine grained (OLD LANDSLIDE DEBRIS)	R-3 100		.W. SENSOR	89	4. CORE DRILLED 12.3–18.1m 5. SLOPE INDICATOR
1890  1		SILTSTONE, extremely soft (R0) to soft (r1), predominately decomposed grading to modereately weathered, close to moderately close bedding inclined at 20° from horizontal	R-4 100	15-(	SEE NOTES 6 & 7)	100	(SI) CASING (0.07m) INSTALLED TO DEPTH OF 19.8m. 6. VIBRATING WIRE (VP) PIEZOMETER SENSOR,
		(NORWOOD TUFF)	R-5 88	17	_	88	SINCO MODEL 52611020, 50 PSI, ATTACHED TO SINCO DATA LOGGER MODEL 52613300 AT TOP OF BORING.
			12 G	18	· · · · · · · · · · · · · · · · · · ·		7. VIBRATING WIRE SENSOR (VP) ATTACHE TO SI CASING WITH 10-20 SAND WRAPPEI WITH NON-WOVEN GEOTEXTILE.
1885	19.8	Bottom of Boring: 19.8 meters		20	· · · · · · · · · · · · · · · · · · ·		8.BORING WAS BACKFILLED WITH CEMENT-BENTONITE TREMIE GROUT.
	-	Lang Exploratory Drilling RT 2/15/99 FINISH 2/17/99	Landslide Technolog		SUMMARY BC		G LOG FEB 1999 JOB NO.
DRILLI	ING	TECHNIQUE <u>Reverse Circulation</u> , with icone bit and 0.102m "P" core barrel.	-	reenburg Rd. 97223	JOB SNOWBASIN AC WEBER COUL	CESS	ROAD 510 7 0

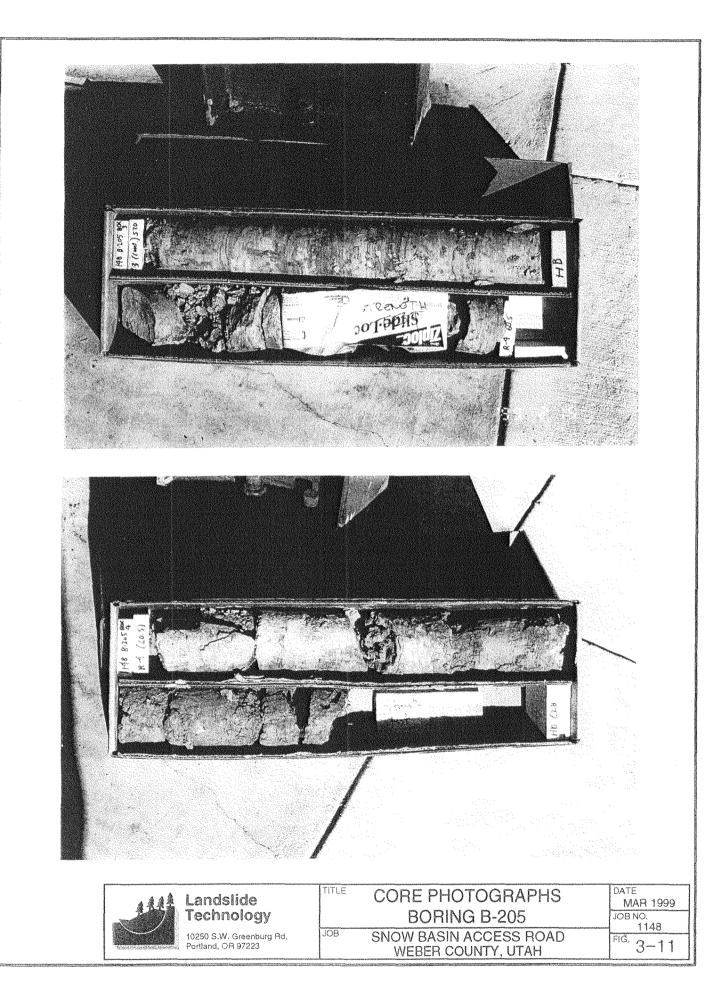


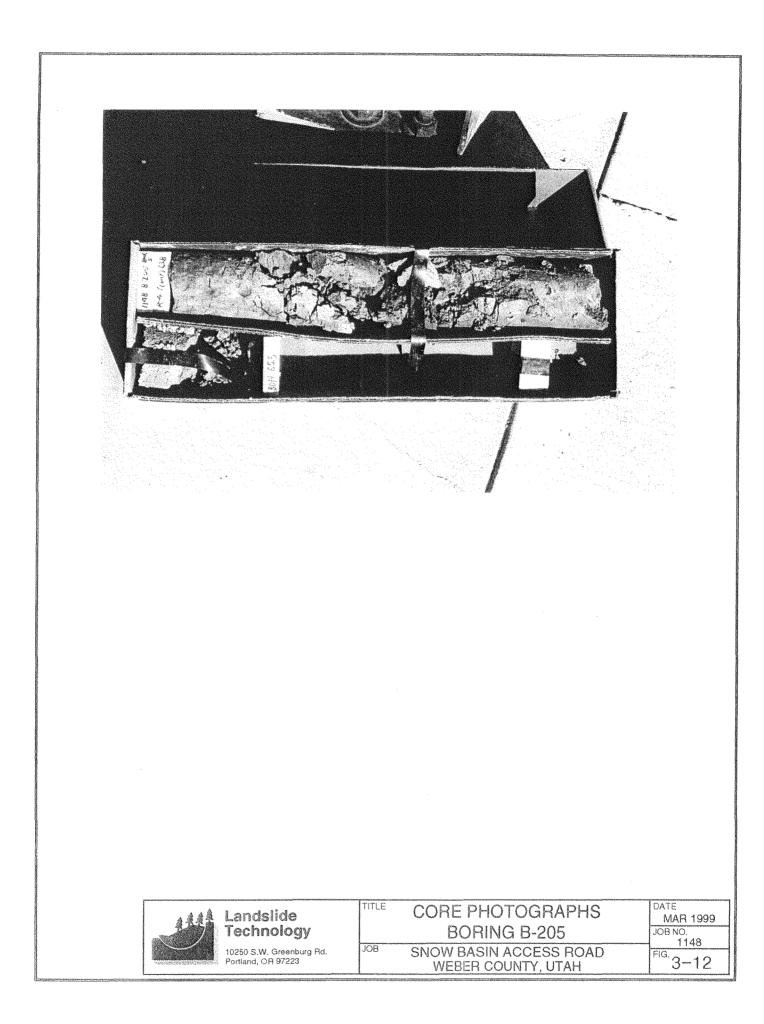
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		1148/MAP1
E		DATE
	OVERALL SITE PLAN	MAR 1999 JOB NO.
}		1148
William	SNOWBASIN ACCESS ROAD WEBER COUNTY, UTAH	FIG.2-0
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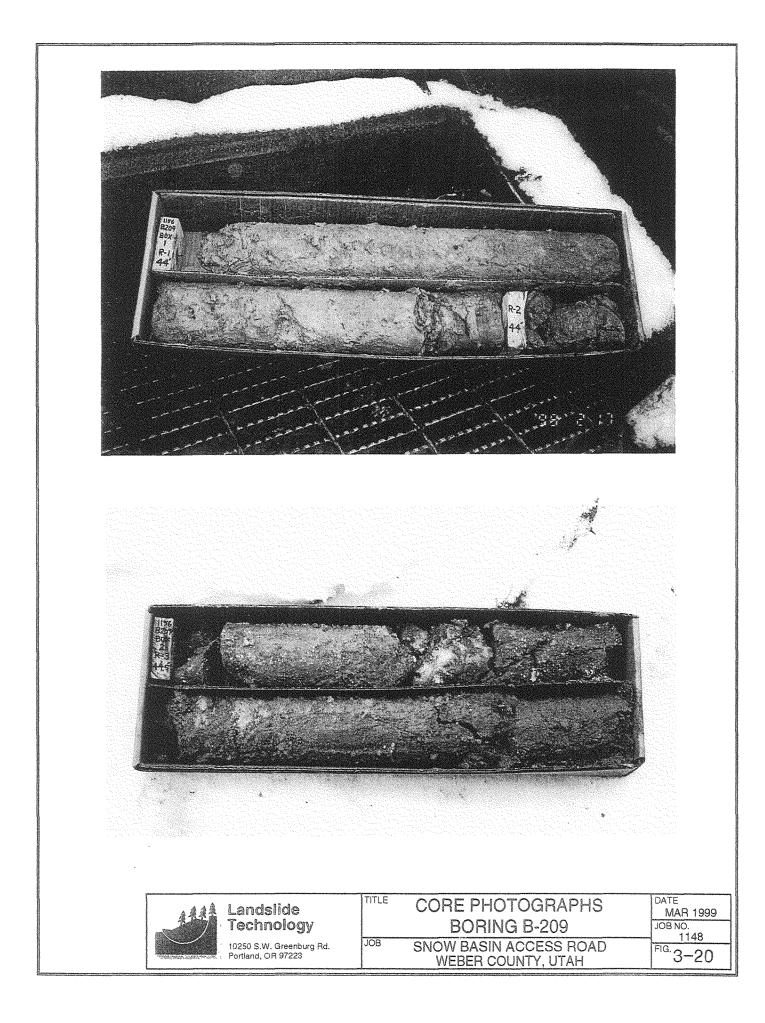


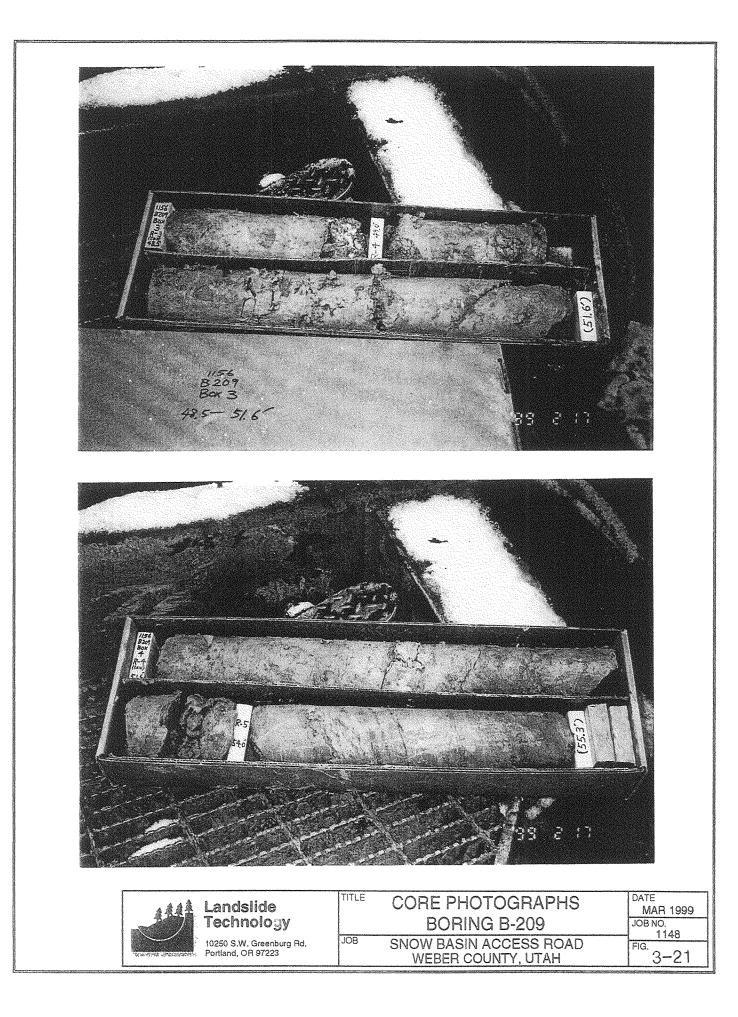


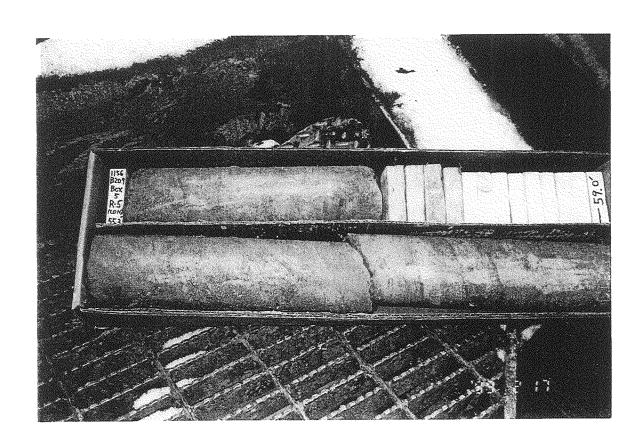












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Landslide<br/>TechnologyTITLECORE PHOTOGRAPHS<br/>BORING B-209DATE<br/>MAR 1999<br/>JOB NO.<br/>114810250 S.W. Greenburg Rd.<br/>Portland, OR 97223JOBSNOW BASIN ACCESS ROAD<br/>WEBER COUNTY, UTAHDATE<br/>MAR 1999<br/>JOB NO.<br/>1148