



**June 2009**

## **WINDSOR-ESSEX PARKWAY**

# **Geotechnical Data Report**

**Submitted to:**

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REPORT



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### 1.0 INTRODUCTION

This report presents the results of geotechnical explorations and testing related to the Windsor-Essex Parkway from the Highway 3 and Highway 401 interchange to the Ojibway Parkway area. This work was undertaken by Golder Associates Ltd. (Golder) working under a subcontract to URS Canada Inc. (URS) on behalf of the Ministry of Transportation Ontario (MTO). This report provides all data collected during the field and laboratory work completed during the most recent phases of study for the Windsor-Essex Parkway project. Data developed for the Golder report titled "Preliminary Foundation Investigation and Design Report, Detroit River International Crossing Bridge Approach Corridor" issued in October, 2007 has been updated and superseded by this report and is included herein.

While this report provides all data collected for this project, no interpretations are provided with respect to conditions between samples, tests, or borehole locations. The stratigraphic boundaries shown on the Record of Borehole sheets are inferred from non-continuous sampling, observations of drilling progress and the results of Standard Penetration Tests (SPTs). These boundaries, therefore, may represent transitions between soil types rather than exact planes of geological change. Furthermore, subsurface conditions will vary between and beyond the boreholes, samples and CPT locations. Use of this report is subject to important limitations summarized following the text of this report.



### 2.0 SITE DESCRIPTION

The proposed Windsor-Essex Parkway (WEP) begins near the existing western terminus of Highway 401 and generally follows the alignments of Highway 3, Huron Church Road and the E.C. Row Expressway to the border crossing plaza site near the Detroit River as illustrated by the Key Plan shown on Figure 1 and Drawings 1 through 6. The alignment of the WEP follows the horizontal alignment of these roadways with some areas within the existing rights-of-way and some parallel to and west/south of the existing roadways.

The site character near the existing terminus of Highway 401 to near the E.C. Row Expressway is generally residential or commercial with low-rise buildings and urban street rights-of-way. The topography in the area is relatively flat with the ground surface elevation gently undulating between about 187 m and 179 m with a general decline from southeast to northwest (toward the river). Within the Highway 3 and Huron Church Road portion of the WEP, the alignment crosses several municipal drains including the Cahill Drain, Lennon Drain and Grand Marais Drain. Of these, the Grand Marais Drain (channelized section of Turkey Creek) is the most significant watercourse with an invert about 5 to 6 m below the ground surface of the surrounding area. Side slopes of this drain are about 1.5 horizontal to 1 vertical where the section is channelized and flatter in areas where the creek takes its natural course.

Between Huron Church Road and Ojibway Parkway, along the south side of E.C. Row Expressway, the site is characterised by relatively low-lying and flat areas. The topography gently undulates with a topographic relief generally less than 5 m between the approximate elevations of 179 m and 184 m with a general decline from east to west toward the Detroit River. The ground surface is covered with a mixture of low vegetation and trees.



### 3.0 INVESTIGATION PROCEDURES

#### 3.1 Drilling and Sampling

Subsurface explorations were carried out for the Windsor-Essex Parkway in three phases between October 2006 and May 2009. During this time, a total of 74 sampled boreholes and 55 cone penetration tests (CPTs) were advanced within the proposed alignment (i.e. from the existing terminus of Highway 401 along Highway 3, Huron Church Road and E.C. Row Expressway to Ojibway Parkway). At twenty-seven of the CPT locations, sampled boreholes (approximately 2 to 5 m deep) were drilled to facilitate the start of the CPT tests. In general, these boreholes and CPTs are designated with increasing numbers from east to west with numbers 1 to 23 included in the first phase of drilling, 101 to 166 in the second phase and 201 to 242N in the third phase of drilling. Where the labelling sequence skips numbers, no boreholes or CPTs were completed. In addition, a total of 158 boreholes of about 1.5 to 1.8 m deep each and 84 pavement cores were completed for this work to explore the shallow subsurface conditions. The pavement boreholes and cores were generally given a designation corresponding to the roadway most closely associated with the exploration location. Where the labelling sequence skips numbers, no boreholes or cores were completed. Locations of all boreholes, field vane shear tests and cone penetration tests are shown on Drawings 1 through 6.

Field work was supervised on a full-time basis by members of Golder's staff who located the boreholes, CPTs and pavement cores, directed the drilling, sampling and in situ testing operations and logged the boreholes. All borehole and testing field locations were determined by Golder relative to points staked in the field by Golder using GPS systems and measured references to local landmarks or features. With the exception of the pavement borehole and core locations, all other final drilling and testing locations were surveyed by Callon-Dietz Surveyors under subcontract to URS Corporation. The drilling and testing locations from the current investigation, including MTM NAD83 northing and easting coordinates and ground surface elevations, referenced to geodetic datum, are summarized in Tables 1 and 2 and shown on Drawings 1 through 6. Boreholes had not been abandoned at the time of this report completion but must be abandoned in accordance with O. Reg. 372/07 (amendment to O. Reg. 903), or current applicable regulations, at such time the MTO concludes the work associated with this project.

The boreholes were advanced using both hollow stem augers and mud-rotary drilling using all-terrain vehicle- and truck-mounted drill rigs supplied and operated by specialist drilling contractors. The sampled boreholes were advanced to depths (including rock coring) ranging from 25.4 to 38.2 m below the existing ground surface. Samples of the overburden were generally obtained at 0.75 to 1.5 m intervals of depth using either 50 mm outside diameter split-spoon samplers in accordance with the Standard Penetration Test (SPT) procedures (ASTM D1586) or thin-walled tube samplers (ASTM D1587). The Standard Penetration Test was conducted using an automatic hammer for some boreholes while others were completed using a conventional rope and cat-head hammer. Table 3 summarizes the hammer systems used for each of the boreholes in which Standard Penetration Tests were conducted. In general, the sampling routine consisted of a repeating sequence of a split-spoon sample, a field vane shear test and a thin-wall tube sample. In some areas, deviations from this sampling routine were necessary to assure recovery of sufficient thin-wall tube samples from critical depths. In the event that the soil strength was sufficient to prohibit completion of field vane shear tests, split-spoon samples were obtained instead. Samples of bedrock were obtained using 'NQ'-size and 'HQ'-size rock core barrels. The Record of Borehole sheets are provided in Appendix A for all boreholes along with the Record of Drillhole sheets for detailed rock coring information. Photographs of the rock core are included in Appendix B. The soil samples and rock cores were identified in the field, placed in labelled containers and transported to Golder's laboratories in London, Windsor and Mississauga for further examination and testing.



Water levels in the open boreholes were observed throughout the drilling operations. For a total of 33 boreholes, a 32 mm diameter standpipe observation well was installed to monitor the groundwater level(s) at the site. The screened portion of each standpipe was typically installed either at or below the overburden-bedrock interface to measure groundwater pressures at this interface or within the bedrock. In addition, porous-tip piezometers were installed in a total of 41 boreholes to allow measurement of groundwater pressures within the overburden soils, 32 of which were installed in shallow unsampled boreholes immediately adjacent to deeper sampled boreholes that included standpipe observation wells. Porous-tip piezometers were also installed along with the standpipes in three of the deeper boreholes and the remaining nine porous-tip piezometers were installed directly within sampled boreholes to depths ranging from 3.6 to 15.3 m. These piezometers consisted of 13 mm diameter rigid CPVC pipe with a 300 mm long porous tip section installed within a silica sand filter pack. Each piezometer or standpipe was sealed within specific geologic units using bentonite pellet backfill. The remainder of the annular space within the boreholes was filled with cement-bentonite grout or backfilled with drilling cuttings, where appropriate. During drilling of boreholes BH-23, BH-163 and BH-166, flowing artesian groundwater conditions were encountered. These boreholes were sealed by filling them with cement-bentonite grout upon completion of coring; separate piezometers were installed in an adjacent unsampled borehole that did not fully penetrate the clayey silt soil.

### 3.2 Field Vane Shear Tests

In situ vane shear strength testing was carried out using a shear test device conventional to practice in Ontario where the device is inserted into the ground at depth intervals, where appropriate, from within a conventional borehole. These tests were carried out using the standard vanes turned with a calibrated torque wrench at shear rates such that the times to failure typically ranged from about 10 to 30 seconds. Push-in field vane shear testing was also conducted adjacent to sixteen boreholes in accordance with ASTM D2573. This testing was carried out using the Nilcon Vane Borer device that provides a record of torque using a circular paper graph. The Nilcon Vane Borer also permits a closely controlled rate of rotational strain during the test using a geared drive such that close conformance with ASTM D2573 can be achieved. Times to failure using this device ranged from about 2 to 5 minutes with an average of about 3 minutes. Profiles of field vane shear strength were developed with tests completed at approximately 1 m intervals following advancement of a shallow borehole (on the order of 3 to 5 m) through the stiff to hard upper overburden soils. No sampling or removal of soils took place during this testing. Profiles were obtained until refusal to penetration of the vane borer equipment was reached. Results from the Nilcon field vane shear tests are included in Appendix D of this report.

### 3.3 In Situ Cone Penetration Tests

Fifty-five cone penetration tests (CPTs) were conducted along the proposed road alignment. Where necessary, shallow boreholes were advanced through the surface soils using solid stem augers, hollow stem augers or rotary drilling to depths ranging from 2 to 5 m in order to facilitate the start of the CPTs. Where the pre-drilling of the CPT location included soil sampling, Record of Borehole sheets summarizing the encountered conditions are included in Appendix A. The CPT is an in situ testing technique for site characterization studies. The CPT consists of a special cone tip equipped with electronic sensing elements to continuously measure tip resistance, local side friction on a steel sleeve behind the conical tip, and porewater pressure. It is pushed at a constant rate into the ground using a drill rig (ASTM D5778). A continuous stratigraphic profile together with engineering properties, such as undrained shear strength, can be inferred from the results of the CPT.



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The CPT equipment was advanced using the hydraulic ram system on the drill rigs. All CPTs were advanced to refusal, which was encountered at depths ranging from about 12.4 to 31.4 m below ground surface. The CPT refusal depths are listed in Table 4. Record of Cone Penetration Test sheets are included in Appendix E following the text of this report. Profiles of tip resistance, porewater pressure during pushing and sleeve-friction are presented on these records.

An additional cone penetration test, CPT-24, was completed near the intersection of Provincial Road and Highway 401 to allow correlation of cone penetration test results with field performance at a location where a “back-analysis” of bridge structure and embankment settlements had been carried out (Golder 2006, GWP 64-00-00).

**Table 1: Coordinates and Elevations of Exploration Locations**

TESTING LOCATION NUMBER	MTM NAD83 Northing (m)	MTM NAD83 Easting (m)	GROUND SURFACE ELEVATION (m)
BH-1	4677738	335500	186.70
BH-7	4678848	333325	183.17
BH-14	4680648	331648	182.06
BH-23	4682323	328529	178.92
BH-101	4677607	335795	187.37
BH-102	4677632	335513	186.60
BH-104	4677630	335263	186.15
BH-105	4677843	335190	186.16
BH-107	4677973	334961	185.85
BH-109	4678155	334716	185.30
BH-112	4678413	334221	184.58
BH-113	4678454	334070	184.41
BH-115	4678585	333911	183.79
BH-116	4678634	333722	183.64
BH-118	4678903	333303	182.66
BH-119	4678962	333121	182.50
BH-122	4679265	332538	181.66
BH-126	4679237	332336	180.61
BH-127	4679371	332252	181.27
BH-129	4679625	332110	180.78
BH-131	4679945	331856	180.80
BH-132	4680071	331910	181.47
BH-135	4680370	331729	182.02
BH-136	4680450	331751	181.75
BH-139	4680788	331599	182.30
BH-140	4680899	331552	182.00





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TESTING LOCATION NUMBER	MTM NAD83 Northing (m)	MTM NAD83 Easting (m)	GROUND SURFACE ELEVATION (m)
BH-141	4681073	331426	181.72
BH-142	4681251	331373	181.11
BH-143	4681192	331295	181.26
BH-145	4681447	331248	182.28
BH-147	4681670	331005	180.83
BH-149	4681628	330950	180.98
BH-151	4681735	330643	180.35
BH-152	4681834	330579	180.16
BH-154	4681960	330201	180.87
BH-156	4682107	329876	179.52
BH-158	4682144	329770	179.30
BH-160	4682217	329156	178.72
BH-163	4682385	328586	178.77
BH-164	4682300	328446	179.06
BH-166	4682168	328350	179.00
BH-201	4677610	335771	187.67
BH-202	4677574	335753	187.31
BH-203	4677539	335744	187.23
BH-206	4677646	335462	186.48
BH-207	4677598	335503	186.89
BH-208	4677544	335526	186.88
BH-215N	4678474	337007	189.69
BH-216N	4678423	336959	189.29
BH-217N	4678380	336912	189.25
BH-218N	4678335	336858	189.13
BH-219N	4678297	336813	189.03
BH-220N	4678251	336761	188.85
BH-221N	4678209	336713	188.81
BH-222N	4678163	336656	188.49
BH-223N	4678122	336610	188.24
BH-224N	4678076	336565	188.32
BH-225N	4678036	336518	188.09
BH-226N	4677994	336470	187.72
BH-227N	4677952	336424	187.61
BH-228N	4677911	336372	187.41





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TESTING LOCATION NUMBER	MTM NAD83 Northing (m)	MTM NAD83 Easting (m)	GROUND SURFACE ELEVATION (m)
BH-229N	4677866	336322	187.34
BH-230N	4677823	336267	187.37
BH-231N	4677776	336214	187.06
BH-232N	4677725	336154	186.75
BH-233N	4677688	336100	186.39
BH-235N	4677707	335838	188.50
BH-236N	4677710	335772	187.56
BH-237N	4677725	335702	187.77
BH-238N	4677746	335633	187.82
BH-239N	4677772	335554	187.56
BH-240N	4677789	335503	187.42
BH-241N	4677813	335434	187.24
BH-242N	4677836	335368	187.05
CPT-1	4677739	335502	186.69
CPT-2	4677841	335185	186.35
CPT-3	4678022	334957	185.91
CPT-4	4678208	334516	185.09
CPT-5	4678413	334220	184.69
CPT-6	4678621	333844	184.08
CPT-7	4678844	333327	183.18
CPT-8	4678967	333109	182.48
CPT-9	4679105	332828	182.32
CPT-10	4679264	332533	181.81
CPT-11	4679634	332110	180.91
CPT-12	4680072	331924	181.61
CPT-13	4680350	331749	182.08
CPT-14	4680652	331651	182.06
CPT-15	4681049	331480	182.13
CPT-16	4681417	331376	181.93
CPT-17	4681625	331208	182.05
CPT-18	4681547	330938	180.65
CPT-19	4681906	330413	181.23
CPT-20	4681775	329868	179.76
CPT-21	4682147	329759	179.89
CPT-22	4682412	328986	178.89



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TESTING LOCATION NUMBER	MTM NAD83 Northing (m)	MTM NAD83 Easting (m)	GROUND SURFACE ELEVATION (m)
CPT-23	4682325	328523	178.93
CPT-24	4679216	338376	190.20
CPT-103	4677620	335401	186.30
CPT-106	4677846	335040	185.72
CPT-108	4678052	334827	185.60
CPT-110	4678298	334449	184.82
CPT-111	4678351	334348	184.92
CPT-114	4678527	334019	184.21
CPT-117	4678744	333602	183.29
CPT-120	4678947	333030	184.49
CPT-121	4679025	333077	181.97
CPT-123	4679310	332536	181.60
CPT-124	4679355	332455	181.51
CPT-128	4679491	332201	180.87
CPT-130	4679822	332036	180.82
CPT-133	4680185	331953	181.64
CPT-134	4680151	331889	181.36
CPT-137	4680542	331710	181.38
CPT-144	4681364	331279	181.34
CPT-145	4681443	331248	182.21
CPT-146	4681541	331126	181.85
CPT-148	4681651	330951	180.72
CPT-150	4681733	330758	180.85
CPT-153	4681793	330576	180.99
CPT-154	4681963	330191	180.75
CPT-155	4682066	329982	179.69
CPT-159	4682293	329332	178.77
CPT-160	4682215	329152	180.00
CPT-161	4682178	328794	179.06
CPT-162	4682439	328729	178.99
CPT-165	4682188	328458	178.98
CPT-201	4677608	335775	187.67
CPT-206	4677643	335466	186.30



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**Table 2: Coordinates of Pavement Boreholes**

TESTING LOCATION NUMBER	MTM NAD83 Northing (m)	MTM NAD83 Easting (m)
3-1	4677590	336166
3-2	4677701	335927
BET-1	4681357	331338
CAB-1	4679699	332153
ECR-1000-N	4682334	328672
ECR-1000-S	4682334	328672
ECR-1001-N	4682395	328805
ECR-1001-S	4682395	328805
ECR-1002-N	4682416	328938
ECR-1002-S	4682416	328938
ECR-1003-N	4682385	329093
ECR-1003-S	4682385	329093
ECR-1004-N	4682302	329253
ECR-1004-S	4682302	329253
ECR-1005-N	4682259	329419
ECR-1005-S	4682259	329419
ECR-1006-N	4682210	329560
ECR-1006-S	4682210	329560
ECR-1007-N	4682167	329706
ECR-1007-S	4682167	329706
ECR-1008-N	4682114	329864
ECR-1008-S	4682114	329864
ECR-1009-N	4682055	330004
ECR-1009-S	4682055	330004
ECR-1010-N1	4681980	330216
ECR-1010-N2	4681980	330216
ECR-1010-S1	4681980	330216
ECR-1010-S2	4681980	330216
ECR-1011-N1	4681920	330368
ECR-1011-N2	4681920	330368
ECR-1012-N	4681873	330519
ECR-1012-S	4681873	330519
ECR-1013-N	4681823	330645
ECR-1013-S	4681823	330645
ECR-1014-N	4681792	330824



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TESTING LOCATION NUMBER	MTM NAD83 Northing (m)	MTM NAD83 Easting (m)
ECR-1014-S	4681792	330824
ECR-1015-N	4681752	330942
ECR-1015-S	4681752	330942
ECR-1016-N	4681679	331063
ECR-1016-S	4681679	331063
HCL-1A	4679462	332232
HCL-1B	4679499	332210
HCR-1A	4681678	331233
HCR-1B	4681674	331226
HCR-1C	4681669	331219
HCR-2A	4680978	331529
HCR-2B	4680987	331550
HCR-3A	4680453	331765
HCR-3B	4680463	331786
HCR-3C	4680460	331780
HCR-4A	4679987	332000
HCR-4B	4679976	331981
HCR-4C	4679977	331985
HCR-4D	4679980	331988
HOW-1	4677832	335220
LAB-1	4681391	331394
MAL-1	4681961	330170
MAL-2	4681959	330166
MAL-3	4681954	330160
MAL-4	4681952	330160
OUT-1	4677342	336010
OUT-2	4677343	336008
OUT-1A	4677211	335844
OUT-1B	4677209	335837
OUT-2A	4677241	335801
OUT-2B	4677246	335804
OUT-3A	4677272	335764
OUT-3B	4677269	335759
OUT-4A	4677302	335724
OUT-4B	4677309	335727
OUT-5A	4677332	335684



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TESTING LOCATION NUMBER	MTM NAD83 Northing (m)	MTM NAD83 Easting (m)
OUT-5B	4677326	335678
OUT-6A	4677363	335642
OUT-6B	4677368	335646
OUT-7A	4677394	335601
OUT-7B	4677389	335597
OUT-8A	4677423	335561
OUT-8B	4677429	335564
OUT-9A	4677450	335542
OUT-9B	4677448	335518
OUT-10A	4677500	335522
OUT-10B	4677498	335508
OUT-11A	4677549	335502
OUT-11B	4677547	335498
OUT-12A	4677598	335512
OUT-12B	4677599	335507
OUT-13A	4677651	335512
OUT-13B	4677651	335507
OUT-14A	4677692	335524
OUT-14B	4677687	335530
OUT-15A	4677619	335472
OUT-15B	4677614	335470
OUT-16A	4677603	335549
OUT-16B	4677607	335550
OUT-17A	4677582	335612
OUT-17B	4677577	335614
OUT-18A	4677540	335696
OUT-18B	4677543	335699
OUT-19A	4677498	335780
OUT-19B	4677509	335784
PUL-1	4680388	331851
PUL-2	4680359	331791
TOD-1	4679648	332099
TR-5A	4679352	332451
TR-5B	4679356	332453
TR-5C	4679342	332431
TR-5D	4679346	332454



## GEOTECHNICAL DATA REPORT - WINDSOR-ESSEX PARKWAY

TESTING LOCATION NUMBER	MTM NAD83 Northing (m)	MTM NAD83 Easting (m)
TR-5E	4679354	332451
TR-6A	4679092	332913
TR-6B	4679088	332911
TR-6C	4679077	332912
TR-6D	4679100	332921
TR-6E	4679103	332922
TR-6F	4679104	332922
TR-7A	4678715	333635
TR-7B	4678696	333624
TR-7C	4678703	333626
TR-7D	4678720	333640
TR-7E	4678718	333639
TR-8A	4678478	334083
TR-8B	4678480	334084
TR-8C	4678468	334074
TR-8D	4678476	334081
TR-8E	4678460	334070
TR-9A	4678249	334510
TR-9B	4678237	334503
TR-9C	4678232	334498
TR-10A	4678018	334914
TR-10B	4678036	334925
TR-10C	4678032	334925
TR-10D	4678036	334924
TR-10E	4678013	334909
TR-A1	4677790	335431
TR-A2	4677793	335432
TR-A3	4677787	335430
TR-A4	4677801	335436
TR-A5	4677798	335434
TR-A6	4677809	335439
TR-A7	4677794	335434
TR-B1	4677641	335860
TR-B2	4677643	335860
TR-B3	4677364	335857
TR-B4	4677656	335864



## GEOTECHNICAL DATA REPORT - WINDSOR-ESSEX PARKWAY

TESTING LOCATION NUMBER	MTM NAD83 Northing (m)	MTM NAD83 Easting (m)
TR-B5	4677659	335865
TR-B6	4677660	335866
TR-B7	4677650	335862
TR-B8	4677651	335863
TR-C1	4677746	336233
TR-C10	4677755	336224
TR-C11	4677753	336226
TR-C2	4677747	336231
TR-C3	4677741	336238
TR-C4	4677743	336236
TR-C5	4677741	336238
TR-C6	4677739	336241
TR-C7	4677755	336220
TR-C8	4677758	336215
TR-C9	4677757	336217

**Table 3: Hammer System Used for Standard Penetration Testing**

Automatic Trip Hammer System			
BH-101	BH-116	BH-135	BH-236N
BH-104	BH-118	BH-136	BH-237N
BH-105	BH-119	BH-139	BH-238N
BH-107	BH-122	BH-149	BH-239N
BH-109	BH-127	CPT-103	BH-240N
BH-112	BH-129	CPT-108	BH-241N
BH-113	BH-131*	CPT-117	BH-242N
BH-115	BH-132	BH-235N	
Rope and Cathead System			
BH-1	BH-160	CPT-144	BH-217N
BH-7	BH-163	CPT-146	BH-218N
BH-14	BH-164	CPT-148	BH-219N
BH-23	BH-166	CPT-150	BH-220N
BH-102	BH-166A	CPT-153	BH-221N
BH-126	CPT-106	CPT-155	BH-222N
BH-131*	CPT-110	CPT-159	BH-223N
BH-140	CPT-111	CPT-161	BH-224N



## GEOTECHNICAL DATA REPORT - WINDSOR-ESSEX PARKWAY

Rope and Cathead System			
BH-141	CPT-114	CPT-162	BH-225N
BH-142	CPT-120	CPT-165	BH-226N
BH-143	CPT-121	BH-201	BH-227N
BH-145	CPT-123	BH-202	BH-228N
BH-147	CPT-124	BH-203	BH-229N
BH-151	CPT-128	BH-206	BH-230N
BH-152	CPT-130	BH-207	BH-231N
BH-154	CPT-133	BH-208	BH-232N
BH-156	CPT-134	BH-215N	BH-233N
BH-158	CPT-137	BH-216N	

\* BH-131 was initially sampled with an automatic hammer system down to sample no. 9. Thereafter, it was advanced using a rope and cathead system.

**Table 4: Cone Penetration Test Refusal Depths**

CPT LOCATION	GROUND SURFACE ELEVATION (m)	DEPTH TO CPT REFUSAL (m)	CPT REFUSAL ELEVATION (m)
CPT-1	186.69	24.90	161.79
CPT-2	186.35	24.12	162.23
CPT-3	185.91	25.00	160.91
CPT-4	185.09	23.16	161.93
CPT-5	184.69	23.92	160.77
CPT-6	184.08	27.04	157.04
CPT-7	183.18	27.96	155.22
CPT-8	182.48	28.80	153.68
CPT-9	182.32	25.16	157.16
CPT-10	181.81	27.14	154.67
CPT-11	180.91	25.74	155.17
CPT-12	181.61	29.30	152.31
CPT-13	182.08	26.92	155.16
CPT-14	182.06	27.98	154.08
CPT-15	182.13	28.18	153.95
CPT-16	181.93	22.24	159.69
CPT-17	182.05	25.78	156.27
CPT-18	180.65	26.22	154.43
CPT-19	181.23	26.86	154.37
CPT-20	179.76	27.98	151.78





## GEOTECHNICAL DATA REPORT - WINDSOR-ESSEX PARKWAY

CPT LOCATION	GROUND SURFACE ELEVATION (m)	DEPTH TO CPT REFUSAL (m)	CPT REFUSAL ELEVATION (m)
CPT-21	179.89	23.24	156.65
CPT-22	178.89	21.24	157.65
CPT-23	178.93	20.84	158.09
CPT-24	190.20	24.02	166.18
CPT-103	186.30	19.12	167.18
CPT-106	185.72	24.82	160.90
CPT-108	185.90	12.44	173.46
CPT-110	184.82	23.04	161.78
CPT-111	184.92	23.62	161.30
CPT-114	184.21	24.18	160.03
CPT-117	183.29	23.42	159.87
CPT-120	184.49	28.58	155.91
CPT-121	181.97	31.24	150.73
CPT-123	181.60	28.54	153.06
CPT-124	181.51	27.56	153.95
CPT-128	180.87	28.98	151.89
CPT-130	180.82	30.98	149.84
CPT-133	181.64	31.40	150.24
CPT-134	181.36	24.52	156.84
CPT-137	181.38	27.56	153.82
CPT-144	181.34	28.52	152.82
CPT-145	182.21	26.72	155.49
CPT-146	181.85	23.14	158.71
CPT-148	180.72	18.84	161.88
CPT-150	180.85	18.82	162.18
CPT-153	181.00	20.92	160.08
CPT-154	180.75	29.84	150.91
CPT-155	179.69	25.16	154.53
CPT-159	178.77	21.28	157.49
CPT-160	180.00	22.44	157.56
CPT-161	179.06	21.24	157.82
CPT-162	178.99	21.70	157.29
CPT-165	178.98	23.18	155.80
CPT-201	187.67	22.30	165.37



CPT LOCATION	GROUND SURFACE ELEVATION (m)	DEPTH TO CPT REFUSAL (m)	CPT REFUSAL ELEVATION (m)
CPT-206	186.30	24.12	162.18

### 3.4 Laboratory Testing

Upon return of the samples to the Golder laboratories, the following suite of tests was carried out:

- Natural water content of soils (ASTM D2216) determinations were completed on 1340 samples;
- Atterberg limits determinations (ASTM D4318) were completed on 254 samples;
- Mechanical sieve analyses, with or without hydrometer tests, were carried out on 238 samples in accordance with ASTM D422;
- Oedometer tests were completed on a total of 26 specimens in accordance with ASTM D2435 and two of these were completed on samples trimmed to permit loading perpendicular to the sample axis (horizontal with respect to the ground surface) and 13 included unload-reload cycles;
- Isotropically consolidated, undrained triaxial compression tests with pore water pressure measurements (ASTM D4767) were completed on a total of 44 samples in which 40 specimens were consolidated to pressures between about one-quarter to one-half of the existing in-situ vertical effective stress with the remaining tests completed at other confining pressures;
- Anisotropically consolidated, undrained triaxial compression tests with pore water pressure measurements (ASTM D4767) were carried out on 6 specimens in which the radial effective consolidation stress was approximately half of the vertical effective consolidation stress;
- A total of 7 isotropically consolidated triaxial extension tests with pore water measurements (ASTM D4767) were completed with consolidation pressures equal to one-quarter to one-half of the in-situ vertical effective stress with another 3 tests completed with higher consolidation pressure values;
- Four isotropically consolidated undrained triaxial tests were also carried out using variable strain rates to assess creep deformation characteristics.
- Flexible-wall permeameter constant head tests (ASTM D5084) were completed on 8 samples;
- Carbonate determinations were completed on a total of 12 soil specimens using the procedure designed by Dreimanis (1962); and
- Unconfined compressive strength tests (ASTM D7012) were completed on 35 rock core samples, 15 of which included measurement of axial stress and strain.



### 3.5 Groundwater Measurements and Testing

#### 3.5.1 Groundwater Levels

Groundwater levels were measured in the boreholes, observation wells and piezometers at various intervals during the field drilling programs undertaken for this project. These groundwater level measurements are noted on the Record of Borehole sheets and are summarized in Tables I and II following the text of this report. It should be noted that groundwater levels obtained during drilling may not necessarily be indicative of stabilized groundwater pressures as the drilling processes will have influenced these values. Furthermore due to the generally low permeability of the clayey silt to silty clay, sufficient time may not have elapsed to permit development of stabilized water levels. Tables I and II indicate the dates on which groundwater levels were measured in each borehole.

#### 3.5.2 Groundwater Chemistry Testing

Groundwater samples were collected on November 11, 12, 14 and 17, 2008 and January 29, February 4 and 5, 2009 from select piezometers located at or near the bedrock interface as listed in Table III. Also included in Table III are the depths of the bottom of the piezometers and the geologic formation(s) present at the screened interval. Subsequent to measuring the water levels and prior to groundwater sampling, each piezometer was purged using Waterra Model D-25 inertial pumps with lengths of 13-millimetre inside-diameter, polyethylene tubing connected to an electrical Waterra Hydrolift-2 actuator. Each piezometer was purged for a total of three volumes or until it went dry. The piezometers that went dry prior to purging three volumes include BH-116, BH-118, BH-122, BH-127 and BH-149.

Groundwater samples were collected at each piezometer using a stainless steel bailer. The bailer was rinsed with methanol and distilled water between each piezometer. Each groundwater sample collected in November 2008 was submitted for laboratory analysis of hardness as calcium carbonate ( $\text{CaCO}_3$ ) calculated from total calcium and magnesium in non-filtered samples, dissolved methane, sulphate and hydrogen sulphide using laboratory EPA methods 200.8, 3810 (modified), 300 (by ion chromatograph) and APHA 4500S2D, respectively. Groundwater samples were collected from twelve piezometers for submission to ALS Laboratory group (ALS) for analysis of dissolved iron and total dissolved solids (TDS). Also, piezometer BH-160 was resampled for hardness ( $\text{CaCO}_3$ ), dissolved methane, sulphate and hydrogen sulphide due to elevated concentrations having been observed in the November 2008 groundwater sample. The groundwater samples were collected into laboratory-supplied containers and placed in a cooler with ice packs for courier shipment to ALS in Waterloo, Ontario.

### 3.6 In Situ Hydraulic Conductivity Testing

To estimate the hydraulic conductivity (k), single piezometer response testing (also referred to as slug testing) was performed in select observation wells on January 30 and February 2, 3, 5 and 6, 2009. Locations tested included piezometers whose screens were installed in the bedrock, the bedrock interface or the overburden close to the bedrock interface. Piezometers tested are listed in Table IV. Both falling and rising head hydraulic conductivity tests were conducted, as feasible. Prior to beginning the test, the static groundwater level was first measured. Next, the falling and rising tests were conducted by inserting and subsequently removing a solid 1.2 metre long slug (concrete filled PVC). Changes to the water levels were measured using Schlumberger Mini-



Divers<sup>®</sup> (data loggers) set at one-second measurement intervals. These data were supplemented by manual measurements where feasible (i.e., where the response was not too fast to manually measure).

The hydraulic conductivity was estimated at each test location using AQTESOLV<sup>®</sup> software for a confined aquifer. Within AQTESOLV<sup>®</sup>, each data set was evaluated using both the Hvorslev (1951) and Bower-Rice (1976) confined aquifer solutions because for cases with relatively high hydraulic conductivity deposits, these methods of analysis may produce significantly different results. This evaluation approach yielded a maximum of four estimates of  $k$  at a given location from which an average hydraulic conductivity was obtained as shown in Table IV.

At one location, BH-109, an oscillatory water-level (underdamped) response to the slug displacement was obtained, which prevented using AQTESOLV<sup>®</sup> to obtain a hydraulic conductivity estimate. Therefore, at BH-109, a single  $k$  value was estimated using a program provided by the United States Geological Survey (USGS) in Open File Report 02-197 (USGS, 2004). This program uses the van der Kamp (1976) solution method which was developed for the analysis of slug-test data from highly transmissive (high  $k$ ) aquifers with an underdamped response to a slug displacement. This underdamped response is sometimes seen in wells with a very long water column above the screen in a high hydraulic conductivity aquifer, which was the case for BH-109.



## 4.0 SITE GEOLOGY AND SUBSURFACE CONDITIONS

### 4.1 Site Geology

The study area is located in the physiographic region of Southwestern Ontario known as the St. Clair Clay Plains. Within this region, Essex County and the southwestern part of Kent County are normally discussed as a subregion known as the Essex Clay Plain. The clay plain was deposited during the retreat of ice sheets (late Pleistocene Era) when a series of glacial lakes inundated the area. In general, the ice sheets deposited till in the area of Windsor and Detroit. Depending on the locations of the glacial ice sheets and depths of water in the ice-contact glacial lakes, the till may have been directly deposited at the contact between the ice sheet and the bedrock or, as the lake levels rose and the ice sheets retreated and floated, the soil and rock debris within and at the base of the ice were deposited through the lake water (lacustrine depositional environment). Glacial till, in its common usage, often indicates a very dense or hard composition resulting from consolidation and densification under the weight of the ice sheet. The mineral soil particles typically have a distribution of grain sizes ranging from cobbles to clay. In many areas of Windsor and Detroit, the soils described as “glacial till” were deposited through water and have a soft to firm consistency as a result.

The major soil stratum in the study area, consisting primarily of silty clay and clayey silt, typically ranging in thickness from about 20 to 35 m, exhibits a till-like structure exemplified by a random distribution of coarser particles within the primarily fine-grained silt and clay deposit (also called “diamict”). In most of the eastern and northern parts of the Windsor metropolitan area below frost depth, the near-surface clay is generally stiff to hard and brown. Underlying this stiff to hard “crust”, the silty clay becomes grey-brown and firm to stiff in consistency. Below the groundwater level, the silty clay becomes soft to firm, particularly in the western and southern areas of metropolitan Windsor.

Surficial layers or pockets of more typical layered lacustrine (lake-deposited) silty clay, silt or sand may be encountered overlying the extensive stratum of “till-like” silty clay. Silt and sand deposits, on the order of 2 m in thickness, can often be found near the ground surface in areas near the western side of Windsor and the southwestern limits of the study area. A relatively thin stratum, on the order of 1 to 6 m in thickness, of very dense or hard basal glacial till or dense silty sand may be found directly overlying the bedrock surface.

### 4.2 Site Stratigraphy

The detailed subsurface soil, bedrock and groundwater conditions encountered in the boreholes and inferred from the CPTs, together with the results of the field and laboratory testing carried out, are shown on the Record of Borehole and Cone Penetration Test sheets following the text of this report and in Appendix F.

In summary, the subsoils generally consist of Upper Granular Deposits consisting of silty sand and sandy silt overlying the extensive clayey silt to silty clay deposits interbedded with silty sand and sandy silt deposits, underlain by the Lower Granular Deposits consisting of silty sand and gravel which overlies limestone bedrock encountered at depths ranging from 22 to 36 m.



## 4.3 Pavement, Fill and Shallow Subsurface Conditions

Eighty-four boreholes and cores were drilled through the existing pavement structures within the project limits to determine the pavement components and to assess the subgrade conditions at these locations. In addition, 74 boreholes were drilled along proposed new alignments to assess topsoil thicknesses, fill thicknesses and quality as well as subgrade conditions for the new pavements. The boreholes for the pavement investigation were supplemented by the information from 59 of the boreholes drilled as part of the foundation investigation component of the project and these data are included in the following discussions, as relevant.

Classification of materials identified in this report as topsoil was based solely on visual and textural evidence. Testing of organic content or other constituents or nutrients, or the topsoil's general suitability as a vegetal growth supporting medium, was not carried out. Therefore, the use of materials classified as topsoil in this report cannot be relied upon for supporting growth of landscaped vegetation (e.g. select grasses).

### 4.3.1 Highway 401

Eleven boreholes were advanced through the Highway 401 main lanes and shoulders north of North Talbot Road. The boreholes were strategically located to provide a cross section of the pavement structure at this location. The results of the boreholes indicate the typical pavement components and thicknesses in the main lanes, as summarized in Table 5. The main lane pavement structures were underlain by the native clayey silt to silty clay. The boreholes advanced in the shoulder areas indicate the typical components and thicknesses, as summarized in Table 6.

**Table 5: Encountered Pavement and Shallow Subsurface Conditions, Highway 401 (main lanes)**

COMPONENT	TYPICAL THICKNESS (mm)			
	Westbound Lanes		Eastbound Lanes	
	Driving Lane	Passing Lane	Passing Lane	Driving Lane
Asphalt	170	170	140	170
Concrete	280	280	230	235
Sand (Fill)	245	-	180	145
Granular Base	-	50	-	-

**Table 6: Encountered Pavement and Shallow Subsurface Conditions, Highway 401 (shoulders)**

COMPONENT	TYPICAL THICKNESS (mm)						
	Westbound Lanes			Eastbound Lanes			
	Driving Lane		Passing Lane	Passing Lane	Driving Lane		
	Rounding	Shoulder	Edge of Pav't	Shoulder	Edge of Pav't	Shoulder	Rounding
Asphalt	-	140	30	-	565	145	-
Base	30	100	170	300	235	155	300
Subbase/Sand (Fill)	-	360	150	-	-	400	400
Subgrade	Topsoil	Fill	Clayey Silt	Fill	Clayey Silt	Fill	Fill



The topsoil in the westbound driving lane rounding was about 270 millimetres thick and was underlain by clayey silt. Layers of buried topsoil were encountered beneath the clayey fill materials in the boreholes, except for the eastbound driving lane shoulder. The topsoil layers were encountered at about 1.1 to 1.2 metres depth and were about 150 to 300 millimetres thick. Clayey silt to silty clay was encountered beneath the topsoil.

## 4.3.2 Highway 3/Talbot Road

Borehole and pavement cores were drilled at 13 locations along Highway 3/Talbot Road between Highway 401 and Huron Church Road for a total of 44 boreholes. A summary of the typical pavement components encountered in the boreholes and cores is summarized in Table 7. Buried topsoil was encountered beneath the pavement structure and/or fill at one location in the eastbound driving lane and three locations in the eastbound passing lane. The topsoil was encountered at about 0.7 metres depth and was about 250 millimetres thick in the driving lane. In the passing lane, the topsoil was encountered at about 0.7 to 0.9 metres depth and was about 200 to 350 millimetres thick. The existing shoulders generally consisted of asphalt over granular base or granular base at the shoulder surface underlain by generally clayey fill and clayey silt to silty clay. Buried topsoil was encountered at some locations.

**Table 7: Encountered Pavement and Shallow Subsurface Conditions, Highway 3/Talbot Road**

COMPONENT	TYPICAL THICKNESS (mm)			
	Westbound Lanes		Eastbound Lanes	
	Driving Lane	Passing Lane	Passing Lane	Driving Lane
Asphalt	300	405	285	265
Concrete	210	205*	190	215
Sand (Fill)	315*	120*	250	240

\* component not encountered at all locations.

## 4.3.3 Huron Church Road

Boreholes were advanced through the travelled lanes on Huron Church Road at four locations for a total of 12 boreholes. A summary of the pavement components encountered in the eleven boreholes and cores drilled through the main lanes is provided in Table 8. Layers of sand fill, sands, silty sands and clayey silt to silty clay were encountered beneath the pavement structure. A single borehole was advanced in the southbound left turn lane adjacent to the turnaround north of Cabana Road. This borehole encountered 280 millimetres of concrete overlying about 560 millimetres of granular base on a clayey silt to silty clay subgrade.





**Table 8: Encountered Pavement and Shallow Subsurface Conditions, Huron Church Road**

COMPONENT	TYPICAL THICKNESS (mm)			
	Northbound Lanes		Southbound Lanes	
	Driving Lane	Passing Lane	Passing Lane	Driving Lane
Asphalt	-	260 <sup>a</sup>	-	345 <sup>c</sup>
Concrete	265	245	300	275
Granular Base	825	540 <sup>b</sup>	555	615

<sup>a</sup> encountered asphalt over concrete at one location

<sup>b</sup> encountered at one location in this lane

<sup>c</sup> encountered asphalt at one location – no concrete beneath asphalt

## 4.3.4 Existing Crossing Roads

Boreholes and cores were advanced on several of the existing roads crossing Highway 3/Talbot Road, Huron Church Road and the E.C. Row Expressway. The typical pavement conditions encountered in these boreholes are summarized in Tables 9 through 14.

**Table 9: Encountered Pavement and Shallow Subsurface Conditions, Outer Drive**

COMPONENT	ENCOUNTERED THICKNESS (mm)	
	Southbound Lane	Southbound Shoulder
Asphalt	20	20
Granular Base	380	335
Clayey Fill with organics	310	405

Notes: 1. Clayey silt to silty clay subgrade materials were encountered beneath the pavement structure and fill at these locations.

**Table 10: Encountered Pavement and Shallow Subsurface Conditions, Howard Avenue**

COMPONENT	THICKNESS (mm)
Asphalt	245
Granular Base	195
Concrete	260
Sand & Gravel (Fill)	180
Topsoil	230

Notes: 1. Table based on a single borehole.

2. Beneath the pavement structure and buried topsoil, clayey silt to silty clay subgrade materials were encountered.





**Table 11: Encountered Pavement and Shallow Subsurface Conditions, Todd Lane and Cabana Road**

COMPONENT	ENCOUNTERED THICKNESS (mm)	
	Todd Lane	Cabana Road
Asphalt	135	100
Granular Base	525	460
Sand & Gravel (Fill)	180	140

Notes: 1. Beneath the pavement structures, clayey silt to silty clay subgrade materials were encountered.

**Table 12: Encountered Pavement and Shallow Subsurface Conditions, Pulford Street**

COMPONENT	ENCOUNTERED THICKNESS (mm)	
	East of Huron Church Road	West of Huron Church Road
Concrete	280	230
Granular Base	630	330
Sand (Fill)	460	660

Notes: 1. East of Huron Church Road, clayey silt to silty clay subgrade materials were encountered beneath the pavement structure. West of Huron Church Road, sand and sandy silts were encountered beneath the pavement structure and these deposits were underlain by clayey silt to silty clay.

**Table 13: Encountered Pavement and Shallow Subsurface Conditions, Bethlehem Avenue and Labelle Street**

BETHLEHEM AVENUE		LABELLE STREET	
Component	Encountered Thickness (mm)	Component	Encountered Thickness (mm)
Concrete	215	Asphalt	105
Granular Base	625	Granular Base	455
		Asphalt	170
		Granular Base	130

Notes: 1. A rigid pavement structure was encountered on Bethlehem Avenue; however a flexible pavement structure was encountered overlying an existing flexible pavement structure on Labelle Street.  
2. Clayey silt to silty clay subgrade materials were encountered beneath both of the pavement structures.



**Table 14: Encountered Pavement and Shallow Subsurface Conditions, Malden Road**

COMPONENT	ENCOUNTERED THICKNESS (mm)			
	Southbound		Northbound	
	Shoulder	Lane	Lane	Shoulder
Topsoil	-	-	-	25
Asphalt	-	150	130	-
Base	560	840	890	355
Sand & Gravel (Fill)	250	-	-	-

- Notes:
1. Four boreholes were drilled on Malden Road which were located in the existing travelled lanes and shoulders.
  2. Beneath the granular base in the northbound shoulder, a layer of buried topsoil about 380 millimetres thick was encountered.
  3. All of the boreholes were terminated in silty sand to sandy silt materials.
  4. Free water was noted in the boreholes at depths of about 1.1 to 1.2 metres below the pavement surface.

## 4.3.5 New Alignments

The following sections provide a summary of the conditions encountered along the new alignments within the project limits.

### 4.3.5.1 Proposed Highway 3 Realignment, Windsor-Essex Parkway, and Outer Drive Realignment

Thirty eight boreholes were drilled in the area south of existing Highway 3 from approximately 150 metres southeast of Outer Drive to approximately 240 metres east of Howard Avenue, within the general area of the proposed Highway 401, Highway 3 and Outer Drive interchange (Drawing 5). Surficial topsoil was encountered at all of the borehole locations. The surficial topsoil was about 200 to 380 millimetres thick at the borehole locations with an average thickness of about 295 millimetres. Silty sand to sandy silt (granular soils) was encountered beneath the topsoil at two locations. The granular soils were about 305 to 335 millimetres thick at these locations and were noted to be wet. Beneath the topsoil and sands, all of the boreholes encountered and were terminated in clayey silt to silty clay.

### 4.3.5.2 Proposed Windsor-Essex Parkway and Service Roads, Highway 3/Talbot Road Corridor

The shallow subsurface conditions along the proposed Windsor-Essex Parkway and service roads in the present Highway 3/Talbot Road corridor alignment were investigated with 25 boreholes south of the existing Highway 3/Talbot Road. Surficial topsoil was encountered at the ground surface at 18 of these locations. The surficial topsoil was about 80 to 610 millimetres thick at these locations with an average thickness of about 275 millimetres. Buried topsoil was encountered beneath the fill at one location. The topsoil was encountered at about 0.3 metres depth and was about 0.6 metres thick. Fill materials were encountered at the ground surface at the remaining six locations. The fill materials consisted of granular materials mixed with varying amounts of topsoil or clayey materials. The fill materials were about 0.2 to greater than 1.5 metres thick with an average



thickness of about 0.6 metres. Fill materials were also encountered beneath the surficial topsoil at four locations. The fill was about 0.5 to 1.4 metres thick at these locations with an average thickness of about 1.0 metres. One borehole encountered silty sand at the ground surface and explored the layer for more than 1.4 metres. Silty sand to sandy silt about 0.3 metres thick was encountered beneath the surficial topsoil at one location. Twenty two boreholes encountered clayey silt to silty clay materials beneath the surficial layers.

#### **4.3.5.3     *Proposed Windsor-Essex Parkway and Service Roads, Huron Church Road Corridor***

Seventeen boreholes were drilled immediately west of the existing Huron Church Road. The conditions encountered in these boreholes were variable but generally consisted of surficial topsoil and/or fill underlain by sand, silty sand, silt and clayey silt to silty clay. Surficial topsoil was encountered in eight of these boreholes. The surficial topsoil was 120 millimetres to 1.4 metres thick at these locations with an average thickness of about 485 millimetres. Buried topsoil was encountered beneath about 460 millimetres of sandy fill in one borehole. The buried topsoil was about 230 millimetres thick at the borehole location. Variable fill materials consisting of granular materials, sands and silty sands, were encountered in eight boreholes. The total fill thickness in these boreholes ranged from about 300 millimetres to 1.2 metres with an average thickness of about 705 millimetres.

#### **4.3.5.4     *Proposed Highway 401 Alignment Adjacent to E.C. Row Expressway***

Forty seven boreholes were drilled south of the existing E.C. Row Expressway. The conditions encountered in these boreholes were variable. In general, the boreholes encountered surficial topsoil and/or fill at ground surface overlying layers of silty sand to sandy silt materials and clayey silt to silty clay.

Surficial topsoil was encountered in 44 of these boreholes. The topsoil was about 75 to 910 millimetres thick with an average thickness of about 330 millimetres. Buried topsoil was encountered beneath fill materials at three locations. The buried topsoil was encountered at depths of 200 and 500 millimetres and were 150 to 700 millimetres thick. Variable fill materials consisting of predominantly topsoil to material resembling granular base were encountered at six locations. The fill materials were 100 to 760 millimetres thick with an average thickness of about 400 millimetres.

### **4.4     Native Soil Stratigraphy**

#### **4.4.1     Upper Granular Deposits**

Silty sand to sandy silt was encountered at the locations of 24 boreholes completed for this project (not including pavement boreholes) to depths of as much as about 2.4 m, with the majority of these located along the alignment west of Cabana Road. In some instances, classification of this material was based only on auger cuttings and visual and textural evidence. A summary of the grain size distribution determinations is provided on Figure F.2; however, it is noted that gravel sizes larger than about 40 mm maximum dimension were not recovered by the sampling methods used. Therefore, Figure F.2 is considered representative of the fraction of the deposit smaller than 25 mm in maximum dimension. The thickness of the Upper Granular Deposits ranged between about 0.2 m and 2.0 m and exhibited Standard Penetration Test (SPT) "N" values between 4 and 19 blows per 0.3 m penetration, with a typical value of about 9 blows per 0.3 m penetration, indicating a loose to compact relative density. Measured CPT tip resistance values within the Upper Granular Deposits were typically about 2 megapascals (MPa) to 3 MPa also indicating a loose to compact relative density.



### 4.4.2 Clayey Silt to Silty Clay Deposit

A thick deposit of clayey silt to silty clay was encountered at all boreholes completed for this project that penetrated deeper than 2 m. Boreholes and CPT test results indicated that seams or interbeds of silty sand to sandy silt are embedded within the clayey silt to silty clay deposit. The subsurface data indicate that these seams or interbeds typically range between 0.1 and 1.5 m thick above Elevation 155 m. These interbeds are not described in further detail and the classification characteristics of the interbeds are considered similar to those described in Section 4.4.1, above. The clayey silt to silty clay deposit is generally mottled grey and brown within and near the frost-depth (upper 1 to 2 m), brown below this level, and grey below the static water level.

The clayey silt to silty clay deposit had 'N' values of from 1 blow per 0.3 metres to over 52 blows per 0.1 metres penetration indicating a soft to hard relative density. The natural water content measured on select samples from these deposits ranged between about 10 and 30 per cent but was typically between 20 and 25 per cent. The higher water contents are typically associated with the middle portion of the deposit. Grain size distribution curves for samples of the clayey silt to silty clay deposit are shown on Figures F.3A to F.3K (inclusive). Atterberg limits testing indicated plastic limits ranging from 12 to 26 per cent, liquid limits ranging from 19 to 56 per cent and plasticity indices from 4 to 31 per cent. Of the 157 samples subjected to Atterberg limits testing, 31 exhibited liquid limits greater than 35 per cent. The results of the Atterberg limits testing are presented on Figures F.1A to F.1N (inclusive). The results of standard Proctor maximum dry density testing performed on samples of the clayey silt to silty clay deposit are presented on Figure F.5.

One boulder was encountered and cored in borehole 158 within this deposit at about elevation 157 m.

### 4.4.3 Lower Granular Deposits

Deposits of loose to very dense silt, sandy silt, silty sand, silty sand and gravel, and sand and gravel were encountered beneath the silty clay to clayey silt in multiple boreholes along the alignment. This deposit typically exhibited "N" values of between 22 blows per 0.3 m penetration and more than 100 blows per 0.3 m penetration, though lower "N" values were recorded in some localized areas with these low values considered to reflect disturbance during drilling and sampling. Grain size distribution data is presented in Figures F.4A and F.4B, although it is noted that gravel larger than about 40 mm maximum dimension was not recovered by the sampling methods used. Therefore, Figure F.4A and F.4B are considered representative of the fraction of the deposit smaller than 25 mm in maximum dimension. This deposit also includes zones or interbeds of clayey silt and silty clay, similar in composition to those described in Section 4.4.2, above. These materials are considered representative of the complex depositional environment near the contact between glacial ice and the bedrock. The consistency of these interbeds typically varies from firm to hard. The thickness of this deposit, where present, varied up to about 10 m.

### 4.4.4 Bedrock

Limestone and dolostone bedrock of the Hamilton Group (Dundee Formation) or Detroit River Group (Lucas Formation) were encountered in the boreholes at depths ranging from about 22.3 to 36.1 m below the ground surface as shown in Table 15 below. The rock encountered in the boreholes on the eastern end comprised mostly of light grey (and occasionally tan or brown) limestone. Dolostone, both brown and grey, was encountered in boreholes BH-14, BH-116, BH-127 and BH-129. The bedrock in the boreholes on the western end composed of brown to grey limestone. Some portions of the rock in boreholes BH-23 and BH-164 emitted a hydrocarbon odour. The presence of hydrocarbon staining was also observed in the rock cores from boreholes



## GEOTECHNICAL DATA REPORT - WINDSOR-ESSEX PARKWAY

BH-142, BH-145, BH-163, BH-164 and BH-166. It is unknown whether the hydrocarbon odour is from natural sources, though some of the expected formations are known to contain natural bitumen. The rock encountered ranged from slightly weathered to fresh. Rock quality designation (RQD) values ranged between 10 and 100 per cent and were typically above 80 per cent below the upper 2 m of rock. A description of some of the terms used in the description of the bedrock samples from this site is provided on the Lithological and Geotechnical Rock Description Terminology sheet that precedes the Record of Borehole sheets included with this report.

**Table 15: Depth to Bedrock**

BOREHOLE NUMBER	GROUND SURFACE ELEVATION (m)	DEPTH TO BEDROCK (m)	BEDROCK SURFACE ELEVATION (m)
1	186.70	32.46	154.24
7	183.17	33.15	150.02
14	182.06	33.53	148.53
23	178.92	22.56	156.36
101	187.37	33.32	154.05
102	186.60	32.00	154.59
104	186.15	30.45	155.70
105	186.16	30.56	155.61
107	185.85	31.24	154.61
109	185.30	36.12	149.18
112	184.58	32.46	152.12
113	184.41	31.49	152.92
115	183.79	32.31	151.48
116	183.64	32.44	151.20
118	182.66	32.34	150.32
119	182.50	32.10	150.40
122	181.66	35.05	146.61
127	181.27	32.79	148.48
129	180.78	33.53	147.26
131	180.80	32.74	148.06
132	181.47	33.43	148.05
135	182.02	33.53	148.49
136	181.75	33.66	148.10
139	182.30	35.26	147.05
140	182.00	33.12	148.88
141	181.72	32.39	149.33
142	181.11	31.70	149.41
145	182.28	32.77	149.52
149	180.98	31.01	149.97
152	180.16	30.78	149.38
154	180.87	31.24	149.63



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BOREHOLE NUMBER	GROUND SURFACE ELEVATION (m)	DEPTH TO BEDROCK (m)	BEDROCK SURFACE ELEVATION (m)
158	179.30	27.48	151.82
160	178.72	22.25	156.47
163	178.77	22.86	155.91
164	179.06	23.47	155.59
166	179.00	23.27	155.73
201	187.67	32.87	154.80
202	187.31	33.23	154.08
203	187.23	32.72	154.51
206	186.48	32.28	154.20
207	186.89	32.36	154.53
208	186.88	32.31	154.57

### 4.5 Groundwater Conditions

Groundwater level measurements were obtained during the field work and these are summarized in Tables I and II. Three of the boreholes included both a shallow piezometer and a deep standpipe observation well, 27 of the boreholes included a deep standpipe immediately adjacent to an unsampled borehole with a shallow piezometer, three boreholes included a deep standpipe only and eleven of the boreholes included piezometers only as described in Section 3 above and as shown on the Record of Borehole sheets. The upper piezometer was installed within the soil profile and the lower standpipe was installed within the bedrock or near the soil-bedrock interface.

Artesian groundwater conditions were observed at and below the soil-bedrock interface at Boreholes BH-23, BH-160 and BH-163. Piezometers were not installed in the bedrock in these boreholes in order to avoid the potential for long-term groundwater flow through or around the piezometer to the ground surface. After drilling of borehole BH-160, static artesian groundwater conditions were measured in the standpipe observation well. For those boreholes in which groundwater was encountered below the ground surface during drilling, the measured groundwater level during drilling will not necessarily be representative of actual groundwater conditions due to the low permeability of the soils and the action of cutting and removal of soils. The final readings for each piezometer may be most reflective of static groundwater levels. The groundwater pressure elevations may be different within the overburden soil and bedrock. Groundwater levels are expected to fluctuate seasonally and are expected to rise during wet periods of the year.

The groundwater in the project area contains dissolved hydrogen sulphide that is liberated from the water on exposure to atmospheric pressure. Hydrogen sulphide gas was noted by its characteristic odour during drilling of Boreholes BH-23 and BH-166 when the bedrock and artesian water pressures were encountered. Concentrations did not exceed health and safety trigger levels of on-site monitoring equipment for the drilling conducted for this report; however it is known that personnel protection equipment alarms have been triggered during drilling completed for other projects when flowing artesian water has been encountered. Table III summarizes testing results for the natural groundwater chemistry completed during the investigations summarized by this report.





### 5.0 MISCELLANEOUS

The investigation was carried out using equipment supplied and operated by Lantech Drilling Services Inc. and Aardvark Drilling Inc., which are Ontario Ministry of Environment licensed well contractors. The field operations were supervised by Mr. David J. Mitchell, Mr. Michael Arthur, Mr. Chris Collins, Mr. Steve Mayer, Ms. Nicole Gould and Ms. Shannon Palmer under the direction of Dr. Storer J. Boone, P.Eng.

The routine laboratory testing was carried out at Golder's London laboratory under the direction of Mr. Chris M. Sewell. The laboratory is an accredited participant in the MTO Soil and Aggregate Proficiency Program and is certified by the Canadian Council of Independent Laboratories for testing Types C and D aggregates.

The oedometer tests, triaxial tests, flexible-wall permeameter constant head tests and unconfined compression tests were carried out at Golder's Mississauga laboratory by Ms. Marijana Manojlovic. In addition to also being a participant in the MTO Soils and Aggregate Proficiency Program, the Mississauga laboratory is an MTO registered laboratory in the Specialty of Soil and Rock Including Testing for Foundation Engineering – Low and High Complexity. The variable strain rate triaxial tests were carried out by Dr. S. Hinchberger, of the University of Western Ontario, under contract to Golder Associates.

This report was prepared by Mr. Mrinmoy Kanungo, Mr. Tyson Pitt, Mr. Michael E. Beadle, P.Eng. and Ms. Lesley A. Sebol under the direction of the Project Manager, Dr. Storer J. Boone, P.Eng. This report was reviewed by Mr. Fintan J. Heffernan, P.Eng., the Designated MTO Contact and Quality Control Auditor for this assignment.

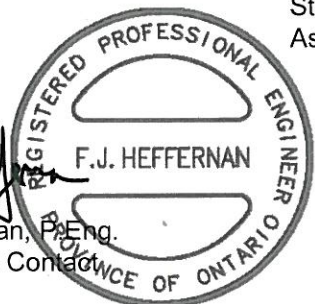
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MK/TP/SJB/MEB/LAS/MSD/PRB/FJH/cr

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### 6.0 REFERENCES

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## **IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT**

**Standard of Care:** Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

**Basis and Use of the Report:** This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder can not be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

**Soil, Rock and Groundwater Conditions:** Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

## **IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT (cont'd)**

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. **The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report.** The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

**Sample Disposal:** Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

**Follow-Up and Construction Services:** All details of the design were not known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

**Changed Conditions and Drainage:** Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that Golder be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

TABLE I

**SUMMARY OF GROUNDWATER LEVELS, PHASE I**

Geotechnical Data Report  
Windsor-Essex Parkway  
Windsor, Ontario

<u>BOREHOLE</u> (#)	<u>GROUND</u> <u>SURFACE</u> <u>ELEVATION</u> (m)	<u>ENCOUNTERED</u> <u>GROUNDWATER</u> <u>ELEVATION</u> (m)	<u>INSTALLATION</u>	<u>MEASURED</u> <u>GROUNDWATER ELEVATION (m)</u>									
				<u>Oct. 6/06</u>	<u>Oct. 13/06</u>	<u>Oct. 20/06</u>	<u>Oct. 24/06</u>	<u>Oct. 25/06</u>	<u>Oct. 27/06</u>	<u>Nov. 6/06</u>	<u>Nov. 7/06</u>	<u>Nov. 14/06</u>	<u>Feb. 10/09</u>
BH-1	186.70	176.60	Shallow Piezometer	dry	175.1	178.2		180.0	180.7	184.0		184.4	184.6
			Deep Piezometer	176.7	176.9	177.1		177.1	177.2	177.2		177.4	177.6
BH-7	183.17	176.80	Shallow Piezometer			180.8		179.0	179.6		179.8	180.1	180.4
			Deep Piezometer			177.3		177.3	177.4		177.5	177.6	177.7
BH-14	182.06	179.20	Shallow Piezometer				176.8	179.0	179.2		179.1	179.3	178.2
			Deep Piezometer				179.0	179.0	179.0		179.3	179.2	178.4
BH-23	178.92	180.60	Shallow Piezometer						dry		178.8	178.9	178.7

## NOTES:

1. Table to be read in conjunction with accompanying report.
2. Artesian water flow encountered during rock coring in Borehole BH-23.

Prepared By: TP  
Checked By: MK

TABLE II (a)  
  
SUMMARY OF GROUNDWATER LEVELS, PHASE II

Geotechnical Data Report  
Windsor-Essex Parkway  
Windsor, Ontario

BOREHOLE (#)	GROUND SURFACE ELEVATION (m)	ENCOUNTERED GROUNDWATER ELEVATION (m)	INSTALLATION	MEASURED GROUNDWATER ELEVATION (m)																			
				Feb. 12/08	Feb. 21/08	Feb. 28/08	Mar. 4/08	Mar. 6/08	Mar. 20/08	Apr. 4/08	Jul. 16/08	Jul. 22/08	Jul. 24/08	Jul. 28/08	Jul. 31/08	Aug. 5/08	Aug. 11/08	Aug. 26/08	Sep. 19/08	Sep. 22/08	Nov. 11/08	Nov. 14/08	Jan. 28/09
101	187.370	186.99	Deep Piezometer						178.15			177.69							175.99			177.26	177.39
101A			Shallow Piezometer						186.30			185.77							185.41				185.86
102	186.595	Dry	Deep Piezometer									177.91							175.88			177.26	177.31
102A			Shallow Piezometer									184.97							184.44				184.56
104	186.148	162.38	Deep Piezometer							177.92									176.09			177.25	
104A			Shallow Piezometer							183.01									183.76				
105	186.164	Dry	Deep Piezometer						178.26			177.93					175.77		176.84			177.35	177.94
105A			Shallow Piezometer						184.72			184.36					184.12		184.05				183.69
107	185.854	Dry	Deep Piezometer																			177.30	177.48
107A			Shallow Piezometer																				
109	185.295	159.39	Deep Piezometer						178.11				177.75									177.20	177.42
109A			Shallow Piezometer						183.39				183.37										183.45
112	184.580	158.52	Deep Piezometer	178.23					178.38				177.93						176.25			177.54	177.72
112A			Shallow Piezometer						181.94				182.55						182.50				182.39
113	184.407	154.54	Deep Piezometer			178.13			182.91			177.75							175.87		177.18		177.44
113A			Shallow Piezometer						182.40			182.63							182.43				182.50
115	183.788	156.19	Deep Piezometer		178.00				178.10				177.69						175.99			177.25	177.35
115A			Shallow Piezometer						182.36				182.34						182.26				182.20
116	183.637	Dry	Deep Piezometer						180.79			177.95					176.69		176.09		177.26		177.48
116A			Shallow Piezometer						182.55			182.80					182.59		182.57				182.72
118	182.657	181.29	Deep Piezometer				176.77		177.30				177.78						177.32			177.28	177.40
118A			Shallow Piezometer					179.15	181.00				180.98						180.73				180.89
119	182.502	Dry	Deep Piezometer						178.18			177.78					178.85		176.03		177.16		177.45
119A			Shallow Piezometer						179.66			180.47					180.75		180.60				181.08
122	181.663	Dry	Deep Piezometer									178.01					178.26		178.26		177.54		177.21
122A			Shallow Piezometer														179.81		179.53				180.22
126	180.610	Dry	None																				
127	181.269	Dry	Deep Piezometer						177.74			178.27					178.12		177.87		177.74		177.28
127A			Shallow Piezometer						172.35			179.06					179.12		179.11				179.07
129	180.783	Dry	Deep Piezometer									178.50					177.88		177.48		177.57		177.46
129A			Shallow Piezometer									178.95					178.93		178.95				178.84
131	180.802	Dry	Deep Piezometer																	177.91	177.54		177.40
131A			Shallow Piezometer																179.23	179.28			179.65
132	181.473	178.57	Deep Piezometer																177.97		177.57		177.48
132A			Shallow Piezometer																179.19				180.19
135	182.017	Dry	Deep Piezometer													178.36	178.22			178.21	177.64		177.57
135A			Shallow Piezometer														178.12		179.88	179.91			180.42
136	181.754	Dry	Deep Piezometer																	178.17	177.63		177.61
136A			Shallow Piezometer																173.35	174.13			179.49
139	182.304	Dry	Deep Piezometer																178.57	178.57	177.60		177.63
139A			Shallow Piezometer																177.94	178.62			180.31
140	182.000	Dry	Deep Piezometer																179.46	179.46	178.21		178.61
140A			Shallow Piezometer																177.96	178.09			180.33
141	181.715	Dry	Deep Piezometer																180.72	180.72	177.24		178.14
141A			Shallow Piezometer																177.07				180.46
142	181.108	Dry	Deep Piezometer																179.94	179.48	177.58		177.92
142A			Shallow Piezometer																178.87				179.93
143	181.263	Dry	Shallow Piezometer																176.44				179.17
145	182.284	179.08	Deep Piezometer												179.08		179.24		180.30	180.35	177.31		178.23
145A			Shallow Piezometer																180.15	180.28			180.56
147	180.830	Dry	Shallow Piezometer																175.34				178.26
149	180.998	Dry	Deep Piezometer																180.33		177.40		177.82
149A			Shallow Piezometer																175.44				176.35
151	180.354	Dry	Shallow Piezometer																175.17				176.53
152	180.164	Dry	Deep Piezometer																		171.94		178.27
152A			Shallow Piezometer																				179.21
154	180.874	Dry	Deep Piezometer											178.97					180.42		177.23		178.27
156	179.521	Dry	Shallow Piezometer																177.54				178.97
158	179.296	Dry	Shallow Piezometer																177.70				178.41
160	178.509	Dry	Deep Piezometer								179.31										177.29		178.69
160A	178.719	Dry	Shallow Piezometer																178.57				178.13
163	178.772	180.14	Shallow Piezometer															180.17	177.27				177.84
164	179.057	Dry	Shallow Piezometer																179.96				179.48
166	179.002	180.60	None																				
166A	179.002	Dry	Shallow Piezometer																163.76	165.19			178.43

NOTES:

1. Table to be read in conjunction with accompanying report.
2. Artesian water flow encountered during rock coring in Boreholes BH-163 and BH-166.

Prepared By: TP  
Checked By: MK

TABLE II (b)

**SUMMARY OF GROUNDWATER LEVELS, PHASE III**

Geotechnical Data Report  
Windsor-Essex Parkway  
Windsor, Ontario

<u>BOREHOLE</u> (#)	<u>GROUND</u> <u>SURFACE</u> <u>ELEVATION</u> (m)	<u>ENCOUNTERED</u> <u>GROUNDWATER</u> <u>ELEVATION</u> (m)	<u>INSTALLATION</u>	<u>MEASURED GROUNDWATER</u> <u>ELEVATION (m)</u>	
				<u>April 15/09</u>	<u>May 26/09</u>
BH-201	187.67	180.3	None		
BH-201A	187.67		Shallow Piezometer	185.3	
BH-202	187.31	170.1	Deep Piezometer	177.7	
BH-203	187.23	179.8	None		
BH-206	186.48	173.9	None		
BH-207	186.89	176.1	Deep Piezometer		178.05
BH-208	186.88	177.2	None		
BH-208A	186.88		Shallow Piezometer		183.53

Prepared By: TP  
Checked By: MK

## NOTES:

1. Table to be read in conjunction with accompanying report.
2. BH 215N to 242N were found to be dry upon completion of drilling. Minor water seepage at about 0.61 m depth was observed in borehole 235N and 242N.

TABLE III

**SUMMARY OF NATURAL GROUNDWATER CHEMISTRY**

Geotechnical Data Report  
Windsor-Essex Parkway  
Windsor, Ontario

	RESULTS <sup>1</sup>						
Sample Identification:	BH-101	BH-102	BH-102	BH-104	BH-105	BH-107	BH-107
Well Depth (m bgs) <sup>2</sup> :	36.2	32.0	32.0	34.7	30.2	34.3	34.3
Matrix at Screen:	bedrock	clayey silt/ bedrock interface	clayey silt/ bedrock interface	bedrock	silty clay/ silty sand & gravel	bedrock	bedrock
Sampling Date:	17-Nov-08	17-Nov-08	5-Feb-09	17-Nov-08	17-Nov-08	17-Nov-08	5-Feb-09
<b><u>PARAMETER</u></b>							
Calcium as Ca	51.3	95.3	--	52	54.2	94.3	--
Magnesium as Mg	10.6	45.6	--	11.6	14.2	39.7	--
Hardness (as CaCO <sub>3</sub> )	170	430	--	180	190	400	--
Methane, Dissolved (µg/L)	6	395	--	6	<5	15	--
Sulphate	28	109	--	46	133	256	--
Sulphide (H <sub>2</sub> S)	<0.02	1.77	--	0.11	0.06	5.54	--
Iron, Dissolved	--	--	0.08	--	--	--	0.75
Total Dissolved Solids	--	--	1030	--	--	--	1330
<b><u>FIELD MEASUREMENTS</u></b>							
pH value	7.57	7.39	7.54	7.60	7.79	7.49	7.56
Conductivity (mS/cm)	0.52	1.10	1.16	0.29	0.41	0.85	1.84
Temperature (°C)	8.8	9.6	9.7	9.3	10.6	10.5	11.3

**SUMMARY OF NATURAL GROUNDWATER CHEMISTRY**

	RESULTS <sup>1</sup>						
Sample Identification:	BH-109	BH-109	BH-112	BH-113	BH-113	BH-115	BH-116
Well Depth (m bgs) <sup>2</sup> :	35.7	35.7	38.1	31.5	31.5	37.5	31.9
				sand & gravel/ bedrock	sand & gravel/ bedrock		
Matrix at Screen:	sand & gravel	sand & gravel	bedrock	interface	interface	bedrock	clayey silt
Sampling Date:	17-Nov-08	5-Feb-09	17-Nov-08	13-Nov-08	5-Feb-09	17-Nov-08	13-Nov-08
<b><u>PARAMETER</u></b>							
Calcium as Ca	52.7	--	45.2	55.1	--	57.3	111
Magnesium as Mg	12.2	--	8.2	15.6	--	9.9	56.1
Hardness (as CaCO <sub>3</sub> )	180	--	150	200	--	180	510
Methane, Dissolved (µg/L)	<5	--	<5	7	--	5	15
Sulphate	36	--	26	53	--	42	577
Sulphide (H <sub>2</sub> S)	2.17	--	0.86	1.40	--	<0.02	<0.02
Iron, Dissolved	--	0.99	--	--	0.64	--	--
Total Dissolved Solids	--	690	--	--	990	--	--
<b><u>FIELD MEASUREMENTS</u></b>							
pH value	7.41	7.92	7.34	7.57	7.70	7.30	7.56
Conductivity (mS/cm)	0.41	1.06	0.32	0.47	1.48	0.34	1.46
Temperature (°C)	9.3	11.4	9.7	12.6	11.2	9.3	12.8

**SUMMARY OF NATURAL GROUNDWATER CHEMISTRY**

	RESULTS <sup>1</sup>						
Sample Identification:	BH-118	BH-118	BH-119	BH-122	BH-122	BH-127	BH-127
Well Depth (m bgs) <sup>2</sup> :	36.0	36.0	31.7	39.9	39.9	36.1	36.1
			clayey silt/ sand & gravel	sandy silt/ bedrock interface	sandy silt/ bedrock interface	bedrock	bedrock
Matrix at Screen:	bedrock	bedrock	13-Nov-08	13-Nov-08	4-Feb-09	13-Nov-08	4-Feb-09
Sampling Date:	17-Nov-08	5-Feb-09					
<b>PARAMETER</b>							
Calcium as Ca	308	--	46.6	283	--	309	--
Magnesium as Mg	155	--	13	207	--	252	--
Hardness (as CaCO <sub>3</sub> )	1410	--	170	1560	--	1810	--
Methane, Dissolved (µg/L)	65	--	<5	162	--	92	--
Sulphate	1200	--	64	1250	--	1320	--
Sulphide (H <sub>2</sub> S)	2.55	--	0.02	<0.02	--	2.21	--
Iron, Dissolved	--	<0.05	--	--	0.30	--	<0.05
Total Dissolved Solids	--	1950	--	--	2340	--	3080
<b>FIELD MEASUREMENTS</b>							
pH value	7.29	7.45	7.52	7.40	7.81	7.31	7.55
Conductivity (mS/cm)	2.10	2.72	0.51	2.30	3.32	2.80	1.69
Temperature (°C)	9.8	10.5	13.0	12.0	10.3	13.1	10.1



**SUMMARY OF NATURAL GROUNDWATER CHEMISTRY**

	RESULTS <sup>1</sup>						
Sample Identification:	BH-129	BH-131	BH-132	BH-135	BH-136	BH-136	BH-139
Well Depth (m bgs) <sup>2</sup> :	32.9	36.0	34.1 silty sand/ bedrock	32.3	33.2	33.2	39.0 sandy silt/ bedrock
Matrix at Screen:	sand & gravel	bedrock	interface	sand	silty sand	silty sand	interface
Sampling Date:	13-Nov-08	13-Nov-08	13-Nov-08	13-Nov-08	13-Nov-08	4-Feb-09	13-Nov-08
<b>PARAMETER</b>							
Calcium as Ca	50.7	30.9	31.4	33.2	294	--	62.1
Magnesium as Mg	29.6	8.3	9.1	11.5	189	--	22.5
Hardness (as CaCO <sub>3</sub> )	250	110	120	130	1510	--	250
Methane, Dissolved (µg/L)	6	<5	<5	<5	<5	--	<5
Sulphate	148	30	42	84	1120	--	26
Sulphide (H <sub>2</sub> S)	0.76	<0.02	<0.02	<0.02	<0.02	--	0.05
Iron, Dissolved	--	--	--	--	--	3.71	--
Total Dissolved Solids	--	--	--	--	--	2690	--
<b>FIELD MEASUREMENTS</b>							
pH value	7.29	7.46	7.59	7.61	7.13	7.64	7.39
Conductivity (mS/cm)	0.96	0.30	0.32	0.52	3.58	3.37	0.42
Temperature (°C)	13.9	12.7	12.6	12.3	12.6	10.3	13.0

**SUMMARY OF NATURAL GROUNDWATER CHEMISTRY**

	RESULTS <sup>1</sup>						
Sample Identification:	BH-140	BH-140	BH-141	BH-142	BH-145	BH-149	BH-149
Well Depth (m bgs) <sup>2</sup> :	32.6	32.6	36.3	31.7	35.7	30.5	30.5
				clayey silt/ silt & gravel/ bedrock interface	bedrock	silty sand	silty sand
Matrix at Screen:	clayey silt/ silt/ sand & gravel	clayey silt/ silt/ sand & gravel	bedrock				
Sampling Date:	13-Nov-08	4-Feb-09	12-Nov-08	12-Nov-08	12-Nov-08	12-Nov-08	4-Feb-09
<b>PARAMETER</b>							
Calcium as Ca	463	--	35.1	43.9	39.9	341	--
Magnesium as Mg	260	--	9.9	17	12.4	229	--
Hardness (as CaCO <sub>3</sub> )	2230	--	130	180	150	1790	--
Methane, Dissolved (µg/L)	<5	--	<5	<5	<5	5	--
Sulphate	1760	--	21	199	31	1600	--
Sulphide (H <sub>2</sub> S)	<0.02	--	<0.02	<0.02	<0.02	<0.02	--
Iron, Dissolved	--	1.78	--	--	--	--	5.39
Total Dissolved Solids	--	3320	--	--	--	--	3380
<b>FIELD MEASUREMENTS</b>							
pH value	7.02	7.46	7.59	7.60	7.70	7.12	7.18
Conductivity (mS/cm)	3.46	4.24	1.94	0.31	3.35	3.95	3.90
Temperature (°C)	12.7	9.0	11.7	12.7	12.5	11.8	9.4

**SUMMARY OF NATURAL GROUNDWATER CHEMISTRY**

	RESULTS <sup>1</sup>				
Sample Identification:	BH-152	BH-152	BH-154	BH-160	BH-160
Well Depth (m bgs) <sup>2</sup> :	36.6	36.6	33.5	23.9	23.9
			clayey silt/ bedrock	clayey silt/ bedrock	clayey silt/ bedrock
Matrix at Screen:	bedrock	bedrock	interface	interface	interface
Sampling Date:	12-Nov-08	4-Feb-09	12-Nov-08	14-Aug-08	29-Jan-09
<b>PARAMETER</b>					
Calcium as Ca	422	--	45.5	420	432
Magnesium as Mg	220	--	14.7	242	197
Hardness (as CaCO <sub>3</sub> )	1960	--	170	2050	1890
Methane, Dissolved (µg/L)	113	--	<5	362	485
Sulphate	1460	--	44	1500	1890
Sulphide (H <sub>2</sub> S)	0.16	--	0.03	238	146
Iron, Dissolved	--	<0.05	--	--	<0.05
Total Dissolved Solids	--	3470	--	--	3190
<b>FIELD MEASUREMENTS</b>					
pH value	6.69	6.79	7.36	6.80	6.41
Conductivity (mS/cm)	2.74	1.56	0.37	3.70	4.14
Temperature (°C)	12.0	7.3	13.1	12.1	5.3

- NOTES:
1. All values shown as milligrams per litre (mg/L) unless otherwise stated.
  2. 'm bgs' Metres below ground surface.
  3. '<' Below reportable method detection limit.
  4. "--" Not analysed.
  5. Table to be read in conjunction with accompanying text.

Prepared by: TCH/LAS  
Checked by: LJ/DM

TABLE IV

## SUMMARY OF HYDRAULIC CONDUCTIVITIES FROM SLUG TESTS

Geotechnical Data Report  
Windsor-Essex Parkway  
Windsor, Ontario

Piezo ID	Geologic Formation(s) at Sand Pack-Screen	Hydraulic Conductivity (m/sec)						
		Average	Falling Head			Rising Head		
			Hvorslev	Bower-Rice	van der Kamp	Hvorslev	Bower-Rice	van der Kamp
BH-101	bedrock	<b>5.7E-06</b>	6.7E-06	4.7E-06				
BH-102	clayey silt/ bedrock interface	<b>2.6E-05</b>	2.5E-05	2.7E-05				
BH-105	silty clay/ silty sand & gravel	<b>1.6E-05</b>	1.7E-05	1.1E-05		2.4E-05	1.3E-05	
BH-107	bedrock	<b>5.4E-05</b>	6.4E-05	4.3E-05				
BH-109	sand & gravel	<b>7.6E-04</b>			7.6E-04			
BH-113	sand & gravel/ bedrock interface	<b>3.3E-04</b>			3.3E-04			
BH-116	clayey silt	<b>5.5E-08</b>	6.9E-08	4.2E-08				
BH-118	bedrock	<b>Insufficient Data<sup>1</sup></b>						
BH-119	clayey silt/ sand & gravel	<b>4.5E-05</b>	4.3E-05	4.8E-05				
BH-122	sandy silt/ bedrock interface	<b>Insufficient Data<sup>1</sup></b>						
BH-129	sand & gravel	<b>2.9E-05</b>	3.3E-05	2.5E-05				
BH-131	bedrock	<b>8.7E-06</b>	9.9E-06	7.5E-06				
BH-132	silty sand/ bedrock interface	<b>2.0E-05</b>	2.4E-05	1.7E-05				
BH-135	sand	<b>Insufficient Data<sup>2</sup></b>						
BH-136	silty sand	<b>1.0E-06</b>	1.2E-06	8.5E-07		1.2E-06	8.2E-07	
BH-139	sandy silt/ bedrock interface	<b>1.8E-06</b>	2.1E-06	1.5E-06				
BH-140	clayey silt/ silt/ sand & gravel	<b>7.5E-09<sup>3</sup></b>	9.2E-09	5.8E-09				
BH-141	bedrock	<b>1.6E-04</b>	1.9E-04	1.4E-04				
BH-142	clayey silt/ silt & gravel/ bedrock interface	<b>1.0E-06</b>	1.3E-06	7.7E-07				
BH-149	silty sand	<b>3.0E-08</b>	3.1E-08	3.2E-08		2.8E-08	2.9E-08	
BH-152	bedrock	<b>3.3E-07</b>	3.9E-07	3.6E-07		3.0E-07	2.8E-07	
BH-154	clayey silt/ bedrock interface	<b>1.9E-04</b>						1.9E-04
BH-160	clayey silt/ bedrock interface	<b>5.9E-06</b>	6.2E-06	4.3E-06		8.1E-06	4.9E-06	

NOTES: 1. Recovery was too slow to obtain a reliable estimate of hydraulic conductivity. K is estimated to be  $<10^{-9}$  m/s.

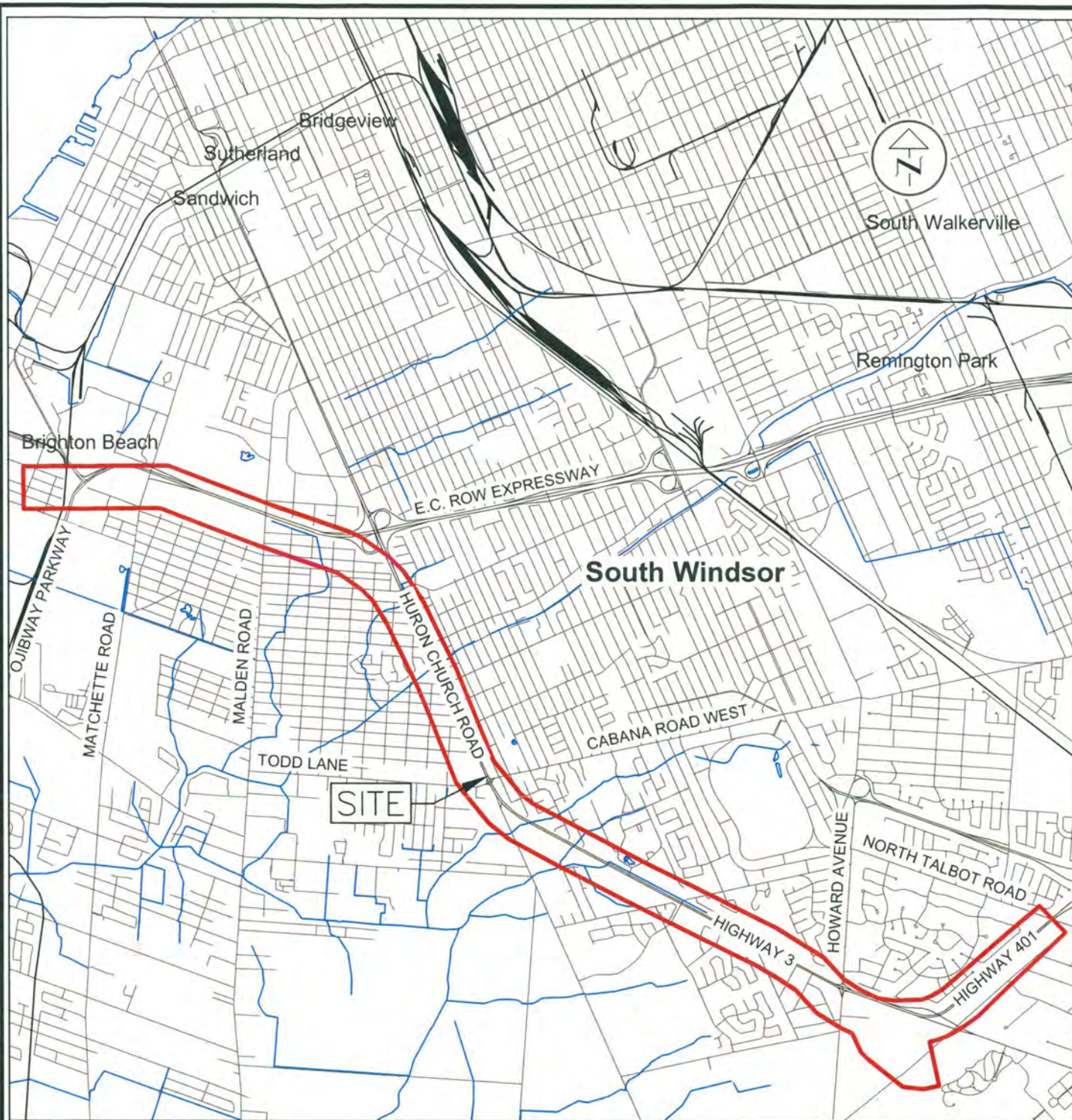
2. Recovery was too fast to obtain a reliable estimate of hydraulic conductivity. K is estimated to be  $>10^{-4}$  m/s.

3. For BH-140, test was truncated before optimal range was obtained due to slow recovery; therefore, K is considered an estimate.

4. Table to be read in conjunction with accompanying report.

Prepared by: DM  
Checked by: LAS





## REFERENCES

- 1) DRAWING BASED ON CANMAP STREETFILES V2005.4.

## NOTES

- 1) THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

TITLE

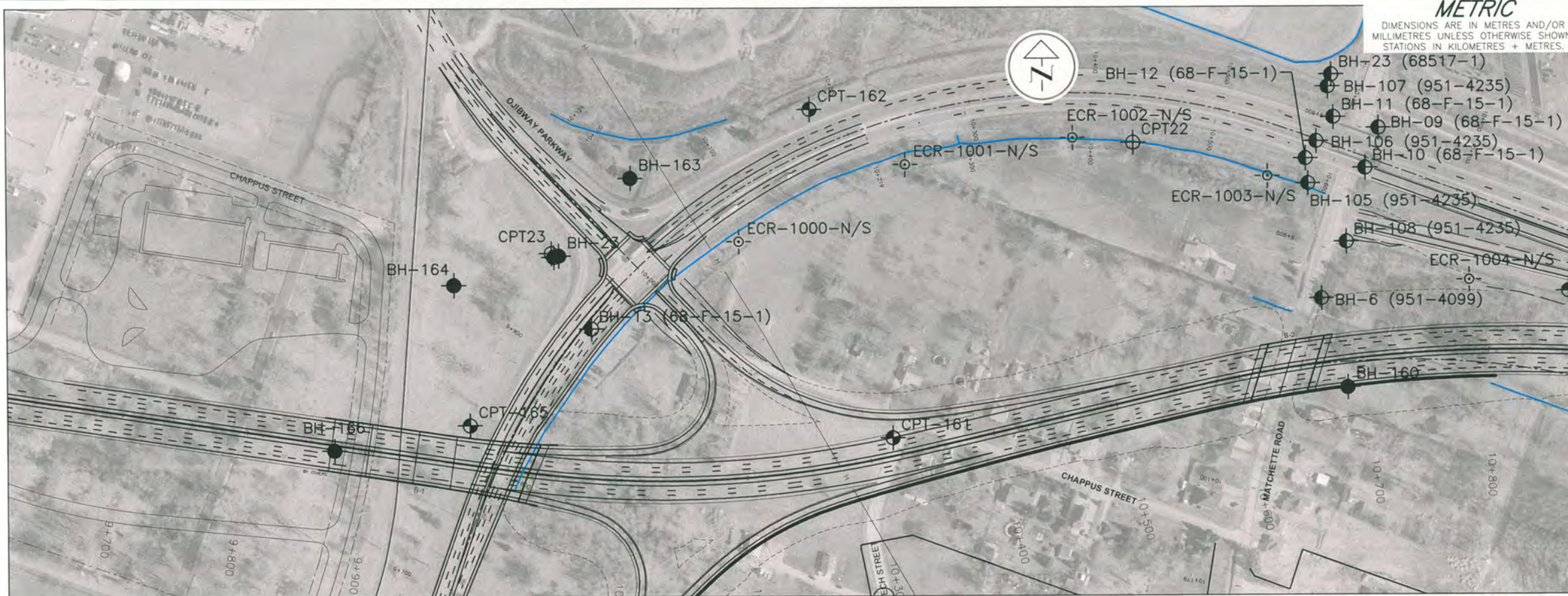
## KEY PLAN



PROJECT No.	07-1130-207-0	FILE No.	0711302070-R01001
CADD	WDF	SCALE	AS SHOWN
CHECK	SSB	REV.	0

FIGURE 1.1





**METRIC**  
DIMENSIONS ARE IN METRES AND/OR  
MILLIMETRES UNLESS OTHERWISE SHOWN.  
STATIONS IN KILOMETRES + METRES.

CONT No. -  
WP No. -

WINDSOR - ESSEX PARKWAY  
Windsor, Ontario

BOREHOLE LOCATION MAP

SHEET  
1



- LEGEND**
- Borehole - Current Investigation
  - Borehole - Previous Investigations
  - Borehole - Pavement Holes
  - Borehole and Cone Penetration Test
  - Cone Penetration Test

**NOTE**  
Horizontal and vertical alignment of road ways and general structure alignments shown are based on drawings provided by URS during conceptual design. Final alignments and structure arrangements may differ.

STN 9+800 TO STN 10+800



**REFERENCE**  
Base plans provided in digital format by URS.

STN 10+800 TO STN 11+800

No.	ELEVATION	CO-ORDINATES (UTM, NAD83 ZONE 17)	
		NORTHING	EASTING
BH-23 (68517-1)	178.92	4682323.0	328529.0
BH-154	180.87	4681959.9	330200.6
BH-156	179.52	4682106.6	329876.3
BH-158	179.30	4682144.3	329769.2
BH-160	178.51	4682216.8	329156.2
BH-163	178.77	4682384.7	328586.3
BH-164	179.06	4682299.7	328445.6
BH-166	179.00	4682168.3	328349.6
BH-23 (68517-1)	178.92	4682465.8	329144.3
BH-6 (951-4099)	178.79	4682287.6	329135.6
BH-105 (951-4235)	179.05	4682379.2	329125.0
BH-106 (951-4235)	184.35	4682412.8	329132.0
BH-107 (951-4235)	178.97	4682456.2	329141.5
BH-108 (951-4235)	178.50	4682332.6	329155.7
BH-05 (68-F-15-1)	180.69	4682005.8	330193.3
BH-06 (68-F-15-1)	180.75	4682042.1	330185.3
BH-07 (68-F-15-1)	180.53	4682056.5	330145.1
BH-08 (68-F-15-1)	180.93	4682020.2	330165.6
BH-09 (68-F-15-1)	178.46	4682423.2	329181.5
BH-10 (68-F-15-1)	178.55	4682391.3	329170.8
BH-11 (68-F-15-1)	178.46	4682431.9	329145.8
BH-12 (68-F-15-1)	178.37	4682399.1	329123.4
BH-13 (68-F-15-1)	178.43	4682264.9	328554.7
CPT-20	179.76	4681775.0	329868.0
CPT-21	179.89	4682147.0	329759.0
CPT-22	178.89	4682412.0	328986.0
CPT-23	178.93	4682325.0	328523.0
CPT-154	180.75	4681963.3	330191.0
CPT-155	179.69	4682065.8	329981.7
CPT-159	178.77	4682292.8	329332.1
CPT-161	179.06	4682177.6	328793.9
CPT-162	178.99	4682439.2	328729.1
CPT-165	178.98	4682188.2	328457.7
ECR-1000-N/S	Grnd	4682334.0	328672.0
ECR-1001-N/S	Grnd	4682395.0	328805.0
ECR-1002-N/S	Grnd	4682416.0	328938.0
ECR-1003-N/S	Grnd	4682385.0	329093.0
ECR-1004-N/S	Grnd	4682302.0	329253.0
ECR-1005-N/S	Grnd	4682259.0	329419.0
ECR-1006-N/S	Grnd	4682210.0	329560.0
ECR-1007-N/S	Grnd	4682167.0	329706.0
ECR-1008-N/S	Grnd	4682114.0	329864.0
ECR-1009-N/S	Grnd	4682055.0	330004.0
ECR-1010-N/S	Grnd	4681980.0	330216.0
MAL-1	Grnd	4681961.0	330170.0
MAL-2	Grnd	4681959.0	330166.0
MAL-3	Grnd	4681954.0	330160.0
MAL-4	Grnd	4681952.0	330160.0

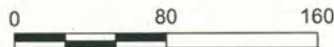
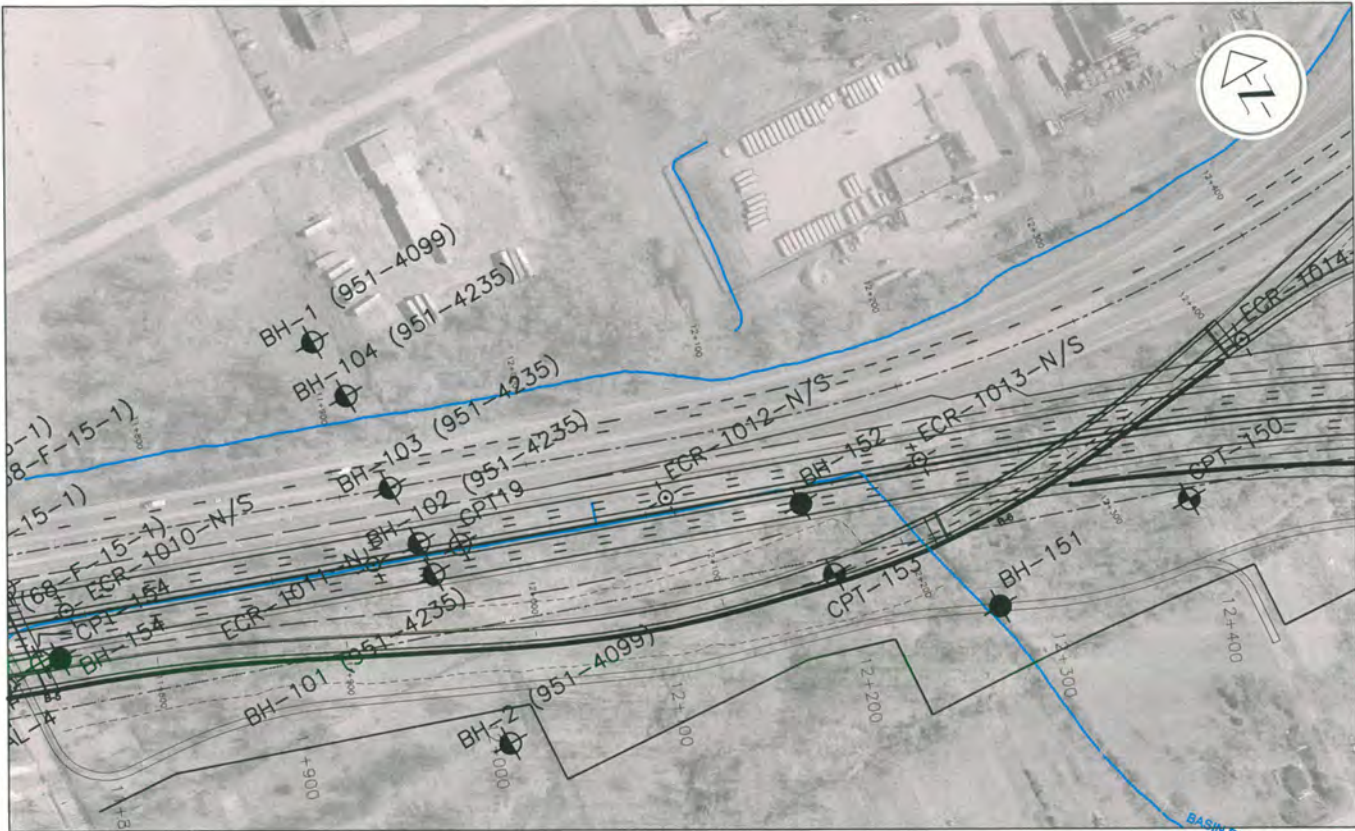
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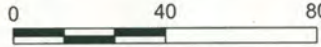
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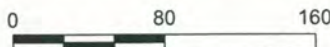
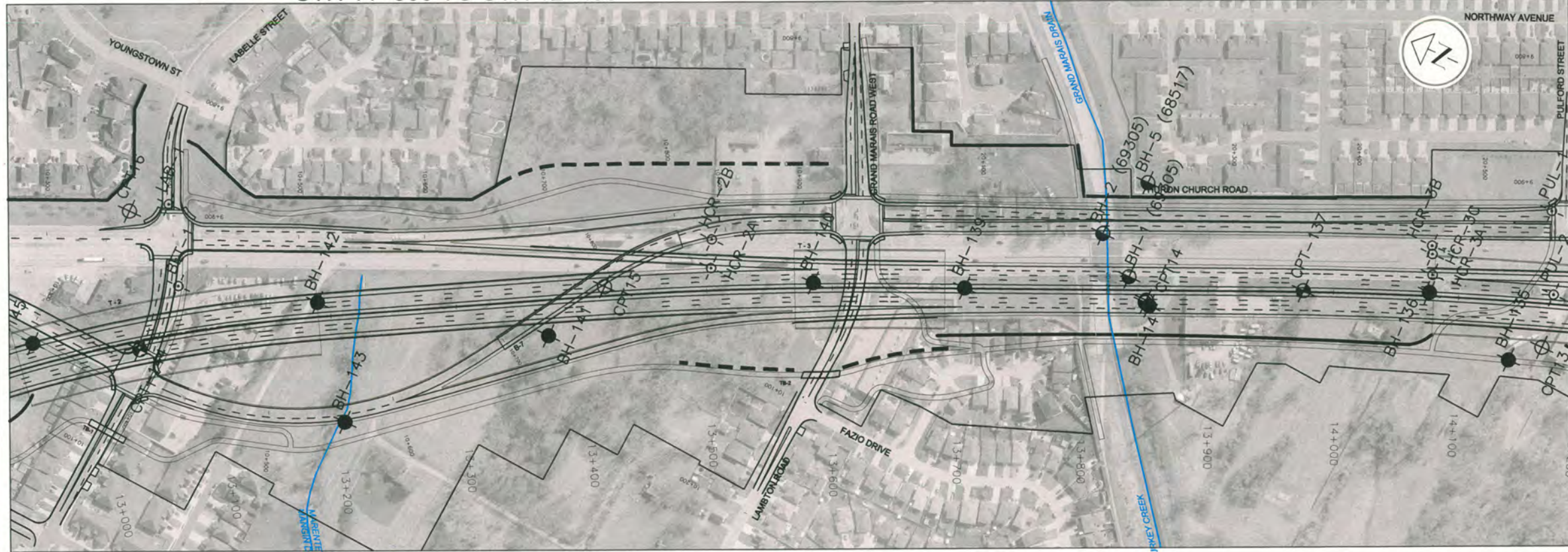




STN 11+800 TO STN 12+450



STN 12+450 TO STN 13+000



STN 13+000 TO STN 14+200

NOTE

Horizontal and vertical alignment of road ways and general structure alignments shown are based on drawings provided by URS during conceptual design. Final alignments and structure arrangements may differ.

REFERENCE

Base plans provided in digital format by URS.

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS IN KILOMETRES + METRES.

CONT No. -  
WP No. -

WINDSOR - ESSEX PARKWAY  
Windsor, Ontario  
BOREHOLE LOCATION MAP

SHEET  
2



Golder Associates Ltd.  
LONDON, ONTARIO, CANADA



KEY PLAN



LEGEND

- Borehole - Current Investigation
- Borehole - Previous Investigations
- Borehole - Pavement Holes
- Borehole and Cone Penetration Test
- Cone Penetration Test

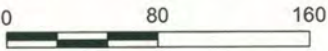
No.	ELEVATION	CO-ORDINATES (UTM, NAD83 ZONE 17)	
		NORTHING	EASTING
BH-14	182.06	4680648.0	331648.0
BH-139	182.30	4680787.5	331599.3
BH-140	182.00	4680899.3	331552.4
BH-141	181.72	4681073.1	331425.8
BH-142	181.11	4681251.2	331372.6
BH-143	182.26	4681191.8	331292.6
BH-144	182.21	4681442.8	331248.2
BH-147	180.83	4681670.0	331004.6
BH-149	180.98	4681628.0	330949.6
BH-151	180.35	4681734.8	330842.9
BH-152	180.16	4681834.3	330579.3
BH-14	182.45	4681903.1	331085.9
BH-15	182.67	4681863.3	331109.2
BH-16	182.88	4681905.2	331136.8
BH-17	183.18	4681888.6	331168.9
BH-1	181.51	4680689.7	331736.7
BH-2	181.87	4680672.3	331662.2
BH-3	181.87	4680705.6	331684.8
BH-4	182.61	4682037.3	330392.7
BH-5	181.20	4681802.3	330382.8
BH-6	178.48	4681899.5	330393.0
BH-7	181.46	4681917.5	330394.5
BH-8	183.10	4681950.3	330396.0
BH-9	182.43	4682003.9	330400.6
BH-10	182.06	4680652.0	331651.0
BH-11	182.13	4681049.0	331480.0
BH-12	181.93	4681417.0	331376.0
BH-13	182.05	4681625.0	331208.0
BH-14	180.65	4681547.0	330938.0
BH-15	181.23	4681906.0	330413.0
BH-16	181.34	4680541.5	331270.0
BH-17	182.31	4681442.8	331248.2
BH-18	181.85	4681540.8	331126.5
BH-19	180.72	4681651.5	330951.4
BH-20	180.85	4681733.4	330757.6
BH-21	180.99	4681793.3	330575.8
BH-22	Grnd	4681920.0	330368.0
BH-23	Grnd	4681873.0	330519.0
BH-24	Grnd	4681823.0	330645.0
BH-25	Grnd	4681792.0	330824.0
BH-26	Grnd	4681752.0	330942.0
BH-27	Grnd	4681679.0	331063.0
BH-28	Grnd	4681674.0	331233.0
BH-29	Grnd	4681669.0	331199.0
BH-30	Grnd	4680978.0	331599.0
BH-31	Grnd	4680987.0	331550.0
BH-32	Grnd	4681391.0	331394.0
BH-33	Grnd	4681357.0	331338.0

Geocres No.		PROJECT NO. 07-1130-207-0		DIST.	
HWY.		CHKD. SJB	DATE: MAY 30/09	SITE:	
SUBM'D. SJB		CHKD.	APPD.	DWG.	2

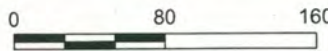




**NOTE**  
Horizontal and vertical alignment of road ways and general structure alignments shown are based on drawings provided by URS during conceptual design. Final alignments and structure arrangements may differ.



STN 14+200 TO STN 14+800 and STN 10+000 TO STN 10+500



STN 10+500 TO STN 11+750

**REFERENCE**  
Base plans provided in digital format by URS.

**METRIC**  
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS IN KILOMETRES + METRES.

CONT No. -  
WP No. -

WINDSOR - ESSEX PARKWAY  
Windsor, Ontario

BOREHOLE LOCATION MAP

SHEET  
3



- LEGEND**
- Borehole - Current Investigation
  - Borehole - Previous Investigations
  - Borehole - Pavement Holes
  - Borehole and Cone Penetration Test
  - Cone Penetration Test

No.	ELEVATION	CO-ORDINATES (UTM, NAD83 ZONE 17)	
		NORTHING	EASTING
BH7	183.17	4678848.0	333325.0
BH-118	182.66	4678903.5	333302.9
BH-119	182.50	4678961.6	333120.6
BH-122	181.66	4679265.4	332537.9
BH-126	180.61	4679237.2	332335.5
BH-127	181.27	4679370.9	332251.6
BH-129	180.78	4679625.1	332109.7
BH-131	180.80	4679944.8	331856.4
BH-132	181.47	4680070.8	331910.3
BH-135	182.02	4680369.9	331728.7
BH-136	181.75	4680449.5	331751.3
CPT-7	183.18	4678844.0	333327.0
CPT-8	182.48	4678967.0	333109.0
CPT-9	182.32	4679105.0	332828.0
CPT-10	181.81	4679264.0	332533.0
CPT-11	180.91	4679634.0	332110.0
CPT-12	181.61	4680072.0	331924.0
CPT-120	184.49	4678947.2	333029.8
CPT-121	181.97	4679024.8	333077.4
CPT-123	181.60	4679309.7	332536.3
CPT-124	181.51	4679354.6	332455.0
CPT-128	180.87	4679490.6	332200.8
CPT-13	182.08	4680350.0	331749.0
CPT-130	180.82	4679821.8	332036.1
CPT-133	181.64	4680184.7	331953.4
CPT-134	181.36	4680151.4	331888.7
CAB-1	Grnd	4679699.0	332153.0
HCL-1A	Grnd	4679462.0	332232.0
HCL-1B	Grnd	4679499.0	332210.0
HCR-3A	Grnd	4680453.0	331765.0
HCR-3B	Grnd	4680463.0	331786.0
HCR-3C	Grnd	4680460.0	331780.0
HCR-4A	Grnd	4679987.0	332000.0
HCR-4B	Grnd	4679976.0	331981.0
HCR-4C	Grnd	4679977.0	331985.0
HCR-4D	Grnd	4679980.0	331988.0
PUL-1	Grnd	4680388.0	331851.0
PUL-2	Grnd	4680359.0	331791.0
TOD-1	Grnd	4679648.0	332099.0
TR-5A	Grnd	4679352.0	332451.0
TR-5B	Grnd	4679356.0	332453.0
TR-5C	Grnd	4679342.0	332431.0
TR-5D	Grnd	4679346.0	332454.0
TR-5E	Grnd	4679354.0	332451.0
TR-6A	Grnd	4679092.0	332913.0
TR-6B	Grnd	4679088.0	332911.0
TR-6C	Grnd	4679077.0	332912.0
TR-6D	Grnd	4679100.0	332921.0
TR-6E	Grnd	4679103.0	332922.0
TR-6F	Grnd	4679104.0	332922.0

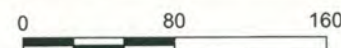
Geocres No.

HWY. PROJECT NO. 07-1130-207-0 DIST.

SUBM'D. SJB CHKD. SJB DATE: MAY 30/09 SITE:

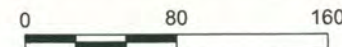
DRAWN: JDR CHKD. APPD. DWG. 3










**NOTE**

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### LEGEND

	Borehole — Current Investigation
	Borehole — Previous Investigations
	Borehole — Pavement Holes
	Borehole and Cone Penetration Test
	Cone Penetration Test

## REFERENCE

No.	ELEVATION	CO-ORDINATES (UTM, NAD83 ZONE 17)	
		NORTHING	EASTING
TR-7A	Grnd	4678715.0	333635.5
TR-7B	Grnd	4678696.0	333624.0
TR-7C	Grnd	4678703.0	333626.0
TR-7D	Grnd	4678720.0	333640.0
TR-7E	Grnd	4678718.0	333639.0
TR-8A	Grnd	4678478.0	334083.0
TR-8B	Grnd	4678480.0	334084.0
TR-8C	Grnd	4678468.0	334074.0
TR-8D	Grnd	4678476.0	334081.0
TR-8E	Grnd	4678460.0	334070.0
TR-9A	Grnd	4678249.0	334510.0
TR-9B	Grnd	4678237.0	334503.0
TR-9C	Grnd	4678232.0	334498.0
TR-A1	Grnd	4677790.0	335431.0
TR-A2	Grnd	4677793.0	335432.0
TR-A3	Grnd	4677787.0	335430.0
TR-A4	Grnd	4677801.0	335436.0
TR-A5	Grnd	4677798.0	335434.0
TR-A6	Grnd	4677809.0	335439.0
TR-A7	Grnd	4677794.0	335434.0

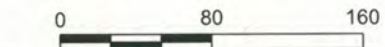
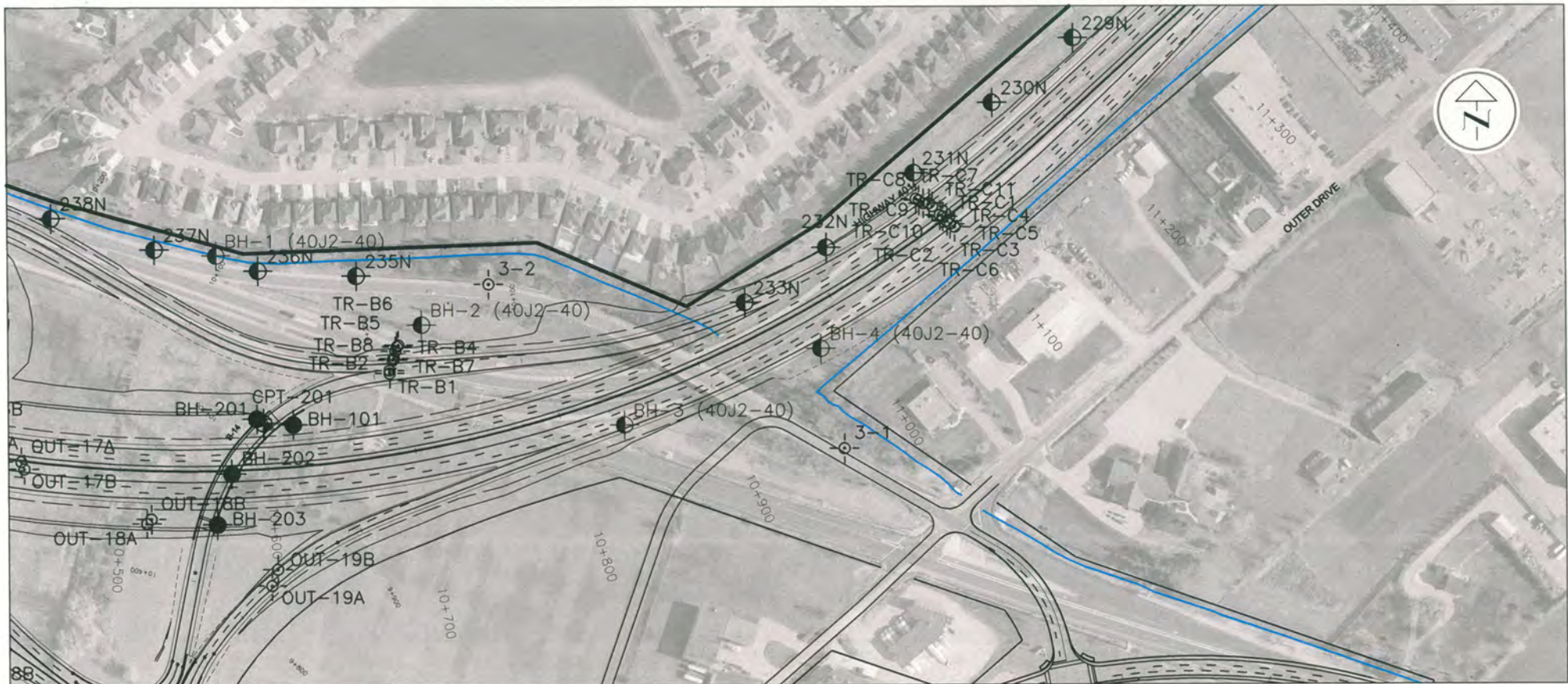
SHEET  
4



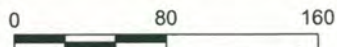
No.	ELEVATION	CO-ORDINATES (UTM, NAD83 ZONE 17)	
		NORTHING	EASTING
237N	187.77	46777724.5	335702.0
238N	187.82	46777745.8	335632.9
239N	187.56	46777771.9	335553.8
240N	187.42	46777789.2	335503.3
241N	187.24	46777812.8	335434.4
242N	187.05	46777836.5	335368.8
BH-1	186.70	46777738.0	335500.0
BH-102	186.60	46777631.8	335512.1
BH-104	186.15	46777630.3	335263.3
BH-105	186.16	46777843.2	335190.0
BH-107	185.85	46777973.1	334961.3
BH-109	185.30	46781555.0	334716.3
BH-112	184.58	4678413.3	334221.3
BH-113	184.41	4678454.5	334070.3
BH-115	183.79	4678585.3	333911.1
BH-116	183.64	46786634.3	333722.2
BH-206	186.48	46777645.8	335462.2
BH-207	186.89	46777598.1	335502.2
BH-208	186.88	46777543.9	335526.2
CPT1	186.69	46777739.0	335502.2
CPT2	186.35	46777841.0	335185.5
CPT3	185.91	4678022.0	334957.7
CPT4	185.09	4678208.0	334516.3
CPT5	184.69	4678413.0	334220.0
CPT6	184.08	4678621.0	333844.4
CPT-103	186.30	46777620.0	335400.0
CPT-106	185.72	46777846.1	335039.9
CPT-108	185.60	4678051.6	334826.6
CPT-110	184.82	4678297.8	334448.8
CPT-111	184.92	4678351.4	334347.7
CPT-114	184.21	4678526.7	334018.8
CPT-117	183.29	4678744.1	333601.1
CPT-206	186.48	46777642.5	335465.5
HOW-1	Grnd	46777832.0	335220.0
OUT-10A	Grnd	46777500.0	335522.2
OUT-10B	Grnd	46777498.0	335508.8
OUT-11A	Grnd	46777549.0	335502.2
OUT-11B	Grnd	46777547.0	335498.8
OUT-12A	Grnd	46777598.0	335512.1
OUT-12B	Grnd	46777599.0	335507.7
OUT-13A	Grnd	46777651.0	335512.1
OUT-13B	Grnd	46777651.0	335507.7
OUT-14A	Grnd	46777692.0	335524.4
OUT-14B	Grnd	46777687.0	335530.0
OUT-15A	Grnd	46777619.0	335472.2
OUT-15B	Grnd	46777614.0	335470.0
OUT-16A	Grnd	46777603.0	335549.9
OUT-16B	Grnd	46777607.0	335550.0
TR-10A	Grnd	4678018.0	334914.4
TR-10B	Grnd	4678036.0	334925.5
TR-10C	Grnd	4678032.0	334925.5
TR-10D	Grnd	4678036.0	334924.4
TR-10E	Grnd	4678013.0	334909.9

Geocres No.				PROJECT NO. 07-1130-207-0		DIST.	
HWY.		SUBM'D. SJB		CHKD. <i>SJB 2/1/09</i>		DATE: MAY 30/09	
DRAWN: JDR		CHKD.		APPD.		DWG. 4	





STN 10+450 TO 11+300



STN 10+350 TO STN 10+650

**METRIC**  
DIMENSIONS ARE IN METRES AND/OR  
MILLIMETRES UNLESS OTHERWISE SHOWN.  
STATIONS IN KILOMETRES + METRES.

CONT No. -  
WP No. -

WINDSOR - ESSEX PARKWAY  
Windsor, Ontario  
BOREHOLE LOCATION MAP

SHEET  
5



**Golder Associates Ltd.**  
LONDON, ONTARIO, CANADA



LEGEND

- Borehole - Current Investigation
- Borehole - Previous Investigations
- Borehole - Pavement Holes
- Borehole and Cone
- Cone Penetration Test

No.	ELEVATION	CO-ORDINATES (UTM, NAD83 ZONE 17)	
		NORTHING	EASTING
229N	187.34	4677866.4	336321.6
230N	187.37	4677822.9	336266.7
231N	187.06	4677775.6	336213.6
232N	186.75	4677725.4	336154.5
233N	186.39	4677688.5	336099.5
235N	188.50	4677706.7	335837.9
236N	187.56	4677710.1	335771.8
237N	187.77	4677724.5	335702.0
238N	187.82	4677745.8	335632.9
BH-1 (40J2-40)	187.20	4677720.4	335743.5
BH-2 (40J2-40)	186.60	4677673.6	335881.7
BH-3 (40J2-40)	187.80	4677606.0	336018.1
BH-4 (40J2-40)	187.20	4677657.3	336150.5
BH-201	187.67	4677610.4	335770.5
BH-202	187.31	4677573.5	335753.3
BH-203	187.23	4677539.3	335743.5
BH-101	187.37	4677606.6	335794.9
CPT-201	187.67	4677607.5	335774.9
3-1	Grnd	4677590.0	336166.0
3-2	Grnd	4677701.0	335927.0

NOTE

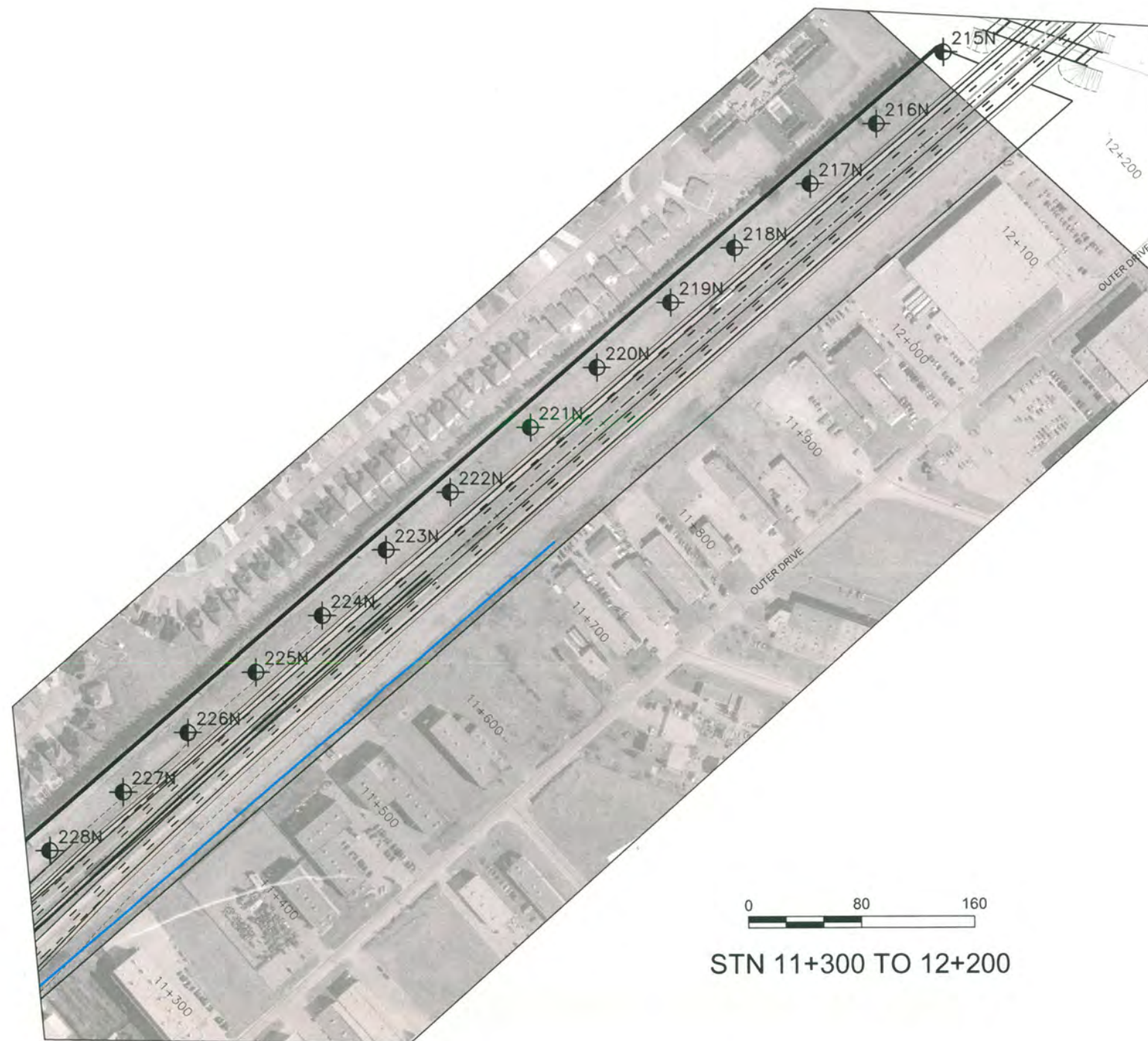
Horizontal and vertical alignment of road ways and general structure  
alignments shown are based on drawings provided by URS during  
conceptual design.  
Final alignments and structure arrangements may differ.

REFERENCE

Base plans provided in digital format by URS.

NO.	DATE	BY	REVISION
Geocres No.			
HWY.		PROJECT NO. 07-1130-207-0	DIST.
SUBM'D. SJB	CHKD. SJB	DATE: MAY 30/09	SITE:
DRAWN: JDR	CHKD.	APPD.	DWG. 5





0 80 160  
STN 11+300 TO 12+200



**METRIC**  
DIMENSIONS ARE IN METRES AND/OR  
MILLIMETRES UNLESS OTHERWISE SHOWN.  
STATIONS IN KILOMETRES + METRES.

CONT No. -  
WP No. -

WINDSOR - ESSEX PARKWAY  
Windsor, Ontario  
BOREHOLE LOCATION MAP

SHEET  
6



**Golder Associates Ltd.**  
LONDON, ONTARIO, CANADA



KEY PLAN  
SCALE 1:5000  
1.5 0 1.5 3  
KM

### LEGEND

- Borehole - Current Investigation
- Borehole - Previous Investigations
- Borehole - Pavement Holes
- Borehole and Cone
- Cone Penetration Test

No.	ELEVATION	CO-ORDINATES (UTM, NAD83 ZONE 17)	
		NORTHING	EASTING
215N	189.69	4678473.3	337006.7
216N	189.29	4678422.6	336959.2
217N	189.25	4678380.3	336912.2
218N	189.13	4678335.0	336858.4
219N	189.03	4678296.5	336813.1
220N	188.85	4678250.7	336760.7
221N	188.81	4678208.5	336713.2
222N	188.49	4678162.8	336656.1
223N	188.24	4678122.1	336610.5
224N	188.32	4678075.8	336565.2
225N	188.09	4678036.1	336518.1
226N	187.72	4677993.6	336469.8
227N	187.61	4677951.7	336423.8
228N	187.41	4677910.5	336371.5

### NOTE

Horizontal and vertical alignment of road ways, and general structure alignments shown are based on drawings provided by URS during conceptual design.  
Final alignments and structure arrangements may differ.

### REFERENCE

Base plans provided in digital format by URS.

NO.	DATE	BY	REVISION
Geocres No.			
HWY.		PROJECT NO. 07-1130-207-0 DIST.	
SUBM'D. SJB	CHKD. SJB	DATE: MAY 30/09	SITE:
DRAWN: JDR	CHKD.	APPD.	DWG. 6

## LIST OF ABBREVIATIONS

The abbreviations commonly employed on each "Record of Borehole", on the figures and in the text of the report, are as follows:

### I. SAMPLE TYPES

AS	Auger sample
BS	Block sample
CS	Chunk sample
SS	Split-spoon
DS	Denison type sample
FS	Foil sample
RC	Rock core
SC	Soil core
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

### II. PENETRATION RESISTANCES

#### Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) drive open sampler for a distance of 300 mm (12 in.).

#### Dynamic Cone Penetration Resistance; $N_d$ :

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

**PH:** Sampler advanced by hydraulic pressure

**PM:** Sampler advanced by manual pressure

**WH:** Sampler advanced by static weight of hammer

**WR:** Sampler advanced by weight of sampler and rod

#### Piezo-Cone Penetration Test (CPT)

An electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm<sup>2</sup> pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance ( $Q_t$ ), porewater pressure (PWP) and friction along a sleeve are recorded electronically at 25 mm penetration intervals.

### III. SOIL DESCRIPTION

#### (a) Cohesionless Soils

Density Index (Relative Density)	N Blows/300 mm or Blows/ft.
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	over 50

#### (b) Cohesive Soils

#### Consistency

	$c_u, s_u$	
	<b>kPa</b>	<b>psf</b>
Very soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1000
Stiff	50 to 100	1000 to 2000
Very stiff	100 to 200	2000 to 4000
Hard	over 200	over 4000

### IV. SOIL TESTS

w	water content
w <sub>p</sub>	plastic limit
w <sub>l</sub>	liquid limit
C	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test <sup>1</sup>
CIU	consolidated isotropically undrained triaxial test
CIUC	CIU compression test
CIUE	CIU extension test
CAU	consolidated anisotropically undrained triaxial test with porewater pressure measurements
CAUC	CAU compression test
CAUE	CAU extension test
D <sub>R</sub>	relative density (specific gravity, $G_s$ )
DS	direct shear test
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO <sub>4</sub>	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V	field vane (LV-laboratory vane test)
$\gamma$	unit weight

**Note: 1** Tests which are anisotropically consolidated prior to shear are shown as CAD, CAU.

## LIST OF SYMBOLS

Unless otherwise stated, the symbols employed in the report are as follows:

### I. General

$\pi$	3.1416
$\ln x$ ,	natural logarithm of x
$\log_{10}$	x or log x, logarithm of x to base 10
$g$	acceleration due to gravity
$t$	time
$F$	factor of safety
$V$	volume
$W$	weight

### II. STRESS AND STRAIN

$\gamma$	shear strain
$\Delta$	change in, e.g. in stress: $\Delta \sigma$
$\varepsilon$	linear strain
$\varepsilon_v$	volumetric strain
$\eta$	coefficient of viscosity
$\nu$	poisson's ratio
$\sigma$	total stress
$\sigma'$	effective stress ( $\sigma' = \sigma - u$ )
$\sigma'_{vo}$	initial effective overburden stress
$\sigma_1, \sigma_2, \sigma_3$	principal stress (major, intermediate, minor)
$\sigma_{oct}$	mean stress or octahedral stress $= (\sigma_1 + \sigma_2 + \sigma_3) / 3$
$\tau$	shear stress
$u$	porewater pressure
$E$	modulus of deformation
$G$	shear modulus of deformation
$K$	bulk modulus of compressibility

### III. SOIL PROPERTIES

#### (a) Index Properties

$\rho(\gamma)$	bulk density (bulk unit weight*)
$\rho_d(\gamma_d)$	dry density (dry unit weight)
$\rho_w(\gamma_w)$	density (unit weight) of water
$\rho_s(\gamma_s)$	density (unit weight) of solid particles
$\gamma'$	unit weight of submerged soil ( $\gamma' = \gamma - \gamma_w$ )
$D_R$	relative density (specific gravity) of solid particles ( $D_R = \rho_s / \rho_w$ ) (formerly $G_s$ )
$e$	void ratio
$n$	porosity
$S$	degree of saturation

#### (a) Index Properties (continued)

$w$	water content
$w_L$	liquid limit
$w_p$	plastic limit
$I_p$	plasticity index $= (w_L - w_p)$
$w_s$	shrinkage limit
$I_L$	liquidity index $= (w - w_p) / I_p$
$I_C$	consistency index $= (w_L - w) / I_p$
$e_{max}$	void ratio in loosest state
$e_{min}$	void ratio in densest state
$I_D$	density index $= (e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density)

#### (b) Hydraulic Properties

$h$	hydraulic head or potential
$q$	rate of flow
$v$	velocity of flow
$i$	hydraulic gradient
$k$	hydraulic conductivity (coefficient of permeability)
$j$	seepage force per unit volume

#### (c) Consolidation (one-dimensional)

$C_c$	compression index (normally consolidated range)
$C_r$	recompression index (over-consolidated range)
$C_s$	swelling index
$C_a$	coefficient of secondary consolidation
$m_v$	coefficient of volume change
$c_v$	coefficient of consolidation
$T_v$	time factor (vertical direction)
$U$	degree of consolidation
$\sigma'_p$	pre-consolidation pressure
OCR	over-consolidation ratio $= \sigma'_p / \sigma'_{vo}$

#### (d) Shear Strength

$\tau_p, \tau_r$	peak and residual shear strength
$\phi'$	effective angle of internal friction
$\delta$	angle of interface friction
$\mu$	coefficient of friction $= \tan \delta$
$c'$	effective cohesion
$c_{u, s_u}$	undrained shear strength ( $\phi = 0$ analysis)
$P$	mean total stress $(\sigma_1 + \sigma_3) / 2$
$P'$	mean effective stress $(\sigma'_1 + \sigma'_3) / 2$
$q$	$(\sigma_1 + \sigma_3) / 2$ or $(\sigma'_1 + \sigma'_3) / 2$
$q_u$	compressive strength $(\sigma_1 + \sigma_3)$
$S_t$	sensitivity

**Notes:** 1  $\tau = c' + \sigma' \tan \phi'$   
 2 shear strength = (compressive strength) / 2  
 \* density symbol is  $\rho$ . Unit weight symbol is  $\gamma$  where  $\gamma = \rho g$  (i.e. mass density  $\times$  acceleration due to gravity)

# LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

## WEATHERING STATE

Fresh: no visible sign of weathering.

**Faintly weathered:** weathering limited to the surface of major discontinuities.

Slightly weathered: penetrative weathering developed on open discontinuity surfaces but only slight weathering of rock material.

Moderately weathered: weathering extends throughout the rock mass but the rock material is not friable.

Highly weathered: weathering extends throughout rock mass and the rock material is partly friable.  
Completely weathered: rock is wholly decomposed and in a friable condition but the rock texture and structure are preserved.

## BEDDING THICKNESS

<u>Description</u>	<u>Bedding Plane Spacing-</u>
Very thickly bedded	>2 m
Thickly bedded	0.6 m to 2m
Medium bedded	0.2 m to 0.6m
Thinly bedded	60 m to 0.2 m
Very thinly- bedded	20 mm to 60 mm
Laminated	6 mm to 20 mm
Thinly laminated	< 6 mm

## JOINT OR FOLIATION SPACING

<u>Description</u>	<u>Spacing</u>
Very wide	> 3 m
Wide	1 – 3 m
Moderately close	0.3 – 1 m
Close	50 – 300 mm
Very close	< 50 mm

## GRAIN SIZE

Term	Size*
Very Coarse Grained	> 60 mm
Coarse Grained	2 – 60 mm
Medium Grained	60 microns – 2 mm
Fine Grained	2 – 60 microns
Very Fine Grained	< 2 microns

Note: \*Grains >60 microns diameter are visible to the naked eye.

## CORE CONDITION

### Total Core Recovery (TCR)

The percentage of solid drill core recovered regardless of quality or length, measured relative to the length of the total core run.

### Solid Core Recovery (SCR)

The percentage of solid drill core, regardless of length, recovered at full diameter, measured relative to the length of the total core run.

### Rock Quality Designation (RQD)

The percentage of solid drill core, greater than 100 mm length, recovered at full diameter, measured relative to the length of the total core run. RQD varies from 0% for completely broken core to 100% for core in solid sticks.

## DISCONTINUITY DATA

### Fracture Index

A count of the number of discontinuities (physical separations) in the rock core, including both naturally occurring fractures and mechanically induced breaks caused by drilling.

### Dip with Respect to (W.R.T.) Core Axis

The angle of the discontinuity relative to the axis (length) of the core, In a vertical borehole a discontinuity with a 90° angle is horizontal.

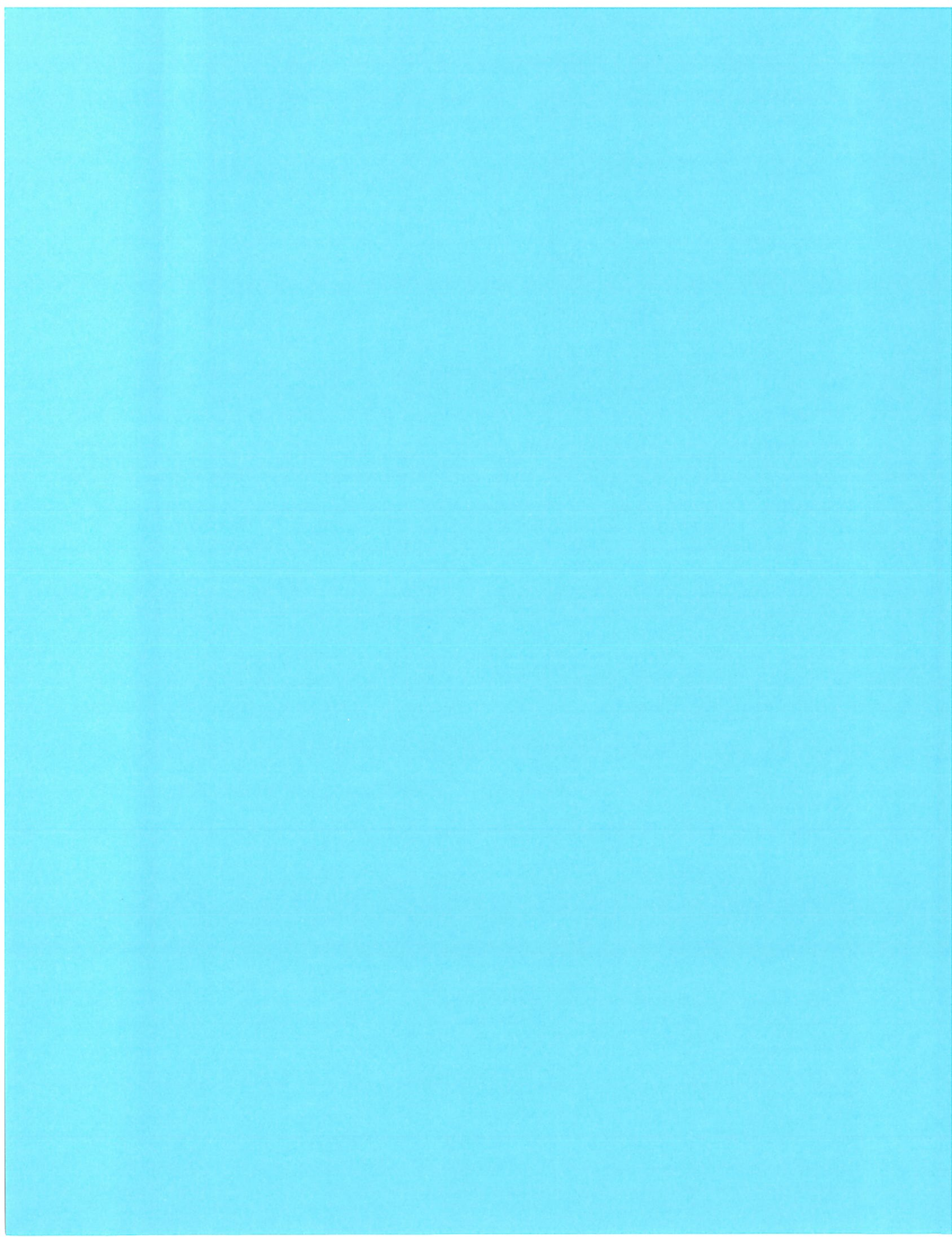
### Description and Notes

An abbreviated description of the discontinuities, whether naturally occurring separations such as fractures, bedding planes and foliation planes or mechanically induced features caused by drilling such as ground or shattered core and mechanically separated bedding or foliation surfaces. Additional information concerning the nature of fracture surfaces

### Abbreviations

B – Bedding	P - Polished
FO - Foliation Schistosity	S - Slickensided
CL - Cleavage	SM - Smooth
SH - Shear Plane Zone	R - Ridged / Rough
VN - Vein	ST - Stepped
F - Fault	PL - Planar
CO - Contact	FL - Flexured
J - Joint	UE - Uneven
FR - Fracture	W - Wavy
M F - Mechanical Fracture	C - Curved
- Parallel To	
⊥ - Perpendicular To	







# APPENDIX A

## Record of Borehole Sheets

PROJECT 04-1111-060

# RECORD OF BOREHOLE No 1

1 OF 4

METRIC

W.P. \_\_\_\_\_

LOCATION N 4677738.0 :E 335500.0

ORIGINATED BY C.C.

DIST WEST HWY 401/3

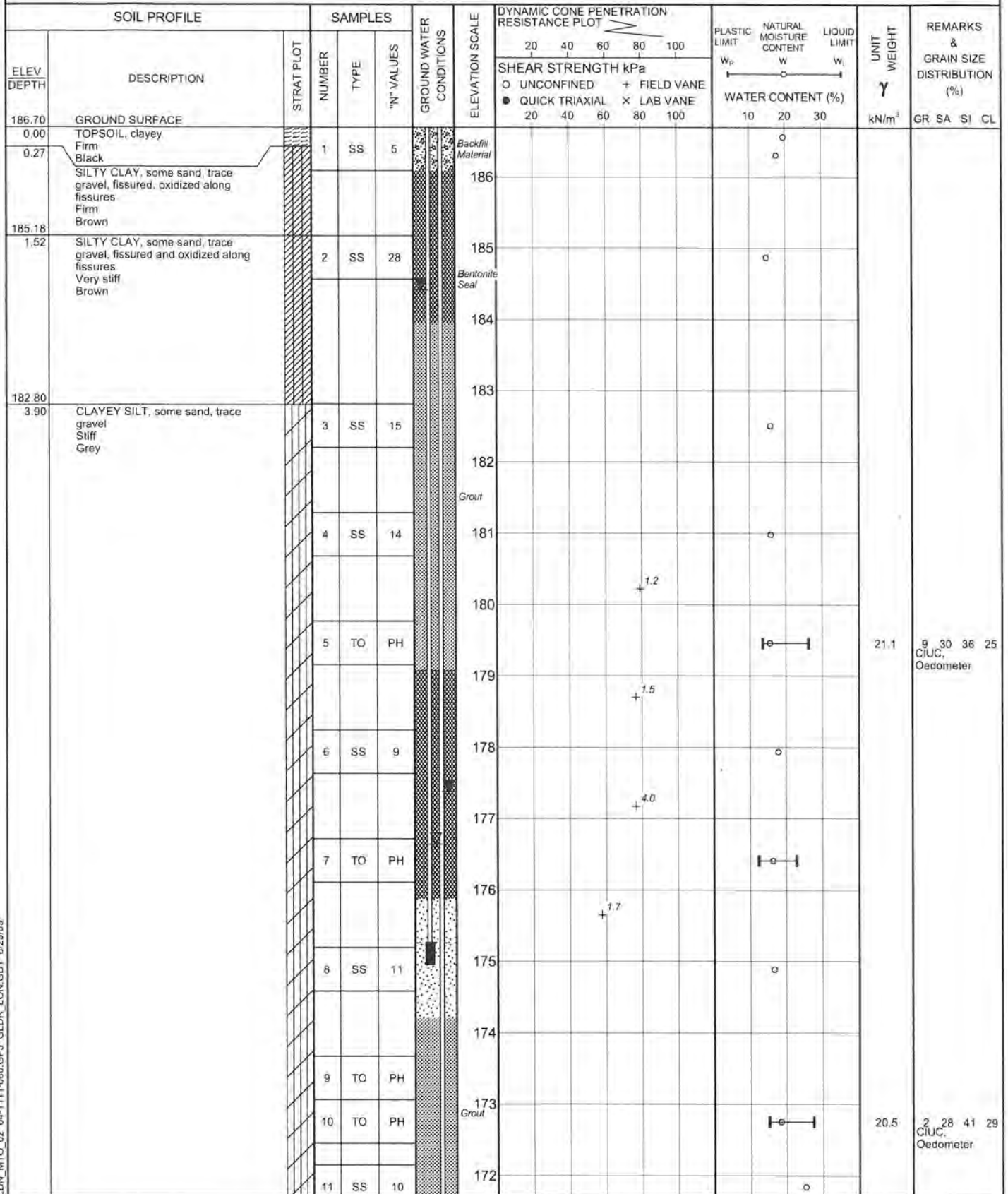
BOREHOLE TYPE POWER AUGER, HOLLOW STEM

COMPILED BY T.M.

DATUM Geodetic

DATE November 2, 2006 - November 5, 2006

CHECKED BY *SSB*



LDN\_MTO\_02 04-1111-060.GPJ GLDR LON.GDT 6/29/09

Continued Next Page

+ 3, x 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE





<b>PROJECT</b> 04-1111-060		<b>RECORD OF BOREHOLE No 1</b>		3 OF 4	<b>METRIC</b>
<b>W.P.</b> _____		<b>LOCATION</b> N 4677738.0 ; E 335500.0		<b>ORIGINATED BY</b> C.C.	
<b>DIST</b> WEST HWY 401 / 3		<b>BOREHOLE TYPE</b> POWER AUGER, HOLLOW STEM		<b>COMPILED BY</b> T.M.	
<b>DATUM</b> Geodetic		<b>DATE</b> November 2, 2006 - November 5, 2006		<b>CHECKED BY</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div style="display: flex; justify-content: space-around; font-size: small;"> <span>20 40 60 80 100</span> </div>	PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
	CLAYEY SILT, some sand, trace gravel, fine to medium silty sand layers Stiff to hard Grey		22	TO	PH								
			23	TO	PH		156						
			24	SS	PH		155						
154.24													
32.46 153.93	LIMESTONE, white to light grey		25	SS	50		154						
32.77	LIMESTONE, fresh, medium strong, laminated, very fine grained, moderately porous, white to light grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		26	NQ	RC		153						
			27	NQ	RC		152						
			28	NQ	RC		151						
			29	NQ	RC		150						
148.78 37.92	END OF BOREHOLE  Water level encountered in borehole at about elevation 176.65m during drilling and on completion of drilling October 2, 2006  Lower piezometer 32mm PVC screen and riser pipe. Second (Upper) piezometer installed in immediately adjacent unsampled borehole, 13mm porous tip and CPVC riser pipe.  Water level in Upper Piezometer at about elevation 184.41m on November 14, 2006.  Water level in Lower Piezometer at about elevation 177.37m on November 14, 2006.						149						

LDN\_MTO\_02 04-1111-060.GPJ GLDR\_LON.GDT 6/30/09

PROJECT: 04-1111-060

## RECORD OF DRILLHOLE: 1

SHEET 4 OF 4

LOCATION: N 4677738.0 E 335500.0

DRILLING DATE: November 2, 2006 - November 5, 2006

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: —

DRILL RIG:

DRILLING CONTRACTOR:

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
				DEPTH (m)						RECOVERY		R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		ROCK STRENGTH INDEX	WEATH- ERING INDEX																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
										TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS			TYPE AND SURFACE DESCRIPTION	W1	W2		W3	W4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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DEPTH SCALE

1:75



LOGGED: C.C.

CHECKED: SJB

**RECORD OF BOREHOLE No 7**

1 OF 4

**METRIC**

PROJECT 04-1111-060

W.P.

LOCATION

N 4678848.0 :E 333325.0

ORIGINATED BY C.C.

DIST WEST HWY 401 / 3

BOREHOLE TYPE POWER AUGER, HOLLOW STEM

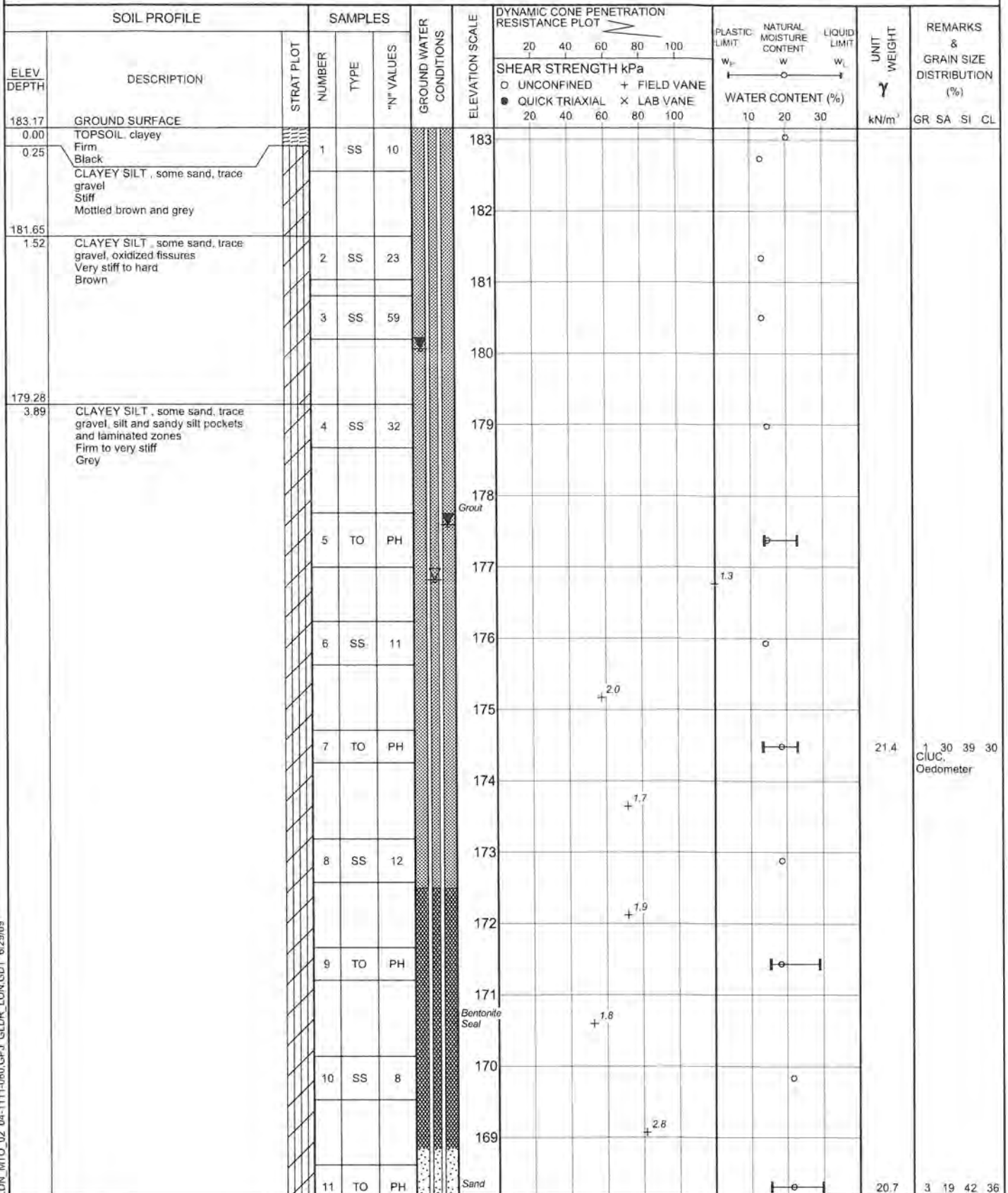
COMPILED BY T.M.

DATUM Geodetic

DATE

November 10, 2006 - November 16, 2006

CHECKED BY *SB*



LON\_MTO\_02 04-1111-060.GPJ GLDR\_LON.GDT 6/29/09

Continued Next Page

+ 3 x 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE





# RECORD OF BOREHOLE No 7

3 OF 4

METRIC

PROJECT 04-1111-060

W.P.

LOCATION

N 4678848.0 ; E 333325.0

ORIGINATED BY C.C.

DIST WEST HWY 401 / 3

BOREHOLE TYPE POWER AUGER, HOLLOW STEM

COMPILED BY T.M.

DATUM Geodetic

DATE

November 10, 2006 - November 16, 2006

CHECKED BY **SB**

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED	+ FIELD VANE						
								● QUICK TRIAXIAL	× LAB VANE						
						20	40	60	80	100	10	20	30		
150.02	CLAYEY SILT , some sand, trace gravel, silt and sandy silt pockets and laminated zones Firm to very stiff Grey		23	SS	13		153								
							152								
			24	SS	PH										
							151								
			25	SS	42										
33.15	LIMESTONE, fresh, medium strong, laminated, very fine grained, moderately porous, light grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		26	NQ RC			150								
							149								
			27	NQ RC											
							148								
			28	NQ RC											
							147								
			29	NQ RC			146								
145.28	END OF BOREHOLE														
37.89	Water level in borehole at about elevation 176.82m on October 16, 2006  Lower piezometer 32mm PVC screen and riser pipe. Second (Upper) piezometer 13mm porous tip and CPVC riser pipe.  Water level in Upper Piezometer at about elevation 180.06m on November 14, 2006.  Water level in Lower Piezometer at about elevation 177.59m on November 14, 2006.														

PROJECT: 04-1111-060

## RECORD OF DRILLHOLE: 7

SHEET 4 OF 4

LOCATION: N 4678848.0 ; E 333325.0

DRILLING DATE: November 10, 2006 - November 16, 2006

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: —

DRILL RIG:

DRILLING CONTRACTOR:

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR FLUSH % RETURN	ELEVATION											NOTES WATER LEVELS INSTRUMENTATION			
									RECOVERY		R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA				ROCK STRENGTH INDEX					WEATH- ERING INDEX
									TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION									
									# 0 20 40 60 80 100	# 0 20 40 60 80 100			DIP w.r.t. CORE AXIS	0 30 60 90	0 30 60 90	0 30 60 90	0 30 60 90	R1 R2 R3	W1 W2 W3			
		ROCK SURFACE		150.04				150														
	MUD ROTARY NW CASING	LIMESTONE, fresh, medium strong, laminated, very fine grained, faintly to moderately porous, light grey		33.13																		
				149.64	1																	
				33.53																		
34		LIMESTONE, fresh, medium strong, laminated to thinly laminated, very fine grained, faintly to moderately porous, light grey			2			149														
				148.02																		
35	DIAMOND DRILLING NO ROCK CORE	LIMESTONE, fresh, medium strong, laminated to thinly laminated, very fine grained, faintly to moderately porous, light grey		35.15				148														
36			Moderately to highly porous from 35.4m to 35.8m and from 36.5m to 36.9m depths.			3			147													
37					4			146														
				145.28																		
38		END OF BOREHOLE		37.89																		
39																						
40																						
41																						
42																						
43																						
44																						
45																						
46																						
47																						
48																						

DEPTH SCALE

1 : 75



LOGGED: C.C.

CHECKED: SB



PROJECT <u>04-1111-060</u>		<b>RECORD OF BOREHOLE No 14</b>		2 OF 4	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4680648.0 :E 331648.0</u>		ORIGINATED BY <u>C.C.</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, HOLLOW STEM</u>		COMPILED BY <u>T.M.</u>	
DATUM <u>Geodetic</u>		DATE <u>November 18, 2006 - November 23, 2006</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED 20 40 60 80 100	+ FIELD VANE X LAB VANE 20 40 60 80 100						
			12	SS	9										
							166	+ 3.3							
			13	TO	PH							56			
			14	TO	PH		165								
			15	SS			164								
			16	TO	PH		163								
							162	+ 1.4					21.4	7 24 44 25 CIUC, Oedometer	
			17	SS	11		161								
							160	+ 2.2							
			18	TO	PH		159								
							158	+ 1.3							
			19	SS	5										
							157	+ 1.7							
			20	TO	PH										
							156								
155.24 26.82	SILTY SAND, trace gravel Compact Grey		21	SS	16		155								
							154								
153.10 28.96	CLAYEY SILT, some sand, trace gravel Stiff Grey		22	TO	PH										
			23	TO	PH		153								

LON\_MTO\_02\_04-1111-060.GPJ GLDR LON.GDT 6/29/09

Continued Next Page

+ 3, × 3, Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 14

3 OF 4

METRIC

PROJECT 04-1111-060

W.P.

LOCATION

N 4680648.0 :E 331648.0

ORIGINATED BY C.C.

DIST WEST HWY 401 / 3

BOREHOLE TYPE POWER AUGER/HOLLOW STEM

COMPILED BY T.M

DATUM Geodetic

DATE

November 18, 2006 - November 23, 2006

CHECKED BY *SJB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							
								20 40 60 80 100							
								20 40 60 80 100							

LDN\_MTO\_02 04-1111-060.GPJ GLDR\_LON.GDT 6/30/09



PROJECT: 04-1111-060

## RECORD OF DRILLHOLE: 14

SHEET 4 OF 4

LOCATION: N 4680648.0 ; E 331648.0

DRILLING DATE: November 18, 2006 - November 23, 2006

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: —

DRILL RIG:

DRILLING CONTRACTOR:

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (mm/min)	FLUSH	COLOUR % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
				DEPTH (m)	RECOVERY						R.O.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA				ROCK STRENGTH INDEX				WEATH- ERING INDEX																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
													DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	R4	R3	R2	R1	W1	W2	W3	W4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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DEPTH SCALE

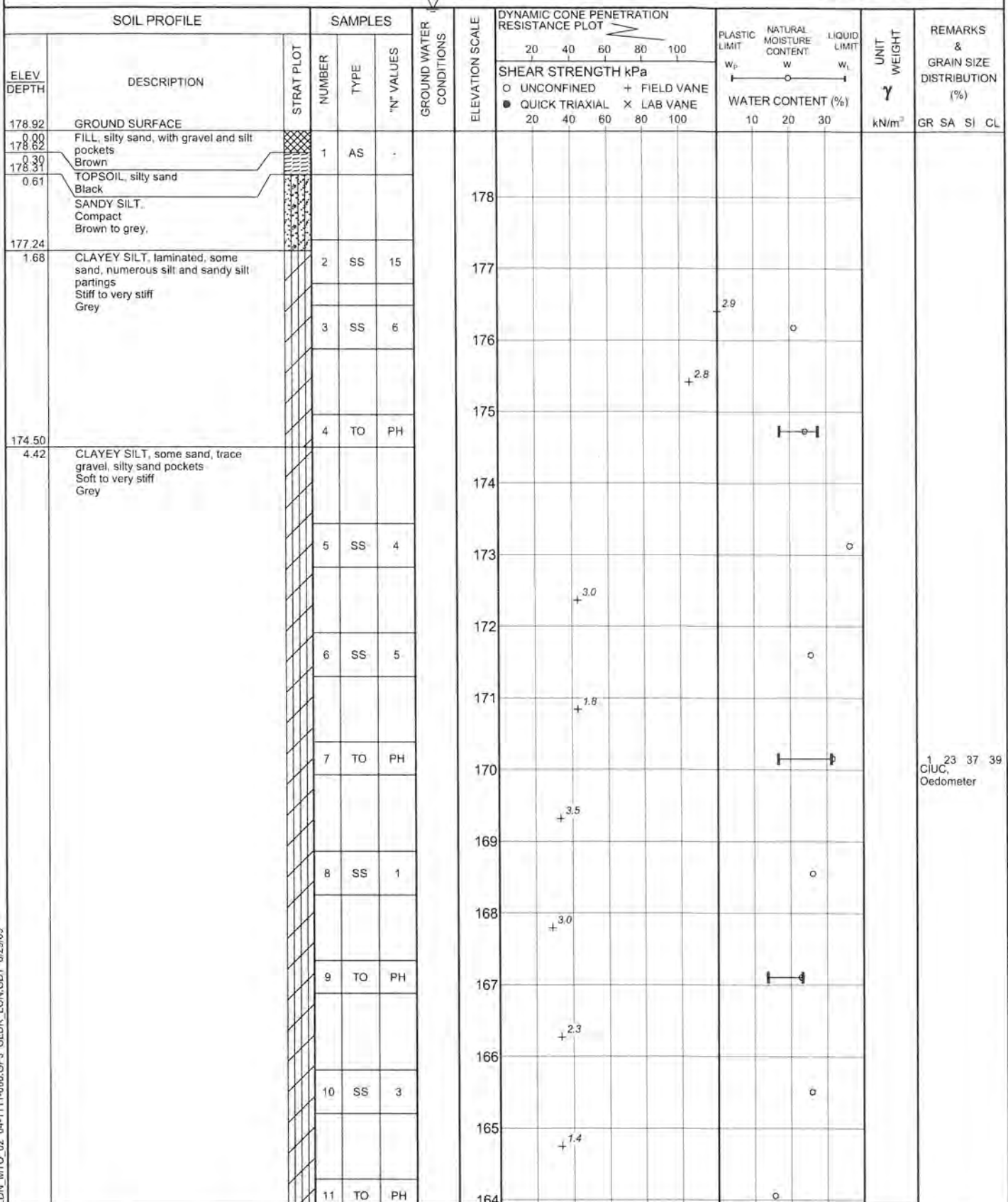
1:75



LOGGED: C.C.

CHECKED: SJB

PROJECT 04-1111-060		<b>RECORD OF BOREHOLE No 23</b>		1 OF 3	<b>METRIC</b>
W.P. _____		LOCATION N 4682323.0 :E 328529.0		ORIGINATED BY C.C.	
DIST WEST HWY 401 / 3		BOREHOLE TYPE POWER AUGER, HOLLOW STEM		COMPILED BY T.M.	
DATUM Geodetic		DATE November 24, 2006 - November 26, 2006		CHECKED BY <i>SSS</i>	



LDN MTO 02 04-1111-060.GPJ GLDR LON.GDT 6/29/09

Continued Next Page

+3, x3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 04-1111-060

W.P.

LOCATION

N 4682323.0 :E 328529.0

ORIGINATED BY C.C.

DIST

WEST

HWY 401 / 3

BOREHOLE TYPE

POWER AUGER,HOLLOW STEM

COMPILED BY T.M.

DATUM

Geodetic

DATE \_\_\_\_\_

November 24, 2006 - November 26, 2006

CHECKED BY **SJB**

[illegible]

+3, X3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT: 04-1111-060

## RECORD OF DRILLHOLE: 23

SHEET 3 OF 3

LOCATION: N 4682323.0 ;E 328529.0

DRILLING DATE: November 24, 2006 - November 26, 2006

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: --

DRILL RIG:

DRILLING CONTRACTOR:

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate										BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage										PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular										PO - Polished K - Slickensided SM - Smooth Ro - Rough										Br - Broken Rock  NOTE: For additional abbreviations refer to list of abbreviations & symbols	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
				DEPTH (m)	RECOVERY						SOLID CORE %	R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA				ROCK STRENGTH INDEX		WEATH- ERING INDEX																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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DEPTH SCALE

1 : 75



LOGGED: C.C.

CHECKED: SJB





PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 101</b>		2 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4677606.6 :E 335794.9		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC		DATE February 29, 2008 - March 5, 2008		CHECKED BY <i>JB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div style="display: flex; justify-content: space-around; font-size: small;"> <span>20 40 60 80 100</span> </div>	PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
171.37	SANDY SILT, some clay, trace gravel Grey		13	TO	PH		172						(56)
16.00	CLAYEY SILT, some sand, trace gravel Stiff to very stiff Grey		14	SS	9		171						2 27 40 31
			15	TO	PH		170						
168.32	CLAYEY SILT, trace sand Stiff Grey		16	SS	7		169						
19.05			17	SS	7		168						
165.27	CLAYEY SILT, some sand, trace gravel Very stiff Grey		18	TO	PH		167						
22.10			19	SS	17		166						
			20	SS	31		165						
			21	TO	PH		164						
			22	TO	PH		163						
							162						
							161						
							160						
							159						
							158						

LON\_MTO\_01 07-1130-207-0.GPJ LON\_MTO.GDT 6/29/09

Continued Next Page

+ 3, x 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

## METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677606.6 ; E 335794.9

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE February 29, 2008 - March 5, 2008

CHECKED BY SJE

[illegible]

DN MTO 01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

+ 3, X 3: Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE



PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 101

SHEET 4 OF 4

LOCATION: N 4677606.6 :E 335794.9

DRILLING DATE: February 29, 2008 - March 5, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Congregate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
				DEPTH (m)						RECOVERY		R.O.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA			ROCK STRENGTH INDEX	WEATH- ERING INDEX																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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DEPTH SCALE

1 : 75



LOGGED: SG

CHECKED: *SG*

# RECORD OF BOREHOLE No 101A

1 OF 1

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677606.6 E 335794.9

ORIGINATED BY SM

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, HOLLOW STEM

COMPILED BY BRS

DATUM GEODETTIC

DATE

March 5, 2008

CHECKED BY S.B.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
187.37	SOIL CONDITIONS INFERRED FROM BOREHOLE No. 101 GROUND SURFACE													
0.00	TOPSOIL, some clay													
186.99	Dark brown													
0.46	SAND AND GRAVEL													
	Brown													
	CLAYEY SILT, some sand, trace gravel, mottled													
	Firm to hard													
	Mottled grey and brown													
184.47														
2.90	CLAYEY SILT, some sand, trace gravel													
	Stiff to very stiff													
	Grey													
178.23														
9.14	END OF BOREHOLE													
	Water level measured in shallow piezometer at elev. 186.30m on March 20, 2008.													
	Water level measured in shallow piezometer at elev. 185.77m on July 22, 2008.													
	Water level measured in shallow piezometer at elev. 185.41m on September 19, 2008.													
	Water level measured in shallow piezometer at elev. 185.86m on January 28, 2009.													

+ 3 x 3

Numbers refer to  
Sensitivity

○ 3% STRAIN AT FAILURE



# RECORD OF BOREHOLE No 102

1 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677631.8 :E 335512.7

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

March 25, 2008 - March 28, 2008

CHECKED BY *SB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
186.60	GROUND SURFACE													
0.00	TOPSOIL, clayey													
186.25	Brown													
0.35	FILL, clayey silt, some sand, trace topsoil, trace gravel Firm to stiff Mottled brown and grey		1	SS	8		186							
185.23														
1.37	CLAYEY SILT, some sand, trace gravel, with silt seams Hard Brown		2	SS	39		185							
			3	SS	38		184							
			4	SS	41		183							
182.94														
3.66	CLAYEY SILT, some sand, trace gravel Stiff to very stiff Grey		5	SS	25		182							
			6	SS	25		181							
			7	SS	15		180							
			8	SS	11		179							
			9	SS	14		178							
			10	SS	23		177							
			11	TO	PH		176							
			12	TO	PH		175							
			13	SS	9		174							
			14	TO	PH		173							
							172							

Continued Next Page

+ 3 x 3. Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 102</b>		2 OF 4	<b>METRIC</b>
W.P.	LOCATION	N 4677631.8 E 335512.7		ORIGINATED BY SM	
DIST WEST HWY 401/3	BOREHOLE TYPE	POWER AUGER, MUD ROTARY WITH HQ TRIGONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC	DATE	March 25, 2008 - March 28, 2008		CHECKED BY <i>SJB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div style="display: flex; justify-content: space-around; font-size: small;"> <span>20 40 60 80 100</span> </div>	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
	CLAYEY SILT, some sand, trace gravel Stiff to very stiff Grey		15	SS	10		171						0 24 43 33
			16	TO	PH		170						
			17	TO	PH		169						
			18	TO	PH		168						
			19	TO	PH		167						
			20	SS	19		166						
			21	TO	PH		165						
			22	SS	21		164						
			23	SS	85		163						
			24	SS	60		162						
							161						
							160						
							159						
							158						
							157						
159.93 26.67	SANDY SILT, trace clay Very dense Grey												
157.41 29.19	CLAYEY SILT, some sand, trace gravel Hard Grey												
156.88 29.72													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+ 3, x 3. Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No 102**

3 OF 4

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677631.8 :E 335512.7

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

March 25, 2008 - March 28, 2008

CHECKED BY *SLB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE LIQUID LIMIT LIMIT CONTENT LIMIT			UNIT WEIGHT  γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
								20 40 60 80 100	20 40 60 80 100	10 20 30				GR SA SI CL
								○ UNCONFINED + FIELD VANE						
								● QUICK TRIAXIAL × LAB VANE						
								20 40 60 80 100	20 40 60 80 100	10 20 30				
155.40	SILTY CLAY, some sand, trace gravel Very stiff Grey		25	TO	PH		Bentonite							
31.20	CLAYEY SILT, some sand, trace gravel Very stiff Grey						Screen							
154.58			26	SS		110/13mm	Bentonite							
32.02	LIMESTONE, fresh, medium strong, thinly laminated, fine grained, faintly porous Brown to grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		27	NQ	RC			100	67	59				
			28	NQ	RC			99	97	92				
			29	NQ	RC		Sand	100	100	97				
150.28	END OF BOREHOLE													
36.32	Borehole dry during drilling between March 25 and 28, 2008.  Water level measured in deep piezometer at elev. 177.91m on July 22, 2008.  Water level measured in deep piezometer at elev. 175.88m on September 19, 2008.  Water level measured in deep piezometer at elev. 177.26m on November 14, 2008.  Water level measured in deep piezometer at elev. 177.00m on January 28, 2009.													

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 102

SHEET 4 OF 4

LOCATION: N 4677631.8 :E 335512.7

DRILLING DATE: March 25, 2008 - March 28, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (m/min)	FLUSH COLOUR % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For occasional abbreviations refer to list of abbreviations & symbols										DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
				DEPTH (m)	ELEVATION					RECOVERY			R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
										TOTAL CORE %	SOLID CORE %	DIP w.r.t CORE AXIS			TYPE AND SURFACE DESCRIPTION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SJB





# RECORD OF BOREHOLE No 104

1 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677630.3 ; E 335263.1

ORIGINATED BY MA

DIST WEST HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

April 1, 2008 - April 2, 2008

CHECKED BY SJS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
186.15	GROUND SURFACE													
0.00	SILTY SAND, some clay, trace gravel, Loose Mottled brown and grey		1	SS	7		Concrete							
184.78							185							
1.37	CLAYEY SILT, some sand, trace gravel Very stiff Brown becoming grey at about elev. 183.1m		2	SS	23		Bentonite							
			3	SS	28		184							
			4	SS	22		183							
182.49														
3.66	CLAYEY SILT, some sand, trace gravel, with sandy silt layers Very stiff Grey		5	SS	16		182							
181.73														
4.42	CLAYEY SILT, some sand, trace gravel Very stiff Grey		6	SS	14		181							
			7	SS	12									
			8	SS	7		180							
178.85							179							
7.35	SAND AND GRAVEL, some silt, some clay Grey		9	TO	PH									
178.17	CLAYEY SILT, some sand, trace gravel Grey													
7.98							178							
8.23	SANDY SILT, trace gravel Grey		10	SS	10									
177.16	SILTY SAND, trace gravel, trace clay, with clayey silt layers Loose to compact Grey						Grout							4 46 37 13
8.99			11	SS	8		177							
	CLAYEY SILT, some sand, trace gravel, with silt and sand partings Firm Grey													
176.09							176							
10.06	CLAYEY SILT, some sand, trace gravel Stiff Grey		12	SS	6									2 27 43 28
							175							
			13	TO	PH									
							174							
			14	SS	7		173							
							172							
171.21														

Continued Next Page

+ 3, x 3, Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

# RECORD OF BOREHOLE No 104

2 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677630.3 E 335263.1

ORIGINATED BY MA

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETTIC

DATE

April 1, 2008 - April 2, 2008

CHECKED BY **SJB**

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	
14.94	CLAYEY SILT, some sand, trace gravel, with sand partings Stiff Grey		15	TO	PH		171					
							170	1.7				
			16	SS	6		169					1 23 41 35
168.62	SILTY CLAY, trace sand, trace gravel Stiff Grey						168	1.5				
17.53			17	SS	4		167					
166.95	CLAYEY SILT, trace sand, trace gravel, with silt partings Stiff Grey						166	2.3				
19.20			18	TO	PH		165	1.8				
165.42	CLAYEY SILT, trace sand, trace gravel Stiff to hard Grey						164	1.2				
20.73			19	SS	5		163					
			20	SS	31		162					8 74 (18)
162.53	SAND AND GRAVEL, trace silt Very dense Grey						161					
23.62			21	SS	68		160					(66)
160.85	SANDY SILT Very dense Grey						159					
25.30			22	SS	71		158					(92)
159.85	CLAYEY SILT, trace sand, trace gravel Hard Grey						157					
26.30			23	SS	39							
158.35	SILT, trace sand Dense Grey											
27.80			24	SS	15							
157.65	CLAYEY SILT, trace sand, trace gravel, with sandy silt partings Stiff to very stiff Grey											
28.50												

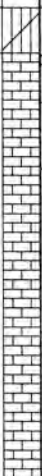
Continued Next Page

+ 3, X 3, Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 5/29/09



PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 104</b>		3 OF 4	<b>METRIC</b>
W.P. _____	LOCATION <u>N 4677630.3 ; E 335263.1</u>	ORIGINATED BY <u>MA</u>			
DIST <u>WEST</u> HWY <u>401/3</u>	BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>	COMPILED BY <u>BRS</u>			
DATUM <u>GEODETIC</u>	DATE <u>April 1, 2008 - April 2, 2008</u>	CHECKED BY <u>SJB</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)
								○ UNCONFINED	+ FIELD VANE	× LAB VANE						
							20	40	60	80	100					
155.70	LIMESTONE, fresh, medium strong, thinly laminated, fine grained, faintly porous Light grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		25	SS	100/76mm											
30.45			26	HQ RC				88	82	82						
			27	HQ RC				95	81	70						
			28	HQ RC				100	100	100						
151.45	END OF BOREHOLE															
34.70	Water level in borehole at about elev. 162.4m during drilling on April 1 and 2, 2008.  Water level measured in deep piezometer at elev. 177.92m on April 4, 2008.  Water level measured in deep piezometer at elev. 176.09m on September 19, 2008.  Water level measured in deep piezometer at elev. 177.25 on November 14, 2008.															

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 104

SHEET 4 OF 4

LOCATION: N 4677630.3 ; E 335263.1

DRILLING DATE: April 1, 2008 - April 2, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (mm/min)	COLOUR FLUSH % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate				BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage				PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular				PO - Polished K - Slickensided SM - Smooth Ro - Rough				Br - Broken Rock	NOTE: For additional abbreviations refer to list of abbreviations & symbols	HYDRAULIC CONDUCTIVITY k, cm/sec				DIAMETRAL POINT LOAD INDEX (MPa)				NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
				DEPTH (m)	RECOVERY					R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		DIP w/1 CORE AXIS	TYPE AND SURFACE DESCRIPTION	10 <sup>-6</sup>			10 <sup>-5</sup>			2	4	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
												TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION	10 <sup>-6</sup>	10 <sup>-5</sup>	10 <sup>-6</sup>	10 <sup>-5</sup>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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		ROCK SURFACE		155.70 30.45																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

LDN ROCK 03 07-1130-207-0-ROCK.GPJ GLDR LDN GDT 6/29/09 DATA INPUT: WDF

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SJS

# RECORD OF BOREHOLE No 104A

1 OF 1

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677630.3 : E 335263.1

ORIGINATED BY MA

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, SOLID STEM

COMPILED BY BRS

DATUM GEODETIC

DATE

April 1, 2008

CHECKED BY **SJS**

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
186.15	SOIL CONDITIONS INFERRED FROM BOREHOLE No. 104 GROUND SURFACE							20 40 60 80 100	20 40 60 80 100	10 20 30				
0.00	SILTY SAND, some clay, trace gravel, Loose Mottled brown and grey					Concrete								
184.78														
1.37	CLAYEY SILT, some sand, trace gravel Very stiff Brown becoming grey at about elev. 183.1m													
182.49														
3.66	CLAYEY SILT, some sand, trace gravel, with sandy silt layers Very stiff Grey					Bentonite								
181.73														
4.42	CLAYEY SILT, some sand, trace gravel Very stiff Grey													
178.85														
7.35	SAND AND GRAVEL, some silt, some clay Grey													
178.17														
7.98	CLAYEY SILT, some sand, trace gravel Grey					Sand								
8.23	SANDY SILT, trace gravel Grey													
177.16														
8.99	SILTY SAND, trace gravel, trace clay, with clayey silt layers Loose to compact Grey					Piezometer								
176.09														
10.06	CLAYEY SILT, some sand, trace gravel, with silt and sand partings Firm Grey													
	END OF BOREHOLE													
	Water level measured in shallow piezometer at elev. 183.01m on April 4, 2008.													
	Water level measured in shallow piezometer at elev. 183.76m on September 19, 2008.													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 8/29/09

**RECORD OF BOREHOLE No 105**

1 OF 4

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677843.2; E 335190.1

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

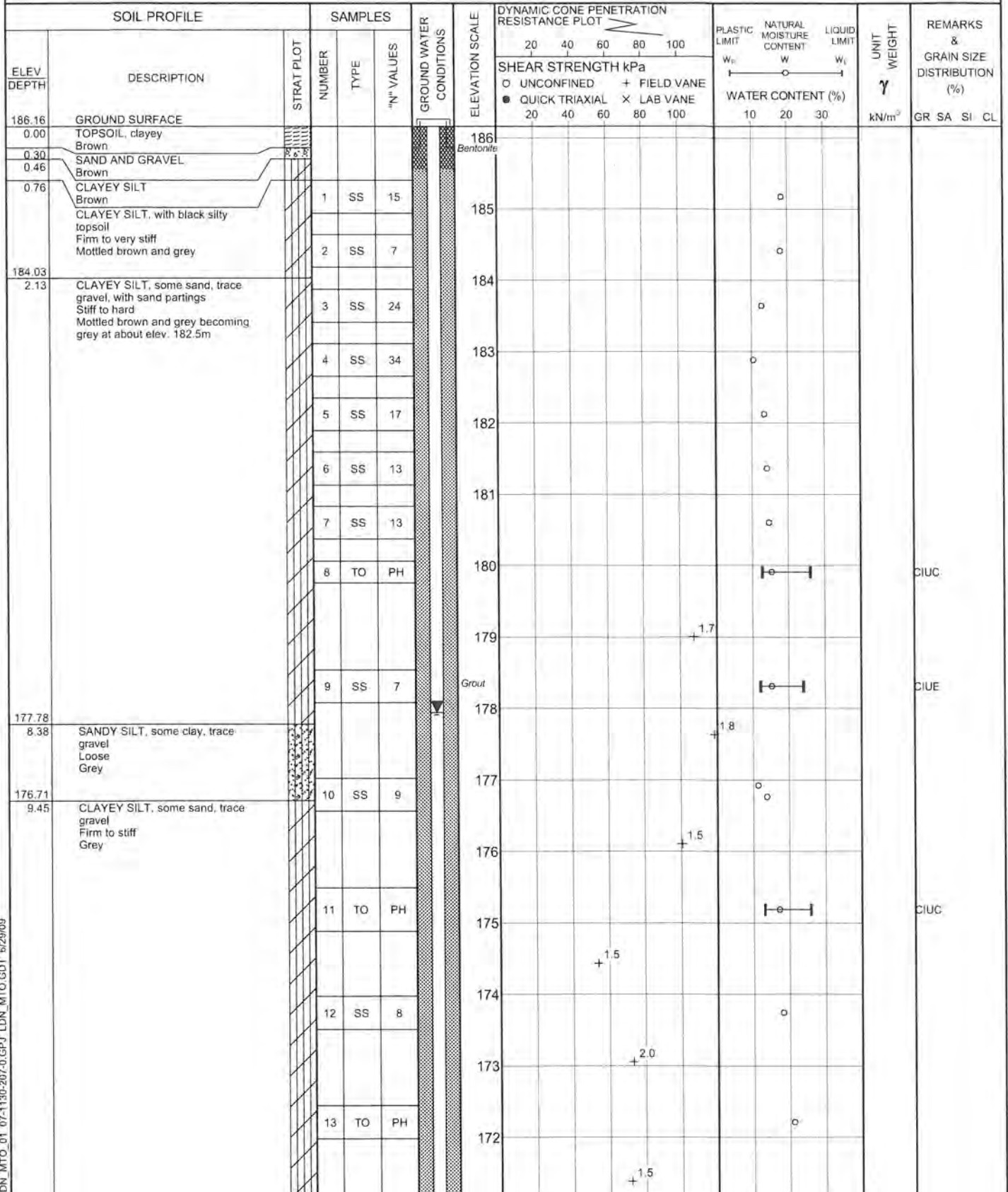
COMPILED BY BRS

DATUM GEODETIC

DATE

February 26, 2008 - February 28, 2008

CHECKED BY *SJB*



Continued Next Page

+ 3, X 3, Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 5/29/09

## METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677843.2 ;E 335190.1

ORIGINATED BY SM

DIST WEST HWY 401/3

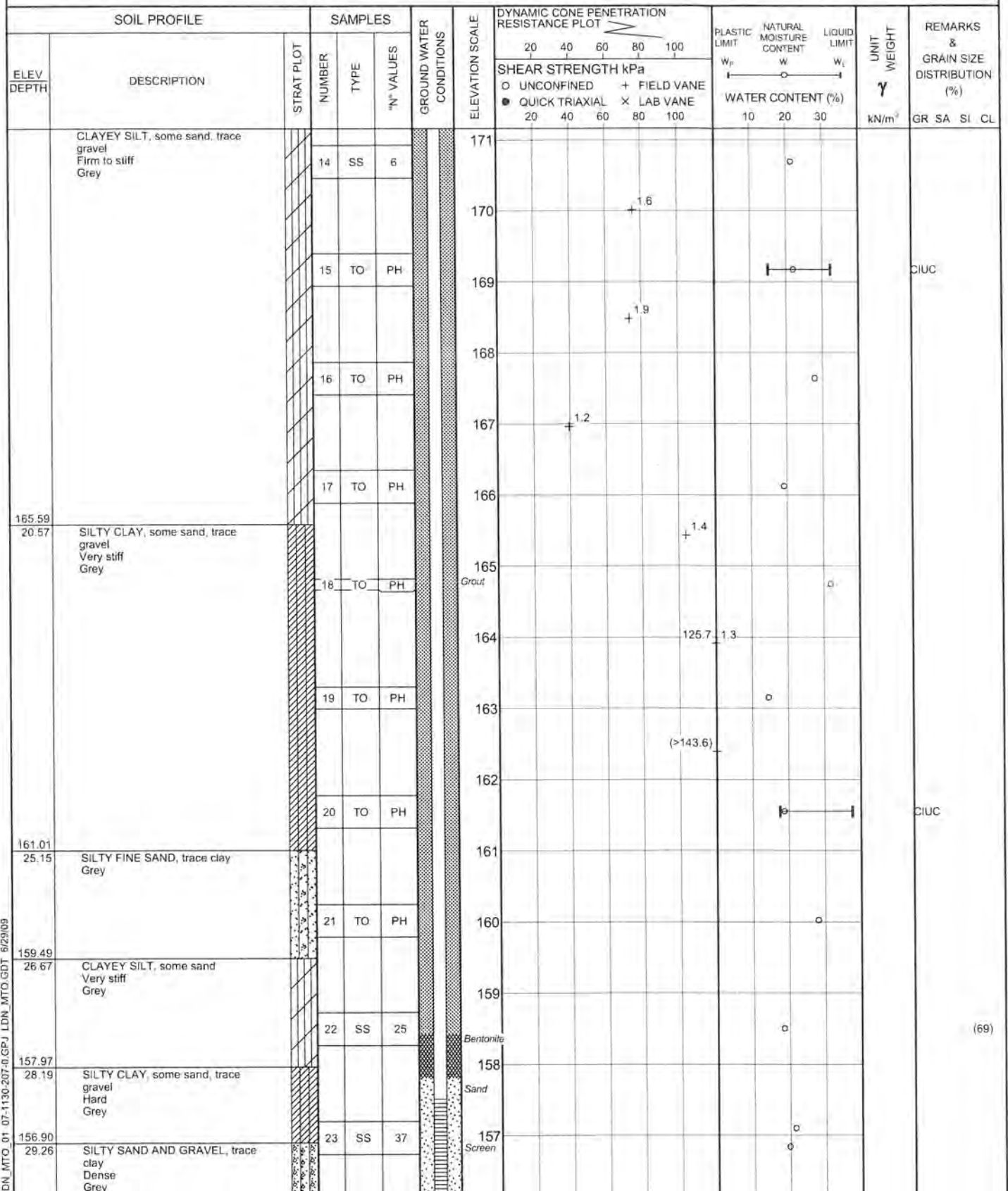
BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE February 26, 2008 - February 28, 2008

CHECKED BY SJS



Continued Next Page

+ 3, X 3: Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE



PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 105</b>		3 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4677843.2 :E 335190.1		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC		DATE February 26, 2008 - February 28, 2008		CHECKED BY <b>SJB</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT $w_p$	NATURAL MOISTURE CONTENT $w$	LIQUID LIMIT $w_L$	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL					
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)				
								○ UNCONFINED								+ FIELD VANE		X LAB VANE	
								20	40							60	80	100	20
155.68	LIMESTONE, fresh, medium strong, thinly laminated to laminated, very fine to fine grained, faintly to strongly porous Light grey to tan  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		24	SS	106		Screen												
30.48							Bentonite												
			25	NQ RC			155												
			26	NQ RC			154												
			27	NQ RC			153												
151.54	END OF BOREHOLE																		
34.62	Borehole dry during drilling on February 27, 2008  Water level measured in deep piezometer at elev. 178.26m on March 20, 2008  Water level measured in deep piezometer at elev. 177.93m on July 22, 2008  Water level measured in deep piezometer at elev. 175.77m on August 11, 2008  Water level measured in deep piezometer at elev. 176.84m on September 19, 2008  Water level measured in deep piezometer at elev. 177.35m on November 14, 2008  Water level measured in deep piezometer at elev. 177.94m on January 28, 2009																		

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GOT 6/29/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 105

SHEET 4 OF 4

LOCATION: N 4677843.2 :E 335190.1

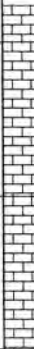
DRILLING DATE: February 26, 2008 - February 28, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No	PENETRATION RATE (mm/min)	COLOUR % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate	BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage	PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular	PO - Polished K - Slickensided SM - Smooth Ro - Rough	Br - Broken Rock  NOTE: For additional abbreviations refer to list of abbreviations & symbols	HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL INDEX (MPI)	NOTES WATER LEVELS INSTRUMENTATION
		ROCK SURFACE		155.88 30.48												
31	MUD ROTARY NO ROCK CORE	LIMESTONE, fresh, medium strong, thinly laminated, fine to very fine grained, faintly porous, light grey to tan		154.59 31.57	1			155								
32																
33		LIMESTONE, fresh, medium strong, laminated, very fine grained, strongly porous to pitted, whitish grey		153.06 33.10	2			154					JN, CU, SM CI JN, PL, SM CI JN, PL, SM CI JN, PL, SM CI			
34		LIMESTONE, fresh, medium strong, laminated, fine grained, porous with localized pitting, light grey, occasional fossils			3			153					JU, UN, SM CI JN, PL, Ro CI			
35		END OF DRILLHOLE		151.54 34.62				152								
36																
37																
38																
39																
40																
41																
42																
43																
44																
45																

DEPTH SCALE

1:75

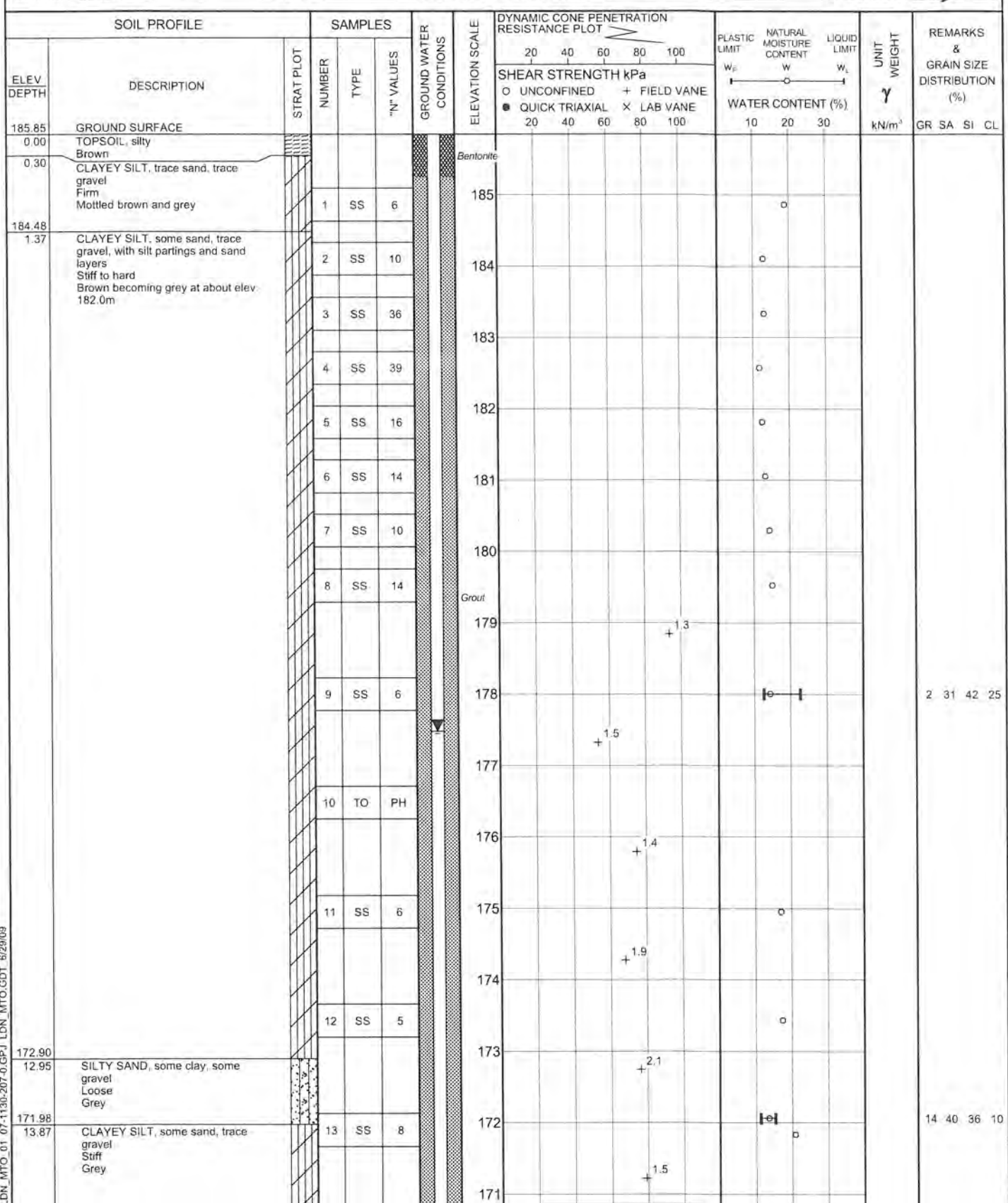


LOGGED: SG

CHECKED: *SB*

+3 × 3 Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 107</b>		1 OF 4 <b>METRIC</b>	
W.P. _____		LOCATION N 4677973.1 :E 334961.3		ORIGINATED BY MA	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC		DATE March 14, 2008 - March 19, 2008		CHECKED BY <i>SB</i>	



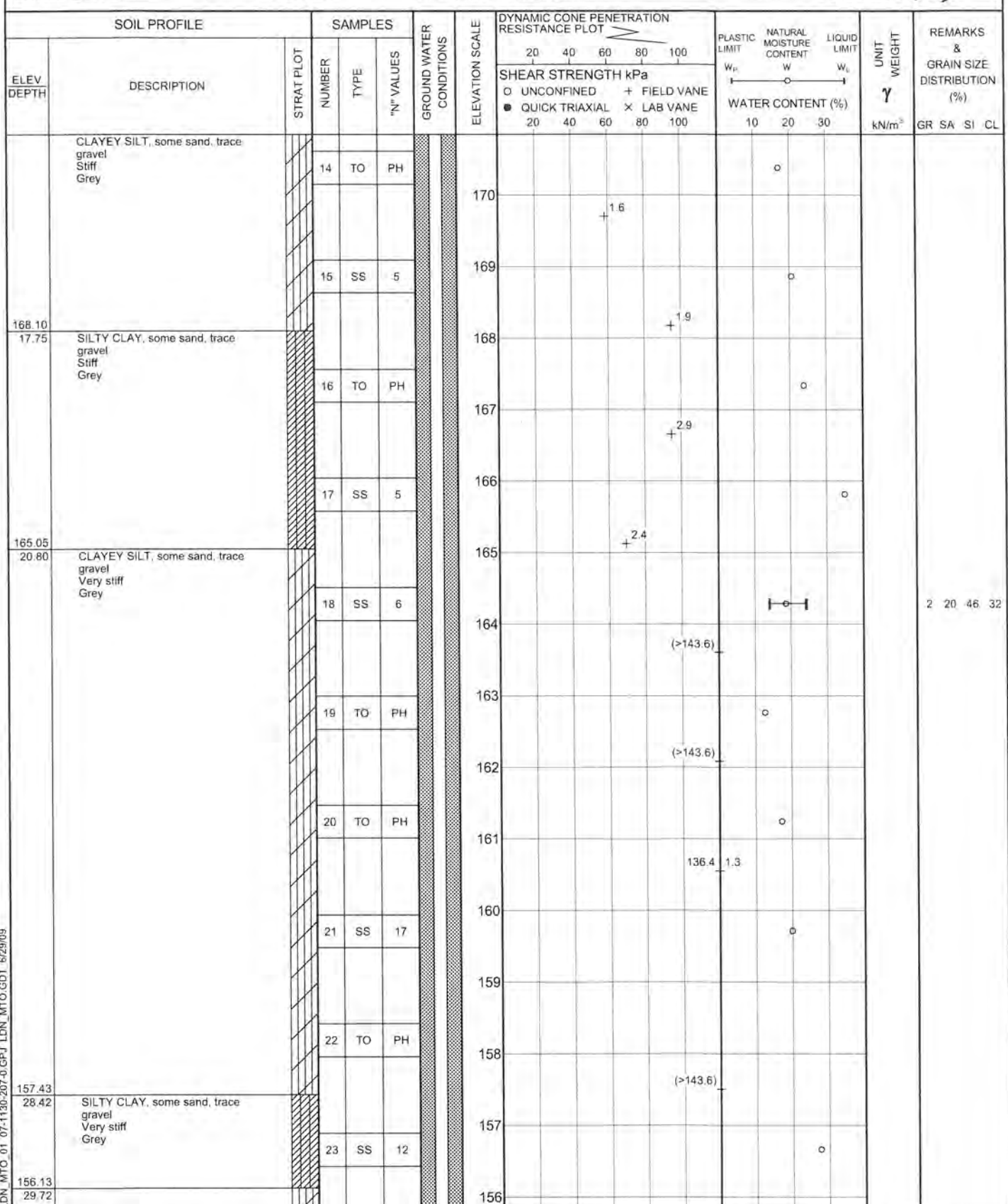
LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 8/29/09

Continued Next Page

+ 3, x 3; Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 107</b>		2 OF 4	<b>METRIC</b>
W.P.	LOCATION	N 4677973.1 ; E 334961.3		ORIGINATED BY MA	
DIST WEST HWY 401/3	BOREHOLE TYPE	POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC	DATE	March 14, 2008 - March 19, 2008		CHECKED BY <i>SJB</i>	



LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+ 3, x 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 107</b>		3 OF 4	<b>METRIC</b>
W.P.	LOCATION	N 4677973.1 E 334961.3		ORIGINATED BY MA	
DIST WEST HWY 401/3	BOREHOLE TYPE	POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC	DATE	March 14, 2008 - March 19, 2008		CHECKED BY <i>SLB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)											
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40						60	80	100	WATER CONTENT (%)	GR	SA	SI	CL			
155.25	CLAYEY SILT, some sand, trace gravel Very stiff Grey		24	SS	235																				
30.68	SILTY SAND, trace clay, trace gravel		25	NQ										45	n/a	0									
154.61	LIMESTONE, weathered Tan and grey		26	RC										0	0	0									
31.24	LIMESTONE, fresh, medium strong, thinly laminated, fine to medium grained, faintly porous Brown and grey		27	NQ										n/a	n/a	n/a									
	(FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		28	RC										50	n/a	n/a									
			29	NQ										91	n/a	n/a									
			30	RC										16	n/a	n/a									
			31	NQ										75	n/a	n/a									
				RC																					
150.95	END OF BOREHOLE																								
34.90	Borehole dry during drilling between March 14 and 19, 2008.																								
	Water level measured in deep piezometer at elev. 177.30m on November 14, 2008.																								
	Water level measured in deep piezometer at elev. 177.48m on January 28, 2009.																								

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 107

SHEET 4 OF 4

LOCATION: N 4677973.1;E 334961.3

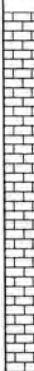
DRILLING DATE: March 14, 2008 - March 19, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	PENETRATION RATE (mm/min)	COLOUR % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										DIAMETRAL INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
				DEPTH (m)					FLUSH	RECOVERY	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec					
										TOTAL CORE %	SOLID CORE %		DIP w / l CORE AXIS	TYPE AND SURFACE DESCRIPTION	10 <sup>-1</sup>	10 <sup>-2</sup>	10 <sup>-3</sup>	10 <sup>-4</sup>		
										80 60 40 20	80 60 40 20	80 60 40 20	5 10 15 20	0 30 60 90						
31	MUD ROTARY NO ROCK CORE	ROCK SURFACE		155.17 30.68				155												
		Core retriever malfunctioning - most of core broken LIMESTONE, fresh, medium strong, thinly laminated to laminated, fine to medium grained, faintly porous, brown and grey		1																
32				2																
33				3																
				4																
34				5																
				6																
35		END OF DRILLHOLE		150.95 34.90	7			151												
36																				
37																				
38																				
39																				
40																				
41																				
42																				
43																				
44																				
45																				

LDN ROCK 03 07-1130-207-0-ROCK.GPJ GLDR LDN GDT 6/29/09 DATA INPUT: WDF

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SSB

# RECORD OF BOREHOLE No 107A

1 OF 1

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677973.1 E 334961.3

ORIGINATED BY MA

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, SOLID STEM

COMPILED BY BRS

DATUM

GEODETIC

DATE

March 14, 2008

CHECKED BY

SB

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
185.85	SOIL CONDITIONS INFERRED FROM BOREHOLE No. 107 GROUND SURFACE													
0.00	TOPSOIL, silty Brown						Concrete							
0.30	CLAYEY SILT, trace sand, trace gravel Firm Mottled brown and grey						185							
184.48							184							
1.37	CLAYEY SILT, some sand, trace gravel, with silt partings and sand layers Stiff to hard Brown becoming grey at about elev 182.0m						183							
							182							
							181							
							180							
							179 Bentonite							
							178 Sand							
							177 Piezometer							
176.25														
9.60	END OF BOREHOLE													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 5/29/09



# RECORD OF BOREHOLE No 109

1 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678155.0 : E 334716.3

ORIGINATED BY MA

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

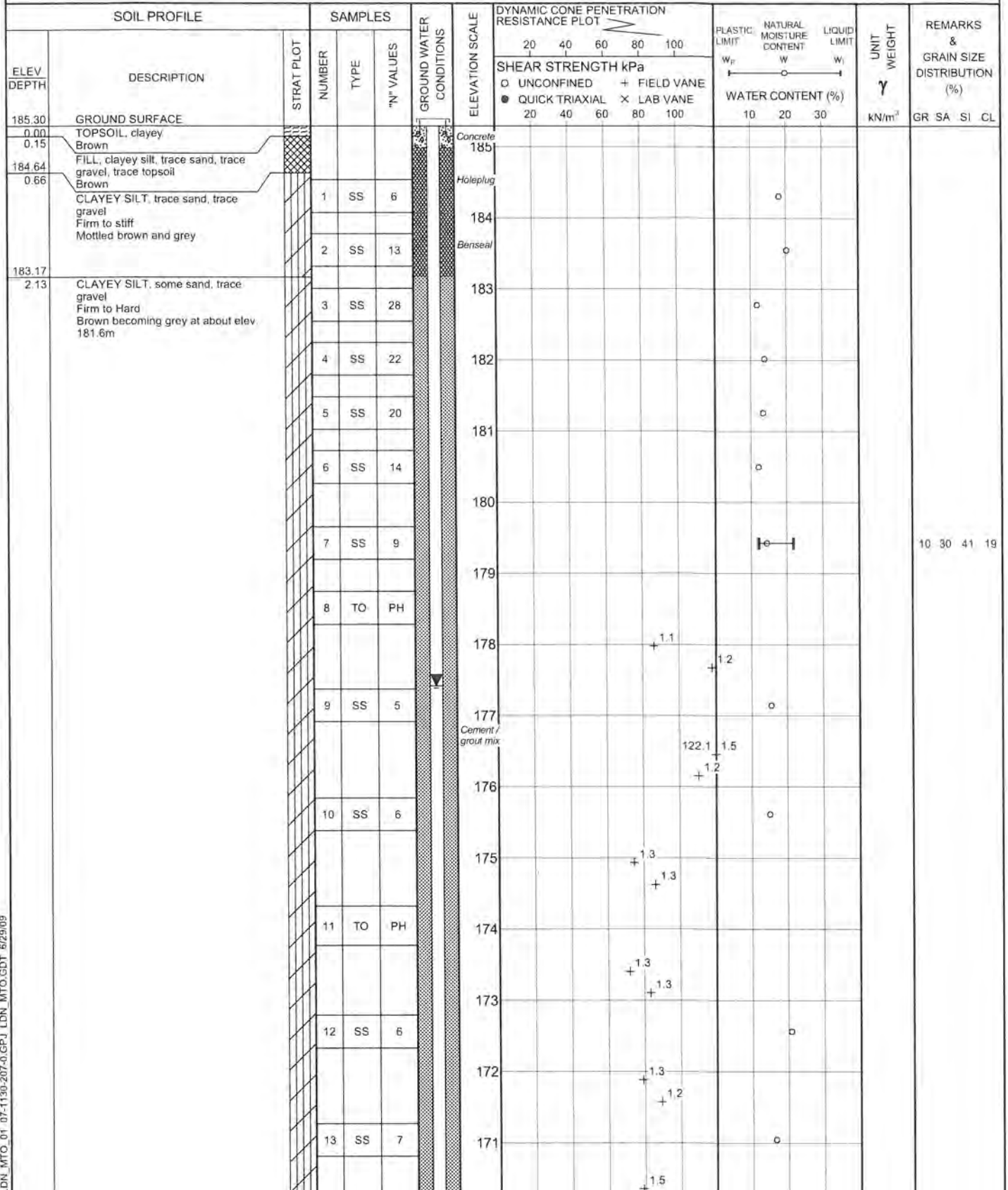
COMPILED BY LMK

DATUM GEODETIC

DATE

January 17, 2008 - January 29, 2008

CHECKED BY SJB



Continued Next Page

+ 3 × 3: Numbers refer to Sensitivity  
○ 3% STRAIN AT FAILURE

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

## METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678155.0 ; E 334716.3

ORIGINATED BY MA

DIST WEST HWY 401/3

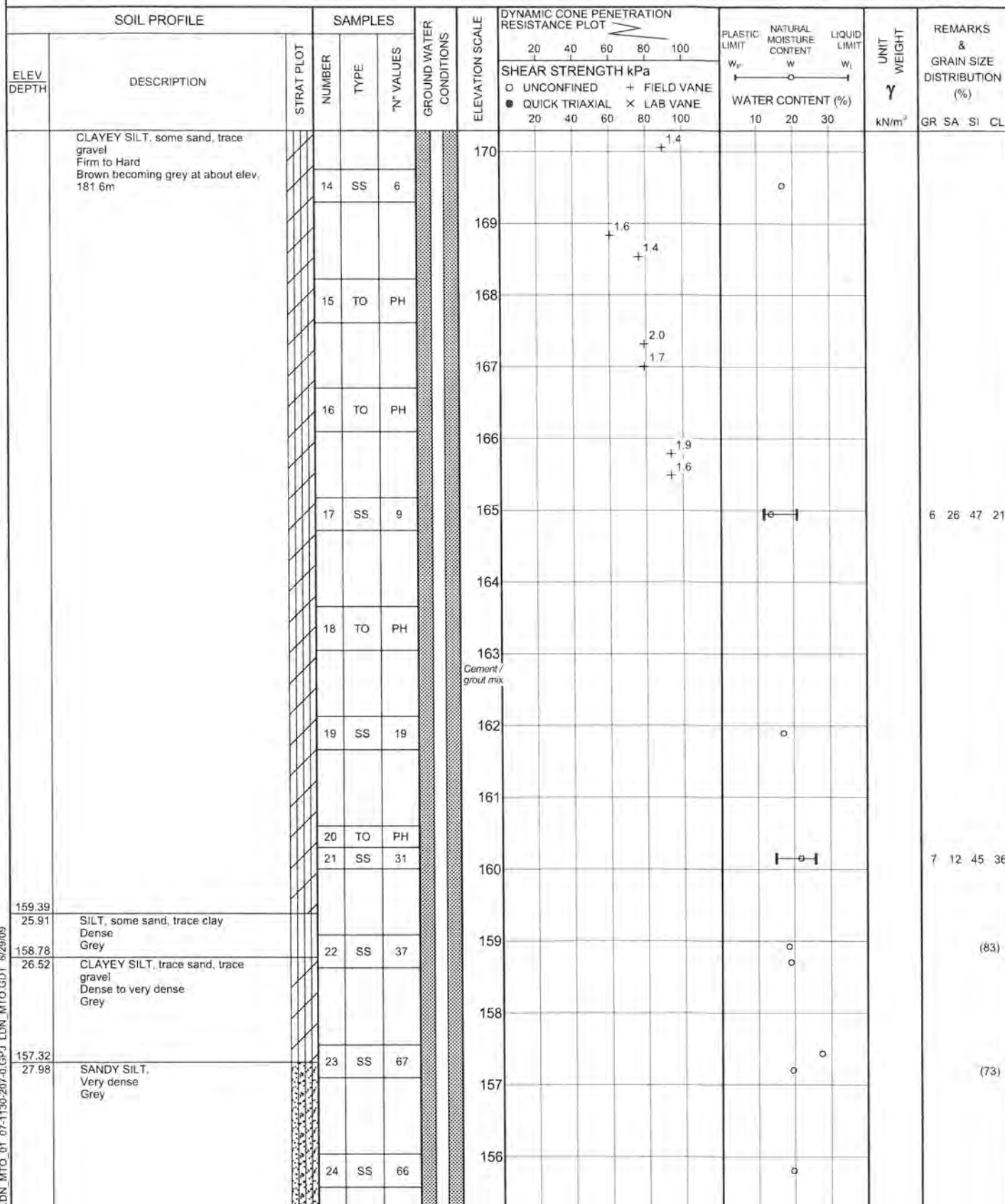
BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY LMK

DATUM GEODETIC

DATE January 17, 2008 - January 29, 2008

CHECKED BY SJB



Continued Next Page

+3, X3, Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 109

3 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678155.0 : E 334716.3

ORIGINATED BY MA

DIST WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY LMK

DATUM GEODETIC

DATE

January 17, 2008 - January 29, 2008

CHECKED BY

SJB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT   NATURAL MOISTURE CONTENT   LIQUID LIMIT			UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR   SA   SI   CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)								
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE × LAB VANE	W <sub>p</sub>	W	W <sub>L</sub>						
						20	40	60	80	100	20	40	60	80	100	10	20	30

155.12	SANDY SILT, some clay, trace gravel Compact Grey						155												(49)		
30.18			25	SS	18																
153.30	SAND AND GRAVEL, trace silt Very dense Grey						154												15   71   10   4		
32.00			26	SS	54																
			27	SS	72/ 127mm																
			28	SS	67																
149.18	LIMESTONE, fresh, medium strong, fine grained, moderately porous Light grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)						152												UC		
36.12																					

+ 3, x 3: Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT: 07-1130-207-0  
LOCATION: N 4678155.0 E 334716.3  
INCLINATION: -90° AZIMUTH: --

# RECORD OF DRILLHOLE: 109

SHEET 4 OF 4  
DATUM: GEODETIC

DRILLING DATE: January 17, 2008 - January 29, 2008  
DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC  
DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate				BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage				PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular				PO - Polished K - Slickensided SM - Smooth Ro - Rough				Br - Broken Rock	NOTE: For additional abbreviations refer to list of abbreviations & symbols	HYDRAULIC CONDUCTIVITY k, cm/sec			DIAMETER PUMP LOG INDEX (MPa)		NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
				DEPTH (m)	R.Q.D. %						RECOVERY		FRACT INDEX PER 0.3	DISCONTINUITY DATA		DIP to 2.2 CORE AXIS	TYPE AND SURFACE DESCRIPTION	10 <sup>-1</sup>	10 <sup>-2</sup>	10 <sup>-3</sup>	2	4	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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		ROCK SURFACE		149.18 36.12						149																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

BD, PL, SM CI  
JN, UN, Ro CI  
BD, PL, Ro CI  
JN, UN, Ro CI  
BD, PL, Ro CI  
BD, PL, Ro CI

LDN ROCK 03 07-1130-207-0-ROCK.GPJ GLDR LDN CDT 8/29/09 DATA INPUT WDF

DEPTH SCALE  
1:75

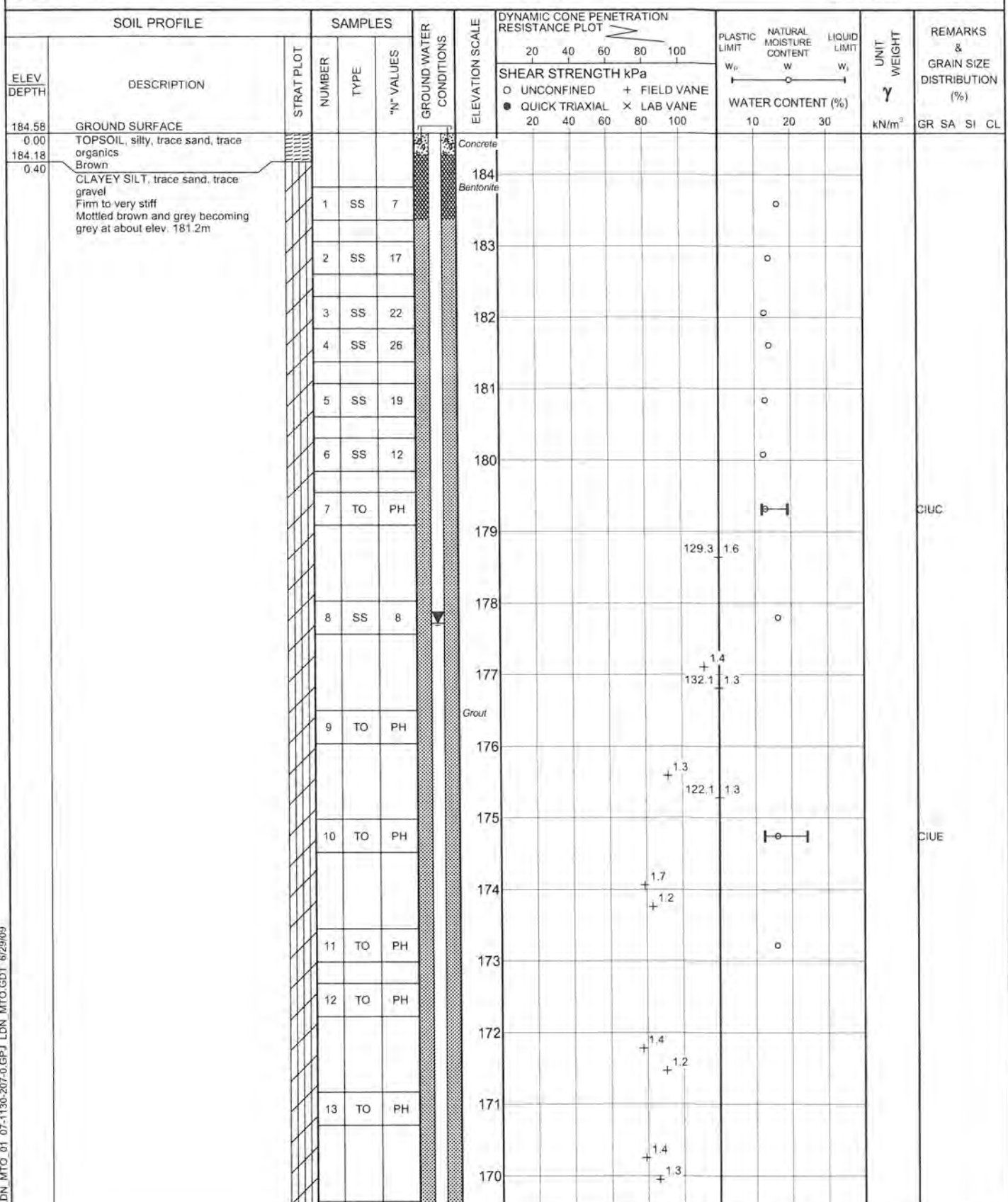


LOGGED: SG  
CHECKED: SJB





<b>PROJECT</b> 07-1130-207-0		<b>RECORD OF BOREHOLE No 112</b>		1 OF 4	<b>METRIC</b>
<b>W.P.</b>		<b>LOCATION</b> N 4678413.3 :E 334221.3		<b>ORIGINATED BY</b> SM	
<b>DIST</b> WEST HWY 401/3		<b>BOREHOLE TYPE</b> POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		<b>COMPILED BY</b> BRS	
<b>DATUM</b> GEODETIC		<b>DATE</b> January 29, 2008 - February 12, 2008		<b>CHECKED BY</b> <i>SJB</i>	



LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+ 3, X 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0

**RECORD OF BOREHOLE No 112**

2 OF 4

**METRIC**

W.P. LOCATION N 4678413.3, E 334221.3

ORIGINATED BY SM

DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE NQRC

COMPILED BY BRS

DATUM GEODETTIC DATE January 29, 2008 - February 12, 2008

CHECKED BY **SJB**

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
	CLAYEY SILT, trace sand, trace gravel Firm to very stiff Mottled brown and grey becoming grey at about elev. 181.2m		14	TO	PH		169							
			15	TO	PH		168							
			16	TO	PH		167							
			17	TO	PH		166							
			18	TO	PH		165							
			19	TO	PH		164							
			20	TO	PH		163							
			21	SS	6		162							
161.64	SILTY CLAY, trace sand, trace gravel Firm Grey		22	TO	PH		161							
22.94			23	SS	29		160							
158.52	SILT, trace clay Grey						159							
26.06	CLAYEY SILT, trace sand, trace gravel Grey						158							
158.21	SANDY SILT, trace gravel Grey						157							
26.37	CLAYEY SILT, trace sand, trace gravel Grey						156							
157.76	CLAYEY SILT, trace sand, trace gravel Very stiff Grey						155							
26.82	SILT, some sand Compact Grey													
157.00	CLAYEY SILT, some sand, trace gravel Very stiff Grey													
27.58														
156.36														
28.22														
155.62														
28.96														

Continued Next Page

+ 3, x 3. Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

# RECORD OF BOREHOLE No 112

3 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678413.3 : E 334221.3

ORIGINATED BY SM

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

January 29, 2008 - February 12, 2008

CHECKED BY *SSB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100			
153.80	CLAYEY SILT, some sand, trace gravel Very stiff Grey		24	SS	28		154								
30.78	SILTY SAND AND GRAVEL, with cobbles and boulders Very dense Grey		25	SS	101/101mm		153								
			26	TO	PH										
152.12	LIMESTONE, fresh, medium strong, thinly laminated to laminated, very fine to medium grained, faintly to moderately porous Light greyish brown		27	SS	101/25mm		152								
32.46	(FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		28	NQ RC			151								
			29	NQ RC			150								
			30	NQ RC			149								
			31	NQ RC			148								
146.39	END OF BOREHOLE						147								
38.19	Water level in borehole at about elev. 158.52m during drilling on February 5, 2008.  Water level measured in deep piezometer at elev. 178.28m on February 12, 2008.  Water level measured in deep piezometer at elev. 178.38m on March 20, 2008.  Water level measured in deep piezometer at elev. 177.93m on July 24, 2008.  Water level measured in deep piezometer at elev. 176.25m on September 19, 2008.  Water level measured in deep piezometer at elev. 177.54m on November 14, 2008.  Water level measured in deep piezometer at elev. 177.72m on January 28, 2009.														



PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 112

SHEET 4 OF 4

LOCATION: N 4678413.3 ; E 334221.3

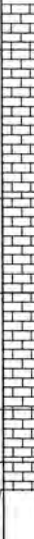
DRILLING DATE: January 29, 2008 - February 12, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate	BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage	PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular	PO - Polished K - Stickensided SM - Smooth Ro - Rough	Br - Broken Rock  NOTE: For occasional abbreviations refer to list of abbreviations & symbols	HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POWER LOG INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		ROCK SURFACE		152.12 32.46				152								
33	MUD ROTARY NQ ROCK CORE	LIMESTONE, fresh, medium strong, thinly laminated, very fine grained, faintly porous, light grey		150.75 33.83	1			151								
34		LIMESTONE, fresh, medium strong, laminated, fine grained, vuggy to faintly porous with depth, light greyish brown, fossils present						150								
35		LIMESTONE, fresh, medium strong, thinly laminated, very fine grained, faintly porous, light grey		149.28 35.30	2			149								
36		LIMESTONE, fresh, medium strong, thinly laminated, fine grained, faintly porous, light greyish brown		148.34 36.24	3			148								
37		LIMESTONE, fresh, medium strong, laminated, medium grained, moderately porous, light greyish brown		147.18 37.40	4			147								
38		LIMESTONE, fresh, medium strong, laminated, fine grained, faintly porous, very light greyish brown		146.66 37.92 146.39												
39		END OF DRILLHOLE		38.19												
40																
41																
42																
43																
44																
45																
46																
47																

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SJB



# RECORD OF BOREHOLE No 113

1 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678454.5 : E 334070.3

ORIGINATED BY DJM/MA

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

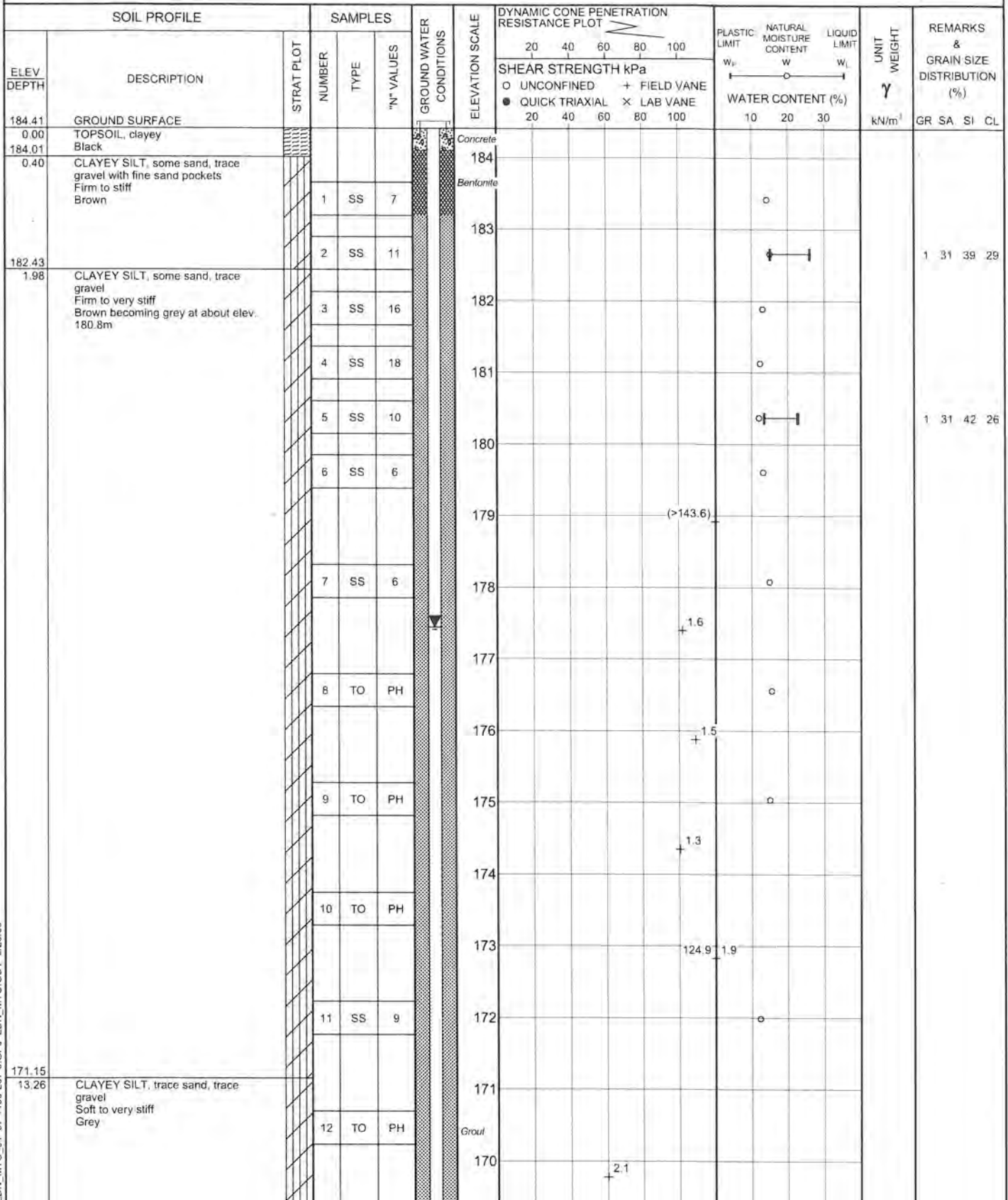
COMPILED BY BRS

DATUM GEODETIC

DATE

February 22, 2008 - February 28, 2008

CHECKED BY *SB*



Continued Next Page

+ 3, x 3. Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

+ 3, X 3: Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE



**RECORD OF BOREHOLE No 113**

3 OF 4

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678454.5 :E 334070.3

ORIGINATED BY DJM/MA

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

February 22, 2008 - February 28, 2008

CHECKED BY *SJB*

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa				WATER CONTENT (%)			
							20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	W <sub>p</sub> W W <sub>L</sub>					GR SA SI CL
29.87	SAND AND GRAVEL, trace silt Compact Grey		23	SS	25										
153.01			24	NQ RC			33	0	0						
31.40	LIMESTONE, fresh, medium strong, thinly laminated to laminated, very fine to fine grained, faintly porous to porous Light grey to brown  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		25	NQ RC			27	10	0						
			26	NQ RC			73	38	12						
			27	NQ RC			T.C.R. (%) 0 S.C.R. (%) 0 R.Q.D. (%) 0								
			28	NQ RC											
148.36							94	92	78						UC
36.05	END OF BOREHOLE														
	Water level in borehole at about elev. 154.54m during drilling between February 22 and 28, 2008														
	Water level measured in deep piezometer at elev. 178.13m on February 28, 2008.														
	Water level measured in deep piezometer at elev. 182.91m on March 20, 2008.														
	Water level measured in deep piezometer at elev. 177.75m on July 22, 2008.														
	Water level measured in deep piezometer at elev. 175.87m on September 19, 2008.														
	Water level measured in deep piezometer at elev. 177.18m on November 11, 2008.														
	Water level measured in deep piezometer at elev. 177.44m on January 28, 2009.														

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 5/29/09

+ 3 X 3

Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE



+3 × 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 115</b>		1 OF 4	<b>METRIC</b>
W.P.	LOCATION	N 4678585.3 E 333911.1		ORIGINATED BY MA	
DIST WEST HWY 401/3	BOREHOLE TYPE	POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC	DATE	February 15, 2008 - February 21, 2008		CHECKED BY <i>SJB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								○ UNCONFINED	+ FIELD VANE							● QUICK TRIAXIAL	x LAB VANE	
183.79	GROUND SURFACE						20	40	60	80	100	10	20	30	GR SA SI CL			
0.00	TOPSOIL, silty Brown																	
183.36																		
0.43	CLAYEY SILT, some sand, trace gravel Soft to very stiff Brown		1	SS	4													
			2	SS	22													
			3	SS	25													
			4	SS	23													
180.44																		
3.35	CLAYEY SILT, some sand, trace gravel Stiff Grey		5	SS	14													
			6	SS	12													
			7	SS	14													
			8	SS	9													
			9	TO	PH													
174.80																		
8.99	SANDY SILT, some clay, trace gravel Loose Grey																	
			10	SS	7													
173.58																		
10.21	CLAYEY SILT, some sand, trace gravel Firm Grey																	
173.12																		
10.67	SAND, trace gravel, trace silt Loose Grey																	
			11	SS	8													
171.90																		
11.89	CLAYEY SILT, some sand, trace gravel Soft to very stiff Grey		12	SS	7													
			13	TO	PH													
			14	SS	6													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 8/29/09

Continued Next Page

+3, x3. Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



## METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678585.3 E 333911.1

ORIGINATED BY MA

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE February 15, 2008 - February 21, 2008

CHECKED BY **SLB**

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES		SHEAR STRENGTH kPa					WATER CONTENT (%)
							○ UNCONFINED	+ FIELD VANE	× LAB VANE			
	CLAYEY SILT, some sand, trace gravel Soft to very stiff Grey											
			15	SS	4							
			16	TO	PH							
			17	SS	6							
			18	SS	13							
			19	SS	22							
			20	SS	22							
			21	SS	24							
			22	SS	11							
			23	TO	PH							
156.21 27.58	SAND, trace sand, trace gravel, trace clay Dense Grey		24	SS	31							
154.83 28.96	SAND, trace gravel Compact to dense Grey		25	SS	30							

Continued Next Page

+ 3, X 3. Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 115

3 OF 4

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678585.3 : E 333911.1

ORIGINATED BY MA

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

February 15, 2008 - February 21, 2008

CHECKED BY **SJB**

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
								20 40 60 80 100						
153.31														
30.48	SAND AND GRAVEL, trace silt; Dense Grey		26	SS	36		153							25 66 6 3
							152							
151.48														
32.31	LIMESTONE, fresh, medium strong, laminated, fine grained Light grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		27	SS	100/ 25mm		151							
			28	NQ RC			150	96 90 86						
			29	NQ RC			149							
			30	NQ RC			148							
							147							
146.15														UC
37.64	END OF BOREHOLE  Water level in borehole at about elev. 156.19m during drilling on February 21, 2008.  Water level measured in deep piezometer at elev. 178.00m on February 21, 2008.  Water level measured in deep piezometer at elev. 178.10m on March 20, 2008.  Water level measured in deep piezometer at elev. 177.69m on July 24, 2008.  Water level measured in deep piezometer at elev. 175.99m on September 19, 2008.  Water level measured in deep piezometer at elev. 177.25m on November 14, 2008.  Water level measured in deep piezometer at elev. 177.35m on January 28, 2009.													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 8/29/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 115

SHEET 4 OF 4

LOCATION: N 4678585.3 ; E 333911.1

DRILLING DATE: February 15, 2008 - February 21, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (m/min)	COLOUR (m/min)	FLUSH % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										DIAMETER POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
				DEPTH (m)	RECOVERY						R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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DEPTH SCALE

1 : 75



LOGGED: SG

CHECKED: SUB

# RECORD OF BOREHOLE No 115A

1 OF 2

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678585.3 ; E 333911.1

ORIGINATED BY MA

DIST WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

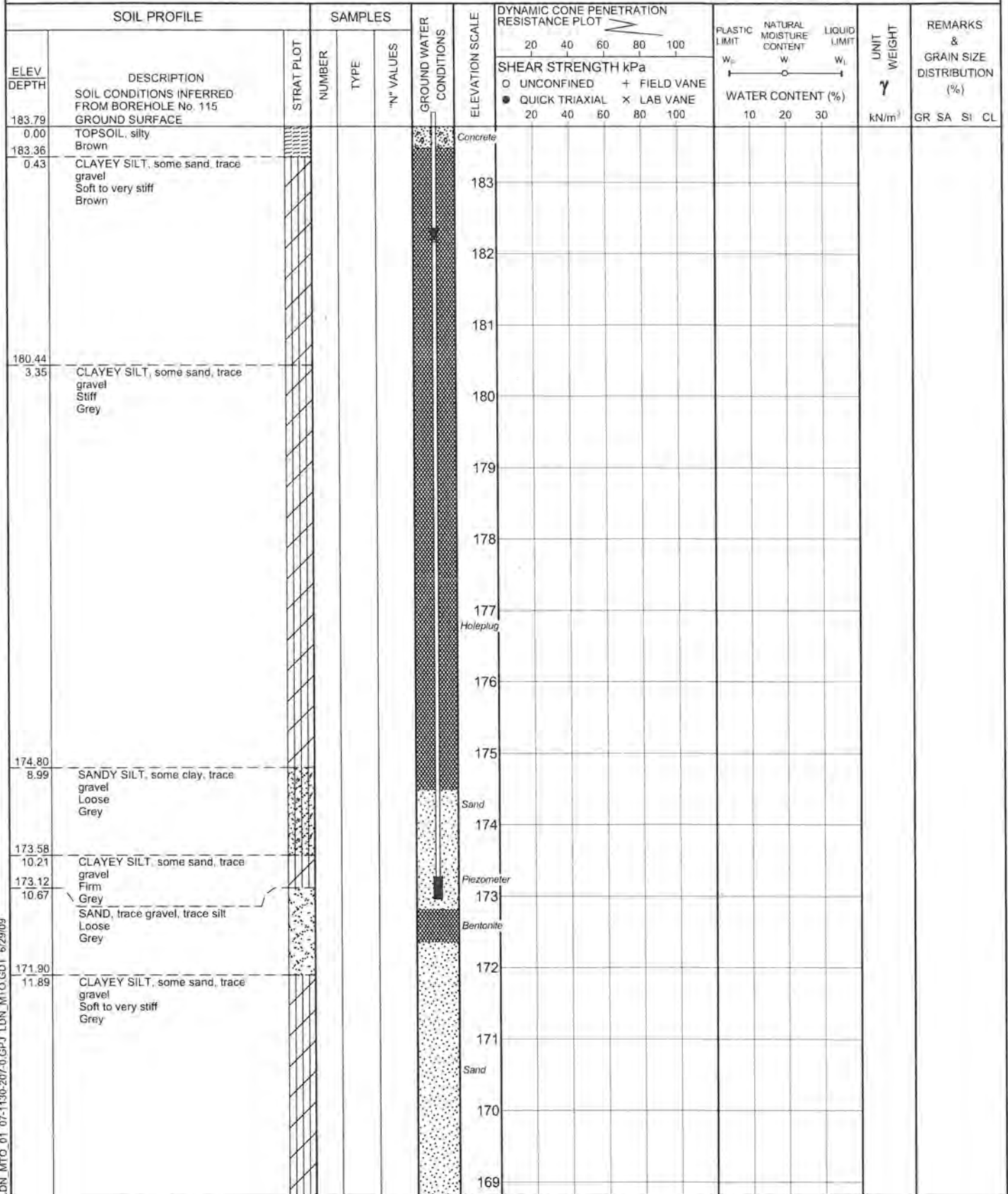
COMPILED BY BRS

DATUM GEODETIC

DATE

February 20, 2008 - February 21, 2008

CHECKED BY SJB



LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+ 3 x 3. Numbers refer to Sensitivity O 3% STRAIN AT FAILURE



PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 115A</b>		2 OF 2	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4678585.3 E 333911.1</u>		ORIGINATED BY <u>MA</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>February 20, 2008 - February 21, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT  γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
								20 40 60 80 100	20 40 60 80 100					
	CLAYEY SILT, some sand, trace gravel Soft to very stiff Grey							○ UNCONFINED + FIELD VANE						
								● QUICK TRIAXIAL X LAB VANE						
								20 40 60 80 100	10 20 30				kN/m <sup>3</sup>	GR SA SI CL

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

+3, X3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 116

2 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678634.3 E 333722.5

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

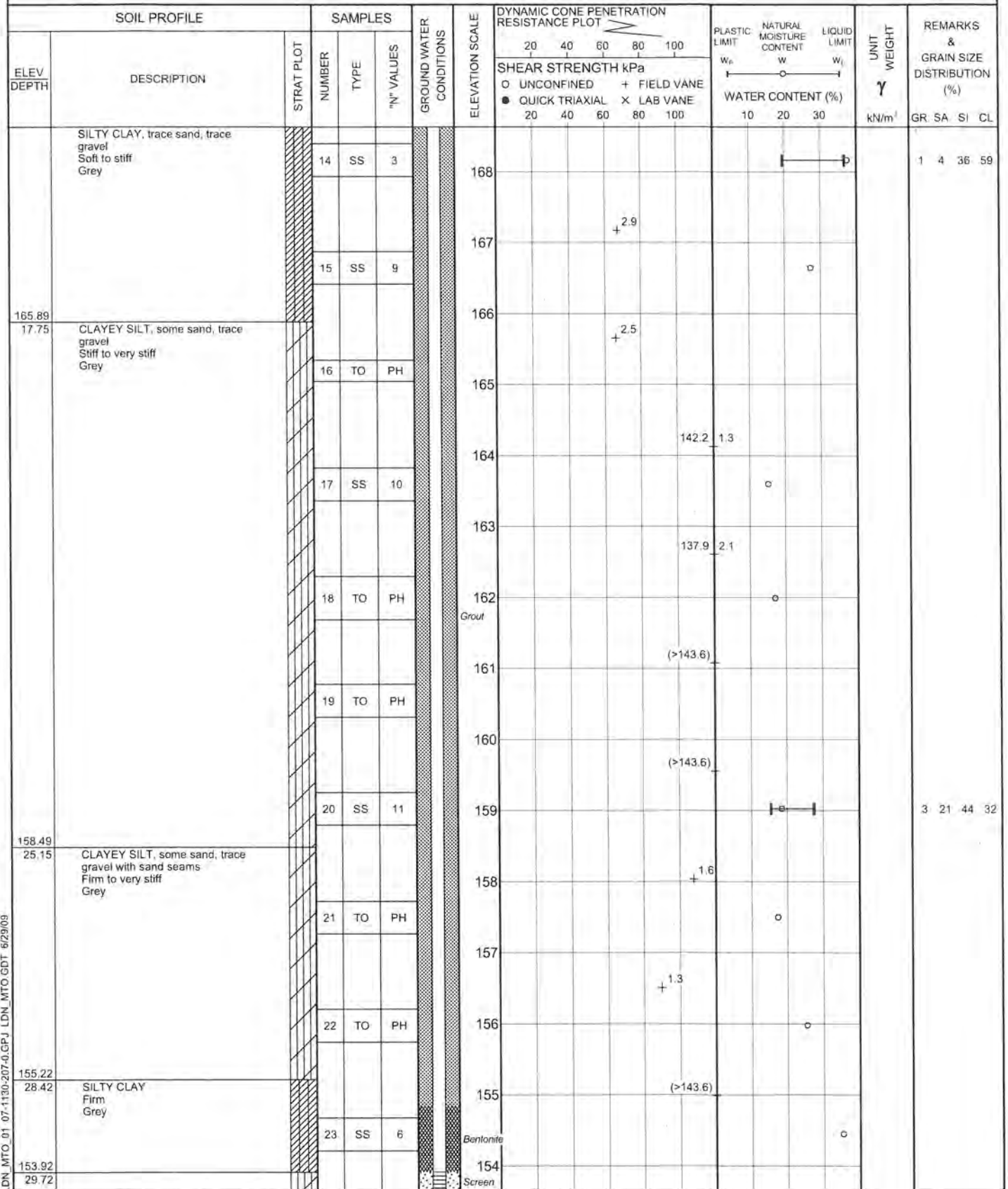
COMPILED BY BRS

DATUM GEODETIC

DATE

February 20, 2008 - February 25, 2008

CHECKED BY **SJB**



Continued Next Page

+ 3, X 3 Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

LDN MTO.01 07-1130-207-0.GPJ LDN MTO.GDT 6/29/09

PROJECT 07-1130-207-0 **RECORD OF BOREHOLE No 116** 3 OF 4 **METRIC**  
W.P. LOCATION N 4678634.3 E 333722.5 ORIGINATED BY SM  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC COMPILED BY BRS  
DATUM GEODETIC DATE February 20, 2008 - February 25, 2008 CHECKED BY *SYB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								
								20	40	60	80	100				
								○ UNCONFINED + FIELD VANE								
								● QUICK TRIAXIAL × LAB VANE								
								20	40	60	80	100	10		20	30
														kN/m <sup>3</sup>	GR SA SI CL	
	CLAYEY SILT, some sand, some gravel, with cobbles and boulders Very stiff Brown		24	SS	21		153									(49)
							152									
151.66							Screen									
31.98	LIMESTONE AND DOLOSTONE, fresh, medium strong, laminated, fine grained, faintly porous Light brown to grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		25	NQ RC			151	53	33	33						
			26	NQ RC			150	80	72	69						
							Sand									
			27	NQ RC			149									
							148	57	56	89						
147.58																
36.06	END OF BOREHOLE  Borehole dry during drilling between February 20 and 25, 2008.  Water level measured in deep piezometer at elev. 180.79m on March 20, 2008.  Water level measured in deep piezometer at elev. 177.95m on July 22, 2008.  Water level measured in deep piezometer at elev. 176.69m on August 11, 2008.  Water level measured in deep piezometer at elev. 176.09m on September 19, 2008.  Water level measured in deep piezometer at elev. 177.26m on November 11, 2008.  Water level measured in deep piezometer at elev. 177.48m on January 28, 2009.															

LDN\_MTO\_01 07-1130-207-0-GPJ LDN\_MTO.GDT 6/29/09



PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 116

SHEET 4 OF 4

LOCATION: N 4678634.3 ; E 333722.5

DRILLING DATE: February 20, 2008 - February 25, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	PENETRATION RATE (mm/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate										BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage										PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular										PO - Polished K - Slickensided SM - Smooth Ro - Rough										Br - Broken Rock	NOTE: For additional abbreviations refer to list of abbreviations & symbols:	HYDRAULIC CONDUCTIVITY k, cm/sec				DIAMETRAL POINT LOAD INDEX (MPa)				NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
				DEPTH (m)						RECOVERY				R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA				TYPE AND SURFACE DESCRIPTION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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LDN ROCK 03 07-1130-207-0-ROCK.GPJ GLDR LDN GDT 8/29/09 DATA INPUT: WDF

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: *SG*

+3, X3. Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 118

1 OF 4

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678903 5 :E 333302.9

ORIGINATED BY MA

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

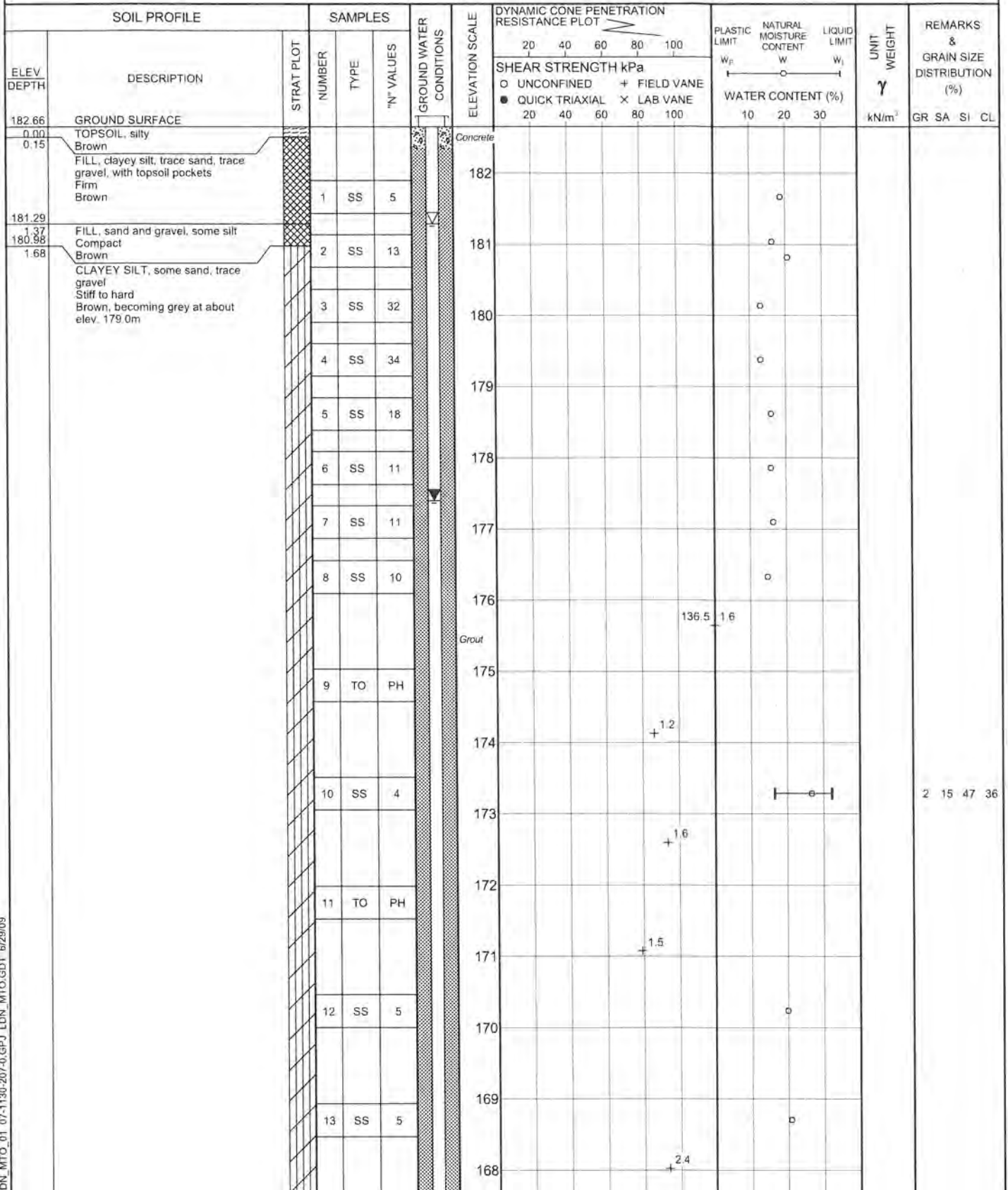
COMPILED BY BRS

DATUM GEODETIC

DATE

February 28, 2008 - March 4, 2008

CHECKED BY **SSB**

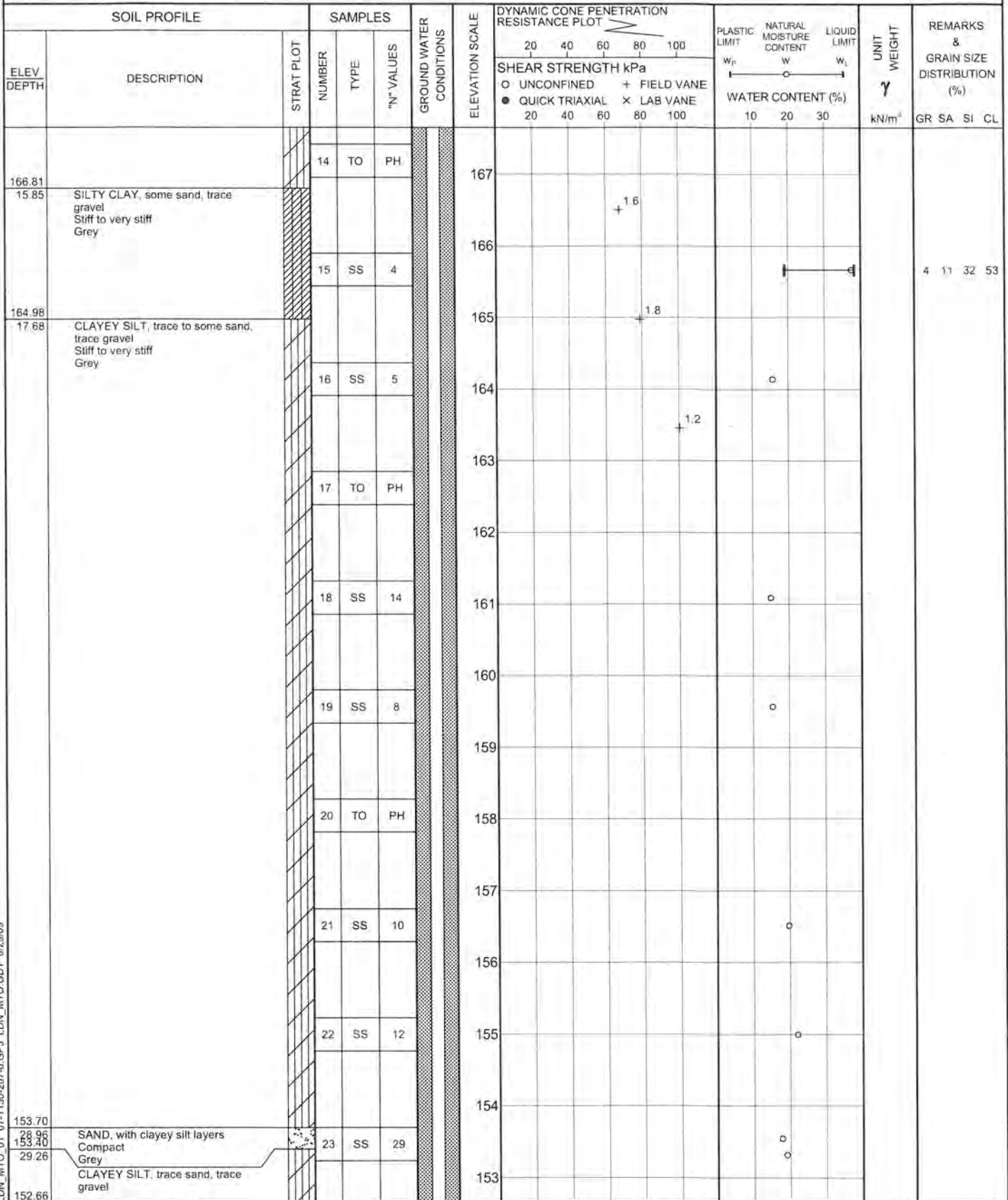


Continued Next Page

+ 3, x 3, Numbers refer to Sensitivity  
○ 3% STRAIN AT FAILURE

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 118</b>		2 OF 4	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4678903.5 :E 333302.9</u>		ORIGINATED BY <u>MA</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>February 28, 2008 - March 4, 2008</u>		CHECKED BY <u>SB</u>	



LDN MTO\_01 07-1130-207-0.GPJ LDN\_MTO\_GDT 6/29/09

Continued Next Page

+ 3, x 3, Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



# RECORD OF BOREHOLE No 118

3 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678903.5 :E 333302.9

ORIGINATED BY MA

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

February 28, 2008 - March 4, 2008

CHECKED BY SJS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED	+ FIELD VANE						
								● QUICK TRIAXIAL	× LAB VANE						
							20 40 60 80 100	20 40 60 80 100	10 20 30						
30.02	Very stiff Grey SILTY SAND, trace clay, trace gravel Compact Grey		24	SS	19									4 48 39 9	
150.96															
31.70	SILTY SAND AND GRAVEL, trace clay Dense Grey		25	SS	100/ 76mm										
150.32															
32.34	LIMESTONE, fresh, medium strong, thinly laminated, fine grained, moderately porous Whitish grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		26	NQ RC			100	60	25					UC	
			27	NQ RC											
			28	NQ RC											
146.61															
36.05	END OF BOREHOLE														
	Water levels in borehole at about elev. 181.29m, 153.70m and 150.96m during drilling between February 28 and March 4, 2008.														
	Water level measured in deep piezometer at elev. 176.77m on March 4, 2008.														
	Water level measured in deep piezometer at elev. 177.30m on March 20, 2008.														
	Water level measured in deep piezometer at elev. 177.78m on July 24, 2008.														
	Water level measured in deep piezometer at elev. 177.32m on September 19, 2008.														
	Water level measured in deep piezometer at elev. 177.28m on November 14, 2008.														
	Water level measured in deep piezometer at elev. 177.40m on January 28, 2009.														

+ 3 X 3

Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 118

SHEET 4 OF 4

LOCATION: N 4678903.5 ;E 333302.9

DRILLING DATE: February 28, 2008 - March 4, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR FLUSH % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION	
									RECOVERY		FRACT INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec							
									TOTAL CORE %	SOLID CORE %		TYPE AND SURFACE DESCRIPTION									
									80 60 40 20	80 60 40 20		DIP w.r.t CORE AXIS		10 <sup>-2</sup> 10 <sup>-1</sup> 10 <sup>0</sup> 10 <sup>1</sup> 10 <sup>2</sup>							
		ROCK SURFACE		150.32																	
	MUD ROTARY NO ROCK CORE	LIMESTONE, fresh, medium strong, thinly laminated, fine grained, faintly porous, whitish grey		32.34	1			150													
33				149.56																	
		LIMESTONE, fresh, medium strong, thinly laminated, fine grained, faintly porous, grey		33.10 149.22 33.44																	
34		LIMESTONE, fresh, medium strong, thinly laminated, fine to very fine grained, pitted, whitish grey			2			149													
					147.97																
		LIMESTONE, fresh, medium strong, thinly laminated, very fine grained, moderately porous, light grey		34.69 147.61 35.05																	
35		LIMESTONE, fresh, medium strong, thinly laminated, fine grained, pitted to vuggy, light brown to grey			3			147													
					146.60																
36		END OF DRILLHOLE		36.06																	
37																					
38																					
39																					
40																					
41																					
42																					
43																					
44																					
45																					
46																					
47																					

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SSB



# RECORD OF BOREHOLE No 119

1 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678961.6 ; E 333120.6

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

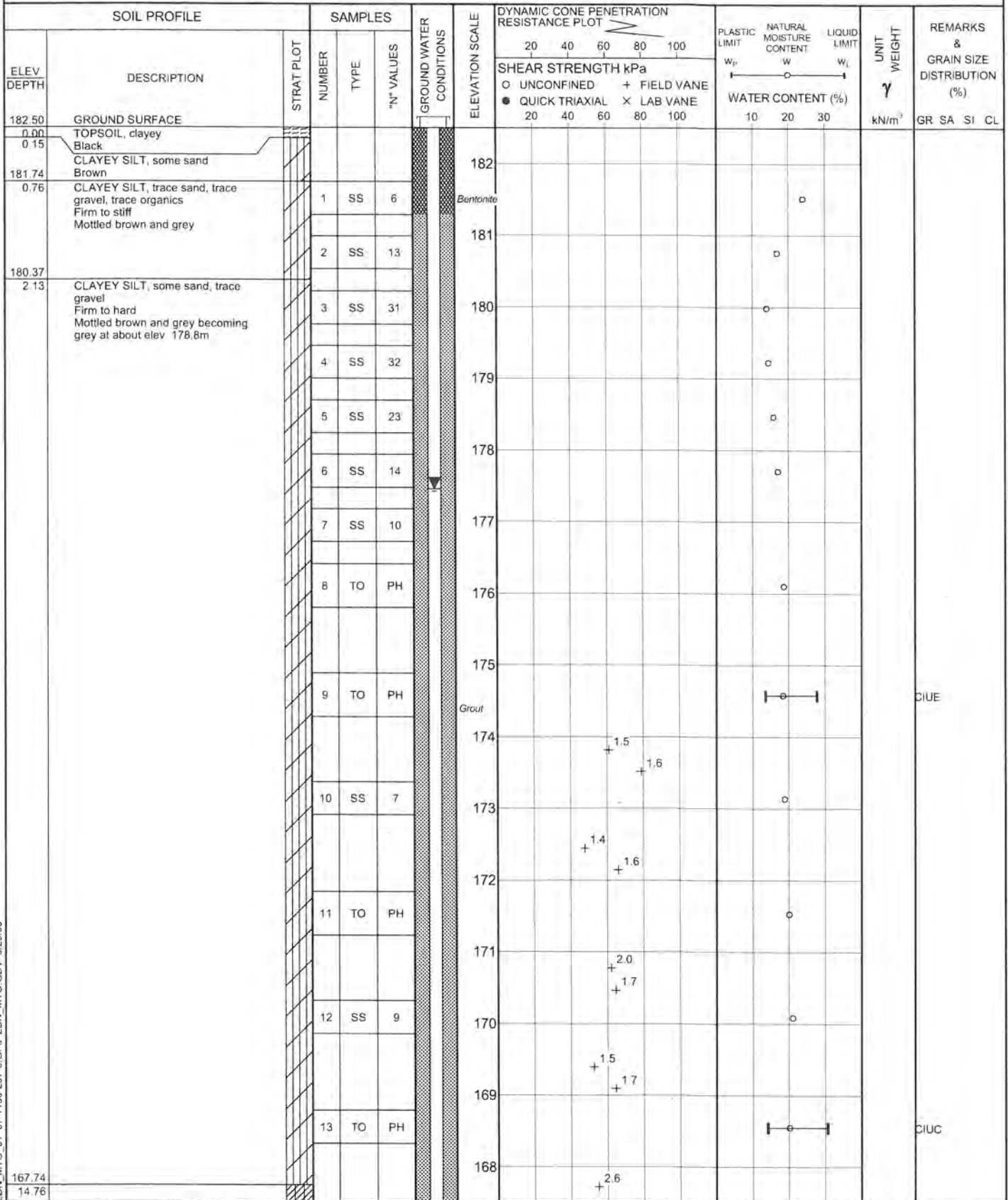
COMPILED BY BRS

DATUM GEODETIC

DATE

February 12, 2008 - February 20, 2008

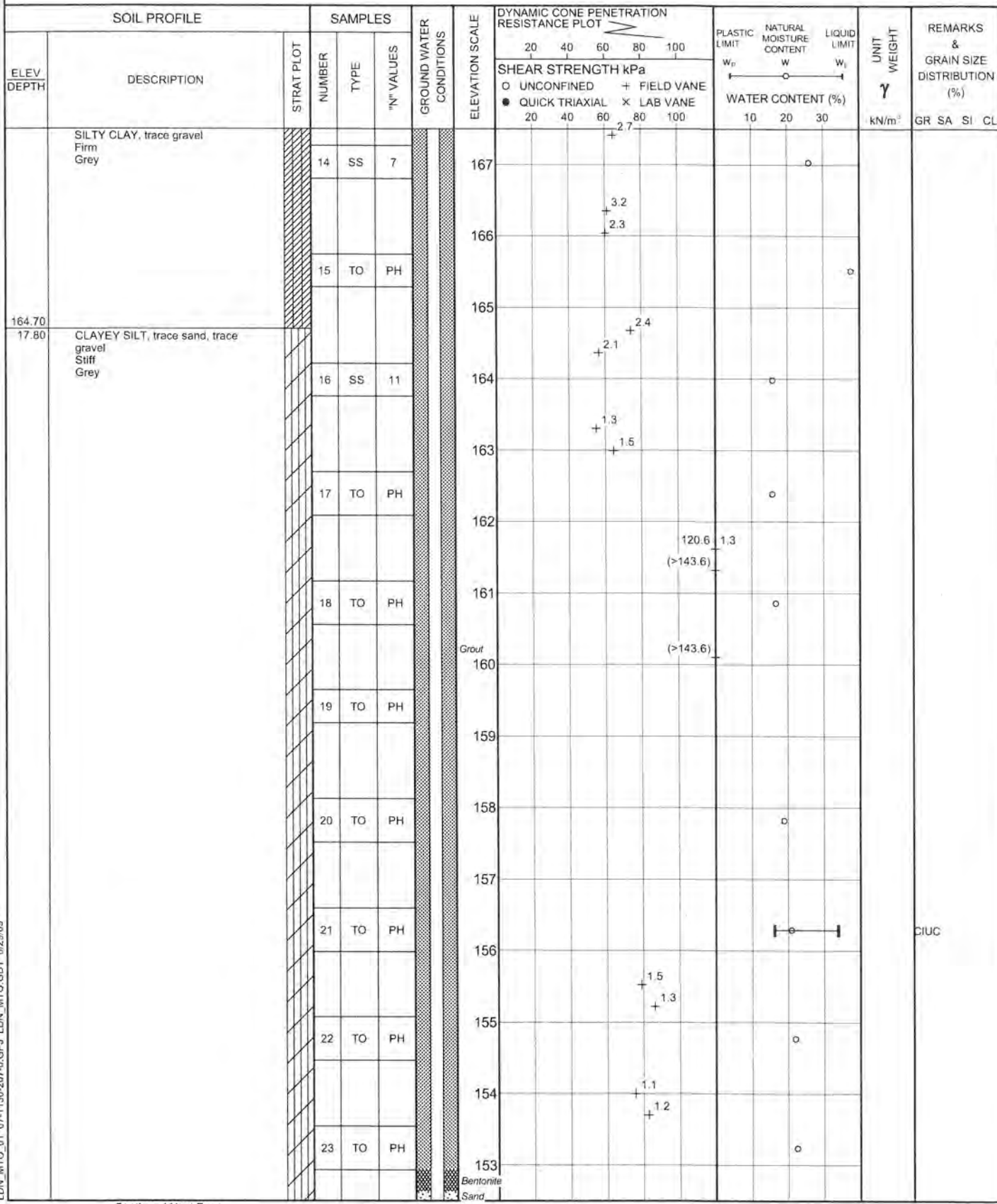
CHECKED BY SJS



LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09



PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 119</b>		2 OF 4	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4678961.6 : E 333120.6</u>		ORIGINATED BY <u>SM</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>February 12, 2008 - February 20, 2008</u>		CHECKED BY <u>SJB</u>	



LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+ 3 x 3 Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 119

3 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678961.6 : E 333120.6

ORIGINATED BY SM

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

February 12, 2008 - February 20, 2008

CHECKED BY

SB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	20 40 60 80 100					
151.18	CLAYEY SILT, trace sand, trace gravel Stiff Grey		24	TO	PH		152								
31.32	SAND AND GRAVEL (Possible glacial till or weathered rock)		25	SS	50/0mm		151								
150.40	LIMESTONE, fresh, medium strong, thinly laminated to laminated, very fine to fine grained, faintly porous to porous, light grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		26	NQ RC			150	48	44	44					
32.10			27	NQ RC			149	95	91	89					
			28	NQ RC			147	100	100	100					
			29	NQ RC			146	67	53	55					
145.54	END OF BOREHOLE														
36.96	Borehole dry during drilling on February 19, 2008.  Water level measured in deep piezometer at elev. 178.18m on March 20, 2008.  Water level measured in deep piezometer at elev. 177.78m on July 22, 2008.  Water level measured in deep piezometer at elev. 178.85m on August 11, 2008.  Water level measured in deep piezometer at elev. 176.03m on September 19, 2008.  Water level measured in deep piezometer at elev. 177.16m on November 11, 2008.  Water level measured in deep piezometer at elev. 177.45m on January 28, 2009.														

+ 3, X 3

Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 119

SHEET 4 OF 4

LOCATION: N 4678961.6 :E 333120.6

DRILLING DATE: February 12, 2008 - February 19, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: --

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	ELEVATION	LEGEND										DISCONTINUITY DATA	HYDRAULIC CONDUCTIVITY k. cm/sec.	DIAMETRAL INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
				DEPTH (m)	FRACT INDEX PER 0.3						RECOVERY		R.Q.D. %	DISCONTINUITY DATA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
											TOTAL CORE %	SOLID CORE %		DIP w.r.t CORE AXIS	TYPE AND SURFACE DESCRIPTION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SJB

LDN ROCK 03 07-1130-207-0-ROCK.GPJ GLDR LDN.GDT 6/29/09 DATA INPUT: WDF

## METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4678961.6 E 333120.6

ORIGINATED BY SM

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, HOLLOW STEM

COMPILED BY BRS

DATUM GEODETIC

DATE \_\_\_\_\_

February 20, 2008

CHECKED BY SSB

[illegible]

+ 3 × 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



# RECORD OF BOREHOLE No 122

1 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4679265.4 :E 332537.9

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

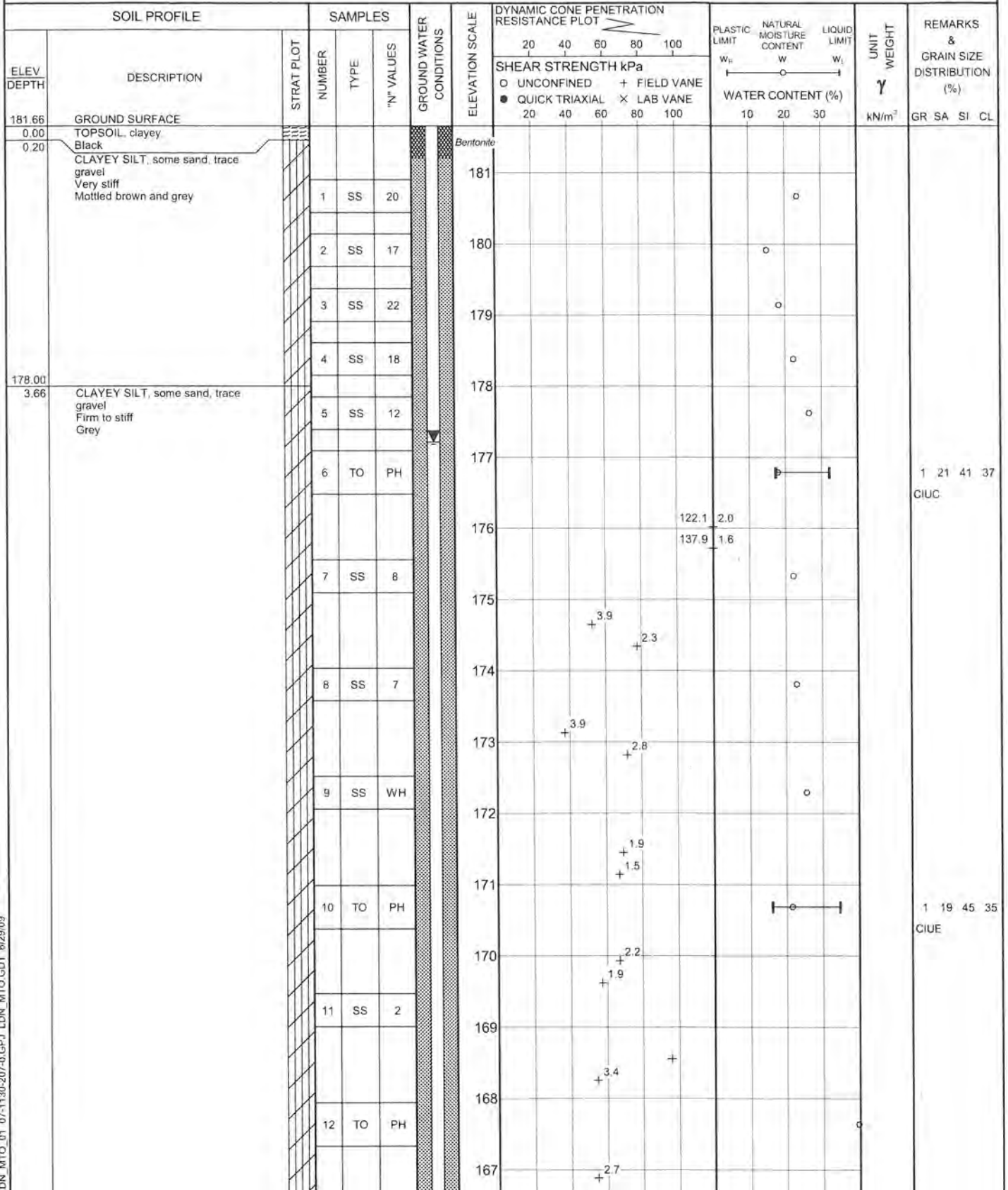
COMPILED BY BRS

DATUM GEODETIC

DATE

January 24, 2008 - January 29, 2008

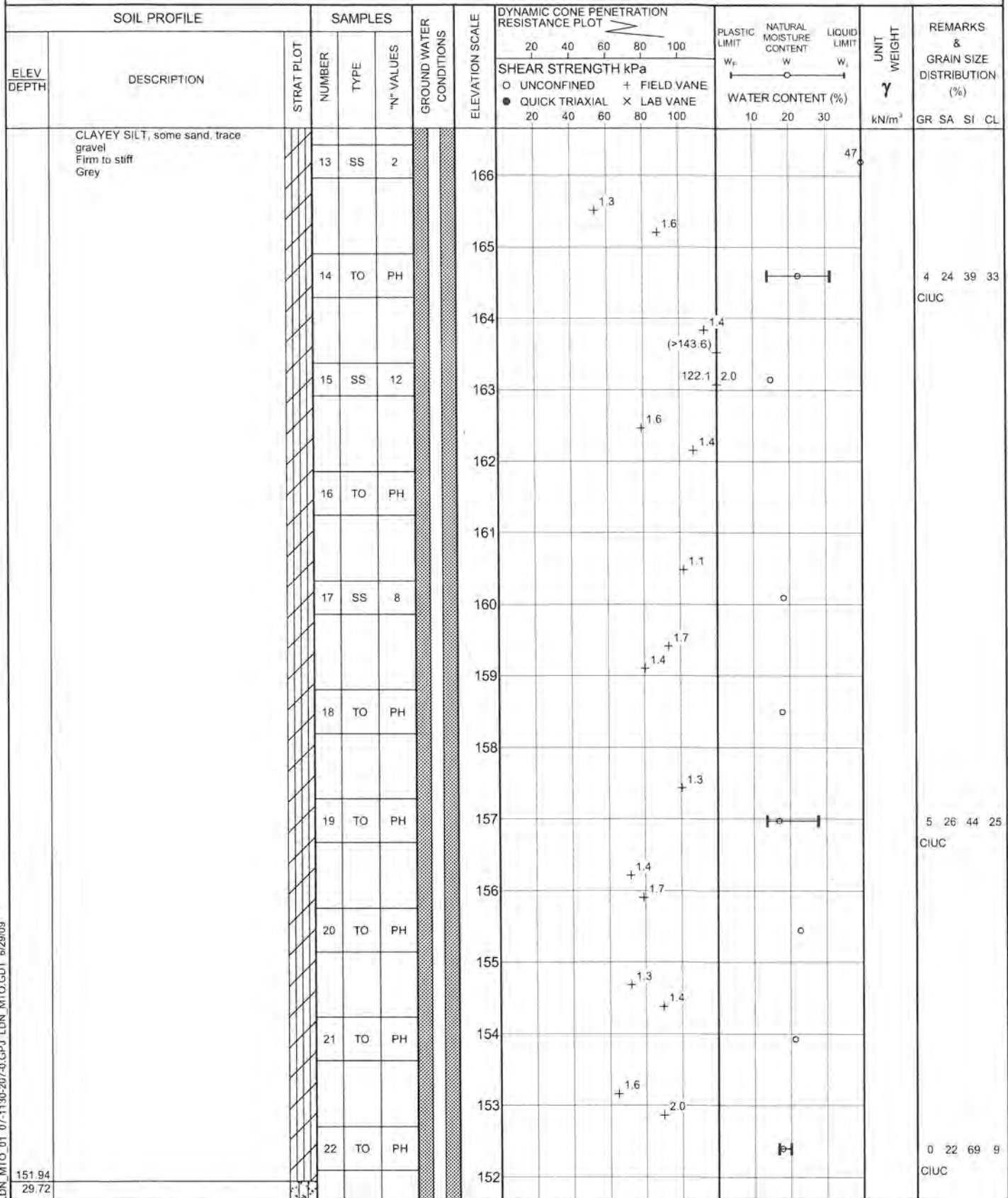
CHECKED BY *SS*



Continued Next Page

+ 3, X 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 122</b>		2 OF 4		<b>METRIC</b>	
W.P. _____		LOCATION N 4679265.4 E 332537.9		ORIGINATED BY SM			
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS			
DATUM GEODETIC		DATE January 24, 2008 - January 29, 2008		CHECKED BY <b>SJB</b>			



LDN MTO\_01 07-1130-207-0.GPJ LDN MTO.GDT 6/29/09

Continued Next Page

+ 3, x 3, Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 122</b>		3 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4679265.4 : E 332537.9		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC		DATE January 24, 2008 - January 29, 2008		CHECKED BY <i>SJS</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT $w_p$	NATURAL MOISTURE CONTENT $w$	LIQUID LIMIT $w_l$	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE	WATER CONTENT (%)					
150.42	SILTY SAND, fine to medium, trace clay Compact Grey		23	SS	13									(29)
31.24	SANDY SILT, trace clay, with clayey silt intrusions Very dense Grey		24	SS	84									
			25	SS	100/ 2.5mm									
146.61	LIMESTONE, fresh, medium strong, thinly laminated to laminated, very fine to fine grained, faintly to strongly porous Brown to grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		26	SS	50/ 3.8mm									
35.05			27	NQ RC			100	100	73					
			28	NQ RC			90	90	60					
			29	NQ RC			100	100	100					
			30	NQ RC			93	93	93					UC
141.33	END OF BOREHOLE													
40.33	<p>Borehole dry during drilling between January 24 and 29, 2008.</p> <p>Water level measured in deep piezometer at elev. 178.01m on July 22, 2008</p> <p>Water level measured in deep piezometer at elev. 178.26m on August 11, 2008.</p> <p>Water level measured in deep piezometer at elev. 178.26m on September 19, 2008.</p> <p>Water level measured in deep piezometer at elev. 177.54m on November 11, 2008.</p> <p>Water level measured in deep piezometer at elev. 177.21m on January 28, 2009.</p>													

LDN MTO\_01 07-1130-207-0.GPJ LDN MTO GDT 8/29/09





## METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4679265.4 E 332537.9

ORIGINATED BY SM

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, HOLLOW STEM

COMPILED BY BRS

DATUM GEODETIC

DATE \_\_\_\_\_

January 24, 2008

CHECKED BY SSS

[illegible]

DN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

+ 3, X 3: Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No 126**

1 OF 1

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4679237.2 :E 332335.5

ORIGINATED BY DM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, HOLLOW STEM

COMPILED BY BRS

DATUM GEODETIC

DATE

March 26, 2008

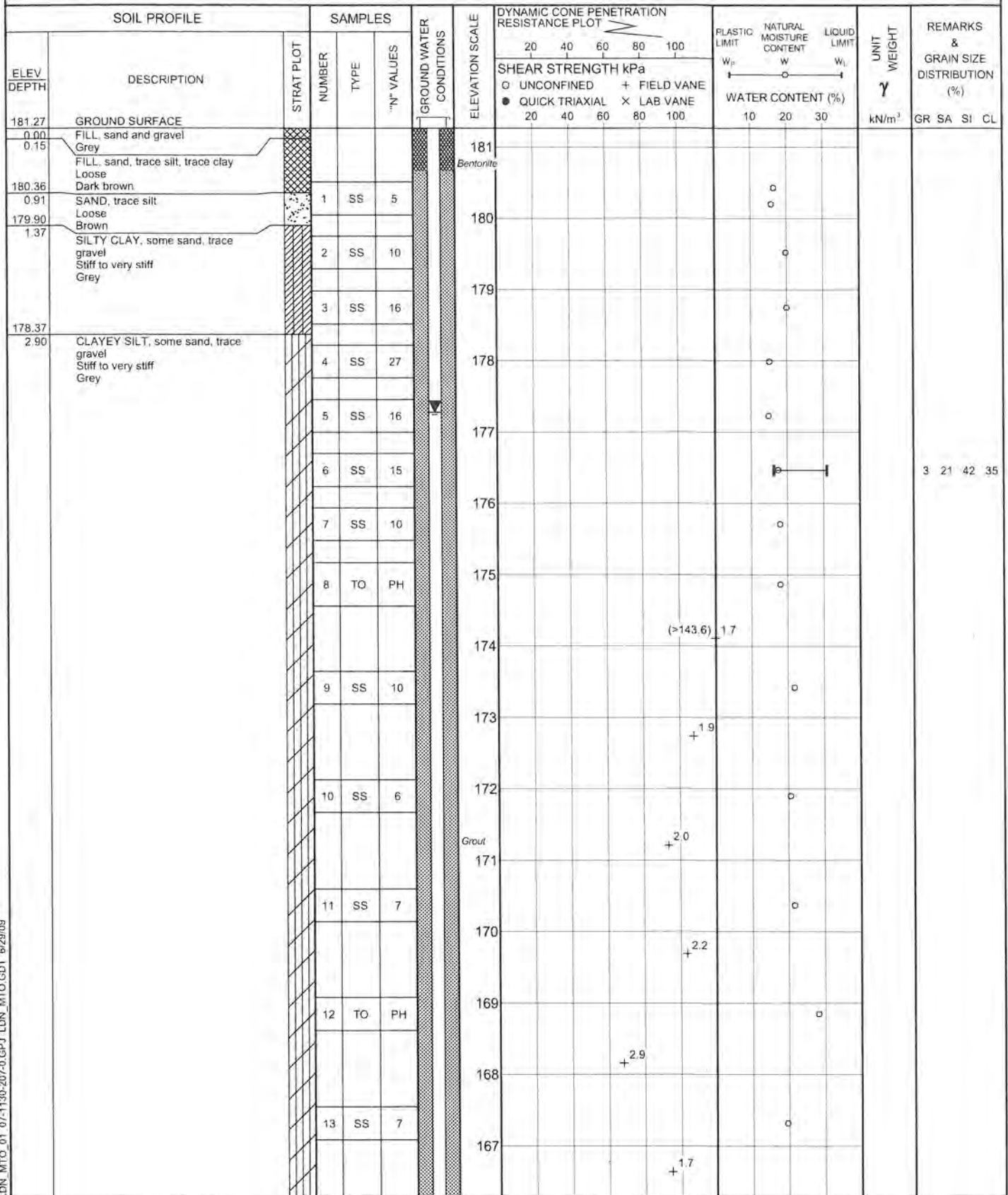
CHECKED BY *SSB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED      + FIELD VANE							
								20 40 60 80 100							
								● QUICK TRIAXIAL      × LAB VANE							
								20 40 60 80 100							
180.61	GROUND SURFACE														
0.00	FILL, sand and gravel, trace silt Compact Brown		1	SS	24		180								
179.09															
1.52	CLAYEY SILT, some sand, trace gravel Stiff to hard Brown, becoming grey at about elev. 177.0m		2	SS	8		179								
			3	SS	20		178								
			4	SS	33		177								
			5	SS	26		176								
			6	SS	17		175								
			7	SS	11		174								
			8	SS	10		173								
			9	SS	10										
			10	SS	8										
172.38	END OF BOREHOLE														
8.23	Borehole dry during drilling on March 26, 2008.														

DN\_MTO\_01 07-11-30-207-0.GPJ LUN\_MTO.GDT 6/23/09

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 07-1130-207-0 **RECORD OF BOREHOLE No 127** 1 OF 4 **METRIC**  
W.P. LOCATION N 4679370.9, E 332251.6 ORIGINATED BY SM  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC COMPILED BY BRS  
DATUM GEODETIC DATE March 11, 2008 - March 13, 2008 CHECKED BY *SLF*



Continued Next Page

+ 3, X 3. Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 127

2 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4679370.9, E 332251.6

ORIGINATED BY SM

DIST WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

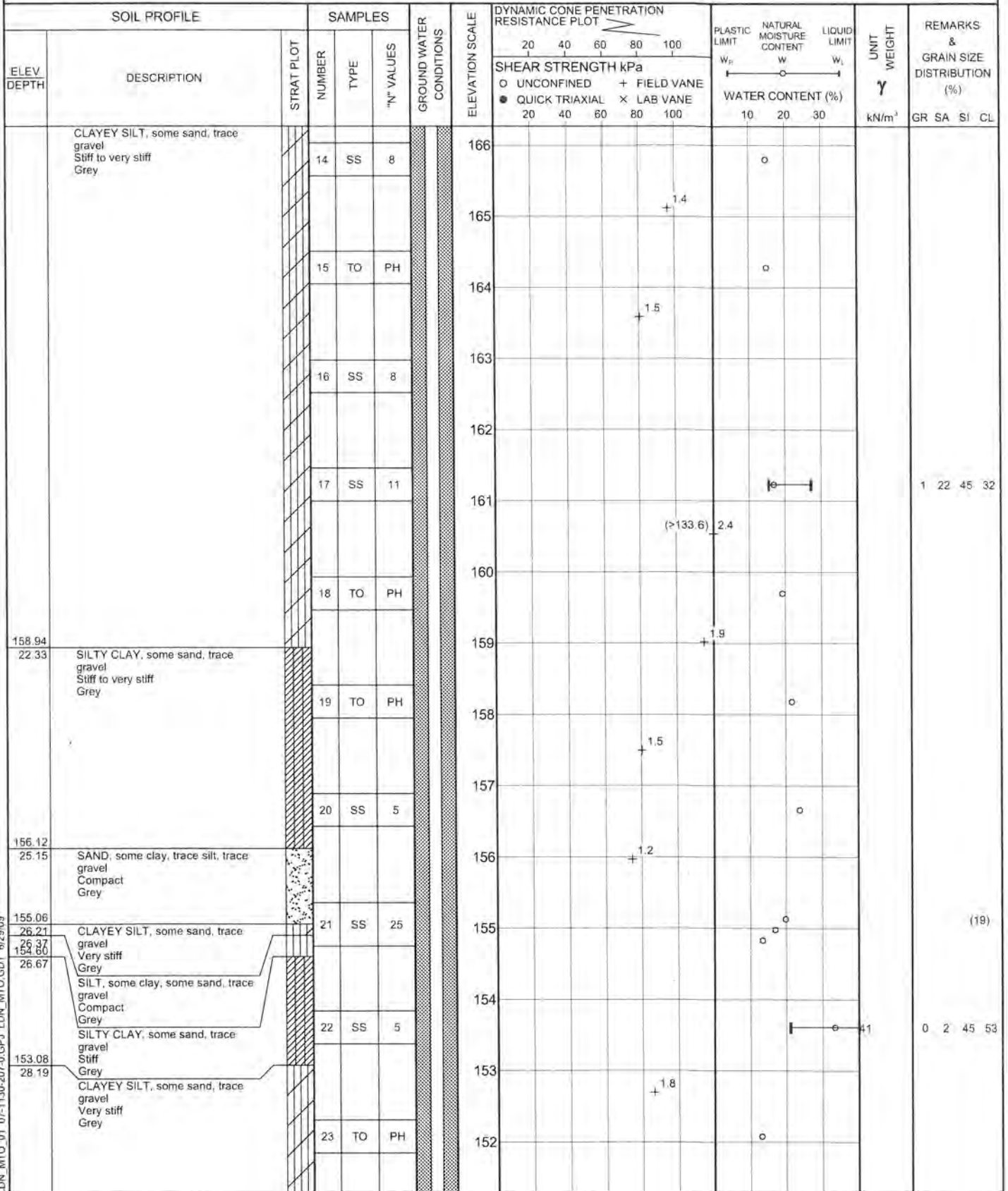
DATUM GEODETIC

DATE

March 11, 2008 - March 13, 2008

CHECKED BY

SJS



Continued Next Page

+ 3, × 3. Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09



PROJECT 07-1130-207-0		RECORD OF BOREHOLE No 127		3 OF 4		METRIC						
W.P. _____		LOCATION N 4679370.9 E 332251.6		ORIGINATED BY SM								
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS								
DATUM GEODETIC		DATE March 11, 2008 - March 13, 2008		CHECKED BY <i>SJB</i>								
SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>l</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE								
150.54	CLAYEY SILT, some sand, trace gravel Very stiff Grey		24	SS	163							(39)
30.73	SANDY SILT, trace clay, trace gravel, with cobbles Very dense Grey		25	SS	100/50mm							
148.47	DOLOSTONE/LIMESTONE, fresh, medium strong, thinly laminated, fine grained, faintly porous Brown to grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		26	NQ RC								
32.80			27	NQ RC								
145.16			28	NQ RC								UC
36.11	END OF BOREHOLE											
<p>Borehole dry during drilling between March 11 and 13, 2008.</p> <p>Water level measured in deep piezometer at elev. 177.74m on March 20, 2008.</p> <p>Water level measured in deep piezometer at elev. 178.27m on July 22, 2008.</p> <p>Water level measured in deep piezometer at elev. 178.12m on August 11, 2008.</p> <p>Water level measured in deep piezometer at elev. 177.87m on September 19, 2008.</p> <p>Water level measured in deep piezometer at elev. 177.74m on November 11, 2008.</p> <p>Water level measured in deep piezometer at elev. 177.28m on January 26, 2009.</p>												

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 127

SHEET 4 OF 4

LOCATION: N 4679370.9 ; E 332251.6

DRILLING DATE: March 11, 2008 - March 13, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	PENETRATION RATE (mm/min)	FLUSH	COLOUR % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
				DEPTH (m)						RECOVERY		R Q D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k. cm/sec	DIP w/11 CORE AXIS	TYPE AND SURFACE DESCRIPTION			
				TOTAL CORE %						SOLID CORE %											
		ROCK SURFACE		148.47																	
33	MUD ROTARY NO ROCK CORE	LIMESTONE/BASALT - broken core, likely cobbles from till		32.80 148.20	1				148												
		DOLOSTONE, fresh, medium strong, thinly laminated, fine grained, faintly porous with localized vugs, dark brown		33.07																	
34					2				147												
		LIMESTONE, fresh, medium strong, thinly laminated, medium grained, faintly porous, grey to brown		146.89 34.38																	
35		DOLOSTONE/LIMESTONE, fresh, medium strong, thinly laminated to bedded, very fine grained to fine grained, faintly porous, light grey to grey		146.47 34.80					146										JN, PL, SM Ci JN, C, Ro Ca		
					3														JN, PL, SM Ca JN, PL, SM Ca		
36		DOLOSTONE/LIMESTONE, fresh, medium strong, laminated, fine grained, faintly porous, brown		145.55 35.72															JN, PL, SM Ci		
		END OF DRILLHOLE		145.16 36.11																	
37																					
38																					
39																					
40																					
41																					
42																					
43																					
44																					
45																					
46																					
47																					

DEPTH SCALE

1 : 75



LOGGED: SG

CHECKED: SJB



# RECORD OF BOREHOLE No 129

1 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4679625.1 E 332109.7

ORIGINATED BY LZ/CC/MA/SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

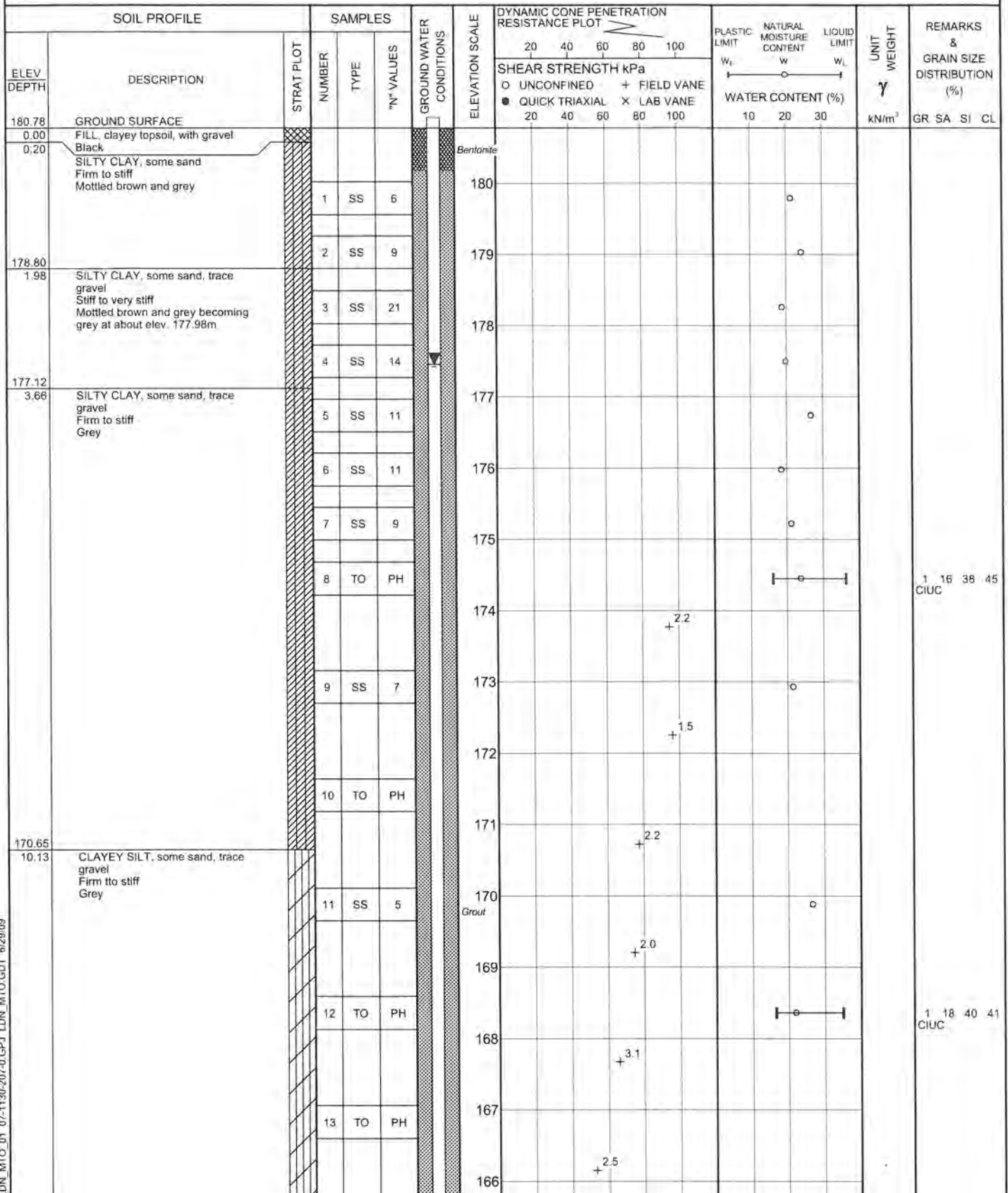
COMPILED BY BRS

DATUM GEODETIC

DATE

March 4, 2008 - March 10, 2008

CHECKED BY SJB



Continued Next Page

+ 3, X 3. Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO\_GDT\_6/29/09



# RECORD OF BOREHOLE No 129

2 OF 4

METRIC

PROJECT 07-1130-207-0

W.P. \_\_\_\_\_

LOCATION N 4679625.1, E 332109.7

ORIGINATED BY LZ/CC/MA/SM

DIST WEST HWY 401/3

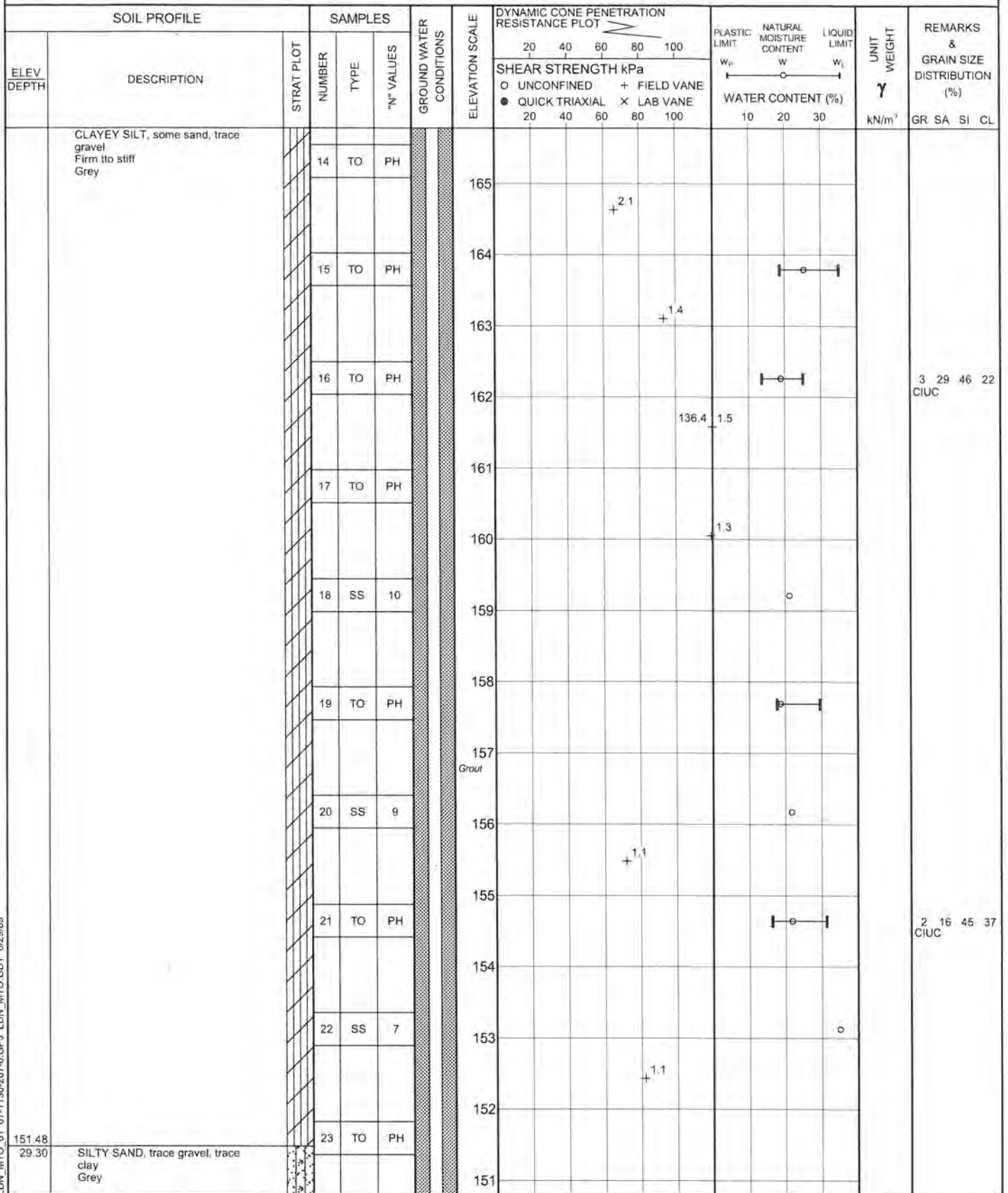
BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE March 4, 2008 - March 10, 2008

CHECKED BY *SSB*



LDN MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/23/09

Continued Next Page

+ 3 x 3: Numbers refer to Sensitivity  
○ 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 129

3 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4679625.1 : E 332109.7

ORIGINATED BY LZ/CC/MA/SM

DIST WEST HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

March 4, 2008 - March 10, 2008

CHECKED BY **SJB**

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
150.55								20 40 60 80 100						
30.23	SAND AND GRAVEL, medium to coarse, trace silt Compact to very dense Grey		24	SS	21		150							
							149							
				25	SS	125		148						
147.88	DOLOSTONE/LIMESTONE, fresh, medium strong, thinly laminated, very fine grained, faintly porous Grey to brown  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)						147							
32.90			26	SS	100/120mm		146							
			27	NQ RC			145							
			28	NQ RC			144							
			29	NQ RC										
			30	NQ RC										
143.78	END OF BOREHOLE													
37.00	Borehole dry during drilling between March 4 and 10, 2008.  Water level measured in deep piezometer at elev. 178.50m on July 22, 2008.  Water level measured in deep piezometer at elev. 177.88m on August 11, 2008.  Water level measured in deep piezometer at elev. 177.48m on September 19, 2008.  Water level measured in deep piezometer at elev. 177.57m on November 11, 2008.  Water level measured in deep piezometer at elev. 177.46m on January 28, 2009.													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 129

SHEET 4 OF 4

LOCATION: N 4679625.1 E 332109.7

DRILLING DATE: March 4, 2008 - March 10, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		PENETRATION RATE (m/min)	COLOUR FLUSH % RETURN	ELEVATION											DIAMETER POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
				DEPTH (m)	RUN No.				RECOVERY		R Q D %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
									TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	10 <sup>-1</sup>	10 <sup>-2</sup>	10 <sup>-3</sup>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
33		ROCK SURFACE		147.88																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: *SG*

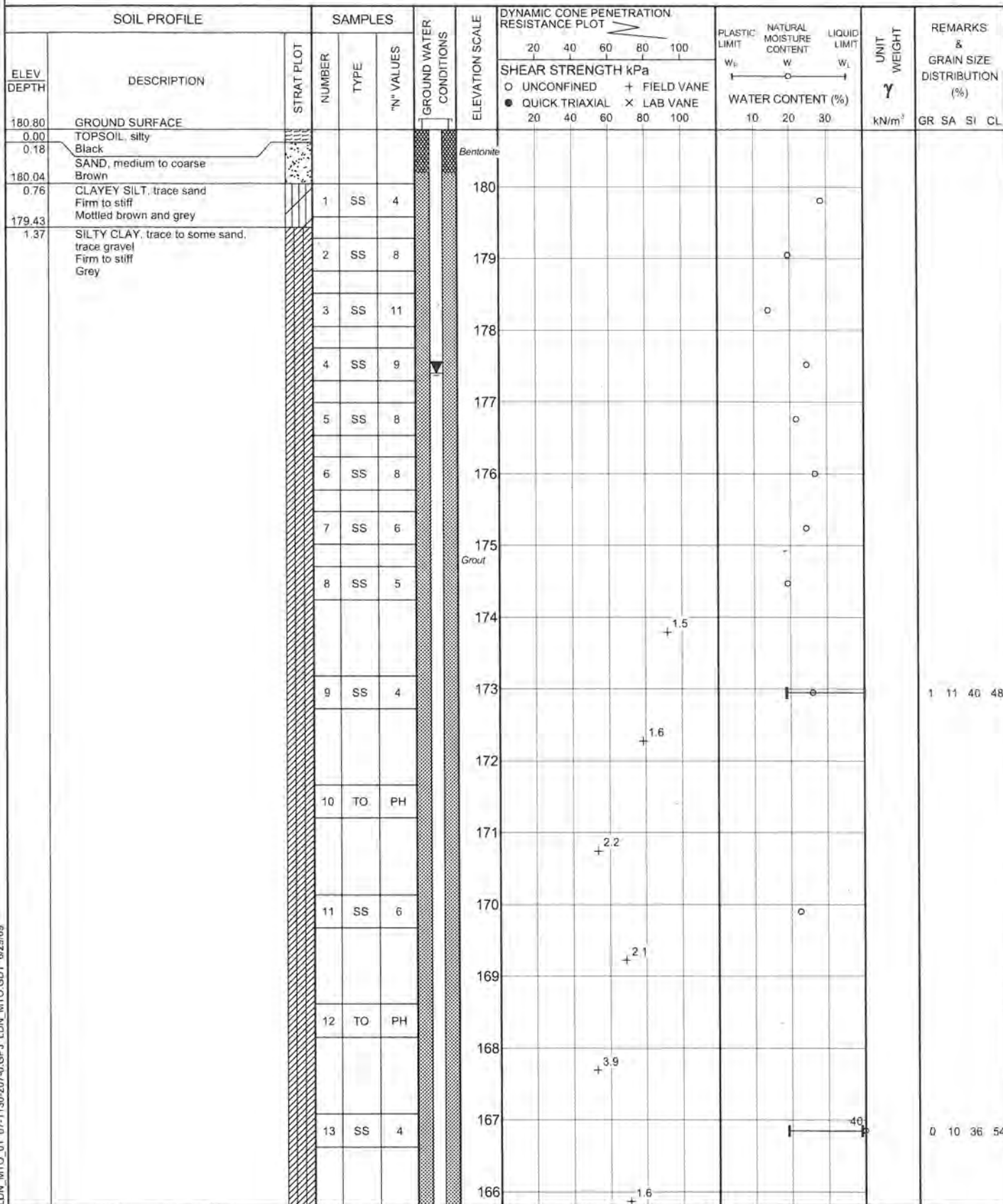
PROJECT 07-1130-207-0 RECORD OF BOREHOLE No 129A 1 OF 1 METRIC  
W.P. LOCATION N 4679625.1 , E 332109.7 ORIGINATED BY SM  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, HOLLOW STEM COMPILED BY BRS  
DATUM GEODETIC DATE March 4, 2008 CHECKED BY SJB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
180.78	SOIL CONDITIONS INFERRED FROM BOREHOLE No. 129 GROUND SURFACE							20 40 60 80 100						
0.00	FILL, clayey topsoil, with gravel							0 UNCONFINED + FIELD VANE						
0.20	Black							● QUICK TRIAXIAL × LAB VANE						
	SILTY CLAY, some sand							20 40 60 80 100						
	Firm to stiff													
	Mottled brown and grey													
178.60														
1.98	SILTY CLAY, some sand, trace gravel													
	Stiff to very stiff													
	Mottled brown and grey to grey at about elev. 177.98m													
177.12														
3.66	SILTY CLAY, some sand, trace gravel													
	Firm to stiff													
	Grey													
171.18														
9.60	END OF BOREHOLE													
	Water level measured in shallow piezometer at elev. 178.95m on July 22, 2008.3													
	Water level measured in shallow piezometer at elev. 178.93m on August 11, 2008.													
	Water level measured in shallow piezometer at elev. 178.95m on September 19, 2008.													
	Water level measured in shallow piezometer at elev. 178.84m on January 28, 2009.													

LDN MTO 01 07-1130-207-0.GPJ LDN MTO GDT 6/29/09



PROJECT 07-1130-207-0 RECORD OF BOREHOLE No 131 1 OF 4 METRIC  
W.P. LOCATION N 4679944 8 E 331856.4 ORIGINATED BY SM  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC COMPILED BY BRS  
DATUM GEODETIC DATE August 8, 2008 - August 13, 2008 CHECKED BY SJB



Continued Next Page

+ 3 × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0

**RECORD OF BOREHOLE No 131**

2 OF 4

**METRIC**

W.P. LOCATION N 4679944.8 : E 331856.4

ORIGINATED BY SM

DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC DATE August 8, 2008 - August 13, 2008

CHECKED BY *SPB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
								20 40 60 80 100						
								20 40 60 80 100		10 20 30				
	SILTY CLAY, trace to some sand, trace gravel Firm to stiff Grey		14	TO	PH		165		+ 1.2					
			15	SS	7		164				○			
									+ 1.5					
							163							
			16	TO	PH		162		+ 1.3					
									+ 1.3					
			17	SS	8		161				○			
									+ 1.5					
							160							
			18	TO	PH		159				○			
									+ 1.7					
							158							
			19	TO	PH									
									+ 1.7					
							157							
			20	SS	13		156				○			
			21	SS	11		155				○			
							154		+ 1.8					
			22	SS	12		153				○			
									+ 1.9					
							152							
			23	SS	5									
							151		+ 1.7				40	

Continued Next Page

+ 3, X 3, Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 131</b>		3 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4679944.8 ; E 331856.4		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC		DATE August 8, 2008 - August 13, 2008		CHECKED BY <b>SJB</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT $w_p$	NATURAL MOISTURE CONTENT $w$	LIQUID LIMIT $w_L$	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)		
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE x LAB VANE									
29.95	SILTY SAND AND GRAVEL, trace clay Dense to very dense Grey																	
			24	SS	28													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/30/09



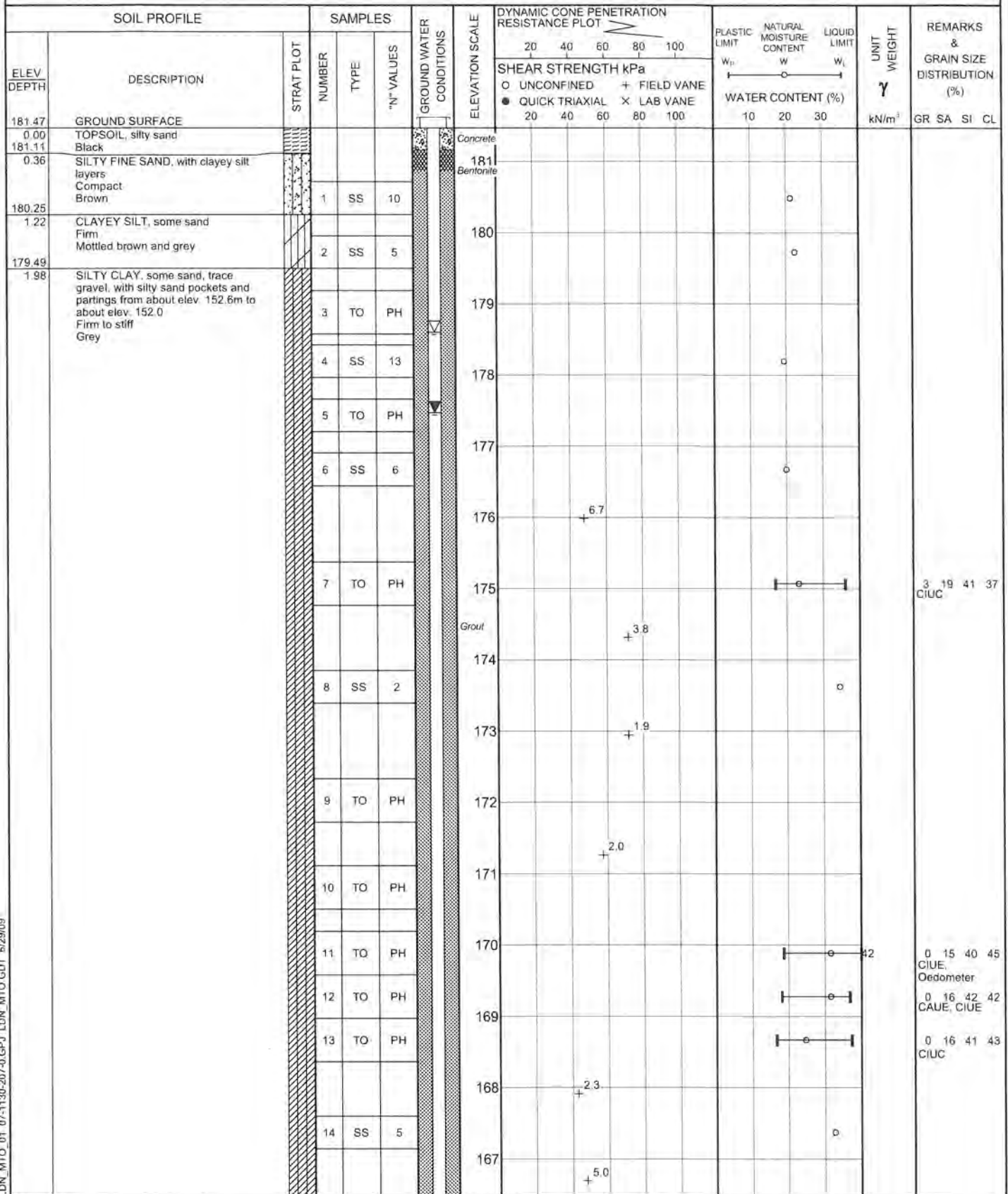


PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 131A</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4679944.8 :E 331856.4		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, HOLLOW STEM		COMPILED BY SJL	
DATUM GEODETIC		DATE August 8, 2008		CHECKED BY <i>SSB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
								20 40 60 80 100						
								20 40 60 80 100						
180.80	SOIL CONDITIONS INFERRED FROM BOREHOLE No. 131													
0.00	GROUND SURFACE													
0.18	TOPSOIL, silty Black													
180.04	SAND, medium to coarse Brown													
0.76	CLAYEY SILT, trace sand Firm to stiff													
179.43	Mottled brown and grey													
1.37	SILTY CLAY, trace to some sand, trace gravel Firm to stiff Grey													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 07-1130-207-0 RECORD OF BOREHOLE No 132 1 OF 4 METRIC  
W.P. LOCATION N 4680070.8 :E 331910.3 ORIGINATED BY CC  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC COMPILED BY BRS  
DATUM GEODETIC DATE July 28, 2008 - July 29, 2008 CHECKED BY SJB

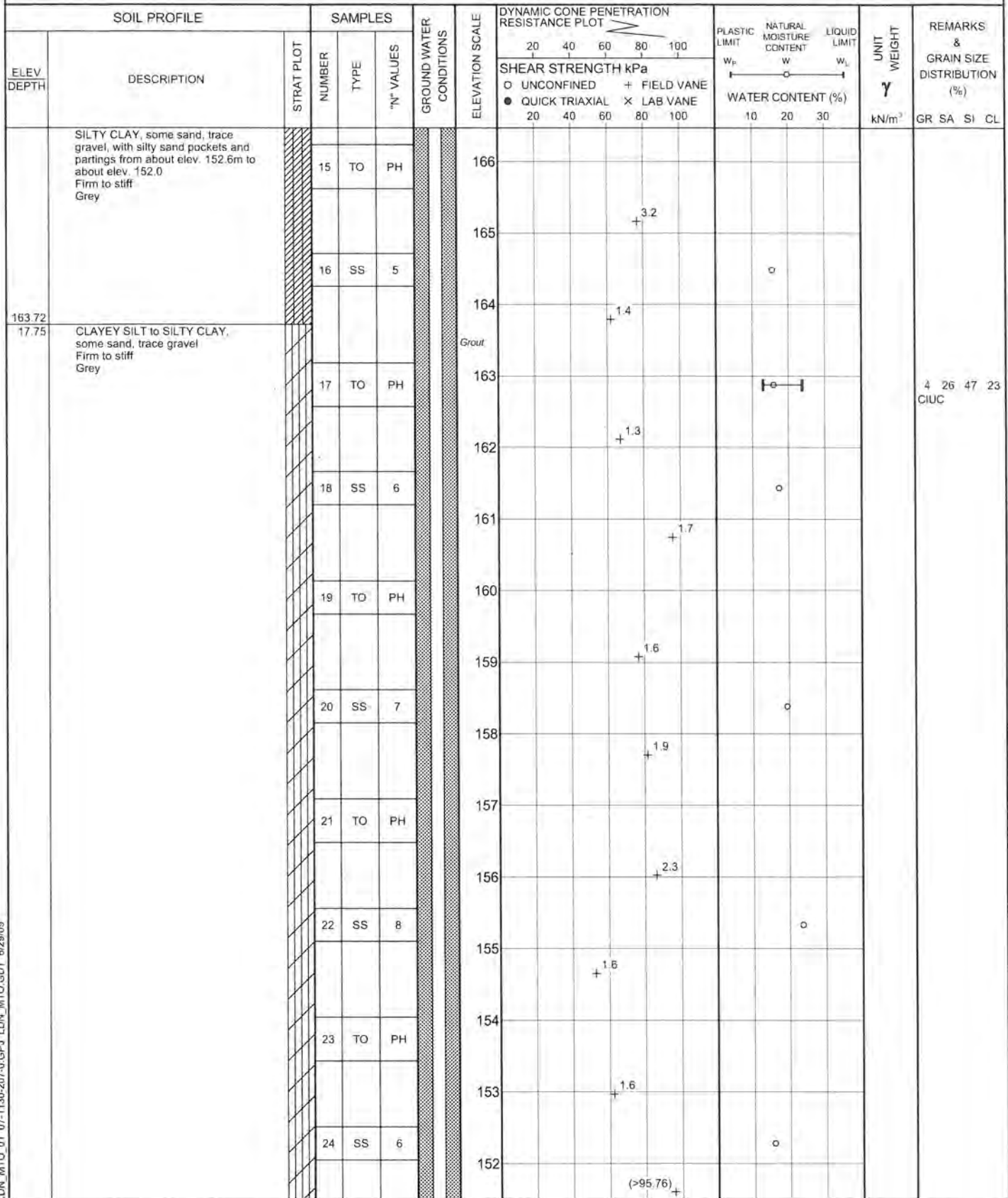


LDN MTO.01 07-1130-207-0.GPJ LDN MTO.GDT 5/29/09

Continued Next Page

+ 3, X 3, Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 132</b>		2 OF 4	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4680070.8 : E 331910.3</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>July 28, 2008 - July 29, 2008</u>		CHECKED BY <u>SJS</u>	



LDN MTO\_01 07-1130-207-0.GPJ LDN MTO.GDT 8/29/09

Continued Next Page

+ 3, X 3. Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE





PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 132

SHEET 4 OF 4

LOCATION: N 4680070.8 :E 331910.3

DRILLING DATE: July 28, 2008 - July 29, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: --

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	PENETRATION RATE (m/min)	COLOUR FLUSH % RETURN	ELEVATION	JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished K - Slickensided SM- Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
				DEPTH (m)					RECOVERY		R.Q.D. %	FRACT INDEX PER D.3	DISCONTINUITY DATA		TYPE AND SURFACE DESCRIPTION						
									TOTAL CORE %	SOLID CORE %			DIP w.r.t CORE AXIS								
									0 10 20 30 40 50 60 70 80 90 100	0 10 20 30 40 50 60 70 80 90 100			0 10 20 30 40 50 60 70 80 90 100								
										ROCK SURFACE				148.04							
34	MUD ROTARY NO ROCK CORE	LIMESTONE, fresh, medium strong, laminated, fine grained, faintly porous, brown		33.43																	
				147.63																	
				33.84	1																
LIMESTONE, fresh, medium strong, thinly laminated, very fine to fine grained, faintly porous, light brown			147.20																		
			34.27																		
LIMESTONE, fresh, medium strong, thinly laminated, very fine grained, faintly porous, occasional stylolite, whitish grey			146.63																		
			34.84																		
LIMESTONE, fresh, medium strong, thinly laminated, very fine to fine grained, faintly porous, occasional stylolites, whitish grey to grey			145.63																		
			35.84	2																	
36			LIMESTONE, fresh, medium strong, weakly laminated, very fine to fine grained, faintly porous, tannish grey		144.82																
37				36.65																	
	LIMESTONE, fresh, medium strong, weakly laminated, fine grained, porous with zones of pitting, occasional stylolites, fossiliferous, light grey		143.67																		
38		END OF DRILLHOLE		37.80																	
39																					
40																					
41																					
42																					
43																					
44																					
45																					
46																					
47																					
48																					

DEPTH SCALE

1 : 75



LOGGED: SG

CHECKED: SJB

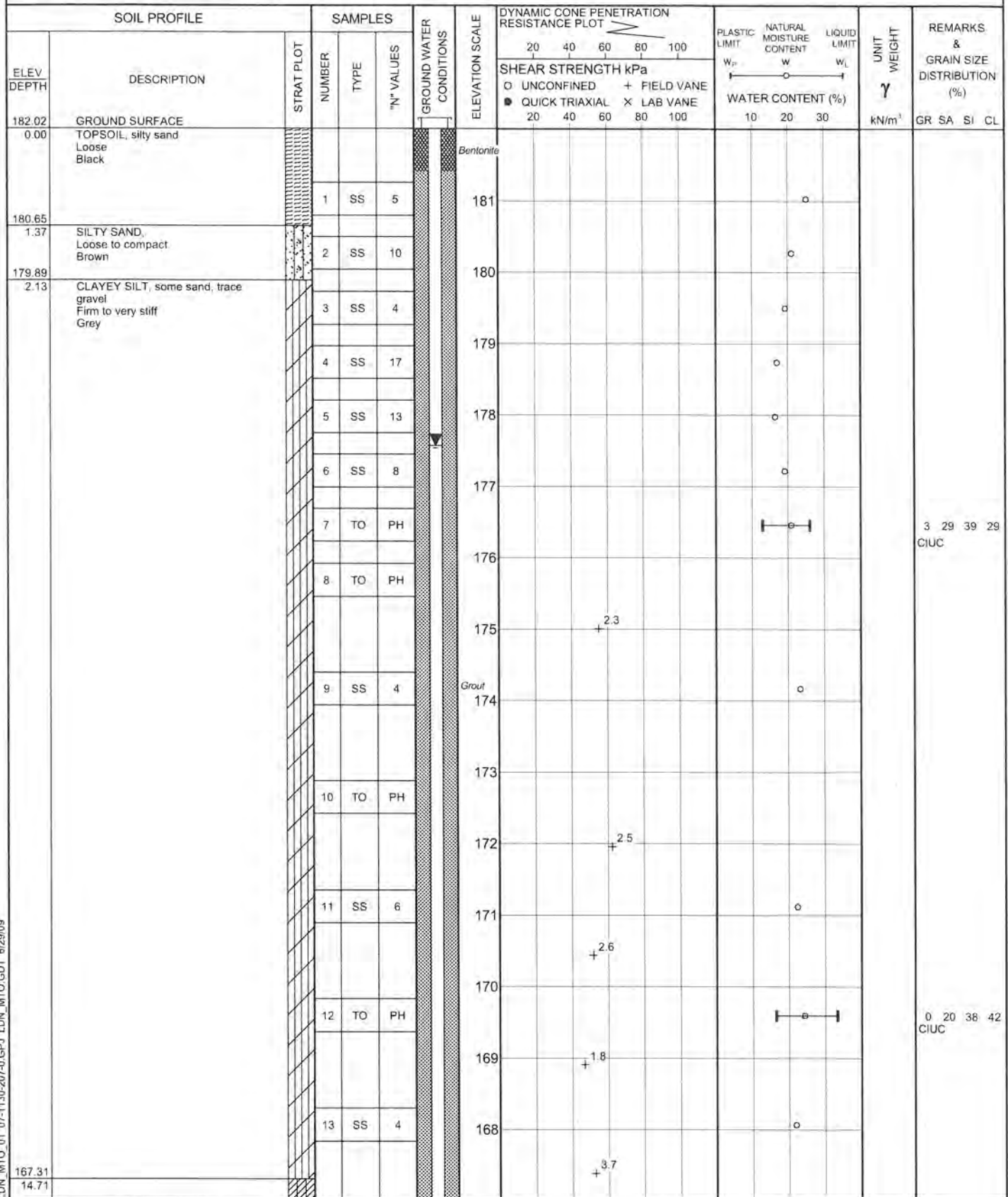
PROJECT <u>07-1130-207-0</u>		RECORD OF BOREHOLE No 132A		1 OF 1	METRIC
W.P. _____		LOCATION <u>N 4680070.8 ; E 331910.3</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, HOLLOW STEM</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>July 29, 2008</u>		CHECKED BY <u>SJS</u>	

[illegible]

DN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

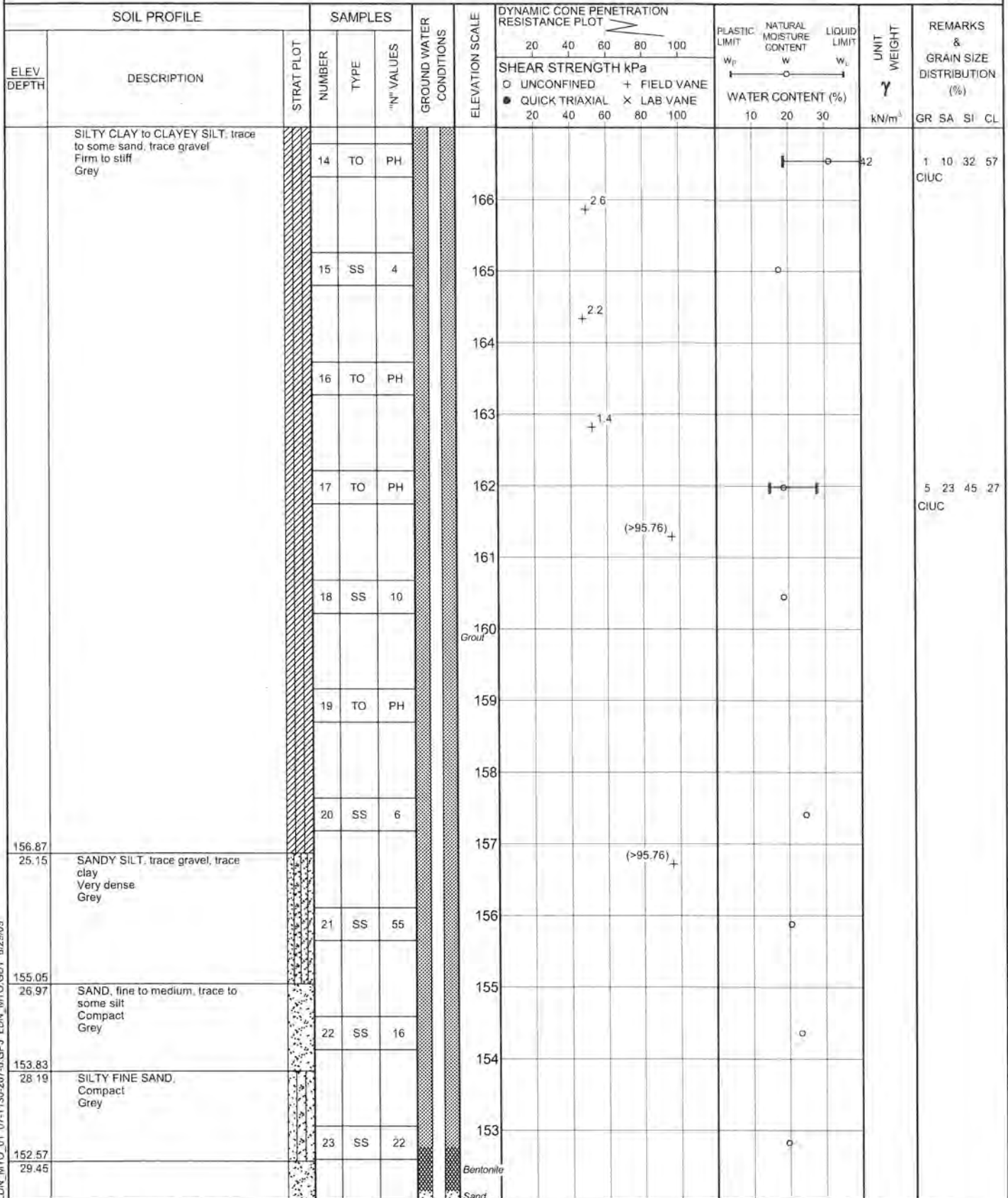
+ 3, × 3: Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0 RECORD OF BOREHOLE No 135 1 OF 4 METRIC  
W.P. LOCATION N 4680369.9 :E 331728.7 ORIGINATED BY SM  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC COMPILED BY BRS  
DATUM GEODETIC DATE July 30, 2008 - August 1, 2008 CHECKED BY *SSB*



LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 5/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 135</b>		2 OF 4	<b>METRIC</b>
W.P. _____	LOCATION <u>N 4680369.9 ; E 331728.7</u>	ORIGINATED BY <u>SM</u>			
DIST <u>WEST</u> HWY <u>401/3</u>	BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>	COMPILED BY <u>BRS</u>			
DATUM <u>GEODETIC</u>	DATE <u>July 30, 2008 - August 1, 2008</u>	CHECKED BY <u>SSB</u>			



LDN MTO\_01 07-1130-207-0.GPJ LDN MTO.GDT 6/29/09

Continued Next Page

+ 3 x 3 Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



# RECORD OF BOREHOLE No 135

3 OF 4

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4680369.9 ; E 331728.7

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

July 30, 2008 - August 1, 2008

CHECKED BY **SYB**

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							
								20 40 60 80 100	○ UNCONFINED	+ FIELD VANE					
								20 40 60 80 100	● QUICK TRIAXIAL	× LAB VANE					
	</														

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/20/09



**RECORD OF BOREHOLE No 135A**

1 OF 1

**METRIC**

PROJECT 07-1130-207-0

W.P. LOCATION N 4680369.9 ; E 331728.7

ORIGINATED BY SM

DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, HOLLOW STEM

COMPILED BY BRS

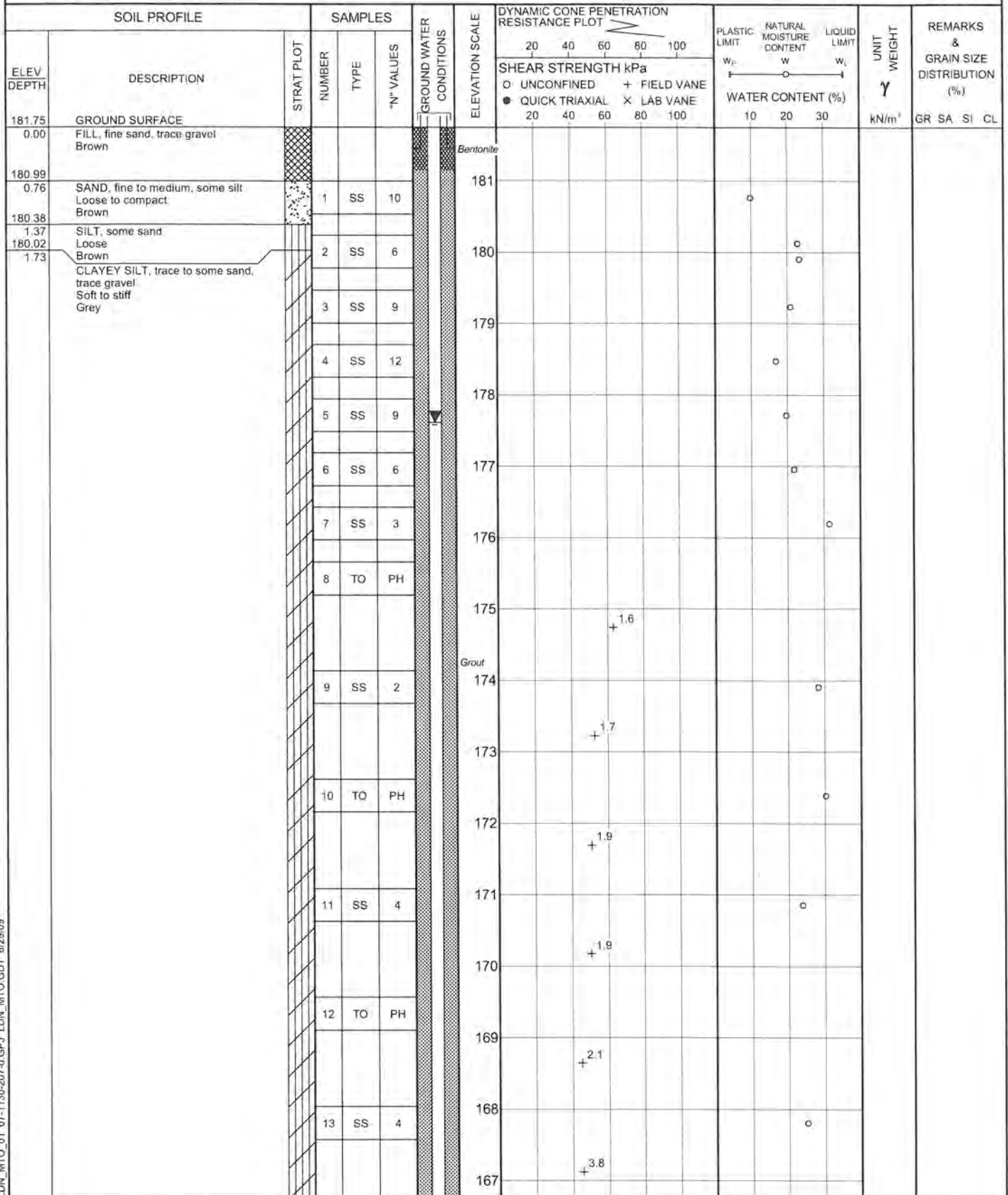
DATUM GEODETIC DATE August 1, 2008

CHECKED BY *SLB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
182.02 0.00	SOIL CONDITIONS INFERRED FROM BOREHOLE No. 135 GROUND SURFACE TOPSOIL, silty sand Loose Black							20 40 60 80 100					
								SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE					
								20 40 60 80 100					

LDN MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 07-1130-207-0 RECORD OF BOREHOLE No 136 1 OF 4 METRIC  
W.P. LOCATION N 4680449.5 :E 331751.3 ORIGINATED BY SM  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC COMPILED BY LMK  
DATUM GEODETIC DATE August 28, 2008 - September 2, 2008 CHECKED BY *SWB*

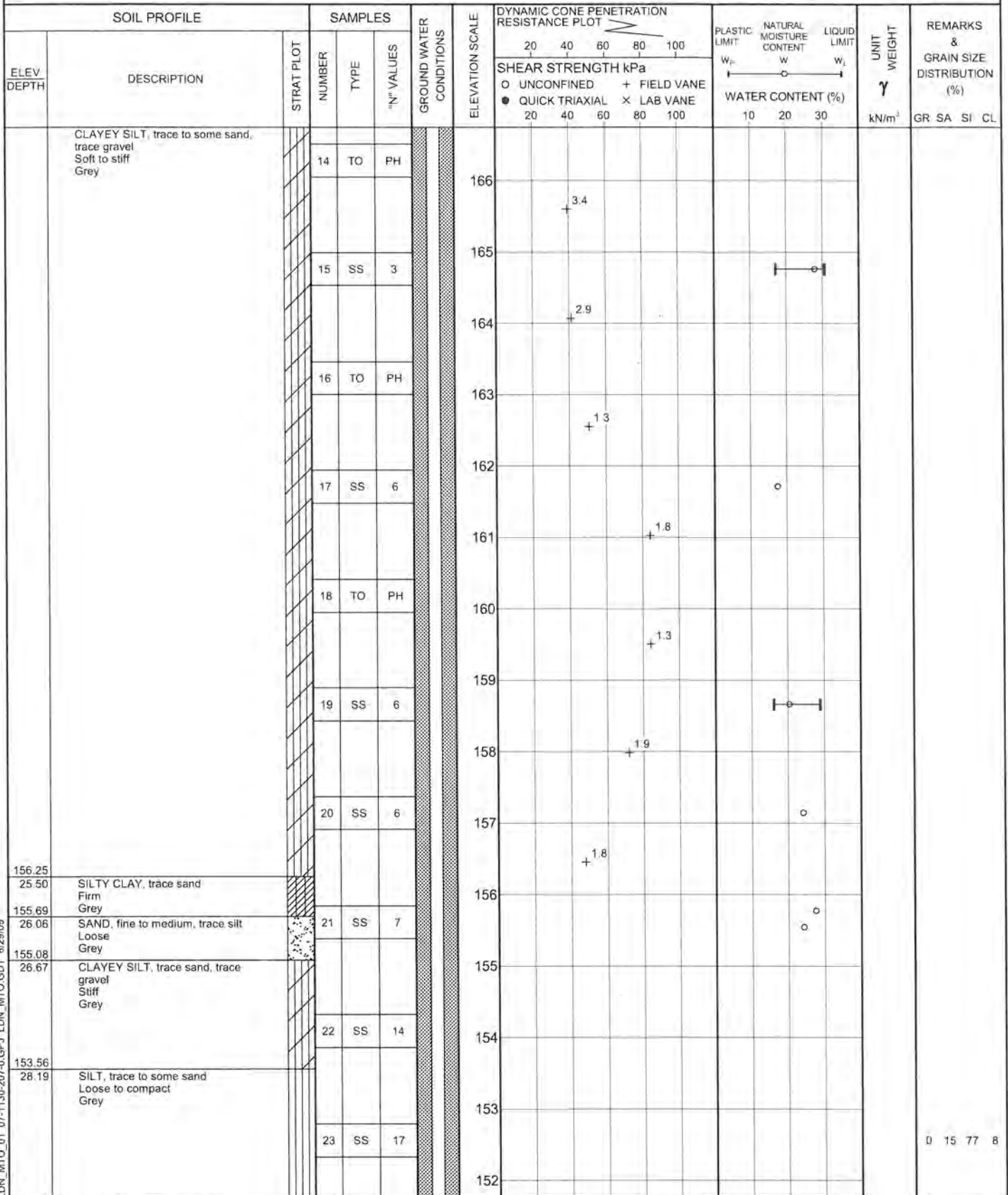


Continued Next Page

+ 3 × 3 Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE



PROJECT 07-1130-207-0 RECORD OF BOREHOLE No 136 2 OF 4 METRIC  
W.P. LOCATION N 4680449.5, E 331751.3 ORIGINATED BY SM  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC COMPILED BY LMK  
DATUM GEODETIC DATE August 28, 2008 - September 2, 2008 CHECKED BY SJB



LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+ 3, X 3 Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 136</b>		3 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4680449.5 ; E 331751.3		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY LMK	
DATUM GEODETIC		DATE August 28, 2008 - September 2, 2008		CHECKED BY <b>SJB</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT $w_p$	NATURAL MOISTURE CONTENT $w$	LIQUID LIMIT $w_L$	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)				
								○ UNCONFINED		+ FIELD VANE						× LAB VANE				
						20	40	60	80	100	10	20	30							

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO\_GDT\_6/20/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 136

SHEET 4 OF 4

LOCATION: N 4680449.5 :E 331751.3


DRILLING DATE: August 28, 2008 - September 2, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: --

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (m/min)	COLOUR FLUSH % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols.										DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
				DEPTH (m)	RECOVERY					R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA	HYDRAULIC CONDUCTIVITY k, cm/sec								
														TOTAL CORE %	SOLID CORE %	DIP w.r.t CORE AXIS	TYPE AND SURFACE DESCRIPTION				
																		0 10 20 30 40 50 60 70 80 90 100	0 10 20 30 40 50 60 70 80 90 100		
		ROCK SURFACE		148.09																	
34	MUD ROTARY NO ROCK CORE	LIMESTONE, fresh, medium, strong, laminated, fine grained, faintly porous, brown		33.66					148							JN,CU,Ro CI					
				147.27													JN,UN,Ro CI				
				34.48																	
35		LIMESTONE, fresh, medium strong, thinly laminated, fine to medium grained, faintly porous, brown		146.72						147								Broken Core			
				35.03														Broken Core			
				LIMESTONE, fresh, medium strong, thinly laminated, very fine to fine grained, faintly porous, light tan to grey to grey						146											
36				145.63																	
				36.12																	
37				LIMESTONE, fresh, medium strong, weakly laminated, fine grained, porous stylistic, light grey						145								Broken Core			
				144.60																	
		LIMESTONE, fresh, medium strong, very weakly laminated, fine grained, faintly porous, fossiliferous, light grey		144.11																	
38		LIMESTONE, fresh, medium strong, faintly laminated, fine to medium grained, faintly porous, fossiliferous (4cm max), light brown		37.64					144												
39		LIMESTONE, fresh, medium strong, laminated, fine to medium grained, porous with occasional vugs, light grey END OF DRILLHOLE		142.81					143							Broken Core					
				38.94																	
				39.17																	
40																					
41																					
42																					
43																					
44																					
45																					
46																					
47																					
48																					

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SJB

<b>PROJECT</b> 07-1130-207-0		<b>RECORD OF BOREHOLE No 136A</b>		1 OF 1	<b>METRIC</b>
<b>W.P.</b> _____		<b>LOCATION</b> N 4680449.5 ; E 331751.3		<b>ORIGINATED BY</b> SM	
<b>DIST</b> WEST HWY 401/3		<b>BOREHOLE TYPE</b> POWER AUGER, HOLLOW STEM		<b>COMPILED BY</b> LMK	
<b>DATUM</b> GEODETIC		<b>DATE</b> September 2, 2008		<b>CHECKED BY</b> <i>SSB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	N° VALUES									
181.75	0.00	FILL, fine sand, trace gravel Brown												
180.99	0.76	SAND, fine to medium, some silt Loose to compact Brown					181							
180.38	1.37	SILT, some sand Loose Brown					180							
180.02	1.73	CLAYEY SILT, trace to some sand, trace gravel Soft to stiff Grey					179							
							178							
							177							
							176							
							175							
							174							
							173							
172.61	9.14	END OF BOREHOLE												
		Water level measured in shallow piezometer at elev. 173.35m on September 19, 2008.												
		Water level measured in shallow piezometer at elev. 174.13m on September 22, 2008.												
		Water level measured in deep piezometer at elev. 179.49m on January 28, 2009.												

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09



PROJECT 07-1130-207-0

# RECORD OF BOREHOLE No 139

1 OF 4

METRIC

W.P. \_\_\_\_\_

LOCATION N 4680787.5 :E 331599.3

ORIGINATED BY SM

DIST WEST HWY 401/3

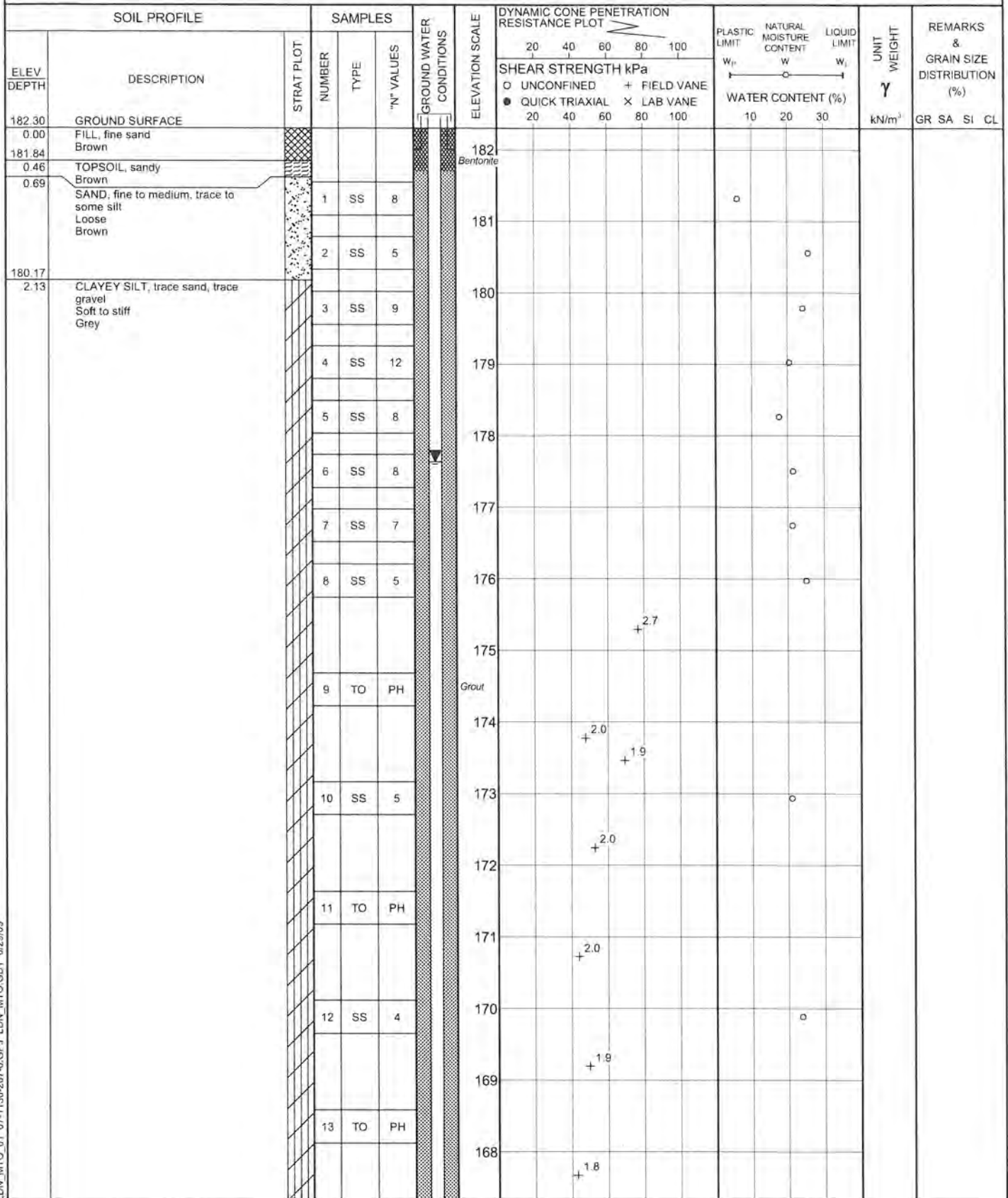
BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE August 26, 2008 - August 27, 2008

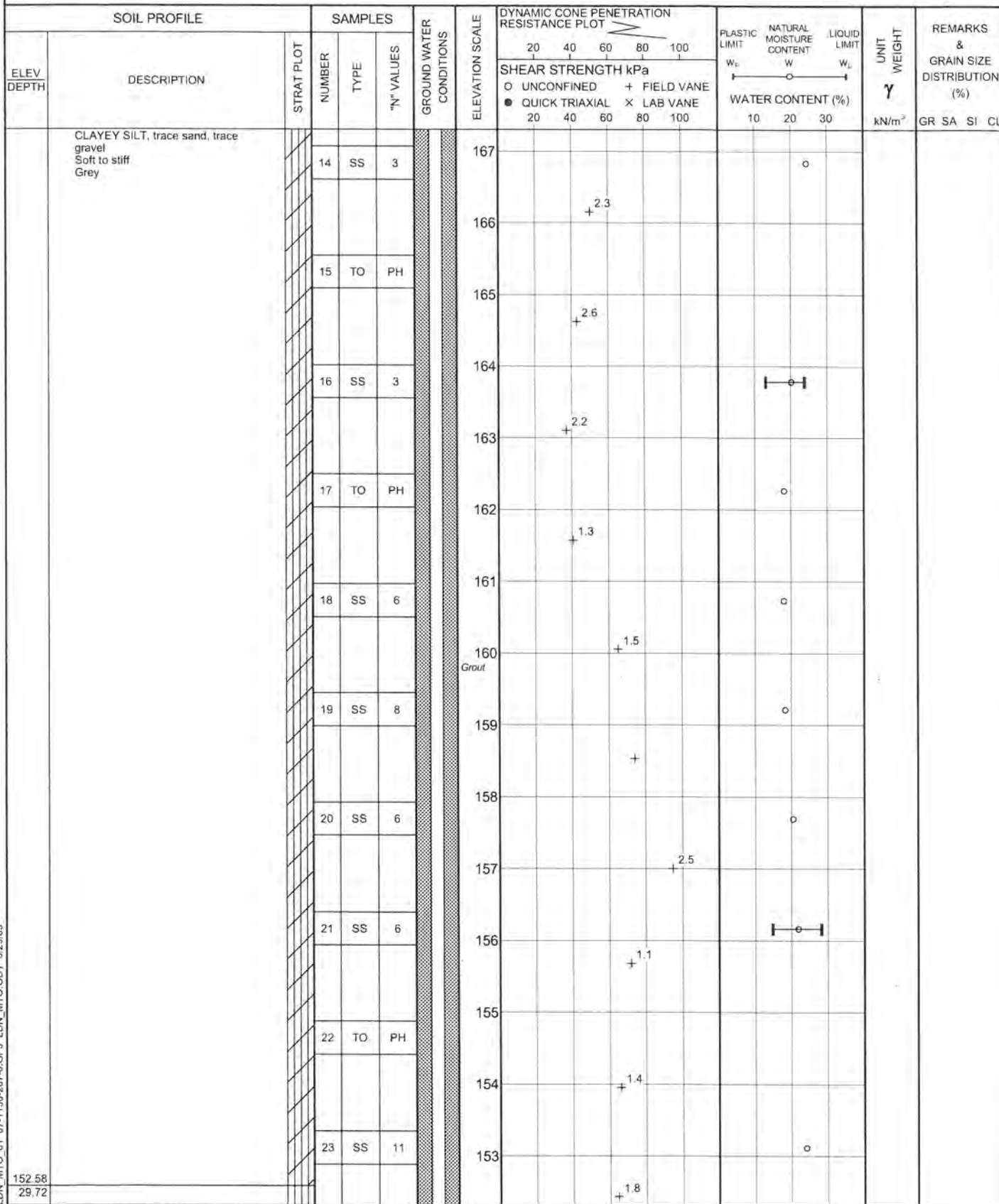
CHECKED BY *SSB*



Continued Next Page

+3, X3, Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 139</b>		2 OF 4	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4680787 5 E 331599.3</u>		ORIGINATED BY <u>SM</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>August 26, 2008 - August 27, 2008</u>		CHECKED BY <u>SJB</u>	



LDN MTO 01 07-1130-207-0.GPJ LDN MTO.GDT 6/29/09

Continued Next Page

+ 3, X 3, Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 139</b>		3 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4680787.5 ; E 331599.3		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC		DATE August 26, 2008 - August 27, 2008		CHECKED BY <i>SB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								○ UNCONFINED	+ FIELD VANE							● QUICK TRIAXIAL	× LAB VANE	
							20	40	60	80	100	10	20	30	GR SA SI CL			
151.72	SILT, some clay Loose Grey																	
30.58	SILTY CLAY Soft Grey		24	SS	3										0 0 40 60			
151.06																		
31.24	SILT, some clay to CLAYEY SILT, trace sand, trace gravel Compact Grey								2.2									
			25	SS	10													
149.53																		
32.77	SANDY SILT, trace to some gravel, trace clay Dense Grey								1.5									
			26	SS	31													
			27	SS	50/ 0mm													
147.04																		
35.26	LIMESTONE, fresh, medium strong, weakly to thinly laminated, very fine to fine grained, faintly to strongly porous Light brown and grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		28	NQ RC														
			29	NQ RC														
			30	NQ RC											UC			
143.19	END OF BOREHOLE																	
39.11	Borehole dry during drilling on August 26 and 27, 2008.  Water level measured in deep piezometer at elev. 178.57m on September 19, 2008.  Water level measured in deep piezometer at elev. 178.57m on September 22, 2008.  Water level measured in deep piezometer at elev. 177.60m on November 11, 2008.  Water level measured in deep piezometer at elev. 177.63m on January 28, 2009.																	

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/20/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 139

SHEET 4 OF 4

LOCATION: N 4680787.5 E 331599.3

DRILLING DATE: August 26, 2008 - August 27, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: --

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	PENETRATION RATE (min/m)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate										BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage										PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular										PO - Polished K - Slickensided SM - Smooth Ro - Rough										Br - Broken Rock	NOTE: For additional abbreviations refer to list of abbreviations & symbols.	HYDRAULIC CONDUCTIVITY k, cm/sec				DIAMETRAL POINT LOAD INDEX (MPa)		NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
				DEPTH (m)						RECOVERY		R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	10 <sup>-6</sup>	10 <sup>-5</sup>	10 <sup>-4</sup>	10 <sup>-3</sup>	2	4	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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DEPTH SCALE

1:75



LOGGED: SG

CHECKED: *SG*

LDN ROCK 03 07-1130-207-0-ROCK GPJ GLDR LDN GDT 6/29/09 DATA INPUT: WDF

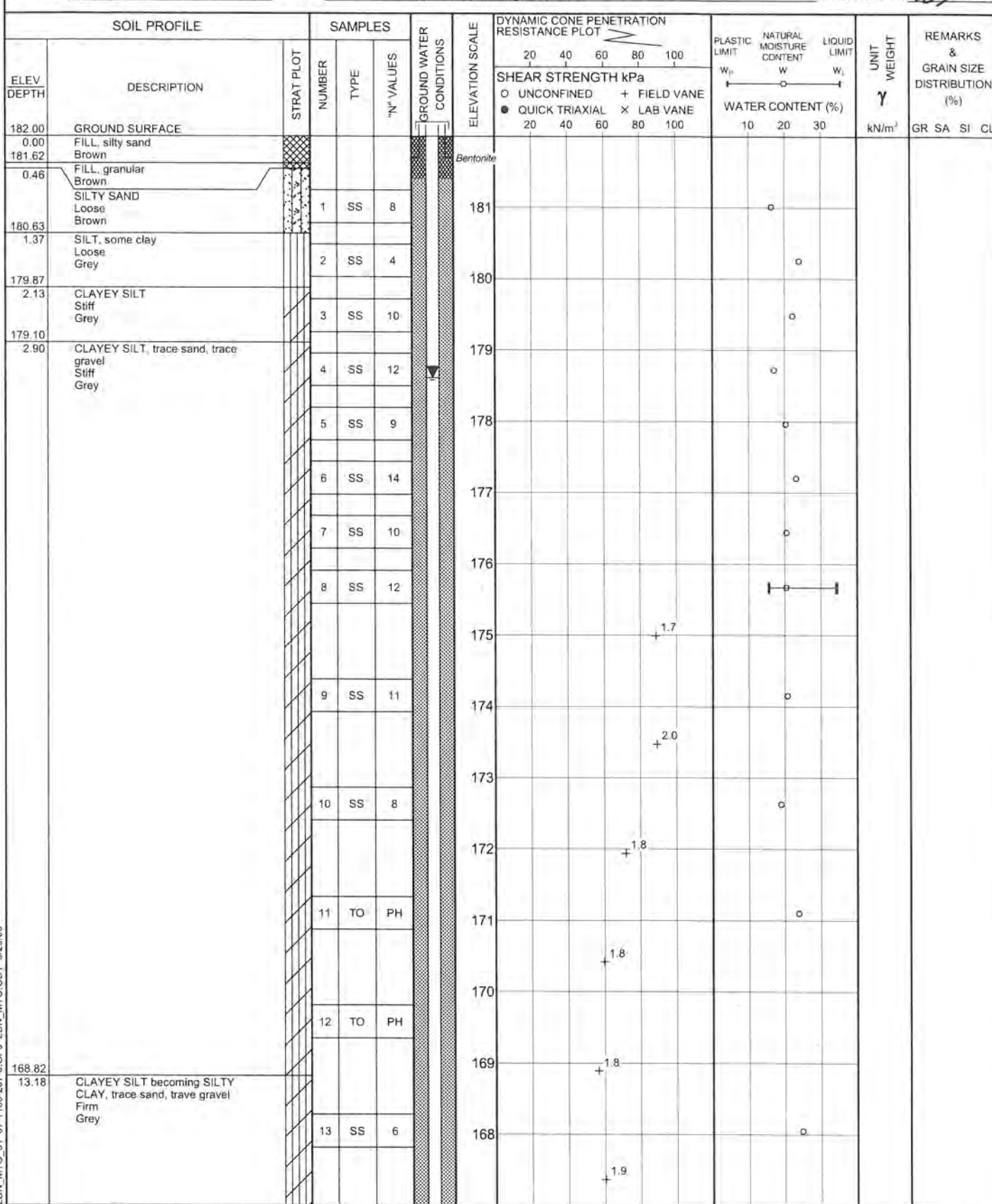


PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 139A</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4680787.5 ; E 331599.3		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, HOLLOW STEM		COMPILED BY BRS	
DATUM GEODETIC		DATE August 27, 2008		CHECKED BY <i>SJB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES									
182.30	FILL, fine sand Brown													
181.84	TOPSOIL, sandy Brown													
0.46														
0.69	SAND, fine to medium, trace to some silt. Loose Brown													
180.17	CLAYEY SILT, trace sand, trace gravel Soft to stiff Grey													
2.13														
173.00	END OF BOREHOLE													
9.30	Water level measured in shallow piezometer at elev. 177.94m on September 19, 2008.													
	Water level measured in shallow piezometer at elev. 178.62m on September 22, 2008.													
	Water level measured in shallow piezometer at elev. 180.31m on January 28, 2009													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 5/29/09

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 140</b>		1 OF 4	<b>METRIC</b>
W.P.	LOCATION	N 4680899.3; E 331552.4		ORIGINATED BY SM	
DIST WEST HWY 401/3	BOREHOLE TYPE	POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC	DATE	August 21, 2008 - August 25, 2008		CHECKED BY <i>SLB</i>	

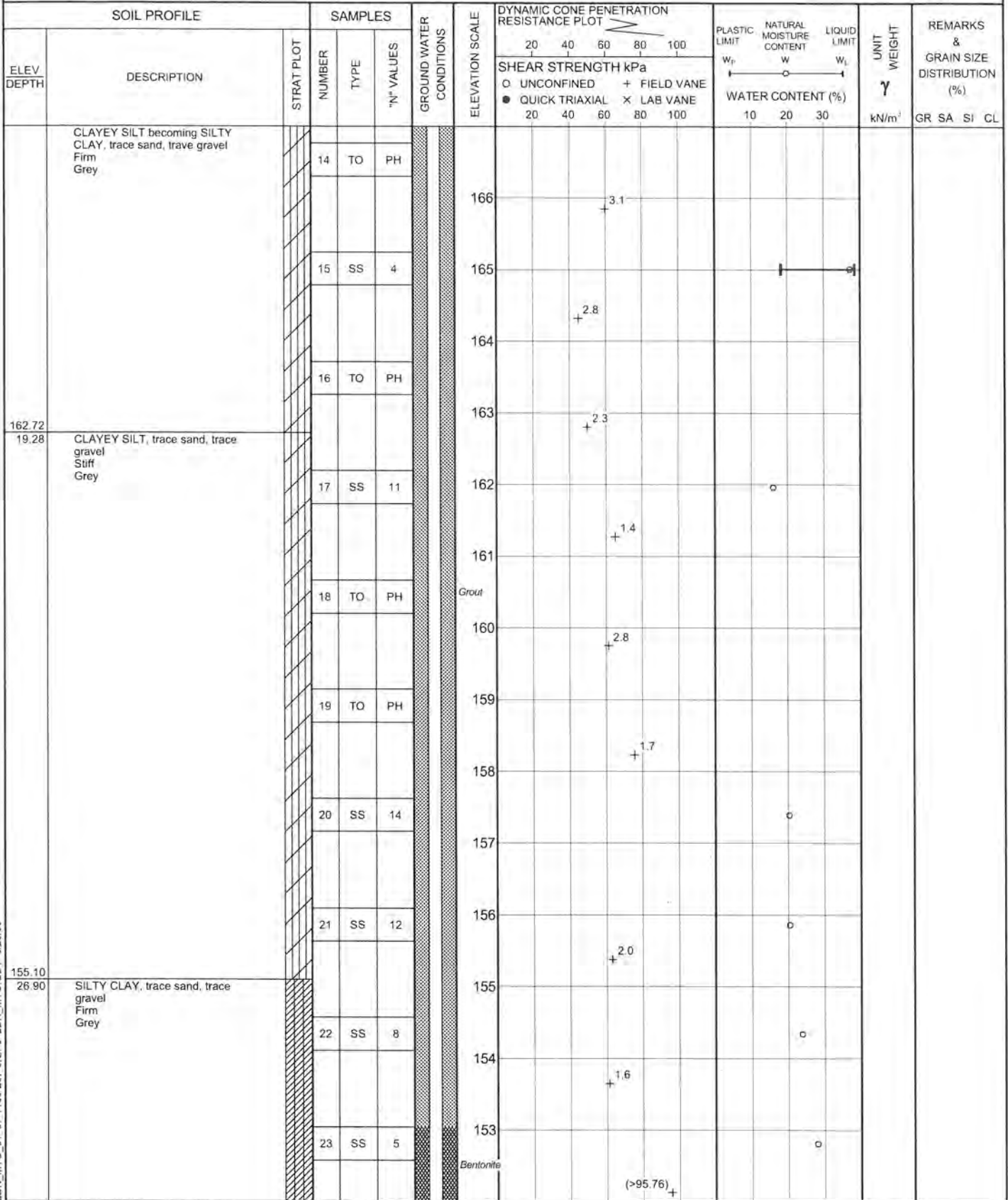


LDN MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 5/29/09

Continued Next Page

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 140</b>		2 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4680899 3 :E 331552.4		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC		DATE August 21, 2008 - August 25, 2008		CHECKED BY <u>SJB</u>	



LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 8/29/09

Continued Next Page

+ 3, X 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 140

3 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4680899.3 :E 331552.4

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

August 21, 2008 - August 25, 2008

CHECKED BY SJB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
150.80	SILTY CLAY, trace sand, trace gravel Firm Grey		24	SS	4		151							
31.20	CLAYEY SILT, layered with silt Hard to dense Grey						150		2.7					
149.70	SILT, trace sand, trace clay Dense Grey		25	SS	31		150							
32.40	SAND AND GRAVEL, some silt Dense Brown						148							
148.88	LIMESTONE, fresh, medium strong, very fine to fine grained, faintly porous Light brown and grey		26	SS	50/25mm		148							
33.12	(FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		27	NQ RC			147							
			28	NQ RC			146							
			29	NQ RC			145							
144.41	END OF BOREHOLE													
37.59	Borehole dry during drilling between August 21 and 25, 2008.  Water level measured in deep piezometer at elev. 179.46m on September 19, 2008.  Water level measured in deep piezometer at elev. 179.46m on September 22, 2008.  Water level measured in deep piezometer at elev. 178.21m on November 11, 2008.  Water level measured in deep piezometer at elev. 178.61m on January 28, 2009.													



PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 140

SHEET 4 OF 4

LOCATION: N 4680899.3 E 331552.4

DRILLING DATE: August 21, 2008 - August 25, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: --

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Stickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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DEPTH SCALE

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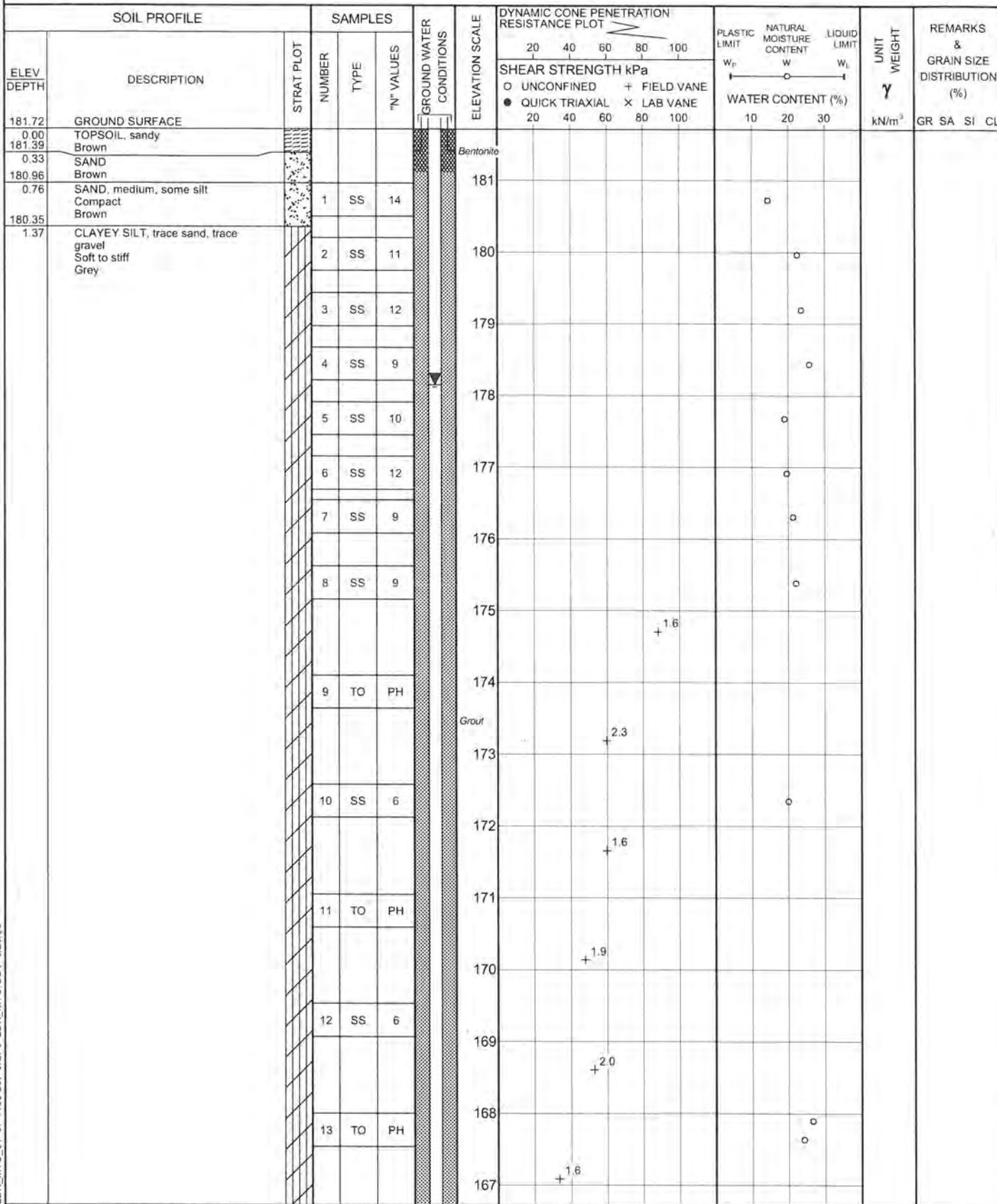
CHECKED: SYB

<b>PROJECT</b> 07-1130-207-0		<b>RECORD OF BOREHOLE No 140A</b>		1 OF 1	<b>METRIC</b>
<b>W.P.</b> _____		<b>LOCATION</b> N 4680899.3 ; E 331552.4		<b>ORIGINATED BY</b> SM	
<b>DIST</b> WEST HWY 401/3		<b>BOREHOLE TYPE</b> POWER AUGER, HOLLOW STEM		<b>COMPILED BY</b> BRS	
<b>DATUM</b> GEODETIC		<b>DATE</b> August 25, 2008		<b>CHECKED BY</b> <i>SB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
182.00	SOIL CONDITIONS INFERRED FROM BOREHOLE No. 140													
0.00	GROUND SURFACE													
181.62	FILL, silty sand Brown													
0.46	FILL, granular Brown													
180.63	SILTY SAND Loose Brown													
1.37	SILT, some clay Loose Grey													
179.87	CLAYEY SILT Stiff Grey													
2.13														
179.10	CLAYEY SILT, trace sand, trace gravel Stiff Grey													
2.90														
172.86	END OF BOREHOLE													
9.14	Water level measured in shallow piezometer at elev. 177.96m on September 19, 2008.													
	Water level measured in shallow piezometer at elev. 178.09m on September 22, 2008.													
	Water level measured in shallow piezometer at elev. 180.33m on January 28, 2009.													

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 8/29/09

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 141</b>		1 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4681073.1 :E 331425.8		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC		DATE August 19, 2008		CHECKED BY <i>SJB</i>	

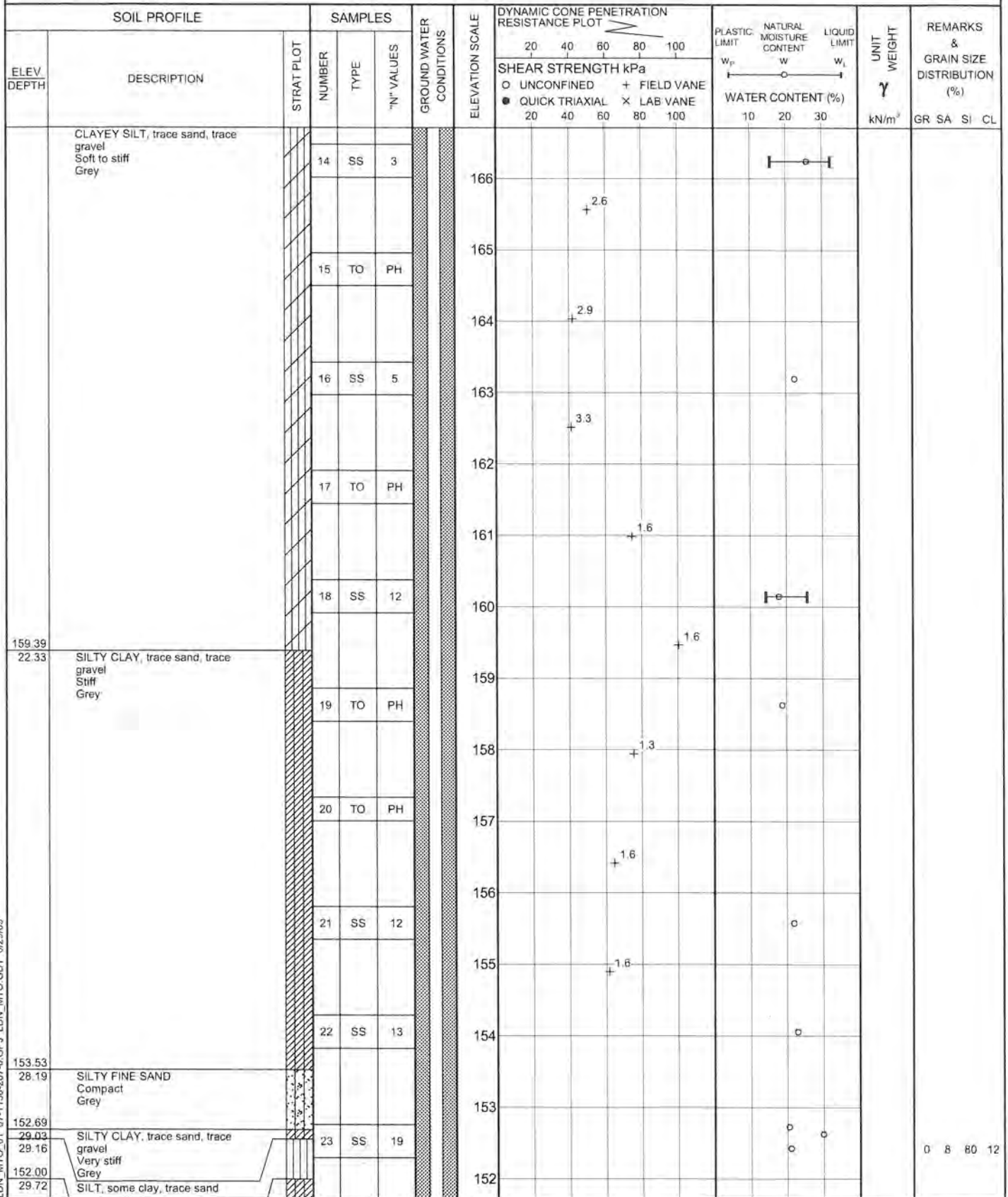


LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 5/29/03

Continued Next Page

+<sup>3</sup>, X<sup>3</sup> Numbers refer to Sensitivity      ○<sup>3</sup>% STRAIN AT FAILURE

PROJECT 07-1130-207-0 RECORD OF BOREHOLE No 141 2 OF 4 METRIC  
W.P. LOCATION N 4681073.1 :E 331425.8 ORIGINATED BY SM  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC COMPILED BY BRS  
DATUM GEODETIC DATE August 19, 2008 CHECKED BY *SLB*



Continued Next Page

+ 3, x 3, Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

LDN MTO\_01 07-1130-207-0 GPJ LDN MTO GOT 8/29/09



## METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4681073.1 : E 331425.8

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY      BRS

DATUM    GEODETIC

DATE August 19, 2008

CHECKED BY SYB

[illegible]

+3, ×3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 141

SHEET 4 OF 4

LOCATION: N 4681073.1 ;E 331425.8

DRILLING DATE: August 19, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (min/m)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Stickensided SM - Smooth Ro - Rough Br - Broken Rock <small>NOTE: For additional abbreviations refer to list of abbreviations &amp; symbols</small>										DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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DEPTH SCALE

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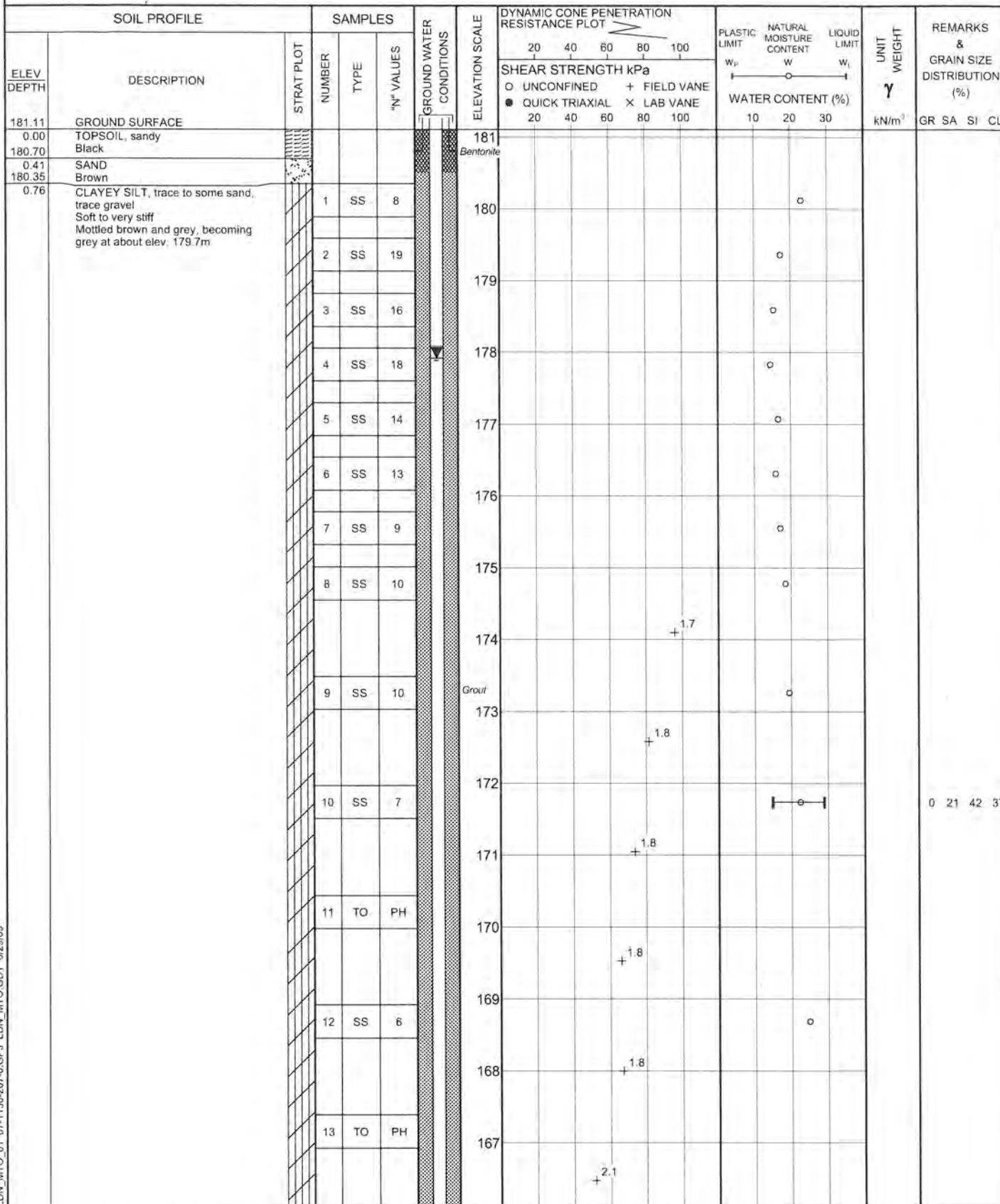


LOGGED: SG

CHECKED: SJB



PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 142</b>		1 OF 4	<b>METRIC</b>
W.P. _____	LOCATION <u>N 4681251.2 : E 331372.6</u>	ORIGINATED BY <u>SM</u>			
DIST <u>WEST</u> HWY <u>401/3</u>	BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>	COMPILED BY <u>BRS</u>			
DATUM <u>GEODETIC</u>	DATE <u>August 13, 2008 - August 14, 2008</u>	CHECKED BY <u>SJB</u>			



Continued Next Page

+ 3, X 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



# RECORD OF BOREHOLE No 142

2 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4681251.2; E 331372.6

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

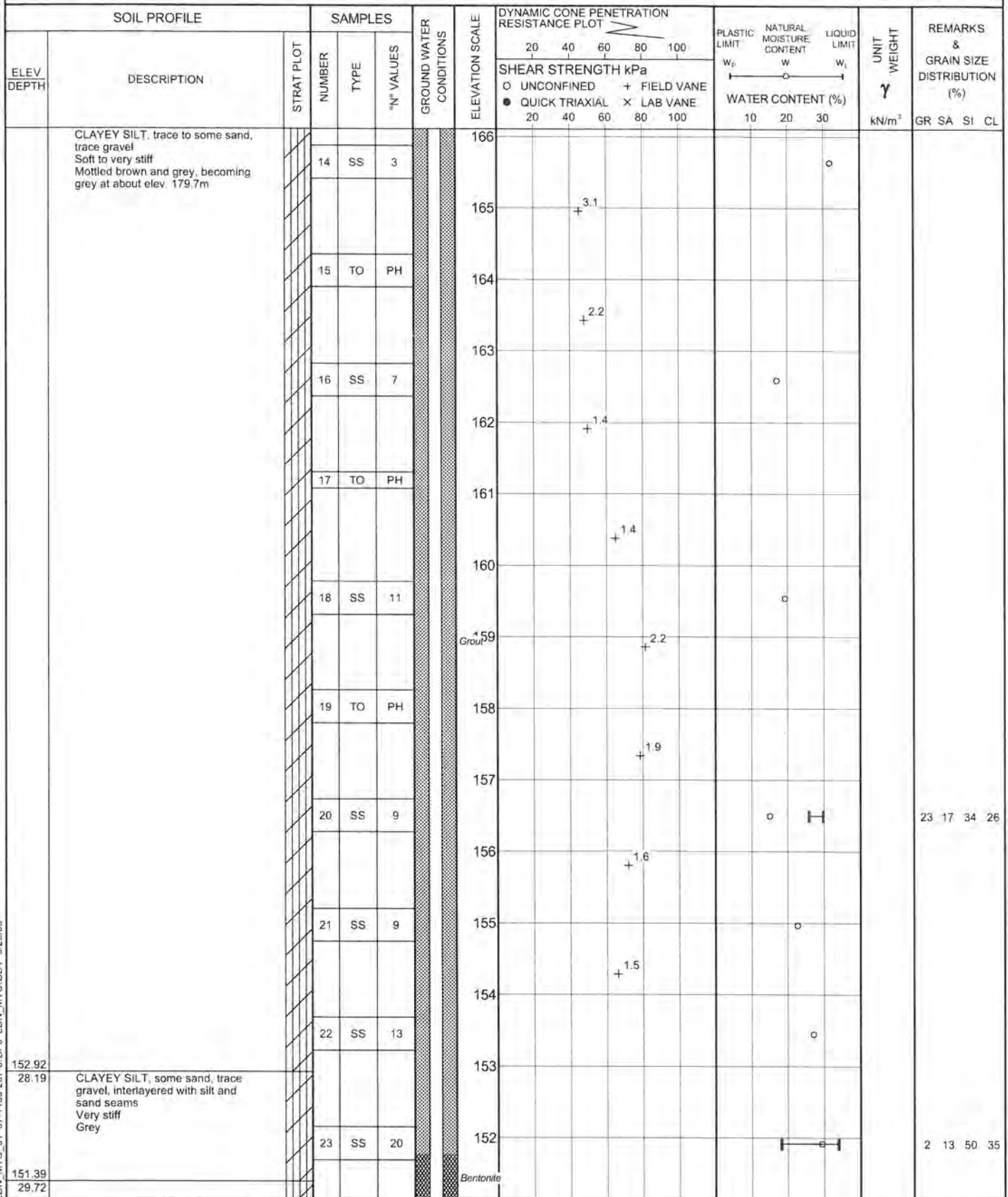
COMPILED BY BRS

DATUM GEODETIC

DATE

August 13, 2008 - August 14, 2008

CHECKED BY **SLB**



Continued Next Page

+ 3 × 3: Numbers refer to Sensitivity  
○ 3% STRAIN AT FAILURE

LDN-MTO-01 07-1130-207-0.GPJ LDN-MTO-GDT 6/29/09

**RECORD OF BOREHOLE No 142**

3 OF 4

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4681251.2 E 331372.6

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

August 13, 2008 - August 14, 2008

CHECKED BY *SS*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
								20 40 60 80 100						
								○ UNCONFINED + FIELD VANE						
								● QUICK TRIAXIAL × LAB VANE						
								20 40 60 80 100						
										10 20 30				
150.33	CLAYEY SILT, trace sand, trace gravel Hard Grey		24	SS	42		151 Sand							
30.78	SILT AND GRAVEL, some sand, some clay Dense Grey						Screen 150							
149.41	LIMESTONE, fresh, medium strong, weakly laminated to bedded, very fine to medium grained, faintly porous Tan-grey to brown		25	NQ RC			Bentonite 149	100	88	92				
31.70	(FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		26	NQ RC			Cave in 148	92	83	68				
			27	NQ RC			147							
							146	99	87	85				
145.07														
36.04	END OF BOREHOLE													UC
	Borehole dry during drilling on August 13 and 14, 2008.													
	Water level measured in deep piezometer at elev. 179.94m on September 19, 2008.													
	Water level measured in deep piezometer at elev. 179.48m on September 22, 2008.													
	Water level measured in deep piezometer at elev. 177.58m on November 11, 2008.													
	Water level measured in deep piezometer at elev. 177.92m on January 28, 2009.													

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 142

SHEET 4 OF 4

LOCATION: N 4681251.2 ; E 331372.6

DRILLING DATE: August 13, 2008 - August 14, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (m/min)	FLUSH % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols.										DIAMETER POINT LOG INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
				DEPTH (m)	RECOVERY					R.Q.D %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SJB



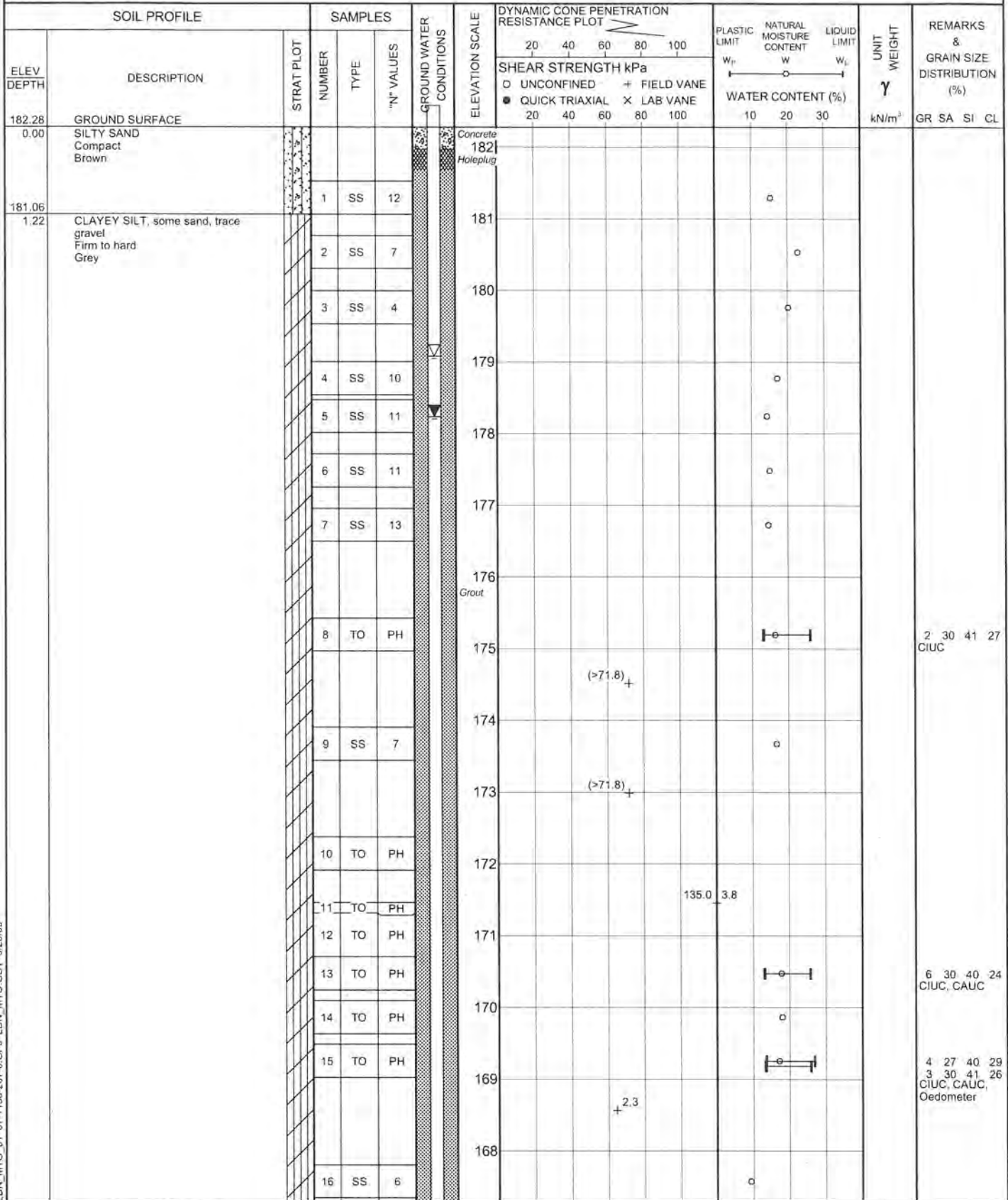


PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 143</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4681191 B, E 331295.2		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY BRS	
DATUM GEODETIC		DATE August 18, 2008		CHECKED BY <i>SJB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40						60	80
181.26	GROUND SURFACE															
0.00	TOPSOIL, sandy Black															
180.65																
0.61	SAND Loose Brown		1	SS	5											
180.19																
1.07	SILTY CLAY, trace sand, trace organics Firm to stiff Mottled brown and grey		2	SS	9											
179.13																
2.13	CLAYEY SILT, some sand, trace gravel Firm to stiff Grey		3	SS	14											
			4	SS	13											
			5	SS	10											
			6	SS	11											
			7	SS	9											
			8	SS	7											
			9	SS	6											
173.18	END OF BOREHOLE															
8.08	Borehole dry during drilling on August 18, 2008.  Water level measured in piezometer at elev. 176.44m on September 19, 2008.  Water level measured in piezometer at elev. 179.17m on January 28, 2009.															

LDN MTO 01 07-1130-207-0.GPJ LDN MTO GDT 6/29/09

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 145</b>		1 OF 4	<b>METRIC</b>
W.P. _____	LOCATION N 4681447.2, E 331247.9	ORIGINATED BY SM			
DIST WEST HWY 401/3	BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC	COMPILED BY BRS			
DATUM GEODETIC	DATE July 28, 2008 - July 30, 2008	CHECKED BY <i>SJB</i>			



LDN MTO.01 07-1130-207-0.GPJ LDN MTO.GDT 8/29/09

Continued Next Page

+ 3, X 3, Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 145</b>		2 OF 4	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4681447 2 E 331247 9</u>		ORIGINATED BY <u>SM</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>July 28, 2008 - July 30, 2008</u>		CHECKED BY <u>SLB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	WATER CONTENT (%) 10 20 30	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES										
	CLAYEY SILT, some sand, trace gravel Firm to hard Grey						167		+ 1.4						
			17	TO	PH		166								
									+ 2.0						
			18	SS	6		165								
							164	Grout							
									+ 1.7						
			19	TO	PH		163								2 26 46 26 CIUC
									+ 3.1						
			20	SS	11		162								
							161								
									+ 1.4						
			21	SS	37		160								
							159								
			22	SS	28		158								
							157								
			23	SS	9		156								
									+ 1.5						
			24	TO	PH		155								
									+ 2.8						
			25	SS	11		154								
							153								

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○<sup>3</sup>% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 145

3 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4681447.2 ; E 331247.9

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

July 28, 2008 - July 30, 2008

CHECKED BY SB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			20 40 60 80 100	20 40 60 80 100	20 40 60 80 100					
149.51	CLAYEY SILT, some sand, trace gravel Firm to hard Grey		26	TO	PH		152								
32.77			27	SS	50/50mm		151								
			28	SS	72/75m		150								
	LIMESTONE, fresh, medium strong, weakly laminated to laminated, very fine to fine grained, faintly porous Grey to brown  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		29	NQ RC			149	100	85	86					
			30	NQ RC			148	100	74	70					
			31	NQ RC			147								
145.55							146								
36.73	END OF BOREHOLE														
	Water level in borehole at about elev. 179.08m during drilling on July 28, 2008.														
	Water level measured in deep piezometer at elev. 179.08m on July 31, 2008.														
	Water level measured in deep piezometer at elev. 179.24m on August 11, 2008.														
	Water level measured in deep piezometer at elev. 180.30m on September 19, 2008.														
	Water level measured in deep piezometer at elev. 180.35m on September 22, 2008.														
	Water level measured in deep piezometer at elev. 177.31m on November 11, 2008.														
	Water level measured in deep piezometer at elev. 178.23m on January 28, 2009.														

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 145

SHEET 4 OF 4

LOCATION: N 4681447.2 ,E 331247.9

DRILLING DATE: July 28, 2008 - July 30, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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		ROCK SURFACE		149.51 32.77																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																</

DEPTH SCALE

1 : 75



LOGGED: SG

CHECKED: SJB



PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 145A</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4681447.2 :E 331247.9		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, HOLLOW STEM		COMPILED BY BRS	
DATUM GEODETIC		DATE July 30, 2008		CHECKED BY <b>SJB</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	"N" VALUES								
182.28 0.00	SOIL CONDITIONS INFERRED FROM BOREHOLE No. 145 GROUND SURFACE SILTY SAND Compact Brown					Concrete	182						
181.06 1.22	CLAYEY SILT, some sand, trace gravel Firm to hard Grey					Cuttings	181						
							180						
							179						
							178						
							177						
							176						
							175						
							174						
173.14 9.14	END OF BOREHOLE  Water level measured in shallow piezometer at elev. 180.15m on September 19, 2008.  Water level measured in shallow piezometer at elev. 180.28m on September 22, 2008.  Water level measured in shallow piezometer at elev. 180.56m on January 28, 2009.					Sand Piezometer							

LDN MTO\_01 07-1130-207-0.GPJ LDN MTO.GDT 5/29/09

# RECORD OF BOREHOLE No 147

1 OF 1

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4681670.0 : E 331004.6

ORIGINATED BY NG

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, HOLLOW STEM

COMPILED BY LMK

DATUM GEODETIC

DATE

August 18, 2008

CHECKED BY SJB

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
180.83	GROUND SURFACE						20 40 60 80 100	20 40 60 80 100	10 20 30				GR SA SI CL
0.00	TOPSOIL, clayey Black												
180.32													
0.51	SANDY SILT, some topsoil, trace clay Compact Mottled brown and grey		1	SS	19								
179.46													
1.37	CLAYEY SILT, some sand, trace gravel Stiff to very stiff Mottled brown and grey becoming grey at about elev. 176.9m		2	SS	21								2 17 43 38
			3	SS	30								
			4	SS	23								10 15 42 33
			5	SS	13								
			6	SS	11								
			7	SS	9								

# RECORD OF BOREHOLE No 149

1 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4681628.0 : E 330949.6

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

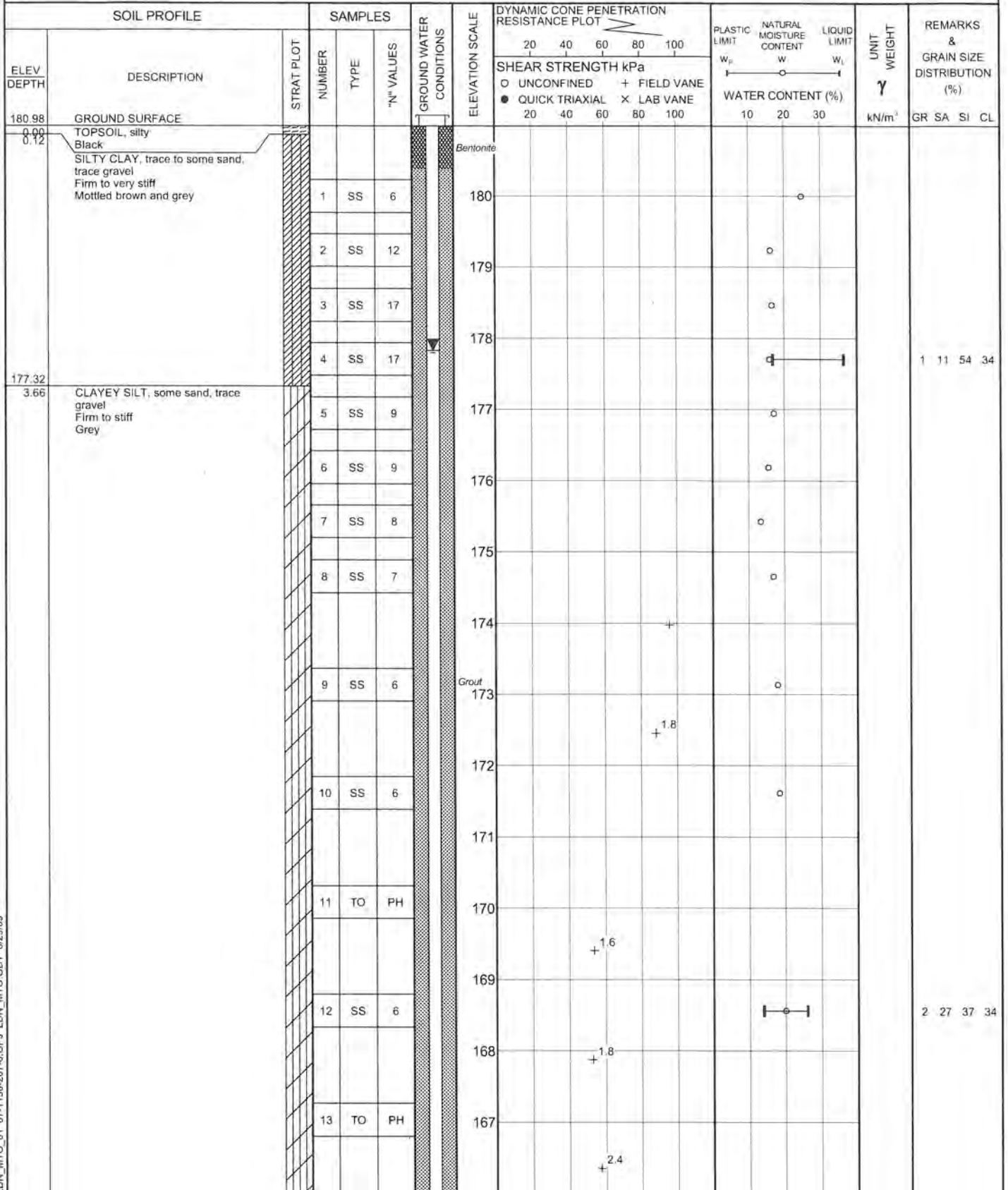
COMPILED BY BRS

DATUM GEODETIC

DATE

August 6, 2008

CHECKED BY *SSB*

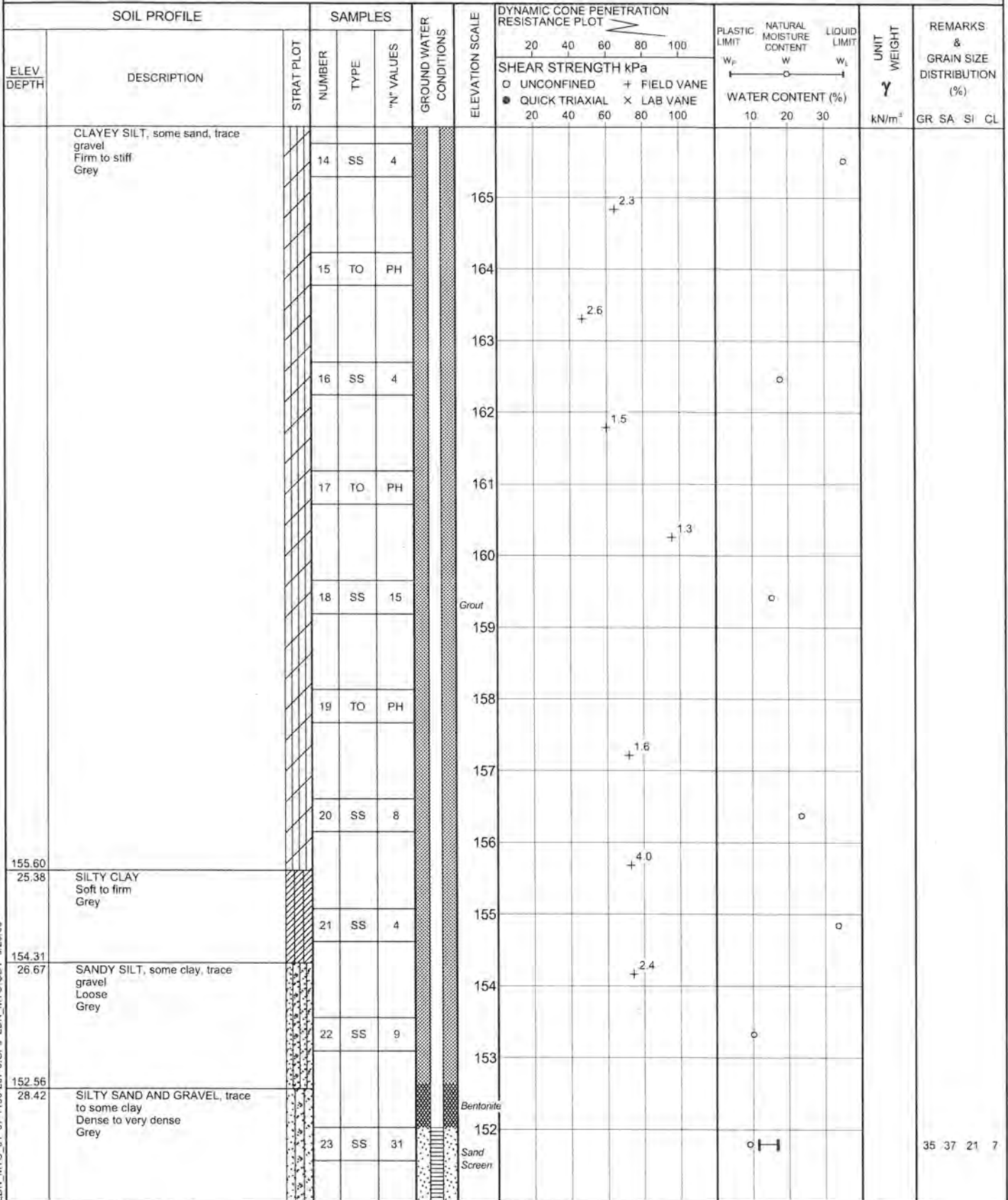


LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 8/29/09

Continued Next Page

+ 3, X 3. Numbers refer to Sensitivity O 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 149</b>		2 OF 4	<b>METRIC</b>
W.P.	LOCATION	N 4681628 0, E 330949.6		ORIGINATED BY SM	
DIST WEST HWY 401/3	BOREHOLE TYPE	POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC	DATE	August 6, 2008		CHECKED BY	



LDN-MTO-01 07-1130-207-0.GPJ LDN-MTO-GDT 6/29/09

Continued Next Page

+ 3 x 3 Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 149</b>		3 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4681628.0 ; E 330949.6		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETTIC		DATE August 6, 2008		CHECKED BY <i>SB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40						60	80
	SILTY SAND AND GRAVEL,, trace to some clay Dense to very dense Grey		24	SS	64											
149.97							Screen									
31.01	LIMESTONE, fresh, medium strong, thinly laminated to laminated, very fine to coarse grained, faintly to moderately porous Light brown and grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		25	SS	50/25mm											
			26	NQ RC												
			27	NQ RC												
			28	NQ RC												
146.46	END OF BOREHOLE															
34.52	Borehole dry during drilling on August 6, 2008.  Water level measured in deep piezometer at elev. 180.33m on September 19, 2008.  Water level measured in deep piezometer at elev. 177.40m on November 11, 2008.  Water level measured in deep piezometer at elev. 177.82m on January 28, 2009.															

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO\_GDT 8/30/09



PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 149

SHEET 4 OF 4

LOCATION: N 4681628.0 ;E 330949.6

DRILLING DATE: August 6, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols.										DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION		
				DEPTH (m)	RUN No.					RECOVERY		R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec							
										TOTAL CORE %	SOLID CORE %			DIP w.r.t CORE AXIS	TYPE AND SURFACE DESCRIPTION								
																10 5 0	40 30 20 10 0	10 5 0	10 <sup>-8</sup> 10 <sup>-6</sup> 10 <sup>-4</sup> 10 <sup>-2</sup>			10 <sup>-8</sup> 10 <sup>-6</sup> 10 <sup>-4</sup> 10 <sup>-2</sup>	10 <sup>-8</sup> 10 <sup>-6</sup> 10 <sup>-4</sup> 10 <sup>-2</sup>
		ROCK SURFACE		149.97																			
	MUD ROTARY NO ROCK CORE	LIMESTONE, fresh, medium strong, thinly laminated, very fine grained, faintly porous, light brown and grey		31.01	1																		
32		LIMESTONE, fresh, medium strong, laminated, very fine grained, faintly porous, weakly stylolitic, light brown to grey		149.32																			
		LIMESTONE, fresh, medium strong, thinly bedded, very fine grained, faintly porous, light brown and grey		31.66																			
		LIMESTONE, fresh, medium strong, laminated, very fine grained, faintly porous, weakly stylolitic, light brown to grey		148.85	2																		
		LIMESTONE, fresh, medium strong, thinly bedded, very fine grained, faintly porous, light brown and grey		32.13																			
33		LIMESTONE, fresh, medium strong, laminated, very fine grained, faintly porous, light brown to grey		147.85																			
		LIMESTONE, fresh, medium strong, laminated, very fine grained, faintly porous, light brown to grey		33.13																			
		LIMESTONE, fresh, medium strong, laminated, very fine to coarse grained, moderately porous, weakly stylolitic, brown		147.20	3																		
34		LIMESTONE, fresh, medium strong, laminated, very fine to coarse grained, moderately porous, weakly stylolitic, brown		33.78																			
		LIMESTONE, fresh, medium strong, laminated, very fine grained, faintly porous, light brown		146.91																			
	LIMESTONE, fresh, medium strong, laminated, very fine grained, faintly porous, light brown		34.07																				
35		END OF DRILLHOLE		34.29																			
				34.52																			
36																							
37																							
38																							
39																							
40																							
41																							
42																							
43																							
44																							
45																							
46																							

DEPTH SCALE

1 : 75



LOGGED: SG

CHECKED: SJB

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 149A</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4681628.0 :E 330949.6		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, HOLLOW STEM		COMPILED BY BRS	
DATUM GEODETIC		DATE August 6, 2008		CHECKED BY <i>SB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES									
180.98	TOPSOIL, silty Black													
0.00 0.12	SILTY CLAY, trace to some sand, trace gravel Firm to very stiff Mottled brown and grey													
177.32 3.66	CLAYEY SILT, some sand, trace gravel Firm to stiff Grey													
171.84 9.14	END OF BOREHOLE  Water level measured in shallow piezometer at elev. 175.44m on September 19, 2008.  Water level measured in shallow piezometer at elev. 176.35m on January 28, 2009													

LDN MTO\_01 07-1130-207-0.GPJ LDN MTO.GDT 6/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 151</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4681734 8 ; E 330642.9</u>		ORIGINATED BY <u>NG</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, HOLLOW STEM</u>		COMPILED BY <u>LMK</u>	
DATUM <u>GEODETIC</u>		DATE <u>August 18, 2008</u>		CHECKED BY <u>SSB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W <sub>p</sub> — W — W <sub>L</sub>	WATER CONTENT (%) 10 20 30	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES								
180.35 0.00	GROUND SURFACE												
179.74 0.61	TOPSOIL, clayey, some sand, trace gravel Brown					Cuttings	180						
	CLAYEY SILT, some sand Very stiff Brown		1	SS	15		179						0 21 48 31
			2	SS	16		178						
			3	SS	19		177						0 20 42 38
177.45 2.90	CLAYEY SILT, some sand, trace gravel Firm to stiff Grey		4	SS	12		176						
			5	SS	14		175						
			6	SS	9		174						
			7	SS	6		173						
			8	SS	7								
172.27 8.08	END OF BOREHOLE												
	<p>Borehole dry during drilling on August 18, 2008.</p> <p>Water level measured in piezometer at elev. 175.17m on September 19, 2008.</p> <p>Water level measured in deep piezometer at elev. 176.53m on January 28, 2009.</p>												

LDN MTO\_01 07-1130-207-0.GPJ LDN MTO.GDT 6/29/09

<b>PROJECT</b> 07-1130-207-0		<b>RECORD OF BOREHOLE No 152</b>		1 OF 4	<b>METRIC</b>
<b>W.P.</b> _____		<b>LOCATION</b> N 4681834.3 :E 330579.3		<b>ORIGINATED BY</b> NG	
<b>DIST</b> WEST HWY 401/3		<b>BOREHOLE TYPE</b> POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		<b>COMPILED BY</b> LMK	
<b>DATUM</b> GEODETIC		<b>DATE</b> August 19, 2008 - August 21, 2008		<b>CHECKED BY</b> SJB	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES									
180.16	GROUND SURFACE													
0.00	TOPSOIL, clayey, some sand Brown						180							
0.30	SAND, fine, trace to some silt Compact Brown		1	AS										
			2	SS	12		179							
178.53														
1.63	CLAYEY SILT, trace sand Firm Mottled brown and grey		3	SS	6									
178.03														
2.13	SAND, fine, some silt Loose Brown		4	SS	11		178							
2.34	CLAYEY SILT, some sand, trace gravel Firm to hard Grey		5	SS	11		177							0 17 47 36
			6	SS	11		176							
			7	SS	13		175							
			8	SS	12		174							
			9	SS	11		173							
			10	SS	8		172							
			11	TO	PH		171							
			12	SS	8		170							
			13	TO	PH		169							
			14	SS	7		168							
			15	TO	PH		167							4 17 39 40
							166							

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+ 3 x 3, Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 152</b>		2 OF 4	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4681834.3 :E 330579.3</u>		ORIGINATED BY <u>NG</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>		COMPILED BY <u>LMK</u>	
DATUM <u>GEODETIC</u>		DATE <u>August 19, 2008 - August 21, 2008</u>		CHECKED BY <u>SJS</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub> NATURAL MOISTURE CONTENT W LIQUID LIMIT W <sub>L</sub> WATER CONTENT (%) 10 20 30	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	CLAYEY SILT, some sand, trace gravel Firm to hard Grey						165	2.1			
			16	SS	8		164				
							163	1.3			
			17	TO	PH		162	1.5			
			18	SS	8		161				
							160	(>95.76)			
			19	TO	PH		159	(>95.76)			
			20	SS	14		158				1 24 42 33
							157				
			21	SS	14		156				
			22	SS	14		155				
			23	SS	43		154				
			24	SS	46		153				
			25	SS	52/100mm		152				
							151				

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity ○<sup>3</sup>% STRAIN AT FAILURE



PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 152</b>		3 OF 4 <b>METRIC</b>	
W.P. _____		LOCATION N 4681834.3 ; E 330579.3		ORIGINATED BY NG	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY LMK	
DATUM GEODETIC		DATE August 19, 2008 - August 21, 2008		CHECKED BY <i>SB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)
								○ UNCONFINED	+ FIELD VANE	×						
							20	40	60	80	100					
149.37	CLAYEY SILT, some sand, trace gravel Firm to hard Grey						150									
30.79	LIMESTONE, fresh, weakly to thinly laminated, very fine to fine grained, faintly porous to porous Tan and grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		26	NQ RC			149	85	65	60						
			27	NQ RC			148	100	76	52						
			28	NQ RC			147	TCR (%) 67	SCR (%) 66	RQD (%) 50						
			29	NQ RC			146	98	98	98						
			30	NQ RC			145									
143.53	END OF BOREHOLE						144	100	100	88						
36.63	Borehole dry during drilling on August 19, 20 and 21, 2008.  Water level measured in deep piezometer at elev. 171.94m on November 11, 2008.  Water level measured in deep piezometer at elev. 178.27m on January 28, 2009.															

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/30/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 152

SHEET 4 OF 4

LOCATION: N 4681834.3 ;E 330579.3

DRILLING DATE: August 19, 2008 - August 21, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (mm/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Congolute BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock <small>NOTE: For occasional abbreviations refer to list of abbreviations &amp; symbols.</small>										HYDRAULIC CONDUCTIVITY k, cm/sec			DIAMETRAL POINT LOAD INDEX (MPa)		NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
										RECOVERY		RQD %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		TYPE AND SURFACE DESCRIPTION	10 <sup>-1</sup>	10 <sup>-2</sup>	10 <sup>-3</sup>	2	4	8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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31	MUD ROTARY NO ROCK CORE	ROCK SURFACE	149.37																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

DEPTH SCALE

1 : 75

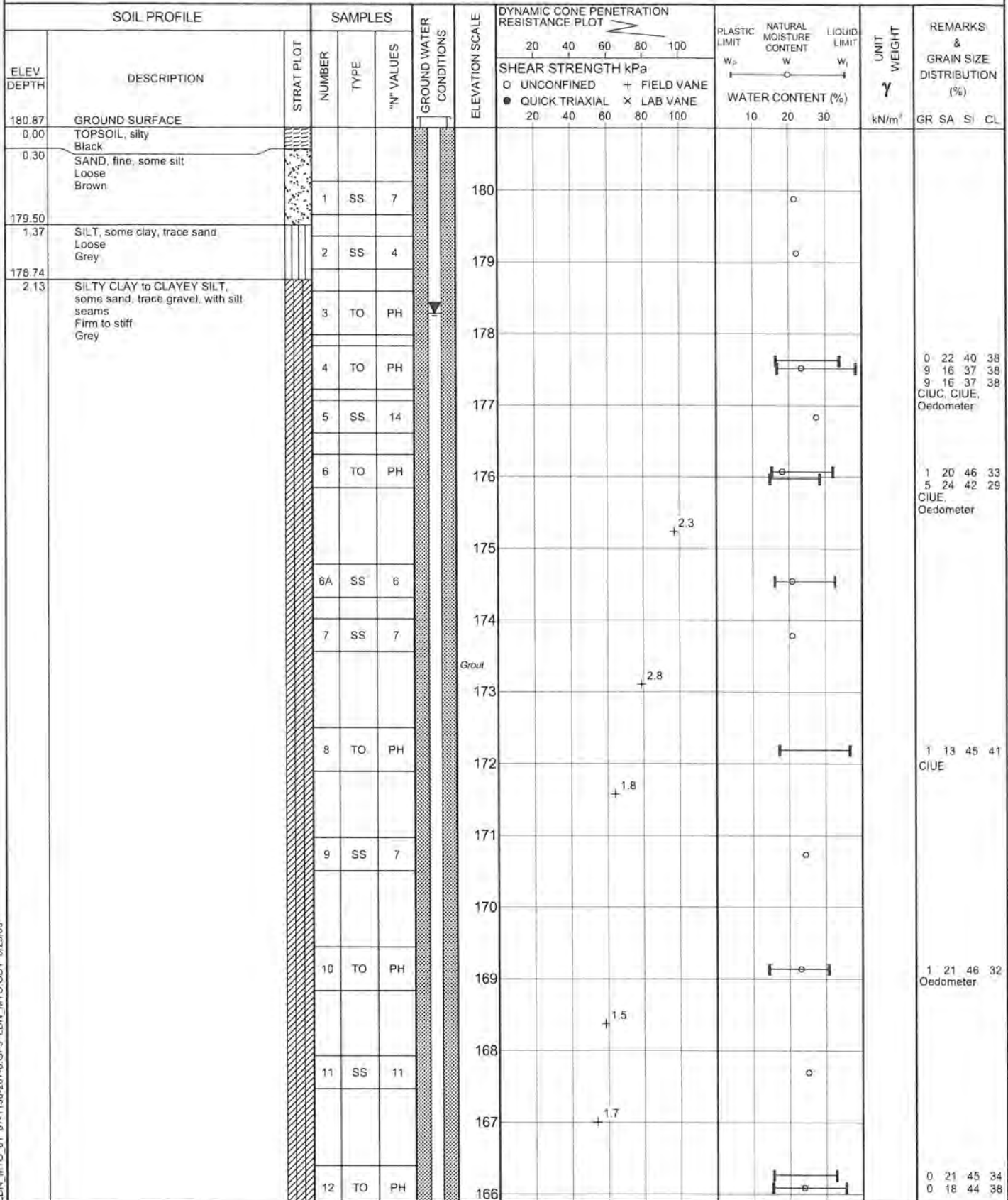


LOGGED: SG

CHECKED: SJB



PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 154</b>		1 OF 4	<b>METRIC</b>
W.P. _____		LOCATION N 4681959 9 , E 330200 6		ORIGINATED BY SM	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC		COMPILED BY BRS	
DATUM GEODETIC		DATE July 22, 2008 - July 24, 2008		CHECKED BY <b>SSB</b>	



LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 8/29/09

Continued Next Page

+ 3 × 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

## METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4681959.9 :E 330200.6

ORIGINATED BY SM

DIST WEST HWY 401/3

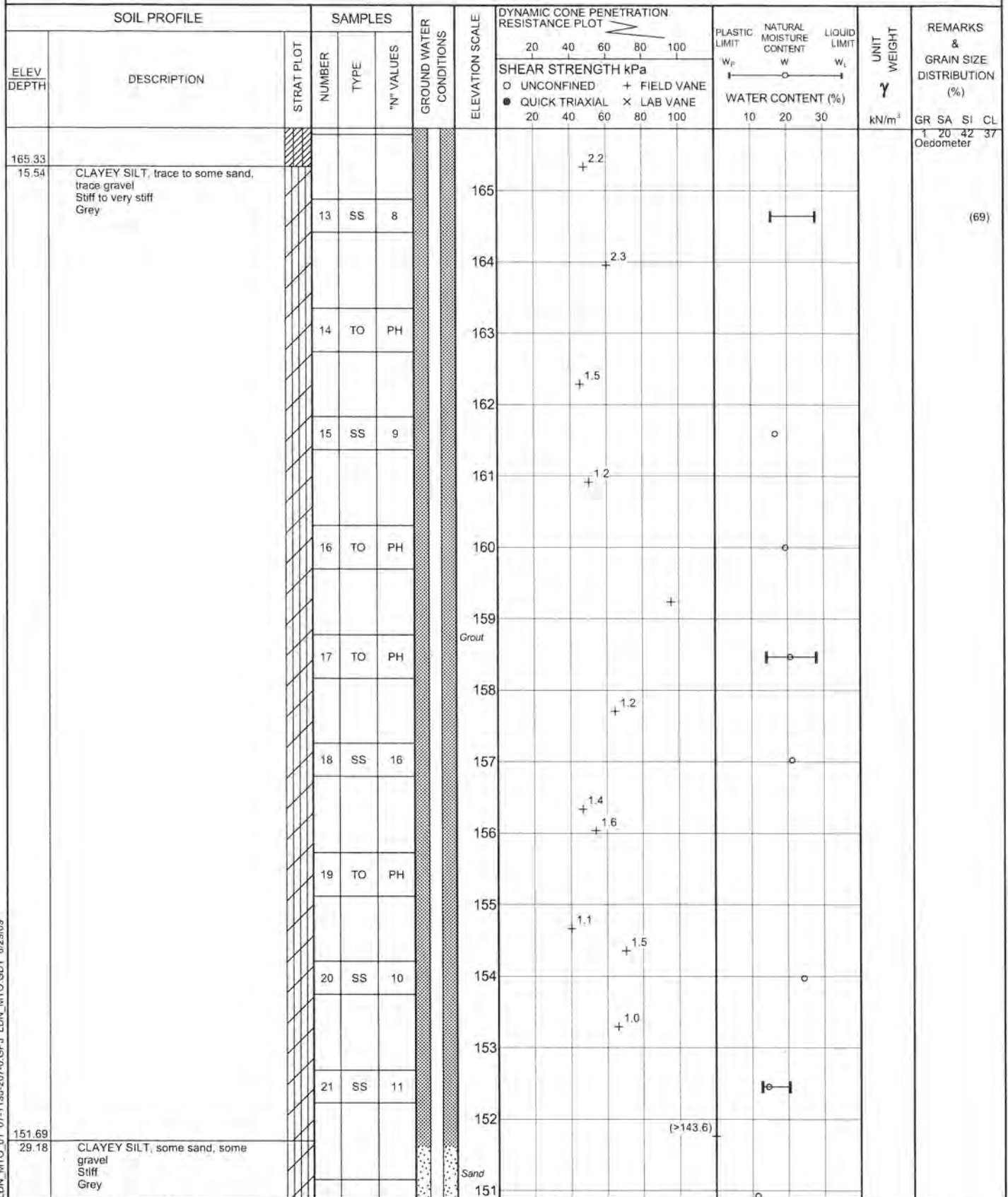
BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE July 22, 2008 - July 24, 2008

CHECKED BY SJB



Continued Next Page

+<sup>3</sup>, ×<sup>3</sup>. Numbers refer to Sensitivity      ○<sup>3%</sup> STRAIN AT FAILURE



**RECORD OF BOREHOLE No 154**

3 OF 4

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4681959.9 ; E 330200.6

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

DATUM GEODETIC

DATE

July 22, 2008 - July 24, 2008

CHECKED BY *SS*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	
	CLAYEY SILT, some sand, some gravel Stiff Grey		22	SS	11							
149.63			23	SS	60/ 125mm		150					
31.24	LIMESTONE, fresh, medium strong, weakly laminated to bedded, fine to coarse grained, faintly porous Light grey to tan to brown  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		24	NQ RC			149 Screen					
			25	NQ RC			148	100 98 97				
			26	NQ RC			147	T.C.R. (%) 94 S.C.R. (%) 87 R.Q.D. (%) 84				
			27	NQ RC			146	86 75 36				
144.22							145	97 92 83				
36.65	END OF BOREHOLE  Borehole dry during drilling between July 22 and July 24, 2008.  Water level measured in piezometer at elev. 178.97m on July 28, 2008.  Water level measured in piezometer at elev. 180.42m on September 19, 2008.  Water level measured in piezometer at elev. 177.23m on November 11, 2008.  Water level measured in piezometer at elev. 178.27m on January 28, 2009.											UC



PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No 156</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4682106.6 E 329876.3		ORIGINATED BY NG	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, HOLLOW STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE August 27, 2008		CHECKED BY <i>SJB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE × LAB VANE						
179.52	GROUND SURFACE														
0.00	TOPSOIL, sandy Black														
178.63							179								
0.89	SILTY FINE SAND Loose Brown		1	SS	8		Holeplug								
178.15															
1.37	SILTY CLAY, trace sand, trace gravel Firm to stiff Grey		2	SS	5		178								
			3	SS	15		177							2 14 28 50	
			4	SS	12										
							Cuttings								
			5	SS	8										
							175								
			6	SS	7										
			7	SS	6		174								
			8	SS	6		Holeplug								
							173								
							Sand								
							172								
							Piezometer								
			9	SS	7										
171.44	END OF BOREHOLE														
8.08	Borehole dry during drilling on August 27, 2008.  Water level measured in piezometer at elev. 177.54m on September 19, 2008.  Water level measured in piezometer at elev. 178.97m on January 28, 2009.														

LDN\_MTO\_01 07-1130-207-0-GPJ LDN\_MTO.GDT 6/29/09

# RECORD OF BOREHOLE No 158

1 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4682144.3 ; E 329769.9

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

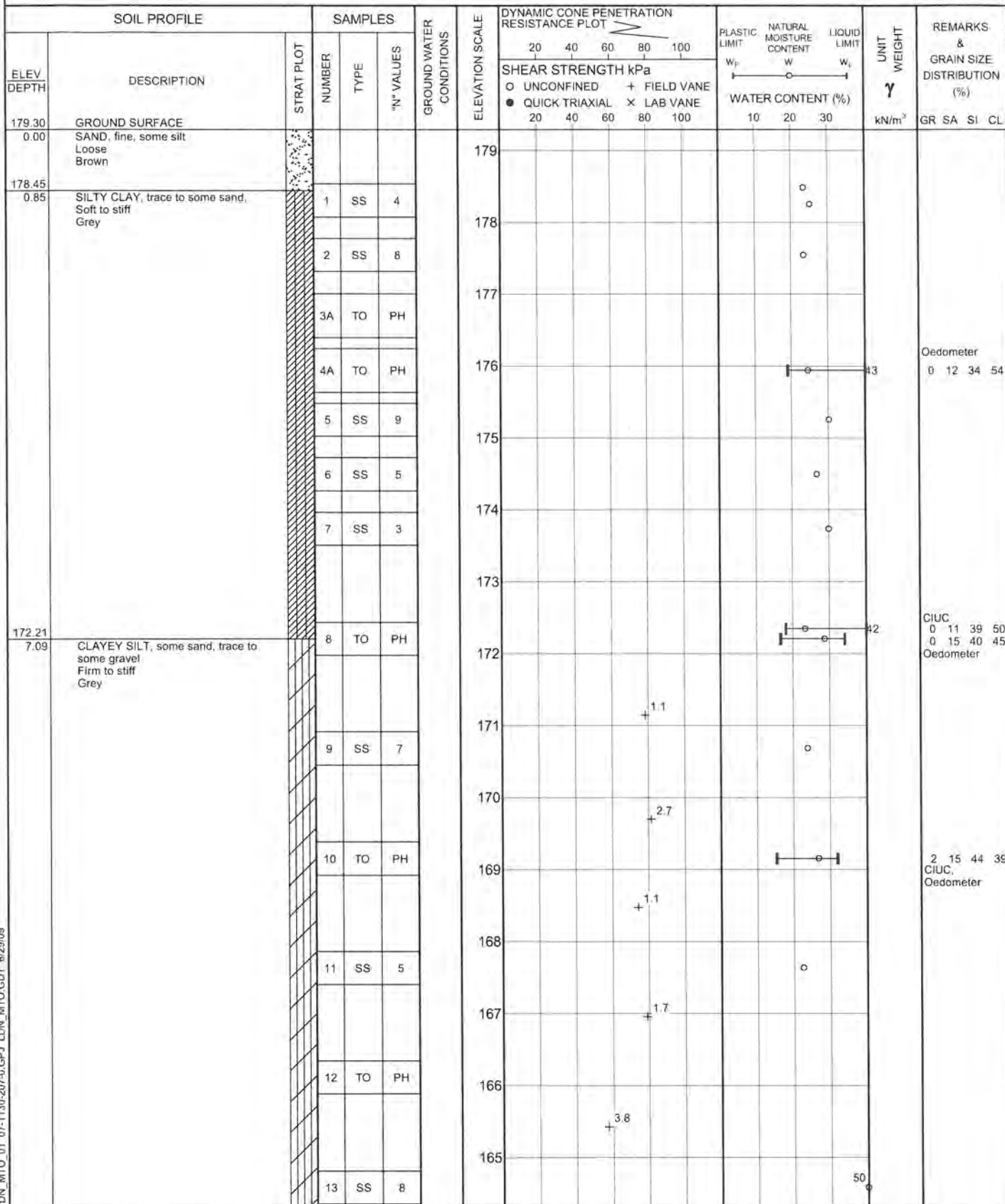
COMPILED BY BRS

DATUM GEODETIC

DATE

July 17, 2008 - July 18, 2008

CHECKED BY SJB



Continued Next Page

+ 3, X 3. Numbers refer to Sensitivity  
○ 3% STRAIN AT FAILURE

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/20/09

# RECORD OF BOREHOLE No 158

2 OF 4

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4682144.3 :E 329769.9

ORIGINATED BY SM

DIST WEST HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

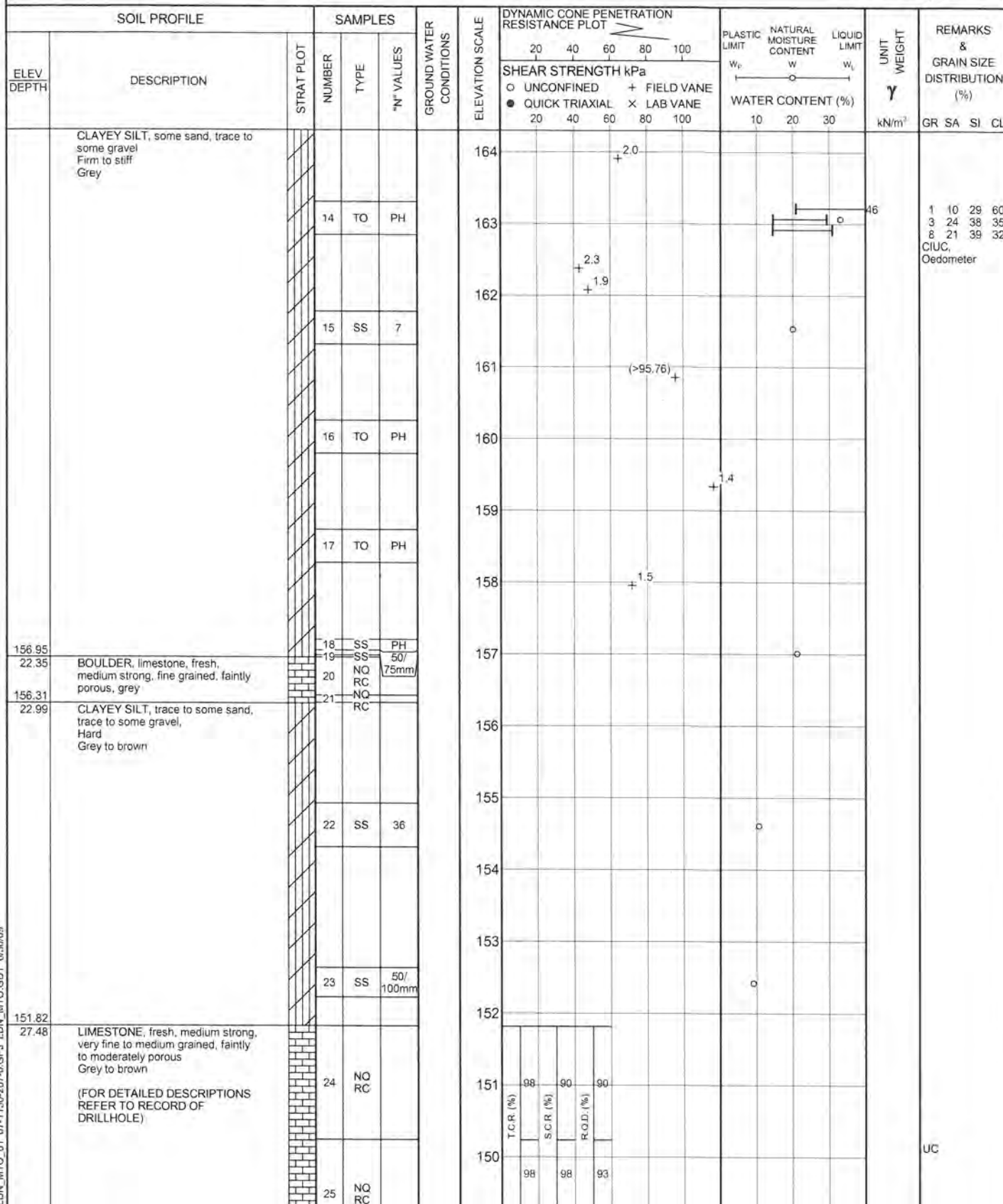
COMPILED BY BRS

DATUM GEODETIC

DATE

July 17, 2008 - July 18, 2008

CHECKED BY **SJB**



Continued Next Page

+ 3 x 3

Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/30/09



[illegible]

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 158

SHEET 4 OF 4

LOCATION: N 4682144.3 E 329769.9

DRILLING DATE: July 17, 2008 - July 18, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										DIAMETRAL CORE LOG INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
				DEPTH (m)						RECOVERY		R Q D %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
										TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	10	10	10	10			10	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

DEPTH SCALE

1 : 75



LOGGED: SG

CHECKED:

PROJECT 07-1130-207-0

# RECORD OF BOREHOLE No 160

1 OF 3

METRIC

W.P.

LOCATION

N 4682216.8 : E 329156.2

ORIGINATED BY SM

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

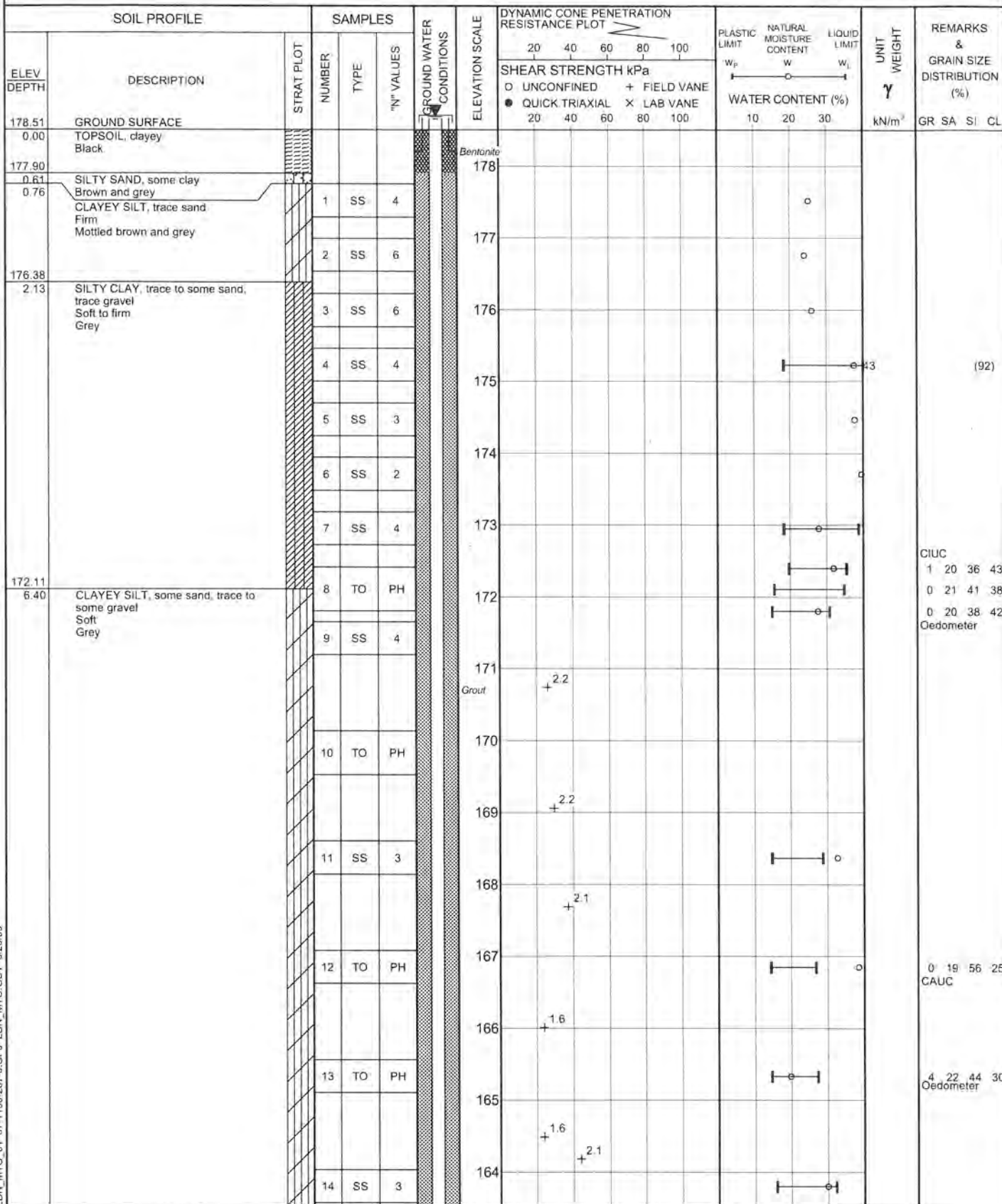
DATUM GEODETIC

DATE

July 14, 2008 - July 15, 2008

CHECKED BY

SSB



Continued Next Page

+ 3 × 3

Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 160

2 OF 3

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4682216.8 ; E 329156.2

ORIGINATED BY SM

DIST

WEST

HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY BRS

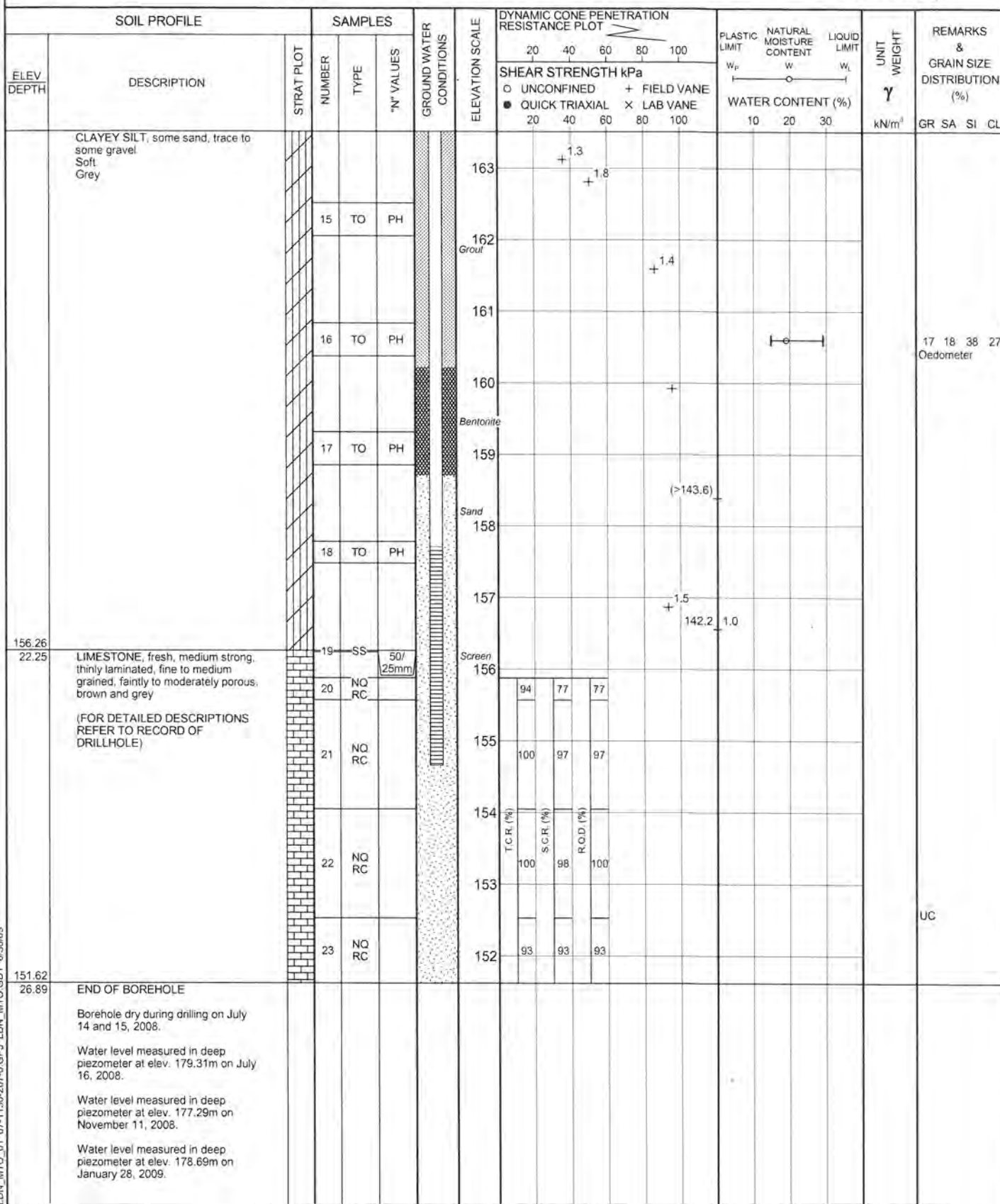
DATUM

GEODETIC

DATE

July 14, 2008 - July 15, 2008

CHECKED BY SB



+ 3, X 3: Numbers refer to Sensitivity  
○ 3% STRAIN AT FAILURE

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/30/09

LOCATION: N 4682216.8 E 329156.2

DRILLING DATE: July 14, 2008 - July 15, 2008

DATUM: GEODETIC

INCLINATION:  $-90^\circ$       AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE. NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

[illegible]

DN ROCK 03 07-1130-207-0-ROCK.GPJ GLDR LDN.GDT 5/29/09 DATA INPUT: WDF

DEPTH SCALE

1:75

LOGGED: SG

CHECKED: SJR







# RECORD OF BOREHOLE No 163

1 OF 3

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4682384.7 E 328586.3

ORIGINATED BY NG

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

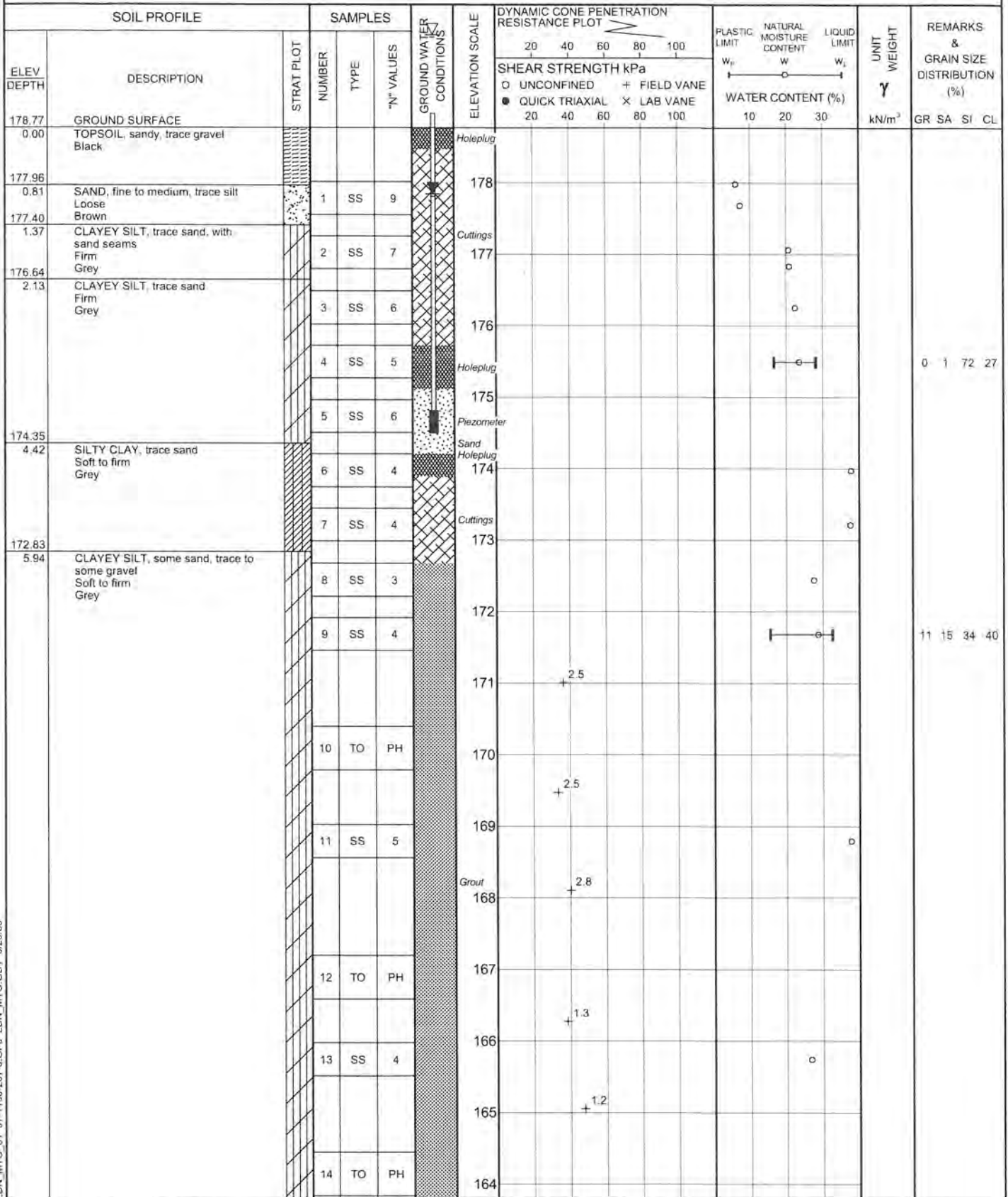
COMPILED BY LMK

DATUM GEODETIC

DATE

August 21, 2008 - August 26, 2008

CHECKED BY SJB



Continued Next Page

+ 3, x 3. Numbers refer to Sensitivity  
○ 3% STRAIN AT FAILURE

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No 163</b>		2 OF 3		<b>METRIC</b>	
W.P. _____		LOCATION <u>N 4682384.7 :E 328586.3</u>		ORIGINATED BY <u>NG</u>			
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC</u>		COMPILED BY <u>LMK</u>			
DATUM <u>GEODETIC</u>		DATE <u>August 21, 2008 - August 26, 2008</u>		CHECKED BY <u>SJB</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE 20 40 60 80 100	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W <sub>p</sub> — W — W <sub>L</sub> WATER CONTENT (%) 10 20 30	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	CLAYEY SILT, some sand, trace to some gravel Soft to firm Grey		15	SS	14		163	+ 1.2			4 22 42 32
							162				
			16	TO	PH		161				
			17	SS	13		160				
							159				
							158				
							157				
			19	SS	71		156				
155.91	LIMESTONE, fresh, medium strong, weakly laminated to laminated, very fine grained, faintly porous Grey to mottled black, brown and grey, with layers of grey silt, trace to some clay  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		20	NQ RC			155				
22.86			21	NQ RC			154				
			22	NQ RC			153				
							152				
151.41	END OF BOREHOLE Water level in borehole at about elev. 180.10m during drilling on August 26, 2008. Artesian water flow during rock coring measured at 1.37m above ground surface. Water level measured in piezometer at elev. 180.17m on August 26, 2008. at elev. 177.27 on September 19, 2008. at elev. 177.84m on Jan. 28, 2009.										UC

LDN MTO 01 07-1130-207-0.GPJ LDN MTO GDT 6/30/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 163

SHEET 3 OF 3

LOCATION: N 4682299.7 E 328445.6

DRILLING DATE: August 21, 2008 - August 26, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	PENETRATION RATE (mm/min)	COLOUR FLUSH % RETURN	ELEVATION	RECOVERY		R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)		NOTES WATER LEVELS INSTRUMENTATION
				DEPTH (m)					TOTAL CORE %	SOLID CORE %			DIP w.r.t CORE AXIS	TYPE AND SURFACE DESCRIPTION		10 <sup>4</sup>	10 <sup>5</sup>	
									50 60 70 80	80 90 100 20	5 10 15 20	0 30 60 90						
									50 60 70 80	80 90 100 20	5 10 15 20	0 30 60 90						
23	MUD ROTARY NO ROCK CORE	ROCK SURFACE		155.91 22.86														
		LIMESTONE, fresh, medium strong, thinly laminated, very fine grained, faintly porous, hydrocarbon staining, mottled dark brown and grey																
24			154.68 24.09	1														
		LIMESTONE, fresh, medium strong, laminated, very fine grained, faintly porous with occasional pits, stylolitic, grey																
25																		
26		LIMESTONE, fresh, medium strong, weakly laminated, very fine grained, faintly porous, fossiliferous, hydrocarbon, staining, mottled, dark brown to black and grey		152.91 25.86														
27																		
28		END OF DRILLHOLE		151.41 27.36														
29																		
30																		
31																		
32																		
33																		
34																		
35																		
36																		
37																		

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SJB



# RECORD OF BOREHOLE No 164

1 OF 3

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4682299.7 ; E 328445.6

ORIGINATED BY NG

DIST WEST HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY LMK

DATUM GEODETIC

DATE

August 27, 2008 - August 28, 2008

CHECKED BY *SJB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
179.06	GROUND SURFACE													
0.00	TOPSOIL, sandy Black													
0.23	SAND, fine to medium, trace silt Compact Brown		1	SS	17		178							
177.46														
1.60	SAND, medium to coarse, trace silt Loose Brown		2	SS	9		177							
176.93														
2.13	CLAYEY SILT, trace sand Firm to stiff Grey		3	SS	9		176							
			4	SS	4									0 2 71 27
175.40														
3.66	SILTY CLAY, trace sand, trace gravel Soft to stiff Grey		5	SS	7		175							
			6	SS	5		174							
			7	SS	3		173							
			8	SS	4		172							
			9	SS	3									
							171	2.4						
			10	SS	6		170							1 9 32 58
			11	TO	PH		169	2.0						
							168	2.8						
			12	SS	4		167							
							166							
			13	TO	PH		165	1.4						
			14	SS	4									

Continued Next Page

+ 3, X 3: Numbers refer to Sensitivity  
O 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 164

2 OF 3

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4682299.7 ; E 328445.6

ORIGINATED BY NG

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY LMK

DATUM GEODETIC

DATE

August 27, 2008 - August 28, 2008

CHECKED BY *SJS*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
	SILTY CLAY, trace sand, trace gravel Soft to stiff Gray													
			15	TO	PH		163		+ 1.4					
							162		+ 1.0					
			16	SS	9		161							
							160		(+95.76)					
			17	TO	PH		159							
							158							
			18	SS	WH		157							
							156							
155.59			20	SS	118/75mm		155							
23.47	LIMESTONE, fresh, medium strong, weakly laminated to laminated, very fine to fine grained, faintly porous to porous Brown and grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILLHOLE)		21	NQ RC			154							
			22	NQ RC			153							
			23	NQ RC			152							
151.58	END OF BOREHOLE													
27.48	Borehole dry during drilling on August 27 and 28, 2008.													

+ 3, x 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

LDN\_MTO\_01\_07-1130-207-0.GPJ LDN\_MTO.GDT 6/30/09

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 164

SHEET 3 OF 3

LOCATION: N 4682299.7 ,E 328445.6

DRILLING DATE: August 27, 2008 - August 28, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For occasional abbreviations refer to list of abbreviations & symbols										DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)		NOTES WATER LEVELS INSTRUMENTATION
				DEPTH (m)	FRACT INDEX PER 0.3						RECOVERY		R.Q.D. %	DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	10 <sup>4</sup>	10 <sup>3</sup>	10 <sup>2</sup>	10 <sup>1</sup>							
											TOTAL CORE %	SOLID CORE %								0	30	60		90		
																									90	
		ROCK SURFACE		155.59																						
		LIMESTONE, medium strong, brown and grey		23.42																						
24		LIMESTONE, fresh, medium strong, weakly laminated, fine grained, porous nearly hydrocarbon staining and odour, fossiliferous (up to 4 cm diameter), mottled grey - brown to black		154.58	1					155																
25		LIMESTONE, fresh, medium, strong, laminated, very fine to fine grained, faintly porous, occasional stylolites, minor hydrocarbon staining, grey with whitish grey zones		24.48	2					154																
26										153																
27		LIMESTONE, fresh, medium strong, weakly laminated, very fine to fine grained, faintly porous with occasional pits, fossiliferous (up to 1 cm diameter), zones with heavy hydrocarbon staining, light grey with dark grey to brown zones		152.39	3					152																
28		END OF DRILLHOLE		26.67																						
29				27.48																						
30																										
31																										
32																										
33																										
34																										
35																										
36																										
37																										
38																										

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SSB

+3, X3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

# RECORD OF BOREHOLE No 166

1 OF 3

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4682168.3; E 328349.6

ORIGINATED BY CC

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

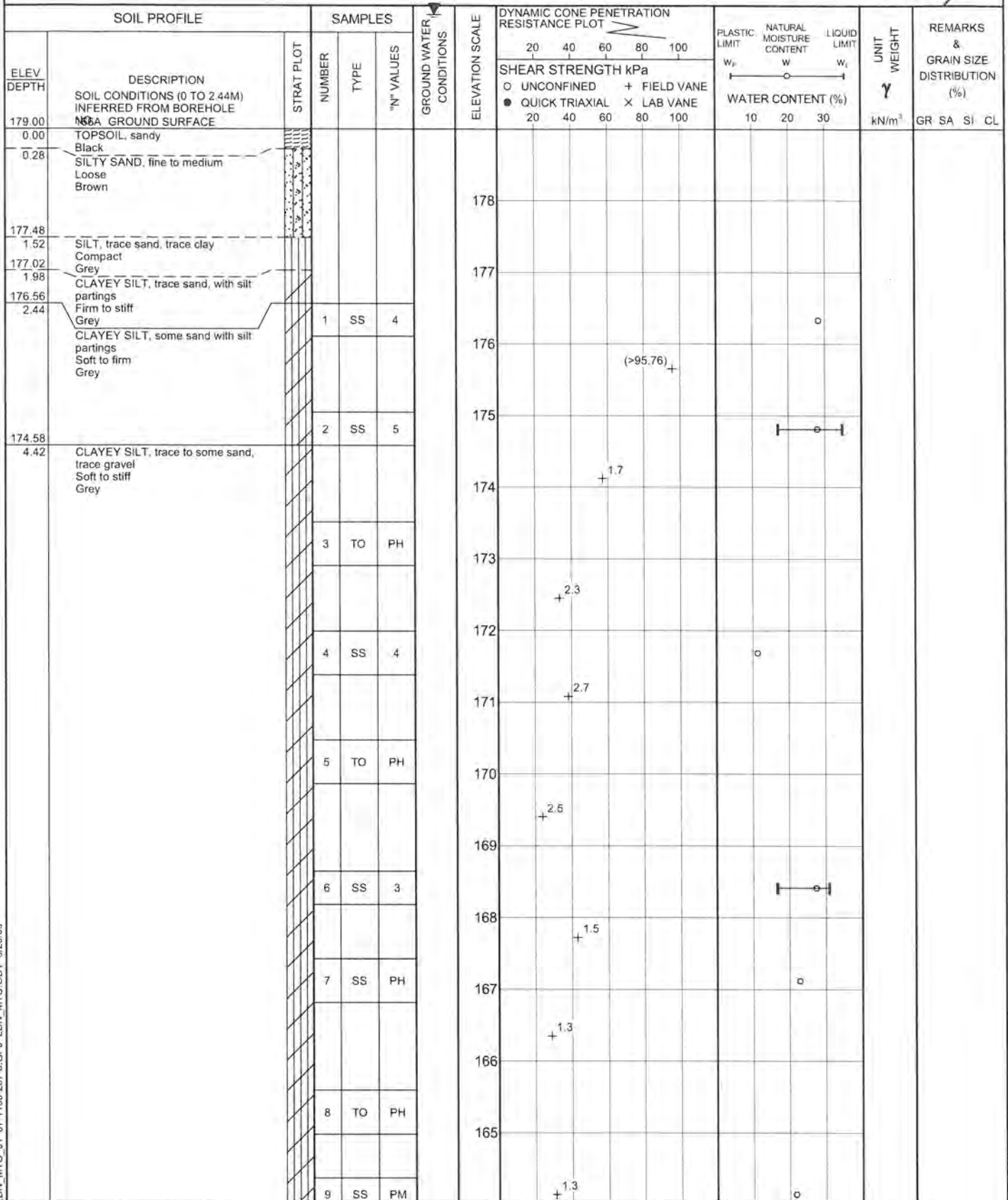
COMPILED BY LMK

DATUM GEODETIC

DATE

September 11, 2008 - September 17, 2008

CHECKED BY *SLB*



Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE



# RECORD OF BOREHOLE No 166

2 OF 3

METRIC

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4682168.3 :E 328349.6

ORIGINATED BY CC

DIST WEST HWY 401/3

BOREHOLE TYPE

POWER AUGER, MUD ROTARY WITH HQ TRICONE, NQRC

COMPILED BY LMK

DATUM GEODETIC

DATE

September 11, 2008 - September 17, 2008

CHECKED BY SJS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	20 40 60 80 100					
	CLAYEY SILT, trace to some sand, trace gravel Soft to stiff Grey														
			10	TO	PH		163								
			11	SS	15		162								
			12	TO	PH		161								
			13	SS	9		160								
			14	SS	9		159								
			15	NQ RC			158								
			16	NQ RC			157								
			17	NQ RC			156								
155.73	LIMESTONE, fresh, medium strong, weakly to thinly laminated, very fine to fine grained, faintly porous Mottled brown and grey  (FOR DETAILED DESCRIPTION REFER TO RECORD OF DRILLHOLE)						155								
23.27							154								
							153								
152.08	END OF BOREHOLE														
26.92	Water level in borehole at about elev. 180.6m during drilling on September 17, 2008.  Artesian water flow during rock coring measured at 1.60m above ground surface.														

+ 3 x 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT: 07-1130-207-0

## RECORD OF DRILLHOLE: 166

SHEET 3 OF 3

LOCATION: N 4682168.3 ;E 328349.6

DRILLING DATE: September 11, 2008 - September 17, 2008

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: MUD ROTARY WITH HQ TRICONE, NQRC

DRILLING CONTRACTOR: AARDVARK DRILLING INC

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH % RETURN	ELEVATION	JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular PO- Polished K - Slickensided SM- Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols										HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)			NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
										RECOVERY		R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA		TYPE AND SURFACE DESCRIPTION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
										TOTAL CORE %	SOLID CORE %			DIP w.r.t CORE AXIS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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24	MUD ROTARY NO ROCK CORE	ROCK SURFACE		155.73																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SSB





PROJECT <u>09-1132-0003</u>		<b>RECORD OF BOREHOLE No 201</b>		1 OF 3	<b>METRIC</b>
W.P. <u>3118-08-01</u>	LOCATION <u>N 4677610.4 :E 335770.5</u>	ORIGINATED BY <u>NG</u>			
DIST <u>WEST</u> HWY <u>WEP/3</u>	BOREHOLE TYPE <u>POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ</u>	COMPILED BY <u>LMK/DMB</u>			
DATUM <u>GEODETIC</u>	DATE <u>February 12, 2009 - February 13, 2009</u>	CHECKED BY <u>SJB</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa	WATER CONTENT (%)					
187.67	GROUND SURFACE													
0.00	TOPSOIL, clayey Black													
0.33	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Very stiff to hard Mottled brown and grey		1	SS	26									
			2	SS	34									
			3	SS	44									
184.77	CLAYEY SILT, some sand, trace gravel, with occasional sand pockets Stiff to hard Grey		4	SS	39									2 30 43 25
2.90			5	SS	23									
			6	TO	PH									
			7	SS	31									0 29 45 26
			8	SS	20									
			9	SS	10									
			10	TO	PH									
			11	SS	13									
			12	SS	13									2 30 40 28
			13	SS	PH									ZERO RECOVERY IN SHELBY TUBE PUSHED

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 5/29/09

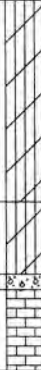

Continued Next Page

+ 3 × 3, Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



+3, X3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

<b>PROJECT</b> 09-1132-0003		<b>RECORD OF BOREHOLE No 201</b>		3 OF 3	<b>METRIC</b>
<b>W.P.</b> 3118-08-01		<b>LOCATION</b> N 4677610.4 ; E 335770.5		<b>ORIGINATED BY</b> NG	
<b>DIST</b> WEST HWY WEP/3		<b>BOREHOLE TYPE</b> POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ		<b>COMPILED BY</b> LMK/DMB	
<b>DATUM</b> GEODETIC		<b>DATE</b> February 12, 2009 - February 13, 2009		<b>CHECKED BY</b> SJB	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>F</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
	CLAYEY SILT, some sand, trace gravel Very stiff Grey						157							
155.67			24	SS	20		156							
32.00	CLAYEY SILT, some sand, trace gravel with sand pockets Hard Grey													
154.95							155							
32.72	SAND AND GRAVEL, trace silt Very dense Grey		25	SS	116/ 250mm									
32.87														
153.99	LIMESTONE (inferred) Grey						154							
33.68	END OF BOREHOLE													
	Groundwater encountered at about elev. 180.3m during drilling on February 12, 2009.													

LDN\_MTO\_01\_09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○<sup>3</sup>% STRAIN AT FAILURE



# RECORD OF BOREHOLE No 202

1 OF 4

METRIC

PROJECT 09-1132-0003

W.P. 3118-08-01

LOCATION N 4677573.5 ; E 335753.3

ORIGINATED BY NG

DIST WEST HWY WEP/3

BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ, NQRC

COMPILED BY LMK/DMB

DATUM GEODETIC

DATE February 18, 2009

CHECKED BY *SJB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
187.31	GROUND SURFACE							○ UNCONFINED + FIELD VANE						
0.00	TOPSOIL, clayey		1	SS	10		187	● QUICK TRIAXIAL × LAB VANE						
0.18	Stiff Black CLAYEY SILT, some sand, trace gravel Stiff to very stiff Mottled brown and grey		2	SS	10		186							
			3	SS	22		185							3 27 39 31
185.18														
2.13	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Very stiff to hard Brown		4	SS	66		184							7 28 43 22
			5	SS	62		183							
			6	SS	20		182							
182.43			7	TO	PH		181							
4.88	CLAYEY SILT, some sand, trace gravel Firm to hard Grey		8	SS	21		180							
			9	SS	34		179							
							178							
			10	SS	9		177							1 31 44 24
							176							
			11	SS	8		175							
							174							
			12	TO	PH		173							
			13	SS	20									7 33 35 25
			14	SS	13									

Continued Next Page

+ 3 × 3 Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

## METRIC

PROJECT 09-1132-0003

W.P. 3118-08-01

LOCATION N 4677573.5 E 335753.3

ORIGINATED BY NG

DIST WEST HWY WEP/3

BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ, NQRC

COMPILED BY LMK/DMB

DATUM GEODETIC

DATE February 18, 2009

CHECKED BY *SSB*

[illegible]

Continued Next Page

+ 3, X 3, Numbers refer to Sensitivity      O 3% STRAIN AT FAILURE



## METRIC

PROJECT 09-1132-0003

W.P. 3118-08-01

LOCATION N 4677573.5 ; E 335753.3

ORIGINATED BY NG

DIST WEST HWY WEP/3

BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ, NQRC

COMPILED BY LMK/DMB

DATUM GEODETTIC

DATE February 18, 2009

CHECKED BY **SJB**

[illegible]

+3, X3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT: 09-1132-0003

## RECORD OF DRILLHOLE: 202

SHEET 4 OF 4

LOCATION: N 4677573.5;E 335753.3

DRILLING DATE: February 18, 2009

DATUM: GEODETIC

INCLINATION: -90° AZIMUTH: —

DRILL RIG: POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ, NQRC

DRILLING CONTRACTOR: LANTECH

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	PENETRATION RATE (mm/min)	FLUSH	COLOUR % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Congregate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock  NOTE: For additional abbreviations refer to list of abbreviations & symbols										HYDRAULIC CONDUCTIVITY k, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)		NOTES WATER LEVELS INSTRUMENTATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
				DEPTH (m)	ELEVATION						RECOVERY			R.Q.D. %	FRACT INDEX PER 0.3	DISCONTINUITY DATA			DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION		10 <sup>0</sup> 10 <sup>1</sup> 10 <sup>2</sup> 10 <sup>3</sup>	2 4 6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
											TOTAL CORE %	SOLID CORE %	60 40 20			60 40 20	60 40 20	60 40 20							60 40 20	60 40 20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		ROCK SURFACE		154.08																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SJB

# RECORD OF BOREHOLE No 203

1 OF 3

METRIC

PROJECT 09-1132-0003

W.P. 3118-08-01

LOCATION N 4677539.3 E 335743.5

ORIGINATED BY NG

DIST WEST HWY WEP/3

BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ

COMPILED BY LMK/DMB

DATUM GEODETTIC

DATE February 25, 2009 - February 26, 2009

CHECKED BY *SWB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE x LAB VANE						
187.23	GROUND SURFACE							20 40 60 80 100							
0.00	TOPSOIL, clayey Black		1	AS			187								
186.62															
0.61	CLAYEY SILT, some sand, trace gravel Very stiff Mottled brown and grey		2	SS	15		186				○				
			3	SS	28						├───┤			2 29 39 30	
185.10															
2.13	CLAYEY SILT, some sand, trace gravel Very stiff to hard Brown		4	SS	60		185				○				
			5	SS	60		184				├───┤			3 29 37 31	
			6	SS	24						○				
182.81							183								
4.42	CLAYEY SILT, some sand, trace gravel Very stiff Grey		7	TO	PH		182				○				
			8	SS	16										
			9	SS	21		181				○				
179.76							180								
7.47	SILTY SAND, some clay, trace gravel Compact Grey		10	SS	20		179				├───┤			4 41 39 16	
178.09							178								
9.14	CLAYEY SILT, some sand, trace gravel Stiff to very stiff Grey		11	SS	PH		177				○			ZERO RECOVERY IN SHELBY TUBE, PUSHED SPLIT-SPOON SAMPLER.	
			12	TO	PH		176				○				
			13	SS	11		175								
							174				○				
</															

Continued Next Page

+ 3, x 3. Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 203</b>		2 OF 3	<b>METRIC</b>
W.P. 3118-08-01	LOCATION N 4677539.3 E 335743.5	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ	COMPILED BY LMK/DMB			
DATUM GEODETTIC	DATE February 25, 2009 - February 26, 2009	CHECKED BY <i>SSS</i>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40					
	CLAYEY SILT, some sand, trace gravel Stiff to very stiff Grey													
			15	TO	PH									
			16	SS	11									
			17	SS	17									
167.34														
19.89	SILTY CLAY, some sand, trace gravel Stiff to very stiff Grey		18	SS	14									
			19	SS	22									
164.29														
22.94	CLAYEY SILT, some sand, trace gravel Very stiff Grey		20	SS	22									3 29 45 23
162.85														
24.38	SANDY SILT, trace clay Dense Grey		21	SS	45									0 33 60 7
161.32														
25.91	CLAYEY SILT, some sand, trace gravel Hard Grey		22	SS	34									
159.06														
28.17	SANDY SILT, trace clay, with gravel layers Very dense Grey		23	SS	129									12 32 50 6
158.27														
28.96	SILTY CLAY, some sand, trace gravel Stiff to very stiff Grey		24	SS	21									

LDN\_MTO\_01\_09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+ 3, X 3. Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 203</b>		3 OF 3	<b>METRIC</b>
W.P. 3118-08-01	LOCATION N 4677539.3 :E 335743.5	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ	COMPILED BY LMK/DMB			
DATUM GEODETIC	DATE February 25, 2009 - February 26, 2009	CHECKED BY <i>SJB</i>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)		
							20 40 60 80 100											
				</														

LDN\_MTO\_01\_09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09



PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 206</b>		1 OF 3	<b>METRIC</b>
W.P. 3117-08-01	LOCATION N 4677645.8 E 335462.4			ORIGINATED BY NG	
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ			COMPILED BY LMK/DMB	
DATUM GEODETIC	DATE February 9, 2009 - February 10, 2009			CHECKED BY <i>CSB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE × LAB VANE						
							20 40 60 80 100	20 40 60 80 100	10 20 30						
186.48	GROUND SURFACE														
0.00	TOPSOIL														
0.20	Firm Black		1	SS	7										
185.87	CLAYEY SILT, some sand, trace gravel														
0.61	Firm		2	SS	11										
185.41	Mottled brown and grey														
1.07	SAND, fine, trace silt														
	Compact Grey		3	SS	6									2 23 45 30	
184.35	CLAYEY SILT, some sand, trace gravel, with oxidized fissures														
2.13	Firm to stiff		4	SS	28										
	Mottled brown and grey														
	CLAYEY SILT, some sand, trace gravel, with oxidized fissures		5	SS	44									5 43 40 12	
	Very stiff to hard Brown		6	SS	35										
181.60	CLAYEY SILT, some sand, trace gravel		7	TO	PH										
4.88	Firm to hard Grey		8	SS	17									2 30 41 27	
			9	SS	17										
			10	SS	13										
			11	SS	9										
			12	TO	PH										
			13	SS	6									6 28 41 25	
			14	SS	14										
			15	TO	PH										

LDN MTO 01 09-1132-0003.GPJ LDN MTO.GDT 5/29/09

Continued Next Page

+ 3 × 3 Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 206</b>		2 OF 3	<b>METRIC</b>
W.P. 3117-08-01	LOCATION N 4677645.8 ; E 335462.4	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ	COMPILED BY LMK/DMB			
DATUM GEODETIC	DATE February 9, 2009 - February 10, 2009	CHECKED BY <b>SDB</b>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE	WATER CONTENT (%)					
	CLAYEY SILT, some sand, trace gravel Firm to hard Grey						171							
			16	SS	14		170							
							169							
			17	SS	8		168	3.8						
			18	SS	7		167							1 13 40 46
							166	1.3						
			19	SS	8		165							
							164	1.8						
			20	SS	13		163							
							162							
			21	SS	20		161							
							160							
			22	SS	76		159							
							158							1 14 49 36
			23	SS	13		157							
			24	SS	14									



LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

156.46

Continued Next Page

+ 3, x 3. Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 206</b>		3 OF 3	<b>METRIC</b>
W.P. 3117-08-01	LOCATION N 4677645.8 ; E 335462.4	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ	COMPILED BY LMK/DMB			
DATUM GEODETIC	DATE February 9, 2009 - February 10, 2009	CHECKED BY <i>SJS</i>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100						20 40 60 80 100
30.02	SILTY SAND, some clay, trace gravel, with silt pockets Very dense Grey		25	SS	72	156							5 47 32 16	
155.70														
30.78	CLAYEY SILT, some sand, trace gravel, with sandy silt pockets Very stiff to hard Grey		26	SS	29									155
154.20			27	SS	80/ 280mm	154								
32.28	LIMESTONE (inferred) Grey													
153.51														
32.97	END OF BOREHOLE  Groundwater encountered at about elev. 173.9m during drilling on February 10, 2009.													

LDN\_MTO\_01\_09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

DN MTO 01 09-1132-0003.GPJ LDN MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 207</b>		2 OF 4	<b>METRIC</b>
W.P. 3117-08-01	LOCATION N 4677598.1 E 335502.7	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ, NQRC	COMPILED BY LMK/DMB			
DATUM GEODETIC	DATE February 27, 2009 - March 2, 2009	CHECKED BY <i>SS</i>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								○ UNCONFINED								+ FIELD VANE		● QUICK TRIAXIAL
							20	40	60	80	100		10	20	30			
	CLAYEY SILT, some sand, trace gravel Stiff to hard Grey																	
			14	SS	13													
				15	SS	13												
				16	SS	10												
				17	SS	13												
				18	SS	20												
				19	SS	38												
				20	SS	23												
				21	SS	21												
				22	SS	34												
				23	SS	15												

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

Continued Next Page

+ 3, x 3. Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT <u>09-1132-0003</u>		<b>RECORD OF BOREHOLE No 207</b>		3 OF 4	<b>METRIC</b>
W.P. <u>3117-08-01</u>	LOCATION <u>N 4677598.1 :E 335502.7</u>	ORIGINATED BY <u>NG</u>			
DIST <u>WEST</u> HWY <u>WEP/3</u>	BOREHOLE TYPE <u>POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ, NQRC</u>	COMPILED BY <u>LMK/DMB</u>			
DATUM <u>GEODETIC</u>	DATE <u>February 27, 2009 - March 2, 2009</u>	CHECKED BY <u>SJB</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH kPa								WATER CONTENT (%)
								20	40	60						
	CLAYEY SILT, some sand, trace gravel Stiff to hard Grey															
			24	SS	100											
154.53			25	SS	100/50mm											
32.36	LIMESTONE, fresh, medium strong, thinly laminated, very fine to coarse grained, faintly porous Light tan to grey  (FOR DETAILED DESCRIPTIONS REFER TO RECORD OF DRILL HOLE)															
			26	NQ RC												
			27	NQ RC												
151.53																
35.36	END OF BOREHOLE  Groundwater encountered at about elev. 176.1m during drilling on February 27, 2009.  Water level measured in deep piezometer at elev. 178.05m on May 26, 2009.															

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO\_GDT 5/29/09

PROJECT: 09-1132-0003

## RECORD OF DRILLHOLE: 207

SHEET 4 OF 4

LOCATION: N 4677598.1 E 335502.7

DRILLING DATE: February 27, 2009 - March 2, 2009


DATUM: GEODETIC

INCLINATION: -90°

AZIMUTH: —

DRILL RIG: POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ, NQRC

DRILLING CONTRACTOR: LANTECH

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	ELEVATION	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Congregate BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular PO - Polished K - Slickensided SM - Smooth Ro - Rough Br - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols.										DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION			
				DEPTH (m)	RUN No.					RECOVERY			FRACT. INDEX PER 0.3	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY k, cm/sec								
										TOTAL CORE %	SOLID CORE %	R.Q.D. %		DIP w.r.t CORE AXIS	TYPE AND SURFACE DESCRIPTION	10 <sup>-2</sup>	10 <sup>-1</sup>	10 <sup>0</sup>						
										00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47														
		ROCK SURFACE		154.53																				
	MUD ROTARY NO ROCK CORE	LIMESTONE, fresh, medium strong, weakly laminated, medium grained, faintly porous, light to tan grey Broken core from about elev. 154.6m to about elev. 154.3m		154.36 154.26	1				154															
33																								
		LIMESTONE, fresh, medium strong, weakly laminated, very fine grained, faintly porous, grey with dark grey inclusions, stylolitic		153.61 153.28 153.21 153.68																				
34																								
		LIMESTONE, fresh, medium strong, weakly laminated, very fine to coarse grained, faintly porous, light grey, fossiliferous, stylolitic		152.20 152.69		2																		
35																								
		LIMESTONE, fresh, medium strong, thinly laminated, fine to coarse grained, faintly porous with porous zones, light tan, fossiliferous		151.53 151.36																				
36																								
		LIMESTONE, fresh, medium strong, thinly laminated, fine to coarse grained, faintly porous, light grey, stylolitic																						
37																								
	LIMESTONE, fresh, medium strong, thinly laminated, fine grained, faintly porous, light tan, stylolitic																							
38																								
	END OF DRILLHOLE																							
39																								
40																								
41																								
42																								
43																								
44																								
45																								
46																								
47																								

LDN, ROCK 03 09-1132-0003-ROCK.GPJ GLDR LDN.GDT 6/29/09 DATA INPUT: LMK

DEPTH SCALE

1:75



LOGGED: SG

CHECKED: SJB

PROJECT <u>09-1132-0003</u>		<b>RECORD OF BOREHOLE No 208</b>		1 OF 3	<b>METRIC</b>
W.P. <u>3117-08-01</u>	LOCATION <u>N 4677543.9 ; E 335526.5</u>	ORIGINATED BY <u>NG</u>			
DIST <u>WEST</u> HWY <u>WEP/3</u>	BOREHOLE TYPE <u>POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ</u>	COMPILED BY <u>LMK/DMB</u>			
DATUM <u>GEODETIC</u>	DATE <u>March 4, 2009 - March 5, 2009</u>	CHECKED BY <u>SJB</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT  γ  KN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100		w								
								SHEAR STRENGTH kPa						WATER CONTENT (%)				
								○ UNCONFINED							+ FIELD VANE	● QUICK TRIAXIAL	× LAB VANE	
186.88	GROUND SURFACE																	
0.00	TOPSOIL, clayey Black																	
186.42	CLAYEY SILT, some sand, trace gravel Hard Brown		1	SS	34	186												
0.46			2	SS	40	185							8 28 40 24					
			3	SS	33	184												
			4	SS	52/ 100mm													
183.22	CLAYEY SILT, some sand, trace gravel Stiff to hard Grey		5	SS	23	183							3 30 42 25					
3.66			6	TO	PH	182												
			7	SS	16	181												
			8	SS	38	180							2 32 41 25					
			9	SS	13	179												
			10	SS	14	178												
			11	TO	PH	177												
			12	SS	21	176												
			13	SS	10	174							1 29 43 27					
			14	SS	14	173												
						172												

Continued Next Page

+3 X 3: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

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PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 208</b>		2 OF 3	<b>METRIC</b>
W.P. 3117-08-01	LOCATION N 4677543.9; E 335526.5	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ	COMPILED BY LMK/DMB			
DATUM GEODETIC	DATE March 4, 2009 - March 5, 2009	CHECKED BY <i>SJB</i>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								○ UNCONFINED								+ FIELD VANE		● QUICK TRIAXIAL
						20	40	60	80	100	10	20	30					
	CLAYEY SILT, some sand, trace gravel Stiff to hard Grey		15	TO	PH								43					
			16	SS	10									1 24 43 32				
168.51																		
18.37	SILTY CLAY, some sand, trace gravel Stiff Grey		17	SS	10													
			18	SS	10													
165.46																		
21.42	CLAYEY SILT, some sand, trace gravel Very stiff to hard Grey		19	SS	19													
			20	SS	35									2 24 47 27				
			21	SS	57													
			22	SS	25													
			23	SS	20													
157.11			24	SS	41									0 45 50 5				
29.77	SANDY SILT, trace clay																	

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Continued Next Page

+ 3, X 3, Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 208A</b>		1 OF 1	<b>METRIC</b>
W.P. 3117-08-01	LOCATION N 4677543.9 E 335528.5	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ	COMPILED BY DMB			
DATUM GEODETIC	DATE March 5, 2009	CHECKED BY <b>SJB</b>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	
ELEV. DEPTH	DESCRIPTION  (SOIL CONDITIONS INFERRED FROM BOREHOLE No. 208)	STRAT. PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE × LAB VANE						
186.88	GROUND SURFACE							20 40 60 80 100	10 20 30						
0.00	TOPSOIL, clayey Black						Holeplug								
186.42															
0.46	CLAYEY SILT, some sand, trace gravel Hard Brown														

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO\_GDT 6/29/09



PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 208</b>		3 OF 3	<b>METRIC</b>
W.P. 3117-08-01	LOCATION N 4677543.9; E 335526.5	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, HOLLOW STEM, WASH BORING WITH HQ	COMPILED BY LMK/DMB			
DATUM GEODETIC	DATE March 4, 2009 - March 5, 2009	CHECKED BY <i>SJB</i>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40					
29.95	Dense Grey CLAYEY SILT, some sand, trace gravel Hard Grey													
			25	SS	31									
154.57														
32.31	LIMESTONE (inferred) Grey													
153.35														
33.53	END OF BOREHOLE													
	Groundwater encountered at about elev. 177.2m during drilling on March 4, 2009.													

LDN\_MTO\_01\_09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

## METRIC

PROJECT 09-1132-0003

W.P.

LOCATION

N 4678473.3 ;E 337006.7

ORIGINATED BY NG

DIST \_\_\_\_\_

WEST

HWY WEP/3

BOREHOLE TYPE

POWER AUGER, HOLLOW STEM

COMPILED BY LMK

DATUM GEODETTIC

DATE \_\_\_\_\_

March 12, 2009

CHECKED BY SJS

[illegible]

DN MTO 01 09-1132-0003.GPJ LDN MTO.GDT 6/29/09

+3, ×3. Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 216N</b>		1 OF 1	<b>METRIC</b>
W.P. _____	LOCATION N 4678422 6 :E 336959 2	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, SOLID STEM	COMPILED BY LMK			
DATUM GEODETIC	DATE March 11, 2009	CHECKED BY <i>SYB</i>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								20 40 60 80 100										

189.29	GROUND SURFACE													
0.00	TOPSOIL, clayey						189							
0.13	Brown													
	CLAYEY SILT, some sand, trace													
	gravel, with oxidized fissures													
	Hard													
	Brown		1	SS	42									
							188							
			2	SS	63									
187.16	CLAYEY SILT, some sand, trace													
2.13	gravel													
	Very stiff													
	Grey													
							187							
			3	SS	29									
			4	SS	29		186							
			5	SS	18									
							185							
			6	SS	17									
184.26	END OF BOREHOLE													
5.03	Borehole dry during drilling on March 11, 2009.													

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 217N</b>		1 OF 1	<b>METRIC</b>
W.P. _____	LOCATION N 4678380.3 ; E 336912.2	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, SOLID STEM	COMPILED BY LMK			
DATUM GEODETIC	DATE March 11, 2009	CHECKED BY <b>SJB</b>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						WATER CONTENT (%)				
								20 40 60 80 100										
189.25	GROUND SURFACE																	
0.00	TOPSOIL, clayey Brown																	
0.15	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown		1	SS	38													
			2	SS	65													
186.94																		
2.31	CLAYEY SILT, some sand, trace gravel Stiff to hard Grey		3	SS	32													
			4	SS	21													
			5	SS	16													
			6	SS	12													
184.22	END OF BOREHOLE																	
5.03	Borehole dry during drilling on March 11, 2009.																	

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LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 218N</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4678335.0 :E 336858.4		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 11, 2009		CHECKED BY <b>SJB</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa	WATER CONTENT (%)					
189.13	GROUND SURFACE													
0.00	TOPSOIL, clayey Brown						189							
0.23	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown		1	SS	52		188							
			2	SS	79		187							
186.59	CLAYEY SILT, some sand, trace gravel, with oxidized fissures to 2.9m depth Stiff to very stiff Grey		3	SS	42		186							
2.54			4	SS	25		185							
			5	SS	15									
184.10	END OF BOREHOLE		6	SS	17									
5.03	Borehole dry during drilling on March 11, 2009.													



PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 219N</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4678296.5 :E 336813.1		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 11, 2009		CHECKED BY <i>SLB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED    + FIELD VANE ● QUICK TRIAXIAL    × LAB VANE						
189.03	GROUND SURFACE													
0.00	TOPSOIL, clayey													
0.13	Brown CLAYEY SILT, some sand, trace gravel, with oxidized fissures Stiff to hard Mottled brown and grey		1	SS	44		188							
			2	SS	66		187							
			3	SS	71									
186.13							186							
2.90	CLAYEY SILT, some sand, trace gravel Stiff to Very stiff Grey		4	SS	25									
			5	SS	17		185							2 29 41 28
184.00			6	SS	12									
5.03	END OF BOREHOLE													
	Borehole dry during drilling on March 11, 2009.													

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PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 220N</b>		1 OF 1	<b>METRIC</b>
W.P.	LOCATION	N 4678250.7 :E 336760.7		ORIGINATED BY NG	
DIST WEST HWY WEP/3	BOREHOLE TYPE	POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC	DATE	March 11, 2009		CHECKED BY <b>SJB</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT $w_p$	NATURAL MOISTURE CONTENT $w$	LIQUID LIMIT $w_L$	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
188.85	GROUND SURFACE													
0.00	TOPSOIL, clayey													
0.13	Brown CLAYEY SILT, some sand, trace gravel, with oxidized fissures													
	Hard Mottled brown and grey		1	SS	39									
			2	SS	77									
			3	SS	45									
185.95	CLAYEY SILT, some sand, trace gravel													
2.90	Very stiff Grey		4	SS	23									
			5	SS	16									
			6	SS	16									
183.82	END OF BOREHOLE													
5.03	Borehole dry during drilling on March 11, 2009.													

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 221N</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4678208.5 ; E 336713.2		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 11, 2009		CHECKED BY <i>SJB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE										
188.81	GROUND SURFACE						20	40	60	80	100							
0.00	TOPSOIL, clayey Black																	
0.25	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown to mottled brown and grey		1	SS	53													
			2	SS	60													
186.68	CLAYEY SILT, some sand, trace gravel Very stiff to hard Grey		3	SS	34													
2.13			4	SS	24													
			5	SS	23													
			6	SS	20													
183.78	END OF BOREHOLE																	
5.03	Borehole dry during drilling on March 11, 2009.																	

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PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 222N</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4678162.8 :E 336656.1		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 11, 2009		CHECKED BY <b>SJS</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								○ UNCONFINED								+ FIELD VANE		● QUICK TRIAXIAL
188.49	GROUND SURFACE					20	40	60	80	100								
0.00	TOPSOIL, clayey Black																	
0.15	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown		1	SS	54													
			2	SS	68													
186.06																		
2.43	CLAYEY SILT, some sand, trace gravel, with oxidized fissures to 2.9m depth Very stiff to hard Grey		3	SS	52													
			4	SS	29													
			5	SS	21													
			6	SS	19													
183.46	END OF BOREHOLE																	
5.03	Borehole dry during drilling on March 11, 2009.																	

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 223N</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4678122.1 E 336610.5		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 11, 2009		CHECKED BY <i>SSB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								20 40 60 80 100										
188.24	GROUND SURFACE																	
0.00	TOPSOIL, clayey						188											
0.13	Black																	
	CLAYEY SILT, some sand, trace																	
	gravel, with oxidized fissures																	
	Hard																	
	Brown																	
			1	SS	84													
							187											
			2	SS	63													
185.88							186											
2.36	CLAYEY SILT, some sand, trace																	
	gravel, with oxidized fissures to																	
	2.9m depth																	
	Very stiff																	
	Grey																	
			3	SS	25													
			4	SS	22		185											
			5	SS	20													
							184											
			6	SS	17													
183.21	END OF BOREHOLE													1 29 40 30				
5.03	Borehole dry during drilling on March 11, 2009.																	

LDN\_MTO\_01\_09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

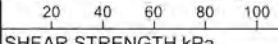
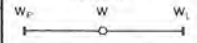


PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 224N</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4678075.8 E 336565.2		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 10, 2009		CHECKED BY <i>SJB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
188.32	GROUND SURFACE													
0.00	TOPSOIL, clayey													
0.20	Black CLAYEY SILT, some sand, trace gravel, with oxidized fissures													
	Hard Brown		1	SS	90									
186.64	CLAYEY SILT, some sand, trace gravel		2	SS	34									1 29 40 30
1.68	Stiff to hard Grey		3	SS	42									
			4	SS	25									
			5	SS	14									
			6	SS	18									
183.29	END OF BOREHOLE													
5.03	Borehole dry during drilling on March 10, 2009.													

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 225N</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4678036.1 :E 336518.1		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 10, 2009		CHECKED BY <i>SJB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT  SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT 	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
188.09	GROUND SURFACE										
0.00	TOPSOIL, clayey Black						188				
0.25	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown		1	SS	44		187				
			2	SS	52						
185.96	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Very stiff Mottled brown and grey		3	SS	29		186				
2.13			4	SS	28		185				
184.43	CLAYEY SILT, some sand, trace gravel Very stiff Grey		5	SS	22		184				
3.66			6	SS	18						
183.06	END OF BOREHOLE										
5.03	Borehole dry during drilling on March 10, 2009.										

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 226N</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4677993.6 :E 336469.8		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 10, 2009		CHECKED BY <i>SB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
187.72	GROUND SURFACE						20	40	60	80	100							
0.00	TOPSOIL, clayey Brown																	
0.13	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown		1	SS	44													
			2	SS	52													
185.59																		
2.13	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Mottled brown and grey		3	SS	66													
184.82																		
2.90	CLAYEY SILT, some sand, trace gravel Very stiff to hard Grey		4	SS	33													
			5	SS	26													
			6	SS	23													
182.69	END OF BOREHOLE																	
5.03	Borehole dry during drilling on March 10, 2009.																	

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 227N</b>		1 OF 1	<b>METRIC</b>
W.P.	LOCATION	N 4677951.7 ; E 336423.8		ORIGINATED BY NG	
DIST WEST HWY WEP/3	BOREHOLE TYPE	POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC	DATE	March 10, 2009		CHECKED BY <b>SLB</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT   NATURAL MOISTURE CONTENT   LIQUID LIMIT			UNIT WEIGHT  γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				
								○ UNCONFINED   + FIELD VANE		● QUICK TRIAXIAL   × LAB VANE			w <sub>p</sub>	w	w <sub>L</sub>		
187.61	GROUND SURFACE						20	40	60	80	100					GR SA SI CL	
0.08	TOPSOIL, clayey Black																
	CLAYEY SILT, some sand, trace gravel, with oxidized fissures		1	SS	78								○				
	Hard Brown		2	SS	72								○				
			3	SS	54								○				
184.71																	
2.90	CLAYEY SILT, some sand, trace gravel		4	SS	26								○				
	Very stiff Grey		5	SS	17								○			9 27 39 25	
			6	SS	19								○				
182.58																	
5.03	END OF BOREOLE																
	Borehole dry during drilling on March 10, 2009.																

LDN\_MTD-01 09-1132-0003.GPJ LDN\_MTD.GDT 9/29/09

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09




PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 228N</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4677910.5 ; E 336371.5		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 9, 2009		CHECKED BY <i>JSB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE × LAB VANE						
187.41	GROUND SURFACE						20 40 60 80 100							GR SA SI CL	
0.00	TOPSOIL, clayey														
0.20	Black CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown		1	SS	79										
			2	SS	94										
185.00															
2.41	CLAYEY SILT, some sand, trace gravel, with oxidized fissures to 2.9m depth Very stiff to hard Grey		3	SS	55										
			4	SS	24										
			5	SS	21										
			6	SS	16										
182.38	END OF BOREHOLE														
5.03	Borehole dry during drilling on March 9, 2009														

LDN\_MTO\_01\_09-1132-0003.GPJ LDN\_MTO\_GDT 5/29/09



PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 229N</b>		1 OF 1	<b>METRIC</b>
W.P. _____	LOCATION N 4677866.4 :E 336321.6	ORIGINATED BY NG			
DIST WEST HWY WEP/3	BOREHOLE TYPE POWER AUGER, SOLID STEM	COMPILED BY LMK			
DATUM GEODETIC	DATE March 9, 2009	CHECKED BY <i>SB</i>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL			
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100									
								SHEAR STRENGTH kPa									
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE									
							20 40 60 80 100					WATER CONTENT (%) 10 20 30					
187.34	GROUND SURFACE																
0.00	TOPSOIL, clayey Black						187										
186.83	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown						186										
0.51			1	SS	33												
			2	SS	45												
184.98	CLAYEY SILT, some sand, trace gravel, with oxidized fissures to 2.9m depth Stiff to very stiff Grey						185										
2.36			3	SS	28												
			4	SS	29												
			5	SS	14												
			6	SS	22												
182.31	END OF BOREHOLE						183										
5.03	Borehole dry during drilling on March 9, 2009.																

LDN\_MTO\_01\_09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 230N</b>		1 OF 1	<b>METRIC</b>
W.P.	LOCATION	N 4677822.9 ; E 336266.7		ORIGINATED BY NG	
DIST WEST HWY WEP/3	BOREHOLE TYPE	POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC	DATE	March 9, 2009		CHECKED BY SSB	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)				
								○ UNCONFINED	+ FIELD VANE						● QUICK TRIAXIAL	× LAB VANE	20	40	60
187.37	GROUND SURFACE																		
0.00	TOPSOIL, clayey Black																		
0.23	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown		1	SS	48														
			2	SS	56														
185.08	CLAYEY SILT, some sand, trace gravel, with oxidized fissures to 2.9m depth Very stiff Grey		3	SS	28														
2.29			4	SS	28														
			5	SS	19														
182.70	SANDY SILT, trace clay, trace gravel, with sand pockets Very dense Grey		6	SS	88														
4.67																			
182.34	END OF BOREHOLE																		
5.03	Borehole dry during drilling on March 9, 2009.																		

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 231N</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4677775.6, E 336213.6		ORIGINATED BY NG	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 9, 2009		CHECKED BY <i>SJS</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								20 40 60 80 100										
187.06	GROUND SURFACE																	
0.00	TOPSOIL, clayey Brown																	
0.28	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown		1	SS	50													
			2	SS	66													
184.77																		
2.29	CLAYEY SILT, some sand, trace gravel Very stiff to hard Grey		3	SS	40													
			4	SS	33													
			5	SS	21													
			6	SS	16													
182.03	END OF BOREHOLE																	
5.03	Borehole dry during drilling on March 9, 2009.																	

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 0/29/03

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

# RECORD OF BOREHOLE No 232N

1 OF 1

**METRIC**

PROJECT 09-1132-0003

W.P. \_\_\_\_\_

LOCATION N 4677725.4 E 336154.5

ORIGINATED BY NG

DIST WEST HWY WEP/3

BOREHOLE TYPE POWER AUGER, SOLID STEM

COMPILED BY LMK

DATUM GEODETIC

DATE March 9, 2009

CHECKED BY *SSB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
186.75	GROUND SURFACE													
0.08	TOPSOIL, clayey Brown CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Mottled brown and grey		1	SS	69		186				o			
			2	SS	61		185				o			
184.62														
2.13	CLAYEY SILT, some sand, trace gravel Very stiff Grey		3	SS	26		184				o			
			4	SS	25						10 15 20 25 30			4 27 42 27
			5	SS	17		183				o			
181.72			6	SS	15		182				o			
5.03	END OF BOREHOLE  Borehole dry during drilling on March 9, 2009.													

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

**RECORD OF BOREHOLE No 233N**

1 OF 1

**METRIC**

PROJECT 09-1132-0003

W.P.

LOCATION

N 4677688.5 :E 336099.5

ORIGINATED BY NG

DIST WEST HWY WEP/3

BOREHOLE TYPE POWER AUGER, SOLID STEM

COMPILED BY LMK

DATUM GEODETIC

DATE

March 9, 2009

CHECKED BY *SJB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	100					
186.39	GROUND SURFACE													
0.10	TOPSOIL, clayey Brown						186							
	CLAYEY SILT, some sand, trace gravel, with oxidized fissures		1	SS	58									
	Hard Brown						185							
184.76			2	SS	28									
1.63	CLAYEY SILT, some sand, trace gravel		3	SS	32		184							
	Very stiff to hard Grey		4	SS	16		183							
			5	SS	18		182							
			6	SS	13									
181.36	END OF BOREHOLE													
5.03	Borehole dry during drilling on March 9, 2009.													



PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 235N</b>		1 OF 1	<b>METRIC</b>
W.P.	LOCATION	N 4677706.7 :E 335837.9		ORIGINATED BY SM	
DIST WEST HWY WEP/3	BOREHOLE TYPE	POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC	DATE	March 9, 2009		CHECKED BY <i>SB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
188.50	GRAVEL SHOULDER													
0.00	FILL, sand some gravel, trace clay Black													
0.15	FILL, crushed stone Grey													
187.89	FILL, sand trace gravel Brown													
0.61	FILL, clayey silt, some sand, trace gravel Stiff Grey		1	SS	9									
0.84	TOPSOIL, clayey silt, some sand, trace organic material Stiff Black													
187.13	CLAYEY SILT, some sand, trace gravel Stiff to hard Mottled brown and grey		2	SS	10									
1.37			3	SS	20									
			4	SS	33									
184.69	CLAYEY SILT, some sand, trace gravel Stiff to hard Grey		5	SS	31									
3.81			6	SS	20									
183.47	END OF BOREHOLE													
5.03	Seepage observed at about 0.61m depth during drilling on March 9, 2009.													

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 237N</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4677724.5 :E 335702.0		ORIGINATED BY SM	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 9, 2009		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub> NATURAL MOISTURE CONTENT W LIQUID LIMIT W <sub>L</sub> WATER CONTENT (%) 10 20 30	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
187.77	ROAD SHOULDER										
0.10	FILL, crushed stone Grey										
	FILL, sand some gravel Brown										
187.01	CLAYEY SILT, some sand, trace gravel, with oxidized fissures		1	SS	12		187				
0.76	Stiff Mottled brown and grey		2	SS	11		186				
185.48	CLAYEY SILT, some sand, trace gravel, with oxidized fissures		3	SS	27		185				
2.29	Very stiff to hard Brown		4	SS	35						3 30 43 24
184.11	CLAYEY SILT, some sand, trace gravel		5	SS	18		184				
3.66	Very stiff Grey		6	SS	18		183				
182.74	END OF BOREHOLE										
5.03	Borehole dry during drilling on March 9, 2009.										

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

# RECORD OF BOREHOLE No 238N

1 OF 1

METRIC

PROJECT 09-1132-0003

W.P.

LOCATION

N 4677745.8 :E 335632.9

ORIGINATED BY SM

DIST

WEST

HWY WEP/3

BOREHOLE TYPE

POWER AUGER, SOLID STEM

COMPILED BY LMK

DATUM GEODETIC

DATE






March 9, 2009

CHECKED BY SJB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
187.82	ROAD SURFACE							20 40 60 80 100						
0.00	ASPHALT							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						
187.34	FILL, sand, trace to some gravel							20 40 60 80 100						
0.48	Brown													
0.69	TOPSOIL, clayey Brown						187							
0.84	CLAYEY SILT, some sand, trace gravel		1	SS	11									
186.45	Stiff													
1.37	Mottled brown and grey		2	SS	9		186							1 29 40 30
185.69	SILTY CLAY, some sand, trace gravel													
2.13	Stiff													
	Mottled brown and grey		3	SS	21		185							
	CLAYEY SILT, some sand, trace gravel, with oxidized fissures													
	Very stiff to hard		4	SS	38		184							
	Brown													
184.16														
3.66	CLAYEY SILT, some sand, trace gravel, with oxidized fissures		5	SS	31		183							
	Very stiff to hard													
	Grey		6	SS	21									
182.79														
5.03	END OF BOREHOLE													
	Borehole dry during drilling on March 9, 2009.													

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 239N</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4677771.9 ; E 335553.8		ORIGINATED BY SM	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 9, 2009		CHECKED BY <i>SSS</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT  γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								○ UNCONFINED	+ FIELD VANE							● QUICK TRIAXIAL	× LAB VANE	
187.56	GRAVEL SHOULDER						20	40	60	80	100							
0.00	FILL, crushed stone Grey																	
187.05																		
0.51	TOPSOIL, clayey Firm Black		1	SS	6													
186.19																		
1.37	CLAYEY SILT, some sand, trace gravel Very stiff Mottled brown and grey		2	SS	16													
185.27																		
2.29	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Hard Brown		3	SS	33													
			4	SS	37													
183.90																		
3.66	CLAYEY SILT, some sand, trace gravel, with oxidized fissures to 4.4m depth Very stiff Grey		5	SS	24													
182.53			6	SS	16													
5.03	END OF BOREHOLE																	
	Borehole dry during drilling on March 9, 2009.																	

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 240N</b>		1 OF 1	<b>METRIC</b>
W.P.	LOCATION	N 4677789.2 ; E 335503.3		ORIGINATED BY SM	
DIST WEST HWY WEP/3	BOREHOLE TYPE	POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC	DATE	March 9, 2009		CHECKED BY <b>SAB</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								20 40 60 80 100										
187.42	GRAVEL SHOULDER																	
0.00	FILL, crushed stone Grey																	
186.96																		
0.46	TOPSOIL, clayey Firm to stiff Black to mottled brown and grey		1	SS	8													
186.20																		
1.22	CLAYEY SILT, some sand, trace gravel Stiff Mottled brown and grey		2	SS	9									8 36 34 22				
185.13																		
2.29	CLAYEY SILT, some sand, trace gravel, with oxidized fissures Very stiff to hard Brown		3	SS	27									3 30 43 24				
183.76			4	SS	30													
3.66	CLAYEY SILT, some sand, trace gravel, with oxidized fissures to 4.4m depth Stiff to very stiff Grey		5	SS	26													
182.39			6	SS	15													
5.03	END OF BOREHOLE  Borehole dry during drilling on March 9, 2009.																	

LDN\_MTO\_01\_09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09













PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 241N</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4677812.8 E 335434.4		ORIGINATED BY SM	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 9, 2009		CHECKED BY <i>SLB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT $w_p$	NATURAL MOISTURE CONTENT $w$	LIQUID LIMIT $w_L$	UNIT WEIGHT $\gamma$  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED	+ FIELD VANE						
187.24	GRAVEL SHOULDER														
0.00	FILL, crushed stone														
186.78	Grey														
0.46	FILL, clayey silt, some sand with clayey topsoil pockets														
0.76	Firm Black		1	SS	6										
185.87	TOPSOIL, sandy silt, trace clay with clayey silt pockets														
1.37	Firm Black		2	SS	18										
	CLAYEY SILT, some sand, trace gravel														
	Very stiff to hard														
	Mottled brown and grey		3	SS	26										
			4	SS	30										
			5	SS	28										
			6	SS	17										
182.21	END OF BOREHOLE														
5.03	Borehole dry during drilling on March 9, 2009.														

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 09-1132-0003		<b>RECORD OF BOREHOLE No 242N</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4677836.5 E 335368.3		ORIGINATED BY SM	
DIST WEST HWY WEP/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE March 9, 2009		CHECKED BY <i>SJS</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT $w_p$	NATURAL MOISTURE CONTENT $w$	LIQUID LIMIT $w_L$	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
187.05	GRAVEL SHOULDER																	
0.00	FILL, crushed stone Grey						186							1 31 40 20				
186.44																		
0.61	FILL, clayey silt, some sand with clayey topsoil pockets		1	SS	10													
0.76	TOPSOIL, sandy silt, trace clay with clayey silt pockets																	
185.68	Stiff Black		2	SS	18													
	CLAYEY SILT, some sand, trace gravel, with sand partings and oxidized fissures																	
	Very stiff to hard Mottled brown and grey becoming grey at about 4.6m depth		3	SS	28													
			4	SS	35													
			5	SS	25													
			6	SS	16													
182.02	END OF BOREHOLE																	
5.03	Seepage observed at about 0.61m depth during drilling on March 9, 2009.																	

LDN\_MTD\_01 05-11-32-0005.GPJ LDN\_MTD\_G01 062909

LDN\_MTO\_01 09-1132-0003.GPJ LDN\_MTO.GDT 6/29/09

**RECORD OF BOREHOLE No CPT-103**

1 OF 1

**METRIC**

PROJECT 07-1130-207-0

W.P.

LOCATION

N 4677620.0 :E 335400.7

ORIGINATED BY MA

DIST WEST HWY 401/3

BOREHOLE TYPE POWER AUGER, SOLID STEM

COMPILED BY BRS

DATUM GEODETIC

DATE

March 31, 2008

CHECKED BY *SSB*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
186.30	GROUND SURFACE													
0.09	TOPSOIL, silty Brown CLAYEY SILT, some sand, trace gravel Firm to hard Mottled brown and grey, becoming grey at about elev. 183.0m		1	SS	7		186							
			2	SS	26		185							
			3	SS	35		184							
			4	SS	29		183							
			5	SS	15									
182.03	END OF BOREHOLE													
4.27	Borehole dry during drilling on March 31, 2008.													

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No CPT-103A</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4677620.0 :E 335400.7		ORIGINATED BY CC	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE September 30, 2008		CHECKED BY <i>SLB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40						60	80	100	20	40
186.30	GROUND SURFACE																		
0.09	TOPSOIL, silty Brown CLAYEY SILT, some sand, trace gravel Firm to hard Mottled brown and grey, becoming grey at about elev 183.0m																		
183.25	CLAYEY SILT, some sand, trace gravel Grey		1	TO	PH														
3.05			2	TO	PH														
181.42			3	TO	PH														
4.88	END OF BOREHOLE  Borehole dry during drilling on September 30, 2008.																		

LDN MTO.01 07-1130-207-0.GPJ LDN\_MTO.GDT 8/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-106</b>		1 OF 1		<b>METRIC</b>	
W.P. _____		LOCATION <u>N 4677846.1 :E 335039.9</u>		ORIGINATED BY <u>CC</u>			
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>SJL</u>			
DATUM <u>GEODETIC</u>		DATE <u>September 8, 2008</u>		CHECKED BY <u>SJB</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES									
185.72	GROUND SURFACE													
0.00	FILL, clayey topsoil with crushed gravel		1	SS	12		185							
185.36	Stiff Brown		2	SS	15									
0.36	CLAYEY SILT, trace to some sand, trace gravel		3	SS	12		184							
183.89	Mottled brown and grey becoming brown at about elev. 184.5m													
1.83	END OF BOREHOLE													
	Borehole dry during drilling on September 8, 2008.													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09



PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-108</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4678051.6 ,E 334826.8</u>		ORIGINATED BY <u>MA</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>March 31, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)
								○ UNCONFINED 20 40 60 80 100	+ FIELD VANE × LAB VANE						
185.60	GROUND SURFACE														
0.00	TOPSOIL, silty Brown														
0.15	CLAYEY SILT, some sand, trace gravel, with silty sand partings Soft to hard Mottled brown and grey, becoming grey at about elev. 182.7m		1	SS	4		185								
			2	SS	8		184								
			3	SS	27		183								
			4	SS	31		182								
			5	SS	16										
181.03	END OF BOREHOLE														
4.57	Borehole dry during drilling on March 31, 2008.														

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-110</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4678297 8 :E 334448.6</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>SJL</u>	
DATUM <u>GEODETIC</u>		DATE <u>September 8, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w <sub>p</sub> — w — w <sub>L</sub>	UNIT WEIGHT γ KN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
184.82	GROUND SURFACE										
0.00	TOPSOIL, clayey Stiff Brown		1	SS	8						
0.30	CLAYEY SILT, trace to some sand, trace gravel Stiff Mottled brown and grey		2	SS	9						
			3	SS	11						
182.99	END OF BOREHOLE										
1.83	Borehole dry during drilling on September 8, 2008.										

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No CPT-111</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4678351.4 :E 334347.6		ORIGINATED BY CC	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY SJL	
DATUM GEODETIC		DATE September 8, 2008		CHECKED BY <i>SSB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
184.92	GROUND SURFACE												
0.00	FILL, silty topsoil with crushed gravel and organics		1	SS	18								
0.23	Very stiff Brown		2	SS	12								
	CLAYEY SILT, trace to some sand, trace gravel		3	SS	17								
183.09	Stiff to very stiff												
	Mottled brown and grey becoming brown at about elev. 183.7m												
1.83	END OF BOREHOLE												
	Borehole dry during drilling on September 8, 2008.												



LDN-MTO-01 07-1130-207-0.GPJ LDN-MTO-GDT 8/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-114</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4678526.7 :E 334018.6</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>SJL</u>	
DATUM <u>GEODETIC</u>		DATE <u>September 10, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
184.21	GROUND SURFACE												
0.00	TOPSOIL, silty, trace to some sand Compact Black		1	SS	20		184						
0.28	CLAYEY SILT, trace to some sand, trace gravel Very stiff Mottled brown and grey becoming brown at about elev. 183.0m		2	SS	20		183						
182.38			3	SS	28								
1.83	END OF BOREHOLE  Borehole dry during drilling on September 10, 2008.												

LDN MTO\_01 07-1130-207-0.GPJ LDN MTO.GDT 6/29/09

PROJECT 07-1130-207-0 **RECORD OF BOREHOLE No CPT-117** 1 OF 1 **METRIC**  
W.P. \_\_\_\_\_ LOCATION N 4678744.1 :E 333601.5 ORIGINATED BY MA  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, SOLID STEM COMPILED BY BRS  
DATUM GEODETIC DATE March 27, 2008 CHECKED BY SSB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED      + FIELD VANE ● QUICK TRIAXIAL    x LAB VANE						
183.29 0.00 0.15	GROUND SURFACE TOPSOIL, silty Brown FILL, clayey silt, some sand, trace gravel Firm to stiff Brown													
181.46			1	SS	5									
1.83	CLAYEY SILT, some sand, trace gravel Stiff to very stiff Brown becoming grey at about elev. 179.9m		2	SS	12									
			3	SS	28									
			4	SS	20									
			5	SS	16									
178.72 4.57	END OF BOREHOLE  Borehole dry during drilling on March 27, 2008.													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO\_GDT 5/29/09



PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-120</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION <u>N 4678947.2 :E 333029.8</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>SJL</u>	
DATUM <u>GEODETIC</u>		DATE <u>September 8, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100					
								SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
							20 40 60 80 100	WATER CONTENT (%)			GR SA SI CL		
184.49	GROUND SURFACE												
0.00	FILL, clayey topsoil, with clayey silt pockets Very stiff Brown		1	SS	20		184						
183.90	CLAYEY SILT, trace to some sand, trace gravel Hard Mottled brown and grey		2	SS	41								
0.59			3	SS	52		183						
182.66													
1.83	END OF BOREHOLE												
	Borehole dry during drilling on September 8, 2008.												

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-121</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4679024.8 :E 333077.4</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>SJL</u>	
DATUM <u>GEODETIC</u>		DATE <u>September 10, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
181.97	GROUND SURFACE												
0.08	TOPSOIL, clayey Very soft Brown CLAYEY SILT, trace to some sand, trace gravel Stiff to very stiff Mottled brown and grey becoming grey at about elev. 180.8m		1	SS	8		181						
			2	SS	11								
180.14			3	SS	26								
1.83	END OF BOREHOLE  Borehole dry during drilling on September 10, 2008.												

LDN MTO-01 07-1130-207-0.GPJ LDN MTO GDT 6/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-123</b>		1 OF 1		<b>METRIC</b>	
W.P. _____		LOCATION <u>N 4679309.7 :E 332536.3</u>		ORIGINATED BY <u>CC</u>			
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>SJL</u>			
DATUM <u>GEODETIC</u>		DATE <u>September 10, 2008</u>		CHECKED BY <u>SJB</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
181.60	GROUND SURFACE												
0.00	FILL, crushed gravel and recycled aggregate		1	AS									
0.28	Grey and black TOPSOIL, clayey												
180.69	Black												
0.91	CLAYEY SILT, trace sand, trace gravel		2	SS	7								
	Firm to stiff												
	Mottled brown and grey												
179.47			3	SS	14								
2.13	END OF BOREHOLE												
	Borehole dry during drilling on September 10, 2008.												

LDN MTO\_01 07-1130-207-0.GPJ LDN MTO.GDT 6/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-124</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4679354.6 :E 332455.0</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>LMK</u>	
DATUM <u>GEODETIC</u>		DATE <u>September 11, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w <sub>p</sub> — w — w <sub>L</sub>	WATER CONTENT (%) 10 20 30	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES							
181.51	GROUND SURFACE											
0.00	TOPSOIL, silty, some sand, trace clay, trace organics, trace gravel		1	SS	14		181					
180.90	Compact Brown											
0.61	SAND, fine to medium, some silt		2	SS	4							
0.91	Loose Brown											
	CLAYEY SILT, trace sand, trace gravel		3	SS	19		180					
179.68	Firm to very stiff											
1.83	Mottled brown and grey											
	END OF BOREHOLE											
	Water level in borehole at about elev. 180.5m during drilling on September 11, 2008.											

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-128</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION <u>N 4679490 6 :E 332200.8</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>SJL</u>	
DATUM <u>GEODETIC</u>		DATE <u>September 5, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
180.87	GROUND SURFACE												
0.00	FILL, silty sand, trace gravel, trace organics with clayey silt Compact Brown		1	SS	10								
180.26	CLAYEY SILT, trace sand, trace gravel Firm to very stiff Mottled brown and grey		2	SS	7								
0.61			3	SS	17								
179.04	END OF BOREHOLE												
1.83	Water level in borehole at about elev. 179.7m during drilling on September 5, 2008.												

LDN MTO\_01 07-1130-207-0.GPJ LDN MTO.GDT 8/29/09



PROJECT 07-1130-207-0 **RECORD OF BOREHOLE No CPT-130** 1 OF 1 **METRIC**  
W.P. \_\_\_\_\_ LOCATION N 4679821.8 :E 332036.1 ORIGINATED BY CC  
DIST WEST HWY 401/3 BOREHOLE TYPE POWER AUGER, SOLID STEM COMPILED BY SJL  
DATUM GEODETIC DATE September 4, 2008 CHECKED BY SJB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
180.82	GROUND SURFACE													
0.00	FILL, crushed sand and gravel, trace silt Compact Brown		1	SS	16									
180.29														
0.61	FILL, sand with slag Compact Black		2	SS	14		180							
	CLAYEY SILT, trace sand, trace gravel Stiff		3	SS	11									
178.99	Mottled brown and grey						179							
1.83	END OF BOREHOLE													
	Borehole dry during drilling on September 4, 2008.													

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No CPT-133</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4680184.7 :E 331953.4		ORIGINATED BY CC	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY LMK	
DATUM GEODETIC		DATE September 30, 2008		CHECKED BY <i>SLB</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
181.64	GROUND SURFACE												
0.00	FILL, crushed gravel and recycled aggregate Grey												
0.30	SAND, fine, some silt Loose to dense		1	SS	31		181						
180.57	Brown												
1.14	CLAYEY SILT, some sand, with silt partings Soft		2	SS	4								
	Mottled brown and grey						180						
179.51	SILTY CLAY, trace sand, trace gravel		3	SS	19								
2.13	Firm to very stiff Brown												
	END OF BOREHOLE												
	Water level in borehole at about elev. 180.7m during drilling on September 30, 2008.												

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-134</b>		1 OF 1	<b>METRIC</b>
W.P. _____	LOCATION <u>N 4680151.4 :E 331888.7</u>	ORIGINATED BY <u>CC</u>			
DIST <u>WEST</u> HWY <u>401/3</u>	BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>	COMPILED BY <u>SJL</u>			
DATUM <u>GEODETIC</u>	DATE <u>September 4, 2008</u>	CHECKED BY <u>SJS</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED    + FIELD VANE ● QUICK TRIAXIAL    x LAB VANE						
181.36	GROUND SURFACE													
0.00	FILL, silty sand, some gravel, trace organics		1	SS	35									
180.75	Dense Brown		2	SS	10									
0.61	FILL, crushed sand and gravel, trace silt													
180.14	Compact Brown		3	SS	14									
1.22	CLAYEY SILT, trace sand													
179.53	Stiff													
1.83	Mottled brown and grey													
	END OF BOREHOLE													
	Borehole dry during drilling on September 4, 2008.													

LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 6/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-137</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4680541.5 :E 331710.2</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>SJL</u>	
DATUM <u>GEODETIC</u>		DATE <u>September 4, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)									
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40						60	80	100	20	40	60	80	100	10
181.38	GROUND SURFACE																						
0.00	TOPSOIL, sandy, some silt, trace gravel Stiff Brown		1	SS	14																		
180.77																							
0.61	SAND, fine, some silt, trace organics Compact Brown		2	SS	16																		
180.16																							
1.22	SAND, fine, trace silt Compact Brown		3	SS	17																		
179.65																							
1.73	CLAYEY SILT, some sand, trace gravel Stiff Grey																						
179.25																							
2.13	END OF BOREHOLE																						
Borehole dry during drilling on September 4, 2008.																							

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PROJECT <u>07-1130-207-0</u>			<b>RECORD OF BOREHOLE No CPT-144</b>			1 OF 1			<b>METRIC</b>		
W.P. _____			LOCATION <u>N 4681363.6 E 331279.2</u>			ORIGINATED BY <u>CC</u>					
DIST <u>WEST</u> HWY <u>401/3</u>			BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>			COMPILED BY <u>BRS</u>					
DATUM <u>GEODETIC</u>			DATE <u>August 1, 2008</u>			CHECKED BY <u>SJB</u>					

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div style="text-align: center;"> </div>	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	"N" VALUES								
181.34	GROUND SURFACE												
0.00	FILL, silty fine sand and crushed gravel Brown						181						
180.58	SILTY CLAY, trace sand, trace gravel Firm to stiff Grey		1	SS	6		180						
0.76			2	SS	10		179						
			3	SS	13		178						
			4	SS	10		177						
			5	SS	8								
			6	SS	10								
176.31	END OF BOREHOLE												
5.03	Borehole dry during drilling on August 1, 2008.												

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PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No CPT-146</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION N 4681540.8 :E 331126.5		ORIGINATED BY CC	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY BRS	
DATUM GEODETIC		DATE August 5, 2008		CHECKED BY <b>SJB</b>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100								SHEAR STRENGTH kPa			WATER CONTENT (%)		
								○ UNCONFINED + FIELD VANE								● QUICK TRIAXIAL × LAB VANE			10 20 30		
181.85	GROUND SURFACE																				
0.00	FILL, crushed gravel																				
0.20	Grey																				
0.41	TOPSOIL, sandy Black																				
	SILTY FINE SAND Compact Brown		1	SS	22																
180.33																					
1.52	SILTY CLAY, trace sand, trace gravel Stiff to hard. Mottled brown and grey becoming grey at about elev. 179.7m		2	SS	33																
			3	SS	18																
			4	SS	22																
176.82			5	SS	12																
5.03	END OF BOREHOLE																				
	Water level in borehole at about elev. 180.5m during drilling on August 5, 2008.																				

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-148</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4681651.5 :E 330951.4</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>August 5, 2008</u>		CHECKED BY <u>SBS</u>	


SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div style="text-align: center;"> </div>	PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
180.72	GROUND SURFACE												
0.00	FILL, silty clay Brown	X	1	SS	16								
0.13	FILL, clayey silt, trace sand, trace organics		2	SS	14								
179.96	Compact Black		3	AS									
0.76	CLAYEY SILT, trace sand, trace gravel						180						
179.20	Stiff												
1.52	Mottled brown and grey												
	END OF BOREHOLE												
Borehole dry during drilling on August 5, 2008.													

PROJECT 07-1130-207-0		<b>RECORD OF BOREHOLE No CPT-150</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION N 4681733.4 :E 330757.6		ORIGINATED BY CC	
DIST WEST HWY 401/3		BOREHOLE TYPE POWER AUGER, SOLID STEM		COMPILED BY BRS	
DATUM GEODETIC		DATE August 6, 2008		CHECKED BY <i>SJS</i>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100					
180.85	GROUND SURFACE												
0.10	FILL, crushed gravel Grey												
180.24	FILL, sandy topsoil, some crushed gravel		1	SS	13								
0.61	Compact Black		2	SS	8								
0.76	FILL, clayey silt, some sand, trace gravel, trace asphalt												
179.63	Compact Brown												
1.22	FILL, clayey silt, some sand, trace gravel, trace asphalt												
	Compact Brown												
178.87	SILTY SAND, fine												
1.98	Loose Brown												
	CLAYEY SILT, some sand, trace gravel												
	Firm												
	Mottled brown and grey												
	END OF BOREHOLE												
Borehole dry during drilling on August 6, 2008.													

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PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-153</b>		1 OF 1 <b>METRIC</b>	
W.P. _____		LOCATION <u>N 4681793.3 :E 330575.8</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>August 7, 2008</u>		CHECKED BY <u>SW3</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT  γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80			100	W <sub>p</sub>
180.99	GROUND SURFACE														
0.00	TOPSOIL, silty, some sand Compact Black		1	SS	13										
180.30	CLAYEY SILT, trace sand, with silt partings Firm Mottled brown and grey		2	SS	5										
0.69															
179.47															
1.52	END OF BOREHOLE														
	Borehole dry during drilling on August 7, 2008.														

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PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-155</b>		1 OF 1		<b>METRIC</b>	
W.P. _____		LOCATION <u>N 4682065.8 ; E 329981.7</u>		ORIGINATED BY <u>CC</u>			
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>BRS</u>			
DATUM <u>GEODETIC</u>		DATE <u>August 13, 2008</u>		CHECKED BY <u>SJB</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED      + FIELD VANE ● QUICK TRIAXIAL    x LAB VANE						
179.69	GROUND SURFACE													
0.00	FILL, sandy topsoil Black													
0.30	FILL, silty fine sand, trace topsoil, trace organics		1	SS	10									
0.46	Compact Brown													
0.61														
178.32	TOPSOIL, sandy Compact Black		2	SS	9									
1.37														
1.52	SILTY SAND, trace gravel Loose to compact Brown CLAYEY SILT, trace sand Stiff Grey END OF BOREHOLE													
Water level in borehole at about elev. 178.5m during drilling on August 13, 2008.														

Water level in borehole at about elev. 178.5m during drilling on August 13, 2008.



PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-159</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4682292.8 :E 329332.1</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>August 12, 2008</u>		CHECKED BY <u>SJS</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT <div style="text-align: center;"> </div>	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT <div style="text-align: center;"> <math>W_p</math>      <math>W</math>      <math>W_L</math> </div>	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
178.77	GROUND SURFACE										
0.00	TOPSOIL, sandy silt, trace clay Loose Black										
177.86											
0.91	FILL, silt, some sand, some clay, trace topsoil, trace organics Loose		1	SS	4						
177.55											
1.22	Mottled brown and grey CLAYEY SILT, trace sand Firm		2	SS	5						
176.94											
1.83	Mottled brown and grey END OF BOREHOLE										
	Borehole dry during drilling on August 12, 2008.										

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PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-161</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4682177.6 :E 328793.9</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>August 14, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)	
								20 40 60 80 100	10 20 30							
179.06	GROUND SURFACE															
0.08	FILL, crushed gravel Grey															
	SILTY SAND Compact Brown		1	SS	12											
177.99																
1.07	SILTY SAND AND GRAVEL															
1.22	Compact Brown		2	SS	24											
177.38																
1.68	SILT, trace fine sand Compact Mottled brown and grey															
176.77			3	SS	7											
2.29	SILT, some clay, trace sand Loose Grey															
	END OF BOREHOLE															
	Water level in borehole at about elev. 177.5m during drilling on August 14, 2008.															

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PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-162</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4682439.2 :E 328729.1</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>SJL</u>	
DATUM <u>GEODETIC</u>		DATE <u>September 3, 2008</u>		CHECKED BY <u>SJB</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT  SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W <sub>p</sub> — W — W <sub>L</sub> WATER CONTENT (%)	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
178.99 0.00	GROUND SURFACE TOPSOIL, sandy, some silt, trace gravel Compact Black		1	SS	22		178				
178.38 0.61	SAND, fine, some silt, trace gravel Compact Brown		2	SS	16						
177.54 1.52	SAND, fine to medium, some gravel, trace silt Compact Brown		3	SS	9						
176.86 2.13	SILT, some clay, some sand Loose Grey END OF BOREHOLE  Borehole dry during drilling on September 3, 2008.						177				

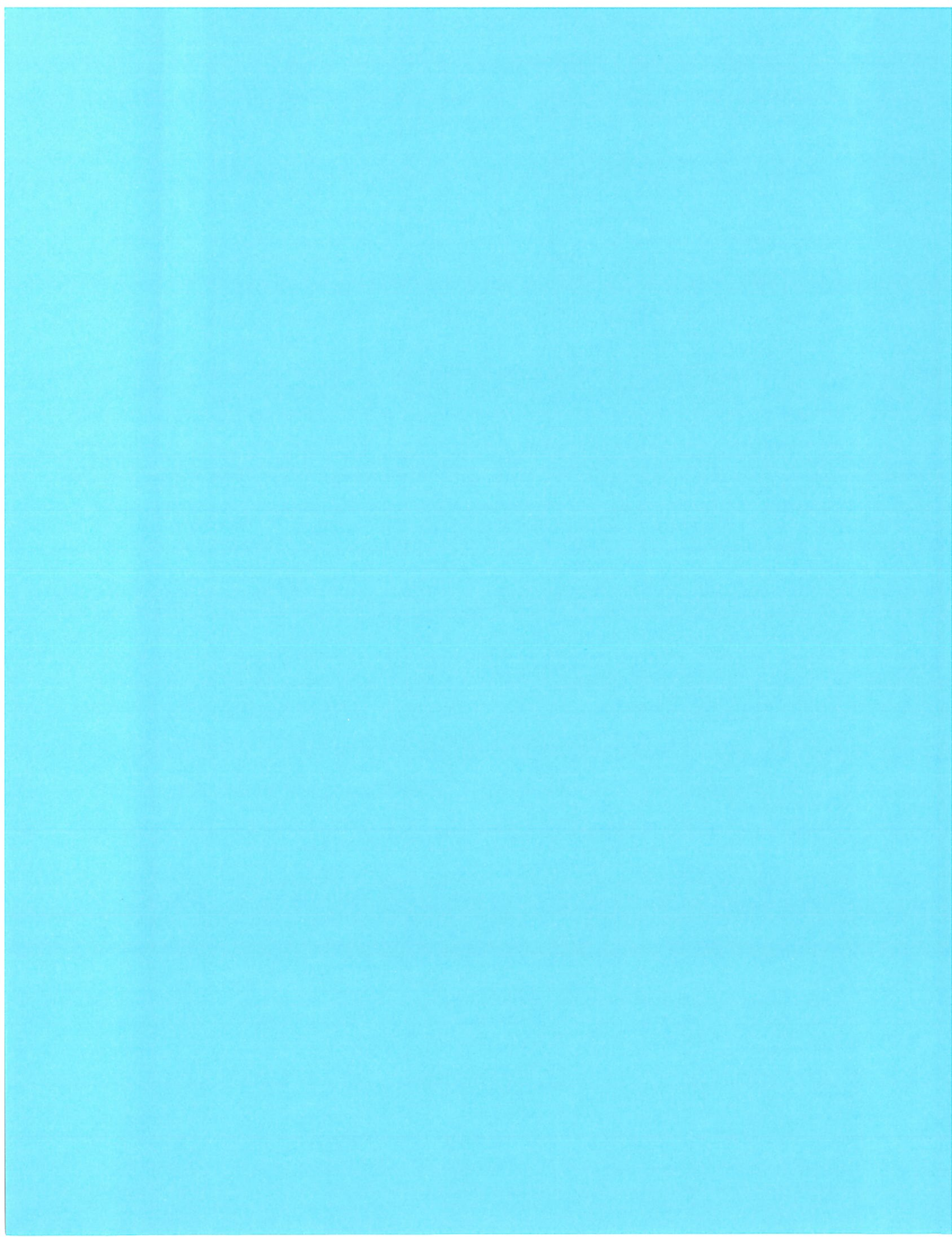
LDN\_MTO\_01 07-1130-207-0.GPJ LDN\_MTO.GDT 5/29/09

PROJECT <u>07-1130-207-0</u>		<b>RECORD OF BOREHOLE No CPT-165</b>		1 OF 1	<b>METRIC</b>
W.P. _____		LOCATION <u>N 4682188.2 ; E 328457.7</u>		ORIGINATED BY <u>CC</u>	
DIST <u>WEST</u> HWY <u>401/3</u>		BOREHOLE TYPE <u>POWER AUGER, SOLID STEM</u>		COMPILED BY <u>BRS</u>	
DATUM <u>GEODETIC</u>		DATE <u>August 13, 2008</u>		CHECKED BY <u>SJS</u>	

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)	
								20 40 60 80 100	20 40 60 80 100						10 20 30	
						○ UNCONFINED + FIELD VANE										
						● QUICK TRIAXIAL x LAB VANE										
178.98	GROUND SURFACE															
0.00	FILL, crushed gravel Grey															
0.30	TOPSOIL, sandy															
0.46	Black		1	SS	8						○					
177.91	FILL, silty sand topsoil with silty sand layers, pockets of gravel and wood															
1.07	Loose		2	SS	7						○					
177.30	Black															
1.68	SILTY SAND AND GRAVEL															
176.69	Loose		3	SS	20						○					
2.29	Brown															
	SAND, trace gravel															
	Compact															
	Grey															
	END OF BOREHOLE															
	Water level in borehole at about elev. 177.31m during drilling on August 13, 2008.															

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# APPENDIX B

## Rock Core Photographs

ROCK CORE PHOTOGRAPHS



Photo 1: Borehole No. 101 – Rock Core. Elevation 154.05 metres to 150.31 metres.



Photo 2: Borehole 102 – Rock Core. Elevation 154.58 metres to 150.28 metres.



ROCK CORE PHOTOGRAPHS



Photo 3: Borehole No. 104 – Rock Core. Elevation 155.70 metres to 151.45 metres.



Photo 4: Borehole No. 105 – Rock Core. Elevation 155.68 metres to 151.54 metres.



ROCK CORE PHOTOGRAPHS

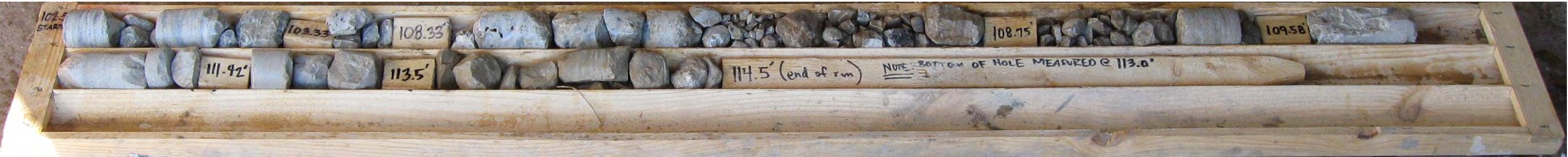


Photo 5: Borehole No. 107 – Rock Core. Elevation 155.17 metres to 150.95 metres.

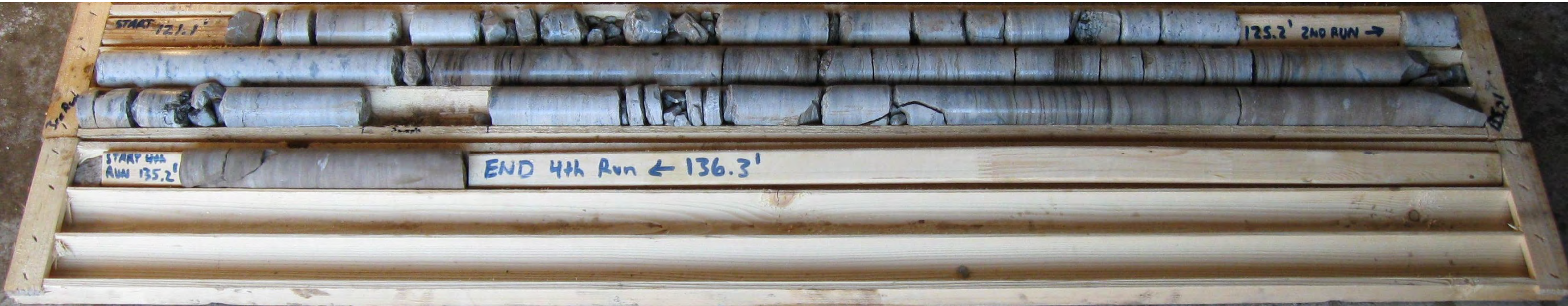


Photo 6: Borehole No. 109 – Rock Core. Elevation 149.18 metres to 143.79 metres.



ROCK CORE PHOTOGRAPHS



Photo 7: Borehole No. 112 – Rock Core. Elevation 152.12 metres to 146.39 metres.



Photo 8: Borehole No. 113 – Rock Core. Elevation 153.01 metres to 148.35 metres.



ROCK CORE PHOTOGRAPHS



Photo 9: Borehole No. 115 – Rock Core. Elevation 151.48 metres to 146.15 metres.



Photo 10: Borehole No. 116 – Rock Core. Elevation 151.66 metres to 147.58 metres.



ROCK CORE PHOTOGRAPHS



Photo 11: Borehole No. 118 – Rock Core. Elevation 150.32 metres to 146.60 metres.



Photo 12: Borehole No. 119 – Rock Core. Elevation 150.40 metres to 145.54 metres.



ROCK CORE PHOTOGRAPHS



Photo 13: Borehole No. 122 – Rock Core. Elevation 146.61 metres to 141.33 metres.



Photo 14: Borehole No. 127 – Rock Core. Elevation 148.47 metres to 145.16 metres.



ROCK CORE PHOTOGRAPHS



Photo 15: Borehole No. 129 – Rock Core. Elevation 147.88 metres to 143.78 metres.



Photo 16: Borehole No. 131 – Rock Core. Elevation 148.10 metres to 144.68 metres.



ROCK CORE PHOTOGRAPHS



Photo 17: Borehole No. 132 – Rock Core. Elevation 148.04 metres to 143.67 metres.



Photo 18: Borehole No. 135 – Rock Core. Elevation 148.49 metres to 141.46 metres.



ROCK CORE PHOTOGRAPHS



Photo 19: Borehole No. 136 – Rock Core. Elevation 148.09 metres to 142.58 metres.



Photo 20: Borehole No. 139 – Rock Core. Elevation 147.04 metres to 143.19 metres.



ROCK CORE PHOTOGRAPHS



Photo 21: Borehole No. 140 – Rock Core. Elevation 148.88 metres to 144.41 metres.



Photo 22: Borehole No. 141 – Rock Core. Elevation 149.33 metres to 145.47 metres.



ROCK CORE PHOTOGRAPHS



Photo 23: Borehole No. 142 – Rock Core. Elevation 149.41 metres to 145.07 metres.



Photo 24: Borehole No. 145 – Rock Core. Elevation 149.51 metres to 145.55 metres.



ROCK CORE PHOTOGRAPHS



Photo 25: Borehole No. 149 – Rock Core. Elevation 149.97 metres to 146.46 metres.



Photo 26: Borehole No. 152 – Rock Core. Elevation 149.37 metres to 143.53 metres.



ROCK CORE PHOTOGRAPHS



Photo 27: Borehole No. 154 – Rock Core. Elevation 149.63 metres to 144.22 metres.



Photo 28: Borehole No. 158 – Rock Core. Elevation 151.82 metres to 148.72 metres.



ROCK CORE PHOTOGRAPHS



Photo 29: Borehole No. 160 – Rock Core. Elevation 156.26 metres to 151.62 metres.



Photo 30: Borehole No. 163 – Rock Core. Elevation 155.91 metres to 151.41 metres.



ROCK CORE PHOTOGRAPHS

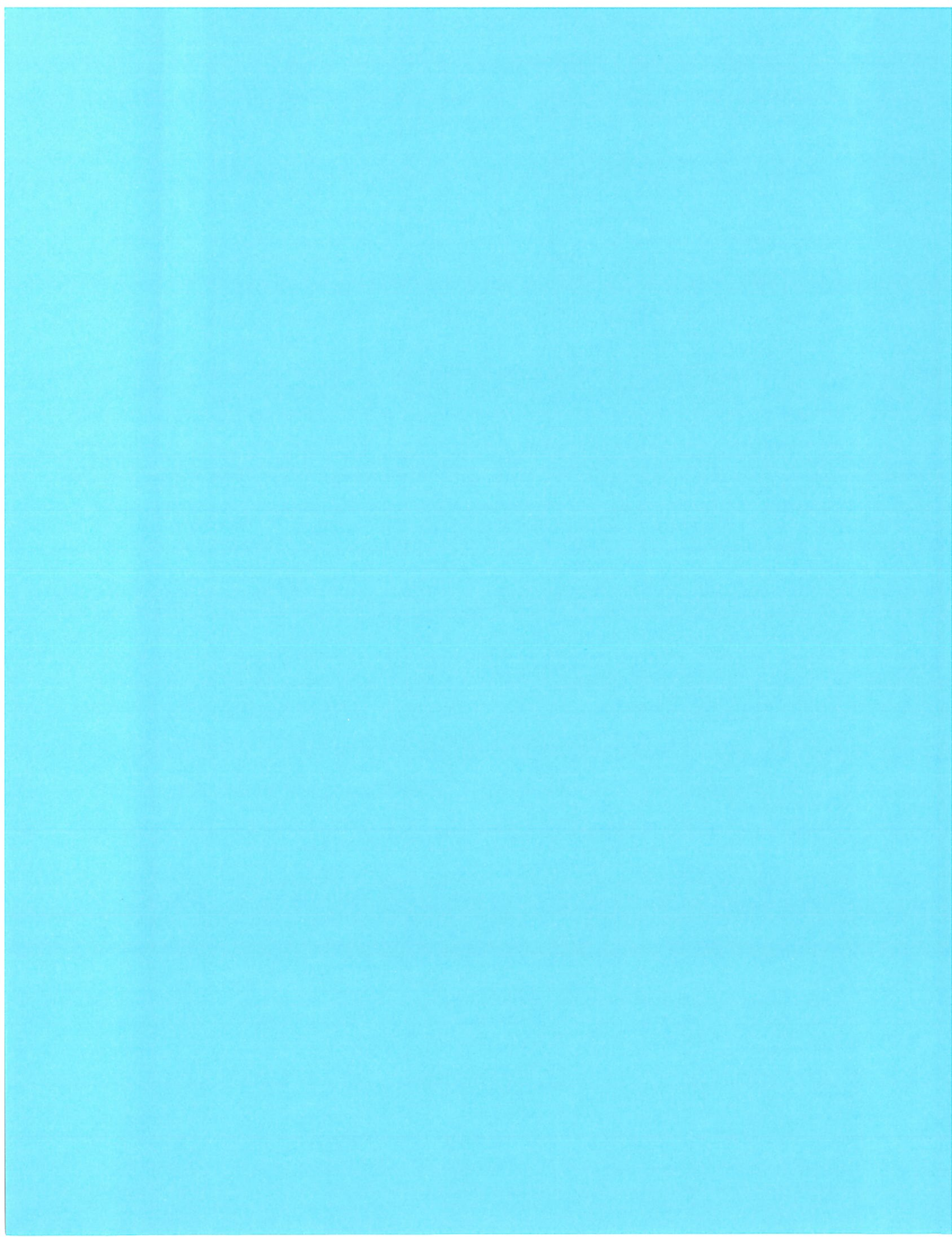


Photo 31: Borehole No. 164 – Rock Core. Elevation 155.59 metres to 151.58 metres.



Photo 32: Borehole No. 166 – Rock Core. Elevation 155.73 metres to 152.08 metres.







# APPENDIX C

## Pavement Cores and Borehole Data



**APPENDIX C****RECORD OF BOREHOLES*****EXISTING HIGHWAY 401***

Borehole TR-C1 (Core &amp; Bore)

N 4,677,746; E 336,233

0 - 140	Asph
140 - 370	Conc
370 - 550	Br Sa W Gr, <u>SA DM-4</u>
550 - 1.70	Br Si Cl Tr Sa Tr Gr

DM-4

% Passing

26.5mm =	100%
19.0mm =	100%
13.2mm =	98.3%
9.5mm =	94.3%
4.75mm =	84.8%
2.36mm =	76.7%
1.18mm =	69.2%
600µm =	59.8%
300µm =	45.2%
150µm =	27.7%
75µm =	21.2%
w =	9.6%

Borehole TR-C2

N 4,677,747; E 336,231

0 - 300	Br Cr Gran
300 - 1.10	Br Cl Si Tr Sa Tr Gr, <u>SA DM-5</u>
1.10 - 1.38	Blk Cl Tps
1.38 - 1.70	Br & Gry Si Cl Tr Sa

DM-5

w = 16.0%

Borehole TR-C3 (Core &amp; Bore)

N 4,677,741; E 336,238

0 - 565	Asph
565 - 800	Cr Gran W Si (Wet)
800 - 1.68	Br Cl Si W Sa Tr Gr

## Borehole TR-C4 (Core &amp; Bore)

N 4,677,743; E 336,236

0 - 170	Asph
170 - 405	Conc
405 - 550	Br Sa Tr Si W Gr, <u>SA DM-7</u>
550 - 1.70	Br Cl Si Tr Sa Tr Gr Tr Tps

DM-7

% Passing

26.5mm =	100%
19.0mm =	100%
13.2mm =	99.2%
9.5mm =	97.3%
4.75mm =	93.2%
2.36mm =	87.2%
1.18mm =	80.8%
600µm =	71.2%
300µm =	50.1%
150µm =	20.3%
75µm =	12.6%
w =	11.7%

## Borehole TR-C5 (Shoulder)

N 4, 677,741; E 336,238

0 - 145	Asph
145 - 300	Cr Gran Tr Si
300 - 700	Br Sa Tr Si W Gr
700 - 1.21	Br Cl Si Tr Sa Tr Gr, <u>SA DM- 8</u>
1.21 - 1.70	Gry & Blk Si Cl Tr Sa Tr Tps

## Borehole TR-C6

N 4,677,739; E 336,241

0 - 300	Cr Gran W Si Tr Asph
300 - 700	Br Sa W Gr
700 - 1.10	Br Cl Si Tr Sa Tr Gr
1.10 - 1.35	Blk Cl Tps
1.35 - 1.68	Br & Gry Cl Si Tr Sa Tr Gr

## Borehole TR-C7 (Core &amp; Bore)

N 4,677,755; E 336,220

0 - 165	Asph
165 - 405	Conc
405 - 650	Br Sa W Gr Tr Si
650 - 1.70	Br & Gry Cl Si W Sa Tr Gr, <u>SA DM-10</u>

## Borehole TR-C8

N 4,677,758; E 336,215

0 - 30	Cr Gran
30 - 300	Blk Si Tps
300 - 1.68	Br & Gry Clayey Si W Sa Tr Gr, <u>SA DM-9</u>

DM-9

## % Passing

19.0mm =	100%
13.2mm =	100%
9.5mm =	100%
4.75mm =	99.7%
2.00mm =	98.7%
850µm =	95.8%
425µm =	92.8%
250µm =	86.6%
106µm =	71.4%
75µm =	68.9%
5 µm =	42.0%
2 µm =	34.0%
w =	21.0%
w <sub>L</sub> =	36.7%
w <sub>P</sub> =	17.7%
I <sub>p</sub> =	19.1%

## Borehole TR-C9 (Shoulder)

N 4,677,757; E 336,217

0 - 140	Asph
140 - 240	Cr Gran Tr Si
240 - 600	Br Sa & Gr Tr Si
600 - 1.15	Br Cl Si Tr Sa Tr Gr
1.15 - 1.30	Blk Cl Tps
1.30 - 1.70	Br & Gry Cl Si Tr Sa Tr Gr

## Borehole TR-C10 (Core &amp; Bore)

N 4,677,755; E 336,224

0 - 170	Asph
170 - 450	Conc
450 - 500	Cr Gran, We)
500 - 1.60	Br & Gry Cl Si Tr Sa Tr Gr

Borehole TR-C11

N 4,677,753; E 336,226

0 - 30	Asph
30 - 200	Cr Gran Tr Si
200 - 350	Br Sa & Gr
350 - 1.70	Br & Gry Cl Si Tr Sa Tr Gr Tr Tps, <u>SA DM-14</u>



**EXISTING HIGHWAY 3 WESTBOUND AT EXISTING HIGHWAY 401**

## Borehole 3-1

N 4,677,590; E 336,166

0 - 90	Blk Si Tps
90 - 185	Br Sa & Gr (FILL)
185 - 3.05	Br & Gry Cl Si W Sa Tr Gr Tr Tps (FILL), <u>SA 3-1-1</u> , <u>SA 3-1-2</u> , <u>SA 3-1-3</u>
3.05 - 4.42	Br & Gry Cl Si Tr Sa Tr Gr (FILL), <u>SA 3-1-4</u> , <u>SA 3-1-5</u>
4.42 - 4.63	Blk Cl Tps, <u>SA 3-1-6A</u>
4.63 - 5.03	Gry Cl Si Tr Sa Tr Gr, <u>SA 3-1-6B</u>

## SA 3-1-1

Sample Depth = 760 - 1.22

N = 14

## SA 3-1-2

Sample Depth = 1.52 - 1.98

N = 12

## SA 3-1-3

Sample Depth = 2.29 - 2.74

N = 20

## SA 3-1-4

Sample Depth = 3.05 - 3.51

N = 28

## SA 3-1-5

Sample Depth = 3.81 - 4.27

N = 19

## SA 3-1-6

Sample Depth = 4.57 - 5.03

N = 17

## Borehole 3-2

N 4,677,701; E 335,927

0 - 60	Blk Si Tps
60 - 150	Br Sa & Gr (FILL)
150 - 4.42	Br & Gry Cl Si W Sa Tr Gr Tr Tps (FILL), <u>SA 3-2-1</u> , <u>SA 3-2-2</u> , <u>SA 3-2-3</u> , <u>SA 3-2-4</u> , <u>SA 3-2-5</u>
4.42 - 4.63	Blk Cl Tps, <u>SA 3-2-6A</u>
4.63 - 6.55	Br Cl Si W Sa Tr Gr, <u>SA 3-2-6B</u> , <u>SA 3-2-7</u>

## SA 3-2-1

Sample Depth = 760 - 1.22

N = 12

SA 3-2-2

Sample Depth = 1.52 - 1.98

N = 12

SA 3-2-3

Sample Depth = 2.29 - 2.74

N = 22

SA 3-2-4

Sample Depth = 3.05 - 3.51

N = 22

SA 3-2-5

Sample Depth = 3.81 - 4.27

N = 20

SA 3-2-6

Sample Depth = 4.57 - 5.03

N = 23

SA 3-2-7

Sample Depth = 6.10 - 6.55

N = 42

**EXISTING TALBOT ROAD**

Borehole TR-5A (WBPS)

N 4,679,352; E 332,451

0 - 185	Asph
185 - 410	Cr Gran
410 - 1.30	Br F – Med Sa Tr Si
1.30 - 1.52	Br & Gry Cl Si W Sa

Borehole TR-5B (WB Shoulder)

N 4,679,356; E 332,453

0 - 150	Blk Cl Tps
150 - 310	Br Cr Gran
310 - 1.37	Br F – Med Sa Tr Si
1.37 - 1.52	Br & Gry Cl Si W Sa

Borehole TR-5C (EBPL)

N 4,679,342; E 332,431

0 - 235	Asph
235 - 405	Conc
405 - 900	Br Sa (FILL)
900 - 1.14	Blk Cl Tps
1.14 - 1.52	Br & Gry Cl Si W Sa

Borehole TR-5D (WBDL)

N 4,679,346; E 332,454

0 - 315	Asph
315 - 490	Conc
490 - 1.24	Br Sa
1.24 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole TR-5E (WB Shoulder)

N 4,679,354; E 332,451

0 - 480	Cr Gran
480 - 1.30	Br F – Med Sa
1.30 - 1.52	Br & Gry Cl Si W Sa

Borehole TR-6A (EB Left Turn Lane)

N 4,679,092; E 332,913

0 - 175	Conc
175 - 685	Cr Gran
685 - 1.52	Br & Gry Cl Si W Sa Tr Gr

## Borehole TR-6B (EBPL)

N 4,679,088; E 332,911

0 - 330	Asph
330 - 470	Conc
470 - 865	Blk & Br Sa W Si, Wet @ 760
865 - 1.52	Br & Gry Cl Si W Sa

## Borehole TR-6C (EBPS)

N 4,679,077; E 332,912

0 - 175	Asph
175 - 610	Cr Gran
610 - 1.52	Br & Gry Cl Si W Sa Tr Gr

## Borehole TR-6D (WBDL)

N 4, 679,100; E 332,921

0 - 325	Asph
325 - 545	Conc
545 - 1.07	Blk Cl Si W Sa
1.07 - 1.52	Br & Gry Cl Si W Sa

## Borehole TR-6E (WBPS)

N 4,679,103; E 332,922

0 - 200	Asph
200 - 560	Cr Gran
560 - 1.07	Blk Cl Si W Sa
1.07 - 1.52	Br & Gry Cl Si W Sa

## Borehole TR-6F (WB Shoulder)

N 4,679,104; E 332,922

0 - 535	Gry Sa & Gr (FILL)
535 - 1.52	Br & Gry Cl Si W Sa

## Borehole TR-7A (WBPL)

N 4,678,715; E 333,635

0 - 340	Asph
340 - 535	Conc
535 - 1.52	Br & Gry Cl Si W Sa Tr Gr



## Borehole TR-7B (EBPS)

N 4,678,696; E 333,624

0 - 175	Asph
175 - 610	Cr Gran
610 - 740	Blk Sa Si W Cl (FILL)
740 - 1.52	Br & Gry Cl Si W Sa Tr Gr

## Borehole TR-7C (EBDL)

N 4,678,703; E 333,626

0 - 295	Asph
295 - 495	Conc
495 - 610	Br Sa
610 - 1.52	Br Cl Si W Sa Tr Gr

## Borehole TR-7D (WB Shoulder)

N 4,678,720; E 333,640

0 - 685	Cr Gran
685 - 840	Blk Cl Si W Sa
840 - 1.52	Br & Gry Cl Si W Sa Tr Gr

## Borehole TR-7E (WBPS)

N 4,678,718; E 333,639

0 - 170	Asph
170 - 590	Cr Gran
590 - 1.52	Br & Gry Si Cl W Sa Tr Gr

## Borehole TR-8A (WBPS)

N 4,678,478; E 334,083

0 - 200	Asph
200 - 505	Cr Gran
505 - 1.52	Br & Gry Cl Si W Sa

## Borehole TR-8B (WB Shoulder)

N 4,678,480; E 334,084

0 - 280	Gry Sa & Gr (FILL)
280 - 535	Blk Cl Si W Sa
535 - 1.52	Br & Gry Cl Si W Sa

Borehole TR-8C (EBPL)

N 4,678,468; E 334,074

0 - 305	Asph
305 - 495	Conc
495 - 535	Br Sa
535 - 1.52	Br & Gry Cl Si W Sa

Borehole TR-8D (WBDL)

N 4,678,476; E 334,081

0 - 310	Asph
310 - 505	Conc
505 - 1.52	Br & Gry Cl Si W Sa

Borehole TR-8E (EBPS)

N 4,678,460; E 334,070

0 - 175	Asph
175 - 635	Cr Gran
635 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole TR-9A (WBPL)

N 4,678,249; E 334,510

0 - 340	Asph
340 - 525	Conc
525 - 910	Blk & Gry Sa Si W Cl
910 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole TR-9B (EBDL)

N 4,678,237; E 334,503

0 - 280	Asph
280 - 480	Conc
480 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole TR-9C (EBPS)

N 4,678,232; E 334,498

0 - 190	Asph
190 - 570	Cr Gran
570 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole TR-10A (EBPL)

N 4,678,018; E 334,914

0 - 340	Asph
340 - 505	Conc
505 - 560	Br Sa
560 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole TR-10B (WBPS)

N 4,678,036; E 334,925

0 - 150	Asph
150 - 865	Cr Gran, Wet @ 865
865 - 1.52	Br & Gry Cl Si W Sa Tr Gr, Fr Wat @ 1.22

Borehole TR-10C (WBDL)

N 4,678,032; E 334,925

0 - 280	Asph
280 - 505	Conc
505 - 585	Cr Gran
585 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole TR-10D (WB Shoulder)

N 4,678,036; E 334,924

0 - 230	Gry Sa & Gr (FILL)
230 - 785	Blk Cl Si W Sa
785 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole TR-10E (EBPS)

N 4,678,013; E 334,909

0 - 245	Asph
245 - 595	Cr Gran
595 - 685	Blk Sa Si W Cl
685 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole TR-A1 (Core & Bore)

N 4,677,790; E 335,431

0 - 230	Asph
230 - 465	Conc
465 - 750	Br Sa & Gr Tr Si
750 - 950	Blk Cl Tps, <u>SA DM-1</u>
950 - 1.68	Br Cl Si Tr Sa Tr Gr

DM-1

w = 19.9%

Borehole TR-A2 (EP)

N 4,677,793; E 335,432

0 - 550	Br Cr Gran, <u>SA DM-2</u>
55 - 750	Br Sa & Gr Tr Si
750 - 950	Blk Cl Tps
950 - 1.68	Br Cl Si Tr Sa Tr Gr

DM-2

% Passing

26.5mm =	100%
19.0mm =	89.3%
13.2mm =	79.4%
9.5mm =	67.0%
4.75mm =	52.4%
2.36mm =	39.6%
1.18mm =	31.1%
600µm =	24.9%
300µm =	20.9%
150µm =	17.1%
75µm =	13.3%
w =	5.2%

Borehole TR-A3 (Core & Bore)

N 4,677,787; E 335,430

0 - 225	Asph
225 - 450	Conc
450 - 700	Br Sa & Gr Tr Si
700 - 1.68	Br & Gry Cl Si W Sa Tr Gr, <u>SA DM-13</u>

Borehole TR-A4

N 4,677,801; E 335,436

0 - 400	Asph
400 - 630	Conc
630 - 750	Br Sa & Gr W Si
750 - 1.70	Br & Gry Cl Si Tr Sa Tr Gr Tr Tps

Borehole TR-A5 (Lt Turn Lane)

N 4,677,798; E 335,434

0 - 215	Asph
215 - 450	Cr Gran W Si
450 - 750	Br Sa & Gr Tr Si
750 - 1.21	Br & Gry Cl Si Tr Sa Tr Tps
1.21 - 1.68	Br Cl Si Tr Sa Tr Gr



Borehole TR-A6 (Core & Bore)  
N 4,677,809; E 335,439

0 - 530	Asph
530 - 750	Cr Gran W Si
750 - 850	Br Sa & Gr Tr Si
850 - 1.05	Br Sa Tr Si
1.05 - 1.70	Br & Gry Cl Si Tr Sa Tr Gr

Borehole TR-A7 (Shoulder)  
N 4,677,794; E 335,434

0 - 500	Cr Gran W Si, <u>SA DM-16</u>
500 - 1.68	Br & Gry Cl Si W Sa Tr Tps, <u>SA DM-17</u>

Borehole TR-B1 (Core & Bore)  
N 4,677,641; E 335,860

0 - 255	Asph
255 - 485	Conc
485 - 700	Br Sa & Gr Tr Si
700 - 1.05	Blk Cl Tps
1.05 - 1.68	Br & Gry Cl Si Tr Sa Tr Gr, <u>SA DM-3</u>

### DM-3

% Passing

19.0mm =	100%
13.2mm =	100%
9.5mm =	100%
4.75mm =	99.0%
2.00mm =	97.8%
850µm =	96.2%
425µm =	93.8%
250µm =	86.2%
106µm =	66.2%
75µm =	63.7%
5 µm =	42.0%
2 µm =	34.0%
w =	19.1%
w <sub>L</sub> =	32.4%
w <sub>P</sub> =	15.0%
I <sub>p</sub> =	17.5%

Borehole TR-B2 (EP)

4,677,643; E 335,860

0 - 70	Asph
70 - 750	Cr Gran
750 - 1.05	Blk Cl Tps
1.05 - 1.70	Br & Gry Cl Si Tr Sa Tr Gr

Borehole TR-B3 (Core & Bore)

N 4,677,364; E 335,857

0 - 250	Asph
250 - 485	Conc
485 - 700	Br Sa & Gr W Si
700 - 950	Blk Cl Tps, <u>SA DM-6</u>
950 - 1.70	Br & Gry Cl Si Tr Sa Tr Gr

DM-6

w = 23.3%

Borehole TR-B4 (Core & Bore)

N 4,677,656; E 335,864

0 - 275	Asph
275 - 510	Conc
510 - 800	Br Sa & Gr Tr Si, <u>SA DM-12</u>
800 - 1.70	Br & Gry Cl Si W Sa Tr Gr Tr Tps

Borehole TR-B5 (Shoulder)

N 4,677,659; E 335,865

0 - 120	Asph
120 - 200	Cr Gran Tr Si
200 - 500	Br Sa & Gr Tr Si
500 - 800	Blk Cl Tps, <u>SA DM-11</u>
800 - 1.70	Br Cl Si W Sa Tr Gr

Borehole TR-B6

N 4,677,660; E 335,866

0 - 300	Cr Gran W Si Tr Tps
300 - 1.70	Br & Gry Cl Si Tr Sa Tr Gr Tr Tps

## Borehole TR-B7

N 4,677,650; E 335,862

0 - 150	Blk Si Sa
150 - 480	Br Cr Gran
480 - 550	Asph
550 - 850	Br Sa & Gr W Si
850 - 1.21	Br & Gry Cl Si W Sa Tr Gr Tr Tps
1.21 - 1.40	Bl Cl Tps
1.40 - 1.65	Br & Gry Cl Si Tr Sa Tr Gr

## Borehole TR-B8 (Shoulder)

N 4,677,651; E 335,863

0 - 120	Asph
120 - 600	Cr Gran Tr Si, <u>SA DM-15</u>
600 - 900	Br Sa Tr Si
900 - 1.30	Br & Gry Cl Si Tr Sa Tr Gr
1.30 - 1.45	Blk Cl Tps
1.45 - 1.70	Gry & Br Cl Si Tr Sa Tr Gr

DM-15

% Passing

26.5mm =	100%
19.0mm =	100%
13.2mm =	92.2%
9.5mm =	77.3%
4.75mm =	56.8%
2.36mm =	43.6%
1.18mm =	35.0%
600µm =	28.7%
300µm =	23.8%
150µm =	19.7%
75µm =	16.9%
w =	11.7%

**EXISTING HURON CHURCH ROAD**

## Borehole HCR-1C (SBDL)

N 4,681,669; E 331,219

0 - 345	Asph
345 - 965	Cr Gran
965 - 1.52	Br & Gr Cl Si W Sa

## Borehole HCR-1A (NBPL)

N 4,681,678; E 331,233

0 - 260	Asph
260 - 445	Conc
445 - 1.37	Br Sa, Wet @ 1.22
1.37 - 1.52	Gry Si Sa Tr Cl

## Borehole HCR-1B (SBPL)

N 4,681,674; E 331,226

0 - 305	Conc
305 - 865	Cr Gran
865 - 1.52	Br & Blk Si Sa Tr Gr Tr Cl (FILL)

## Borehole HCR-2A (SBDL)

N 4,680,978; E 331,529

0 - 285	Conc
285 - 865	Cr Gran
865 - 1.52	Br Sa Tr Gr (FILL)

## Borehole HCR-2B (NBDL)

N 4,680,987; E 331,550

0 - 280	Conc
280 - 1.52	Cr Gran

## Borehole HCR-3A (SBDL)

N 4,680,453; E 331,765

0 - 255	Conc
255 - 990	Cr Gran
990 - 1.37	Br Sa Tr Gr (FILL)
1.37 - 1.52	Gry Cl Si W Sa

## Borehole HCR-3B (NBDL)

N 4,680,463; E 331,786

0 - 280	Conc
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280 - 910 Cr Gran  
910 - 1.52 Br Sa Tr Gr (FILL)

Borehole HCR-3C (NBPL)  
N 4,680,460; E 331,780

0 - 300 Conc  
300 - 840 Cr Gran  
840 - 1.17 Br Sa  
1.17 - 1.37 Br Si Sa Tr Cl  
1.37 - 1.52 Gry Cl Si W Sa

Borehole HCR-4A (NBDL)  
N 4,679,987; E 332,000

0 - 230 Conc  
230 - 840 Cr Gran  
840 - 1.52 Br & Gry Si Cl W Sa Tr Gr

Borehole HCR-4B (SBDL)  
N 4,679,976; E 331,981

0 - 280 Conc  
280 - 815 Cr Gran  
815 - 1.52 Br & Gry Si Cl W Sa

Borehole HCR-4C (SBPL)  
N 4,679,977; E 331,985

0 - 290 Conc  
290 - 840 Cr Gran  
840 - 1.52 Br & Gry Cl Si W Sa Tr Gr

Borehole HCR-4D (SBTL)  
N 4,679,980; E 331,988

0 - 280 Conc  
280 - 840 Cr Gran  
840 - 1.52 Br & Gry Cl Si W Sa Tr Gr



**EXISTING LABELLE STREET**

Borehole LAB-1 (Left Turn Lane)  
N 4,681,391; E 331,394

0 - 105	Asph
105 - 560	Cr Gran
560 - 730	Asph
730 - 860	Cr Gran
860 - 1.52	Br & Gry Cl Si W Sa

**EXISTING HOWARD AVENUE**

Borehole HOW-1 (Left Turn Lane)  
N 4,677,832; E 335,220

0 - 245	Asph
245 - 440	Cr Gran
400 - 660	Conc
660 - 840	Sa & Gr W Si (FILL)
840 - 1.07	Br Cl Tps
1.07 - 1.52	Br & Gry Cl Si W Sa Tr Gr

**EXISTING PULFORD STREET**

Borehole PUL-1 (SBTL)  
N 4,680,388; E 331,851

0 - 230	Conc
230 - 560	Cr Gran
560 - 1.22	Br Sa
1.22 - 1.37	Br Sa Si Tr Cl
1.37 - 1.52	Gry Cl Si W Sa

Borehole PUL-2 (NBTL)  
N 4,680,359; E 331,791

0 - 280	Conc
280 - 910	Cr Gran
910 - 1.37	Br Sa W Si
1.37 - 1.52	Br & Gry Cl Si W Sa

**EXISTING HURON CHURCH LINE**

Borehole HCL-1A (Left Turn Lane)

N 4,679,462; E 332,232

0 - 230	Asph
230 - 890	Cr Gran
890 - 1.30	Br Sa
1.30 - 1.52	Br & Gry Si W Cl W Sa

Borehole HCL-1B (HCR Off Ramp)

N 4,679,499; E 332,210

0 - 245	Asph
245 - 690	Cr Gran
690 - 910	Conc
910 - 1.07	Br Si Sa Tr Gr (FILL)
1.07 - 1.52	Br Sa Si W Cl

**EXISTING OUTER DRIVE**

Borehole OUT-1 (SB Lane)

0 - 20	Asph
20 - 400	Cr Gran
400 - 710	Blk Cl Si W Sa Tr Org (FILL)
710 - 1.52	Br & Gry Cl Si W Sa

Borehole OUT-2 (SB Shoulder)

0 - 20	Asph
20 - 355	Cr Gran
355 - 760	Blk Cl Si W Sa Tr Org (FILL)
760 - 1.52	Br & Gry Si Cl W Sa Tr Gr

**EXISTING CABANA ROAD**

Borehole CAB-1 (Left Turn Lane)

N 4,679,699; E 332,153

0 - 100	Asph
100 - 560	Cr Gran
560 - 700	Br Sa & Gr (FILL)
700 - 1.52	Br & Gry Cl Si W Sa Tr Gr

**EXISTING TODD LANE**

Borehole TOD-1 (Left Turn Lane)  
N 4,679,648; E 332,099

0 - 135	Asph
135 - 660	Cr Gran
660 - 840	Br Sa & Gr (FILL)
840 - 1.52	Br & Gry Cl Si W Sa Tr Gr

**EXISTING BETHLEHEM AVENUE**

Borehole BET-1 (Left Turn Lane)  
N 4,681,357; E 331,338

0 - 215	Conc
215 - 840	Cr Gran
840 - 1.52	Br & Gry Cl Si W Sa Tr Gr

**EXISTING MALDEN ROAD**

Borehole MAL-1 (NB Shoulder)  
N 4,681,961; E 330,170

0 - 25	Blk Sa Tps
25 - 380	Br Gr Gran
380 - 760	Blk Sa Tps
760 - 1.52	Br Si Sa, Wet, Fr Wat @ 1.22

Borehole MAL-2 (NBL)  
N 4,681,959; E 330,166

0 - 130	Asph
130 - 1.02	Br Cr Gran
1.02 - 1.52	Br Si Sa, Wet, Fr Wat @ 1.22

Borehole MAL-3 (SBL)  
N 4,681,954; E 330,160

0 - 150	Asph
150 - 990	Gry Cr Gran
990 - 1.52	Br Si Sa, Fr Wat @ 1.22

Borehole MAL-4 (SB Shoulder)  
N 4,681,952; E 330,160

0 - 560	Gry Cr Gran
560 - 810	Br Sa & Gr (FILL)
810 - 1.45	Br Si Sa, Fr Wat @ 1.14
1.45 - 1.52	Gry Si W Sa

**PROPOSED HIGHWAY 3 REALIGNMENT AND WINDSOR-ESSEX PARKWAY  
BETWEEN BRIDGES 13 AND 14**

## Borehole OUT-1A

N 4,677,211; E 335,844

0 - 300	Blk Cl Tps
300 - 1.22	Br Cl Si W Sa

## Borehole OUT-1B

N 4,677,209; E 335,837

0 - 300	Blk Cl Tps
300 - 1.37	Br Cl Si W Sa

## Borehole OUT-2A

N 4,677,241; E 335,801

0 - 365	Blk Cl Tps
365 - 1.22	Br & Gry Cl Si W Sa Tr Gr

## Borehole OUT-2B

N 4,677,246; E 335,804

0 - 300	Blk Cl Tps
300 - 1.37	Br & Gry Cl Si W Sa Tr Gr

## Borehole OUT-3A

N 4,677,272; E 335,764

0 - 340	Blk Cl Tps
340 - 1.37	Br & Gry Cl Si W Sa Tr Gr

## Borehole OUT-3B

N 4,677,269; E 335,759

0 - 330	Blk Cl Tps
330 - 1.37	Br & Gry Cl Si W Sa Tr Gr

## Borehole OUT-4A

N 4,677,302; E 335,724

0 - 300	Blk Cl Tps
300 - 1.37	Br & Gry Cl Si W Sa Tr Gr



Borehole OUT-4B

N 4,677,309; E 335,727

0 - 300	Blk Cl Tps
300 - 1.37	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-5A

N 4,677,332; E 335,684

0 - 295	Blk Si Tps
295 - 1.37	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-5B

N 4,677,326; E 335,678

0 - 280	Blk Si Tps
280 - 1.37	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-6A

N 4,677,363; E 335,642

0 - 280	Blk Si Tps
280 - 1.37	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-6B

N 4,677,368; E 335,646

0 - 300	Blk Si Tps
300 - 1.37	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-7A

N 4,677,394; E 335,601

0 - 200	Blk Si Tps
200 - 1.52	Br Cl Si W Sa Tr Gr

Borehole OUT-7B

N 4,677,389; E 335,597

0 - 260	Blk Si Tps
260 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-8A

N 4,677,423; E 335,561

0 - 255	Blk Sa Tps
255 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-8B

N 4,677,429; E 335,564

0 - 255	Blk Sa Tps
255 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-9A

N 4,677,450; E 335,542

0 - 280	Blk Sa Tps
280 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-9B

N 4,677,448; E 335,518

0 - 255	Blk Sa Tps
255 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-10A

N ; E

0 - 255	Br Cl Tps
255 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-10B

N ; E

0 - ____	Br Cl Tps
____ - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-11A

N 4,677,549; E 335,502

0 - 300	Br Cl Tps
300 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-11B

N 4,677,547; E 335,498

0 - 280	Br Cl Tps
280 - 1.52	Br Cl Si W Sa Tr Gr

Borehole OUT-12A

N 4,677,598; E 335,512

0 - 380	Br Cl Tps
380 - 1.52	Br Cl Si W Sa Tr Gr

Borehole OUT-12B

N 4,677,599; E 335,507

0 - 330	Br Cl Tps
330 - 1.52	Br & Gr Cl Si W Sa Tr Gr

Borehole OUT-13A

N 4,677,651; E 335,512

0 - 340	Br Cl Tps
340 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-13B

N 4,677,651; E 335,507

0 - 355	Br Cl Tps
355 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-14A

N 4,677,692; E 335,524

0 - 300	Blk Cl Tps
300 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-14B

N 4,677,687; E 335,530

0 - 340	Blk Cl Tps
340 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-15A

N 4,677,619; E 335,472

0 - 300	Blk Cl Tps
300 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-15B

N 4,677,614; E 335,470

0 - 280	Blk Cl Tps
280 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-16A

N 4,677,603; E 335,549

0 - 280	Br Cl Tps
280 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-16B

N 4,677,607; E 335,550

0 - 280	Br Cl Tps
280 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-17A

N 4,677,582; E 335,612

0 - 280	Br Cl Tps
280 - 585	Br F – Co Sa W Cob
585 - 1.52	Br & Gr Cl Si W Sa Tr Gr, Fr Wat @ 610

Borehole OUT-17B

N 4,677,577; E 335,614

0 - 300	Blk Sa Tps
300 - 635	Br F – Co Sa Tr Gr, Fr Wat @ 610
635 - 1.52	Br & Gr Cl Si W Sa Tr Gr

Borehole OUT-18A

N 4,677,540; E 335,696

0 - 300	Blk Cl Tps
300 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-18B

N 4,677,543; E 335,699

0 - 255	Blk Cl Tps
255 - 1.52	Br & Gr Cl Si W Sa Tr Gr, Fr Wat @ 1.45

Borehole OUT-19A

N ; E

0 - 255	Blk Cl Tps
255 - 1.52	Br & Gry Cl Si W Sa Tr Gr

Borehole OUT-19B

N ; E

0 - 280	Blk Cl Tps
280 - 1.52	Br & Gry Cl Si W Sa Tr Gr

**PROPOSED WINDSOR-ESSEX PARKWAY AND SERVICE ROADS  
E.C. ROW EXPRSSWAY CORRIDOR**

Borehole ECR-1000-S  
N 4,682,334; E 328,672

0 - 350	Blk Si Tps
350 - 1.52	Br Cl Si W Sa

Borehole ECR-1000-N  
N 4,682,334; E 328,672

0 - 300	Blk Sa Tps
300 - 1.52	Br Cl Si W Sa

Borehole ECR-1001-N  
N 4,682,395; E 328,805

0 - 230	Br Sa Tps
230 - 1.35	Br Sa

Borehole ECR-1001-S  
N 4,682,395; E 328,805

0 - 200	Br Sa Tps
200 - 1.20	Br Sa

Borehole ECR-1002-S  
N 4,682,416; E 328,938

0 - 350	Blk Sa Tps
350 - 1.35	Br Sa Tr Si Tr Gr

Borehole ECR-1002-N  
N 4,682,416; E 328,938

0 - 200	Blk Sa Tps
200 - 1.35	Br & Gry Si Cl W Sa

Borehole ECR-1003-N  
N 4,682,385; E 329,093

0 - 300	Blk Sa Tps
300 - 1.13	Br & Gry Sa
1.13 - 1.20	Br & Gry Cl Si W Sa



Borehole ECR-1003-S  
N 4,682,385; E 329,093

0 - 230	Blk Sa Tps
230 - 1.05	Br Sa
1.05 - 1.35	Br & Gry Cl Si W Sa

Borehole ECR-1004-S  
N 4,682,302; E 329,253

0 - 320	Blk Sa Tps
320 - 1.05	Br Si Sa Tr Cl
1.05 - 1.35	Br Cl Si to Si Cl W Sa

Borehole ECR-1004-N  
N 4,682,302; E 329,253

0 - 350	Blk Sa Tps
350 - 1.05	Br Sa Si W Cl
1.05 - 1.35	Br Cl Si W Sa

Borehole ECR-1005-S  
N 4,682,259; E 329,419

0 - 300	Blk Sa Tps
300 - 350	Br Sa Si W Cl
350 - 1.35	Br Cl Si W Sa

Borehole ECR-1005-N  
N 4,682,259; E 329,419

0 - 300	Blk Sa Tps
300 - 400	Br Sa Si W Cl
400 - 1.35	Br Cl Si W Sa

Borehole ECR-1006-N  
N 4,682,210; E 329,560

0 - 230	Blk Sa Tps
230 - 1.20	Br Sa
1.20 - 1.35	Br Cl Si W Sa

Borehole ECR-1006-S  
N 4,682,210; E 329,560

0 - 230	Blk Sa Tps
230 - 1.20	Br Sa
1.20 - 1.35	Br Cl Si W Sa

Borehole ECR-1007-S  
N 4,682,167; E 329,706

0 - 280	Blk Sa Tps
280 - 1.13	Br Si Sa to Sa Si W Cl
1.13 - 1.35	Br & Gry Si Cl W Sa

Borehole ECR-1007-N  
N 4,682,167; E 329,706

0 - 400	Blk Sa Tps W Cl Si
400 - 1.07	Br Si Sa To Sa Si W Cl
1.07 - 1.35	Br & Gry Cl Si W Sa

Borehole ECR-1008-N  
N 4,682,114; E 329,864

0 - 200	Blk Sa Tps
200 - 1.28	Br Sa
1.28 - 1.35	Gry Cl Si W Sa

Borehole ECR-1008-S  
N 4,682,114; E 329,864

0 - 250	Blk Sa Tps
250 - 1.28	Br Sa
1.28 - 1.35	Gry Cl Si W Sa

Borehole ECR-1009-S  
N 4,682,055; E 330,004

0 - 280	Blk Sa Tps
280 - 1.35	Br Sa Si W Cl

Borehole ECR-1009-N  
N 4,682,055; E 330,004

0 - 320	Bl Sa Tps
320 - 1.00	Br Si Sa Tr to W Cl
1.00 - 1.35	Br Cl Si W Sa

Borehole ECR-1010-N1  
N 4,681,980; E 330,216

0 - 230	Blk Sa Tps
230 - 1.35	Br F - Med Sa Tr Si

Borehole ECR-1010-N2

N 4,681,980; E 330,216

0 - 250	Blk Sa Tps
250 - 1.35	Br F - Med Sa Tr Si

Borehole ECR-1010-S1

N 4,681,980; E 330,216

0 - 300	Blk Sa Tps
300 - 1.35	Br F - Med Sa Tr Si

Borehole ECR-1010-S2

N 4,681,980; E 330,216

0 - 350	Blk Sa Tps
350 - 1.35	Br F - Med Sa Tr Si

Borehole ECR-1011-N1

N 4,681,920; E 330,368

0 - 200	Blk Sa Tps
200 - 500	Gr F Sa Tr Si
500 - 1.20	Br & Blk Sa Tps
1.20 - 1.35	Br F Sa Tr Si

Borehole ECR-1011-N2

N 4,681,920; E 330,368

0 - 150	Blk Sa Tps
150 - 1.35	Br F Sa Tr Si

Borehole ECR-1012-N

N 4,681,873; E 330,519

0 - 170	Blk Si Tps
170 - 1.35	Br F to Med Sa Tr Si

Borehole ECR-1012-S

N 4,681,873; E 330,519

0 - 300	Blk Si Tps
300 - 1.35	Br F to Med Sa Tr Si

Borehole ECR-1013-S  
N 4,681,823; E 330,645

0 - 230	Blk Sa Tps
230 - 1.13	Br F Sa Tr Si Tr Cl
1.13 - 1.35	Br Cl Si W Sa

Borehole ECR-1013-N  
N 4,681,823; E 330,645

0 - 300	Blk Sa Tps
300 - 1.28	Br Cl Si W Sa
1.28 - 1.35	Br & Gry Cl Si W Sa

Borehole ECR-1014-S  
N 4,681,792; E 330,824

0 - 300	Blk Si Tps
300 - 900	Br Si Sa Tr to W Cl
900 - 1.35	Br Si Cl W Sa

Borehole ECR-1014-N  
N 4,681,792; E 330,824

0 - 200	Blk Si Tps
200 - 900	Br Si Sa Tr to W Cl
900 - 1.35	Br Si Cl W Sa

Borehole ECR-1015-S  
N 4,681,752; E 330,942

0 - 900	Blk Si Tps
900 - 1.35	Br & Gry Cl Si to Si Cl W Sa

Borehole ECR-1015-N  
N 4,681,752; E 330,942

0 - 75	Bl Si Tps
75 - 1.35	Br & Gry Mott Cl Si to Si Cl W Sa

Borehole ECR-1016-N  
N 4,681,679; E 331,063

0 - 230	Bl Cl Tps
230 - 1.35	Br Si Cl W Sa

Borehole ECR-1016-S  
N 4,681,679; E 331,063

0 - 200	Bl Cl Tps
200 - 1.35	Br Si Cl W Sa



**RECORDS OF BOREHOLES FROM FOUNDATIONS INVESTIGATION**

Borehole 101

N 4,677,606.6; E 335,794.9

0 - 380	Br Cl Tps
380 - 460	Br Sa & Gr, Wet @ 380
460 - 1.52	Br & Gry Cl Si W Sa Tr Gr, <u>SA 101-1</u>

SA 101-1

Sample Depth = 760 - 1.22

N = 6 blows/0.3m

w = 13%

Borehole 102

N 4,677,631.8; E 335,512.7

0 - 350	Br Cl Tps
350 - 1.37	Br & Gry Cl Si W Sa Tr Gr Tr Tps (FILL), <u>SA 102-1</u>
1.37 - 1.52	Br Cl Si W Sa Tr Gr

SA 102-1

Sample Depth = 760 - 1.22

N = 8 blows/0.3m

w = 21.8%

Borehole 104

N 4,677,630.3; E 335,263.1

0 - 1.37	Br & Gry Si Sa W Cl Tr Gr, <u>SA 104-1</u>
1.37 - 1.52	Br Cl Si W Sa Tr Gr

SA 104-1

Sample Depth = 760 - 1.22

N = 7 blows/0.3m

w = 15.5%

Borehole 105

N 4,677,843.2; E 335,190.1

0 - 300	Br Cl Tps
300 - 460	Br Sa & Gr
460 - 760	Br Cl Si
760 - 1.52	Br & Gry Cl Si W Tps, <u>SA 105-1</u>

SA 105-1

Sample Depth = 760 - 1.22

N = 15 blows/0.3m

w = 18.4%

Borehole 107

N 4,677,973.1; E 334,961.3

0 - 300	Br Si Tps
300 - 1.37	Br & Gry Cl Si Tr Sa Tr Gr, <u>SA 107-1</u>
1.37 - 1.52	Br Cl Si W Sa Tr Gr

SA 107-1

Sample Depth = 760 - 1.22

N = 6 blows/0.3m

w = 18.9%

Borehole 109

N 4,678,155.0; E 334,716.3

0 - 150	Br Cl Tps
150 - 660	Br Cl Si Tr Sa Tr Gr Tr Tps (FILL)
660 - 1.52	Br & Gry Cl Si Tr Sa Tr Gr, <u>SA 109-1</u>

SA 109-1

Sample Depth = 760 - 1.22

N = 6 blows/0.3m

w = 18.1%

Borehole 112

N 4,678,413.3; E 334,221.3

0 - 400	Br Si Tps
400 - 1.42	Br & Gry Cl Si Tr Sa Tr Gr, <u>SA 112-1</u>

SA 112-1

Sample Depth = 760 - 1.22

N = 7 blows/0.3m

w = 16.3%

Borehole 113

N 4,678,454.5; E 334,070.3

0 - 400	Blk Cl Tps
400 - 1.52	Br Cl Si W Sa Tr Gr W F Sa Pockets, <u>SA 113-1</u>

SA 113-1

Sample Depth = 760 - 1.22

N = 7 blows/0.3m

w = 14.2%

Borehole 115

N 4,678,585.3; E 333,911.1

0 - 430 Br Si Tps  
430 - 1.52 Br Cl Si W Sa Tr Gr, SA 115-1

SA 115-1

Sample Depth = 760 - 1.22

N = 4 blows/0.3m

w = 13.4 %

Borehole 116

N 4,678,634.3; E 333,722.5

0 - 300 Blk Cl Tps  
300 - 1.37 Br & Gry Si Cl W Sa Tr Gr, SA 116-1

SA 116-1

Sample Depth = 760 - 1.22

N = 6 blows/0.3m

w = 22.2%

Borehole 118

N 4,678,903.5; E 333,302.9

0 - 150 Br Si Tps  
150 - 1.37 Br Cl Si Tr Sa Tr Gr W Tps (FILL), SA 118-1  
1.37 - 1.52 Br Sa & Gr W Si (FILL)

SA 118-1

Sample Depth = 760 - 1.22

N = 5 blows/0.3m

w = 18.7%

Borehole 119

N 4,678,961.6; E 333,120.6

0 - 150 Blk Cl Tps  
150 - 760 Br Cl Si W Sa  
760 - 1.52 Br & Gry Cl Si Tr Sa Tr Gr Tr Org, SA 119-1

SA 119-1

Sample Depth = 760 - 1.22

N = 6 blows/0.3m

w = 24.0%

Borehole 126

N 4,679,237.2; E 332,335.5

0 - 1.52 Br Sa & Gr Tr Si (FILL), SA 126-1

SA 126-1

Sample Depth = 760 - 1.22

N = 24 blows/0.3m

w = 5.9%

Borehole 127

N 4,679,370.9; E 332,251.6

0 - 150 Gry Sa & Gr (FILL)  
150 - 910 Br Sa Tr Si Tr Cl (FILL), SA 127-1A  
910 - 1.37 Br Sa Tr Si, SA 127-1B  
1.37 - 1.52 Gry Si Cl W Sa Tr Gr

SA 127-1

Sample Depth = 760 - 1.22

N = 5 blows/0.3m

SA 127-1A

w = 16.5%

SA 127-1B

w = 15.8%

Borehole 131

N 4,679,944.8; E 331,856.4

0 - 180 Blk Si Tps  
180 - 760 Br Med - Co Sa  
760 - 1.37 Br & Gry Cl Si Tr Sa, SA 131-1  
1.37 - 1.52 Gry Si Cl, W Sa Tr Gr

SA 131-1

Sample Depth = 760 - 1.22

N = 4 blows/0.3m

w = 28.5%

Borehole 132

N 4,680,070.8; E 331,910.3

0 - 360	Blk Sa Tps
360 - 1.22	Br Si F Sa W Cl Si Layers, <u>SA 132-1</u>
1.22 - 1.52	Br & Gry Cl Si W Sa

SA 132-1

Sample Depth = 760 - 1.22

N = 10 blows/0.3m

w = 21.3%

Borehole 135

N 4,680,369.9; E 331,728.7

0 - 1.37	Blk Sa Tps, <u>SA 135-1</u>
1.37 - 1.52	Br Si Sa

SA 135-1

Sample Depth = 760 - 1.22

N = 5 blows/0.3m

w = 25.2%

Borehole 136

N 4,680,449.5; E 331,751.3

0 - 760	Br F Sa Tr Gr (FILL)
760 - 1.37	Br F – Med Sa W Si, <u>SA 136-1</u>
1.37 - 1.52	Br Si W Sa

SA 136-1

Sample Depth = 760 - 1.22

N = 10 blows/0.3m

w = 9.9%

Borehole 139

N 4,680,787.5; E 331,599.3

0 - 460	Br F Sa (FILL)
460 - 690	Br Sa Tps
690 - 1.52	Br F – Med Sa W Si, <u>SA 139-1</u>

SA 139-1

Sample Depth = 760 - 1.22

N = 8 blows/0.3m

w = 6.2%



Borehole 140

N 4,680,899.3; E 331,552.4

0 - 380	Br Si Sa (FILL)
380 - 460	Br Sa & Gr (FILL)
460 - 1.37	Br Si Sa, <u>SA 140-1</u>
1.37 - 1.52	Gry Si W Cl

SA 140-1

Sample Depth = 760 - 1.22

N = 8 blows/0.3m

w = 16.4%

Borehole 141

N 4,681,073.1; E 331,425.8

0 - 330	Br Sa Tps
330 - 760	Br Sa
760 - 1.37	Br Med Sa W Si, <u>SA 141-1</u>
1.37 - 1.52	Gry Cl Si Tr Sa Tr Gr

SA 141-1

Sample Depth = 760 - 1.22

N = 14 blows/0.3m

w = 14.5%

Borehole 142

N 4,681,251.2; E 331,372.6

0 - 410	Blk Sa Tps
410 - 760	Br Sa
760 - 1.52	Br & Gry Cl Si W Sa Tr Gr, <u>SA 142-1</u>

SA 142-1

Sample Depth = 760 - 1.22

N = 8 blows/0.3m

w = 23.0 %

Borehole 145

N 4,681,447.2; E 331,247.9

0 - 1.22	Br Si Sa, <u>SA 145-1</u>
1.22 - 1.52	Gry Cl Si W Sa Tr Gr

SA 145-1

Sample Depth = 760 - 1.22

N = 12 blows/0.3m

w = 15.4%

## Borehole 147

N 4,681,670.0; E 331,004.6

0 - 510	Blk Cl Tps
510 - 1.37	Br & Gry Sa Si W Tps Tr Cl, <u>SA 147-1</u>
1.37 - 1.52	Br & Gry Cl Si W Sa Tr Gr

## SA 147-1

Sample Depth = 760 - 1.22

N = 19 blows/0.3m

w = 16.5%

## Borehole 149

N 4,681,628.0; E 330,949.6

0 - 120	Blk Si Tps
120 - 1.52	Br & Gry Si Cl W Sa Tr Gr, <u>SA 149-1</u>

## SA 149-1

Sample Depth = 760 - 1.22

N = 6 blows/0.3m

w = 24.9%

## Borehole 151

N 4,681,734.8; E 330,642.9

0 - 610	Br Cl Tps
610 - 1.52	Br Cl Si W Sa, <u>SA 151-1</u>

## SA 151-1

Sample Depth = 760 - 1.22

N = 15 blows/0.3m

## % Passing

4.75mm = 100%

2.00mm = 97.9%

425mm = 95.9%

250mm = 91.3%

106mm = 80.2%

75mm = 78.2%

5mm = 36.0%

2mm = 29.0%

w = 12.9%

Borehole 152

N 4,681,834.3; E 330,579.3

0 - 300 Br Cl Tps  
300 - 1.52 Br F Sa W Si, SA 152-1, SA 152-2

SA 152-1

Sample Depth = 300

w = 11.0%

SA 152-2

Sample Depth = 760 - 1.22

N = 12 blows/0.3m

w = 13.2 %

Borehole 154

N 4,681,959.9; E 330,200.6

0 - 300 Blk Si Tps  
300 - 1.37 Br F Sa W Si, SA 154-1  
1.37 - 1.52 Gry Si W Cl Tr Sa

SA 154-1

Sample Depth = 760 - 1.22

N = 7 blows/0.3m

w = 21.6%

Borehole 156

N 4,682,106.6; E 329,876.3

0 - 890 Blk Sa Tps, SA 156-1A  
890 - 1.37 Br Si F Sa, SA 156-1B  
1.37 - 1.52 Gry Si Cl Tr Sa Tr Gr

SA 156-1

Sample Depth = 760 - 1.22

N = 8 blows/0.3m

SA 156-1A

w = 21.7%

SA 156-1B

w = 20.9%

Borehole 158

N 4,682,144.3; E 329,769.9

0 - 850 Br F Sa W Si, SA 158-1A  
850 - 1.52 Gry Si Cl W Sa, SA 158-1B

SA 158-1

Sample Depth = 760 - 1.22

N = 4 blows/0.3m

SA 158-1A

w = 23.5%

SA 158-1B

w = 25.2%

Borehole 160

N 4,682,216.8; E 329,156.2

0 - 610	Blk Cl Tps
610 - 760	Br & Gry Si Sa W Cl
760 - 1.52	Br & Gry Cl Si Tr Sa, <u>SA 160-1</u>

SA 160-1

Sample Depth = 760 - 1.22

N = 4 blows/0.3m

w = 25.2%

Borehole 163

N 4,682,384.7; E 328,586.3

0 - 810	Blk Sa Tps, <u>SA 163-1A</u>
810 - 1.37	Br F – Med Sa Tr Si, <u>SA 163-1B</u>
1.37 - 1.52	Gry Cl Si Tr Sa W Sa Layers

SA 163-1

Sample Depth = 760 - 1.22

N = 9 blows/0.3m

SA 163-1A

w = 6.1%

SA 163-1B

w = 7.3%

Borehole 164

N 4,682,299.7; E 328,445.6

0 - 230	Blk Sa Tps
230 - 1.52	Br F – Med Sa Tr Si, <u>SA 164-1</u>

SA 164-1

Sample Depth = 760 - 1.22

N = 17 blows/0.3m

Borehole 166

N 4,682,168.3; E 328,349.6

0 - 280 Blk Sa Tps  
280 - 1.52 Br Si Sa, SA 166A-1

SA 166-1

Sample Depth = 760 - 1.22

N = 9 blows/0.3m

w = 13.9%

Borehole CPT-103

N 4,677,620.0; E 335,400.7

0 - 90 Br Si Tps  
90 - 1.52 Br & Gry Cl Si W Sa Tr Gr, SA CPT-103-1

SA CPT-103-1

Sample Depth = 760 - 1.22

N = 7 blows/0.3m

w = 19.2%

Borehole CPT-106

N 4,677,846.1; E 335,039.9

0 - 360 Br Cl Tps W Gr (FILL), SA CPT-106-1A  
360 - 1.83 Br & Gry Cl Si W Sa Tr Gr, SA CPT-106-1B, SA CPT-106-2,  
SA CPT-106-3

SA CPT-106-1

Sample Depth = 0 - 610

N = 12 blows/0.3m

SA CPT-106-1A

w = 10.6%

SA CPT-106-1B

w = 13.8%

SA CPT-106-2

Sample Depth = 610 - 1.22

N = 15 blows/0.3m

w = 14.6%

SA CPT-106-3

Sample Depth = 1.22 - 1.83

N = 12 blows/0.3m

w = 12.3%



## Borehole CPT-108

N 4,678,051.6; E 334,826.8

0 - 150 Br Si Tps  
150 - 1.52 Br & Gry Cl Si W Sa Tr Gr W Si Sa Partings, SA CPT-108-1

## SA CPT-108-1

Sample Depth = 760 - 1.22

N = 4 blows/0.3m

w = 20.6%

## Borehole CPT-110

N 4,678,297.8; E 334,448.6

0 - 300 Br Cl Tps, SA CPT-110-1A  
300 - 1.83 Br & Gry Cl Si W Sa Tr Gr, SA CPT110-1B, SA CPT-110-2,  
SA CPT-110-3

## SA CPT-110-1

Sample Depth = 0 – 610

N = 8 blows/0.3m

## SA CPT-110-1A

w = 17.5%

## SA CPT-110-1B

w = 11.1%

## SA CPT-110-2

Sample Depth = 610 - 1.22

N = 9 blows/0.3m

w = 18.6%

## SA CPT-110-3

Sample Depth = 1.22 - 1.83

N = 11 blows/0.3m

w = 6.4%

## Borehole CPT-111

N 4,678,351.4; E 334,347.6

0 - 230 Br Si Tps W Cr Gran (FILL), SA CPT-111-1A  
230 - 1.83 Br & Gry Cl Si W Sa Tr Gr, SA CPT-111-1B, SA CPT-111-2,  
SA CPT-111-3

## SA CPT-111-1

Sample Depth = 0 – 610

N = 18 blows/0.3m

## SA CPT-111-1A

w = 11.2%

## SA CPT-111-1B

w = 10.0%

## SA CPT-111-2

Sample Depth = 610 - 1.22

N = 12 blows/0.3m

w = 11.1%

## SA CPT-111-3

Sample Depth = 1.22 - 1.83

N = 17 blows/0.3m

w = 13.3%

## Borehole CPT-114

N 4,678,526.7; E 334,018.6

0 - 280      Blk Si Tps, SA CPT-114-1A  
280 - 1.83      Br & Gry Cl Si W Sa Tr Gr, SA CPT-114-1B, SA CPT-114-2,  
                         SA CPT-114-3

## SA CPT-114-1

Sample Depth = 0 – 610

N = 20 blows/0.3m

## SA CPT-114-1A

w = 14.0%

## SA CPT-114-1B

w = 10.9%

## SA CPT-114-2

Sample Depth = 610 - 1.22

N = 20 blows/0.3m

w = 12.6%

## SA CPT-114-3

Sample Depth = 1.22 - 1.83

N = 28 blows/0.3m

w = 13.4%

## Borehole CPT-117

N 4,678,744.1; E 333,601.5

0 - 150      Br Si Tps  
150 - 1.52      Br Cl Si W Sa Tr Gr (FILL), SA CPT-117-1

## SA CPT-117-1

Sample Depth = 760 - 1.22

N = 5 blows/0.3m

w = 19.2%

## Borehole CPT-120

N 4,678,947.2; E 333,029.8

0 - 590 Br Cl Tps W Cl Si Pockets (FILL), SA CPT-120-1A  
590 - 1.83 Br & Gry Cl Si W Sa Tr Gr, SA CPT-120-1B, SA CPT-120-2,  
SA CPT-120-3

## SA CPT-120-1

Sample Depth = 0 - 610

N = 20 blows/0.3m

## SA CPT-120-1A

w = 10.8%

## SA CPT-120-1B

w = 12.7%

## SA CPT-120-2

Sample Depth = 610 - 1.22

N = 41 blows/0.3m

w = 10.9%

## SA CPT-120-3

Sample Depth = 1.22 - 1.83

N = 52 blows/0.3m

w = 12.4%

## Borehole CPT-121

N 4,679,024.8; E 333,077.4

0 - 80 Br Cl Tps, SA CPT-121-1A  
80 - 1.83 Br & Gry Cl Si W Sa Tr Gr, SA CPT-121-1B, SA CPT-121-2,  
SA CPT-121-3

## SA CPT-121-1

Sample Depth = 0 - 610

N = 8 blows/0.3m

## SA CPT-121-1A

w = 24.9%

## SA CPT-121-1B

w = 19.7%

## SA CPT-121-2

Sample Depth = 610 - 1.22

N = 11 blows/0.3m

w = 17.1%

## SA CPT-121-3

Sample Depth = 1.22 - 1.83

N = 26 blows/0.3m

w = 14.6%

## Borehole CPT-123

N 4,679,309.7; E 332,536.3

0 - 280	Gry & Blk Cr Gran W Asph (FILL), <u>SA CPT-123-1A</u>
280 - 910	Blk Cl Tps, <u>SA CPT-123-1B</u>
910 - 1.52	Br & Gry Cl Si Tr Sa Tr Gr, <u>SA CPT-123-2</u>

## SA CPT-123-1A

w = 17.6%

## SA CPT-123-1B

w =

## SA CPT-123-2

Sample Depth = 910 - 1.52

N = 7 blows/0.3m

w = 22.2%

## Borehole CPT-124

N 4,679,354.6; E 332,455.0

0 - 610	Br Si Tps, <u>SA CPT-124-1</u>
610 - 910	Br F - Med Sa W Si, <u>SA CPT-124-2A</u>
910 - 1.83	Br & Gry Cl Si Tr Sa Tr Gr, Fr Wat @ 1.0, <u>SA CPT-124-2B</u> , <u>SA CPT-124-3</u>

## SA CPT-124-1

Sample Depth = 0 - 610

N = 14 blows/0.3m

w = 11.5%

## SA CPT-124-2

Sample Depth = 610 - 1.22

N = 4 blows/0.3m

## SA CPT-124-2A

w = 14.5%

## SA CPT-124-2B

w = 20.6%

SA CPT-124-3

Sample Depth = 1.22 - 1.83

N = 19 blows/0.3m

w = 19.8%

Borehole CPT-128

N 4,679,490.6; E 332,200.8

0 - 610 Br Si Sa Tr Gr Tr Org (FILL), SA CPT-128-1

610 - 1.83 Br & Gry Cl Si Tr Sa Tr Gr, Fr Wat @ 1.2, SA CPT-128-2, SA CPT-128-3

SA CPT-128-1

Sample Depth = 0 - 610

N = 10 blows/0.3m

w = 12.1%

SA CPT-128-2

Sample Depth = 610 - 1.22

N = 7 blows/0.3m

w = 21.3%

SA CPT-128-3

Sample Depth = 1.22 - 1.83

N = 17 blows/0.3m

w = 28.4%

Borehole CPT-130

N 4,679,821.8; E 332,036.1

0 - 530 Br Cr Gran Tr Si, SA CPT-130-1A

530 - 610 Blk Sa W Slag (FILL), SA CPT-130-1B

610 - 1.83 Br & Gry Cl Si Tr Sa Tr Gr, SA CPT-130-2, SA CPT-130-3

SA CPT-130-1

Sample Depth = 0 - 610

N = 16 blows/0.3m

SA CPT-130-1A

w = 1.0%

SA CPT-130-1B

w = 5.9%

SA CPT-130-2

Sample Depth = 610 - 1.22

N = 14 blows/0.3m

w = 22.2%



## SA CPT-130-3

Sample Depth = 1.22 - 1.83

N = 11 blows/0.3m

w = 26.3%

## Borehole CPT-133

N 4,680,184.7; E 331,953.4

0 - 300	Gry Cr Gran W Asph (FILL)
300 - 1.07	Br F Sa W Si, Fr Wat @ 940, <u>SA CPT-133-1</u> , <u>SA CPT-133-2A</u>
1.07 - 1.14	Br & Gry Cl Si W Sa W Si Partings, <u>SA CPT-133-2B</u>
1.14 - 1.52	Br Si Cl Tr Sa Tr Gr, <u>SA CPT-133-2C</u>

## SA CPT-133-1

Sample Depth = 0 – 610

N = 31 blows/0.3m

## SA CPT-133-2

Sample Depth = 610 - 1.22

N = 4 blows/0.3m

## SA CPT-133-2A

w = 18.6%

## SA CPT-133-2B

w = 21.9%

## SA CPT-133-2C

w = 24.3%

## Borehole CPT-134

N 4,680,151.4; E 331,888.7

0 - 610	Br Si Sa W Gr Tr Org (FILL), <u>SA CPT-134-1</u>
610 - 1.22	Br Cr Gran Tr Si (FILL), <u>SA CPT-134-2</u>
1.22 - 1.83	Br & Gry Cl Si Tr Sa, <u>SA CPT-134-3</u>

## SA CPT-134-1

Sample Depth = 0 – 610

N = 35 blows/0.3m

w = 6.1%

## SA CPT-134-2

Sample Depth = 610 - 1.22

N = 10 blows/0.3m

w = 3.3%

## SA CPT-134-3

Sample Depth = 1.22 - 1.83

N = 14 blows/0.3m

w = 22.1%

Borehole CPT-137

N 4,680,541.5; E 331,710.2

0 - 610	Br Sa Tps, <u>SA CPT-137-1</u>
610 - 1.22	Br F Sa W Si Tr Org, <u>SA CPT-137-2</u>
1.22 - 1.52	Br F Sa Tr Si, <u>SA CPT-137-3A</u>

SA CPT-137-1

Sample Depth = 0 – 610

N = 14 blows/0.3m

w = 7.4%

SA CPT-137-2

Sample Depth = 610 - 1.22

N = 16 blows/0.3m

w = 9.6%

SA CPT-137-3A

w = 3.6%

Borehole CPT-144

N 4,681,363.6; E 331,279.2

0 - 760	Br Si F Sa W Gr (FILL)
760 - 1.52	Gry Si Cl Tr Sa Tr Gr, <u>SA CPT-144-1</u>

SA CPT-144-1

Sample Depth = 760 - 1.22

N = 6 blows/0.3m

w = 22.2%

Borehole CPT-146

N 4,681,540.8; E 331,126.5

0 - 200	Gry Cr Gran
200 - 410	Blk Sa Tps
410 - 1.52	Br Si F Sa, Fr Wat @ 1.35, <u>SA CPT-146-1</u>

SA CPT-146-1

Sample Depth = 760 - 1.22

N = 22 blows/0.3m

w = 15.3%

Borehole CPT-148

N 4,681,651.5; E 330,951.4

0 - 130	Br Si Cl (FILL)
130 - 760	Blk Cl Si Tr Sa Tr Org (FILL), <u>SA CPT-148-1</u>
760 - 1.52	Br & Gry Cl Si Tr Sa Tr Gr, <u>SA CPT-148-2</u> , <u>SA CPT-148-3</u>

SA CPT-148-1

Sample Depth = 305 – 610

N = 16 blows/0.3m

SA CPT-148-2

Sample Depth = 760 - 1.22

N = 14 blows/0.3m

w = 23.3%

SA CPT-148-3

w = 20.8%

Borehole CPT-150

N 4,681,733.4; E 330,757.6

0 - 100	Gry Cr Gran
100 - 610	Blk Sa Tps W Cr Gran (FILL), <u>SA CPT-150-1A</u>
610 - 760	Br Cl Si W Sa Tr Gr Tr Asph (FILL), <u>SA CPT-150-1B</u>
760 - 1.22	Br Si F Sa, <u>SA CPT-150-2</u>
1.22 - 1.98	Br & Gry Cl Si W Sa Tr Gr, <u>SA CPT-150-3</u>

SA CPT-150-1

Sample Depth = 305 – 760

N = 13 blows/0.3m

SA CPT-150-1A

w = 12.3%

SA CPT-150-1B

w = 16.9%

SA CPT-150-2

Sample Depth = 760 - 1.22

N = 8 blows/0.3m

w = 13.5%

SA CPT-150-3

Sample Depth = 1.52 - 1.98

N = 4 blows/0.3m

w = 17.5%

Borehole CPT-153

N 4,681,793.3; E 330,575.8

0 - 690 Blk Si Tps, SA CPT-153-1A  
690 - 1.52 Br & Gry Cl Si Tr Sa W Si Partings, SA CPT-153-1B, SA CPT-153-2

SA CPT-153-1

Sample Depth = 305 – 760

N = 13 blows/0.3m

SA CPT-153-1A

w = 28.0%

SA CPT-153-1B

w = 17.5%

SA CPT-153-2

Sample Depth = 760 - 1.22

N = 5 blows/0.3m

w = 18.1%

Borehole CPT-155

N 4,682,065.8; E 329,981.7

0 - 300 Blk Sa Tps  
300 - 460 Br Si F Sa Tr Tps (FILL), SA CPT-155-1A  
460 - 610 Blk Sa Tps, SA CPT-155-1B  
610 - 1.37 Br Si Sa Tr Gr, Fr Wat @ 1.2, SA CPT-155-1C, SA CPT-155-2A  
1.37 - 1.52 Gry Cl Si Tr Sa, SA CPT-155-2B

SA CPT-155-1

Sample Depth = 305 – 910

N = 10 blows/0.3m

SA CPT-155-1A

w = 14.2%

SA CPT-155-1B

w = 15.0%

SA CPT-155-1C

w = 13.7%

SA CPT-155-2

Sample Depth = 910 - 1.52

N = 9 blows/0.3m

SA CPT 155-2A

w = 18.6%

SA CPT-155-2B

w = 24%

Borehole CPT-159

N 4,682,292.8; E 329,332.1

0 - 910	Blk Si Tps, <u>SA CPT-159-1A</u>
910 - 1.22	Br Si W Sa W Cl Tr Tps (FILL), <u>SA CPT-159-1B</u>
1.22 - 1.83	Br & Gry Cl Si Tr Sa, <u>SA CPT-159-2</u>

SA CPT-159-1

Sample Depth = 760 - 1.22

N = 4 blows/0.3m

SA CPT-159-2

Sample Depth = 1.22 - 1.83

N = 5 blows/0.3m

w = 26.6%

Borehole CPT-161

N 4,682,177.6; E 328,793.9

0 - 80	Gry Cr Gran
80 - 1.07	Br Si Sa, <u>SA CPT-161-1</u>
1.07 - 1.22	Br Si Sa & Gr, <u>SA CPT-161-2A</u>
1.22 - 1.68	Br & Gry Si Tr F Sa, Fr Wat @ 1.5, <u>SA CPT-161-2B</u>

SA CPT-161-1

Sample Depth = 460 - 1.07

N = 12 blows/0.3m

w = 13.5%

SA CPT-161-2

Sample Depth = 1.07 - 1.68

N = 24 blows/0.3m

SA CPT-161-2A

w = 15.5%

SA CPT-161-2B

w = 18.5%

Borehole CPT-162

N 4,682,439.2; E 328,729.1

0 - 610	Blk Sa Tps Tr Gr, <u>SA CPT-162-1A</u>
610 - 1.45	Br F Sa W Si Tr Gr, <u>SA CPT-162-1B</u> , <u>SA CPT-162-2A</u>
1.45 - 1.52	Br F - Med Sa W Gr Tr Si, <u>SA CPT-162-2B</u>



SA CPT-162-1

Sample Depth = 305 – 910

N = 22 blows/0.3m

SA CPT-162-1A

w = 6.3%

SA CPT-162-1B

w = 5.3%

SA CPT-162-2

Sample Depth = 910 - 1.52

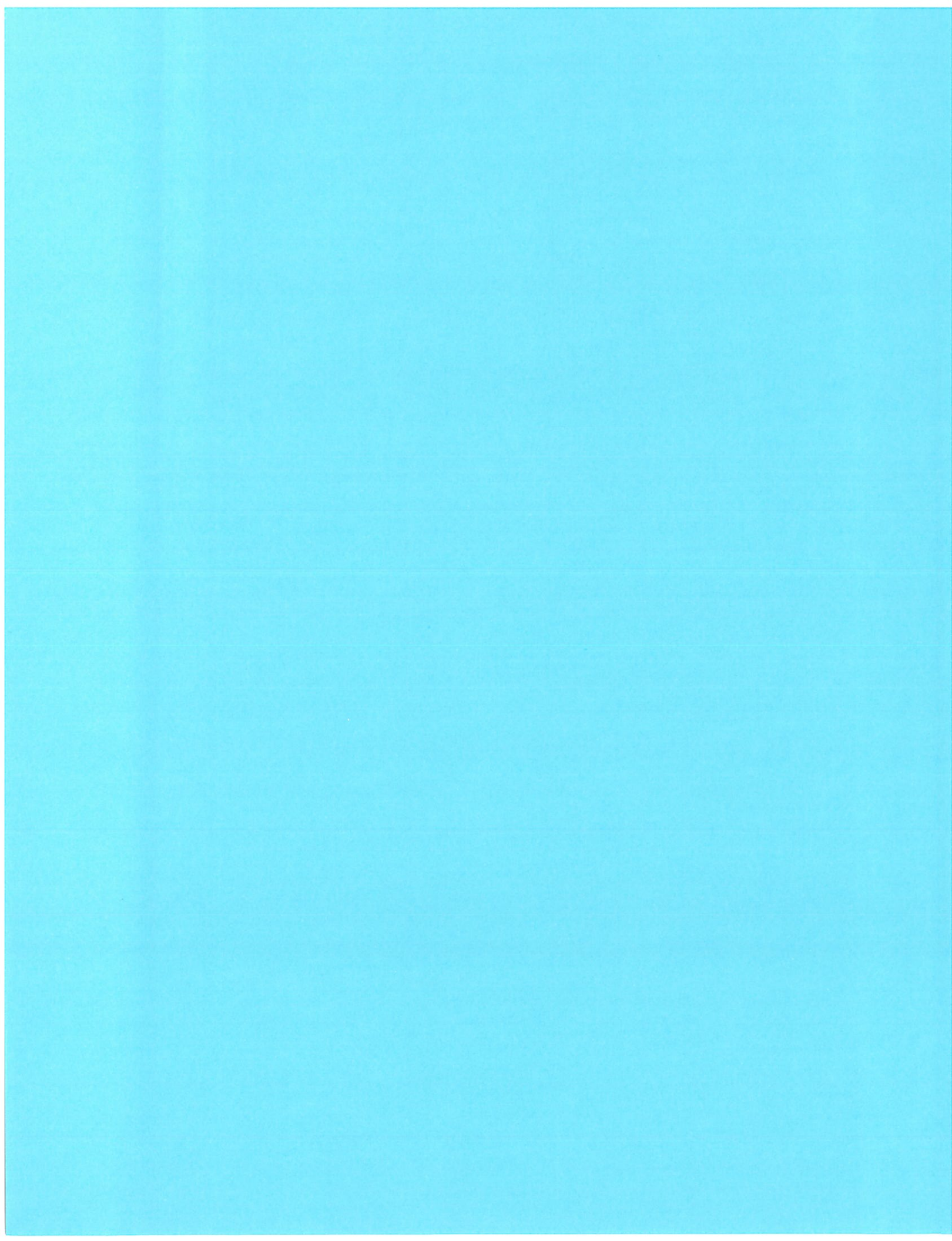
N = 16 blows/0.3m

SA CPT-162-2A

w = 5.2%

SA CPT-162-2B

w = 5.5%





# APPENDIX D

## Nilcon Vane Borer Tests

**NILCON FIELD VANE SHEAR TEST RESULTS****Windsor-Essex Parkway**

Depth (m)	Elevation (m)	Undrained Shear Strength (kPa)			Sensitivity
		Natural	Post-Peak	Remoulded	

**Field Vane Location 1 (Borehole BH-1)**

5.1	181.6	145	104	93	1.6
6.1	180.6	109	94	73	1.5
7.1	179.6	81	65	66	1.2
8.1	178.6	107	90	64	1.7
9.1	177.6	90	77	62	1.4
10.1	176.6	75	60	59	1.3
11.1	175.6	84	65	62	1.4
12.1	174.6	83	60	47	1.7
13.1	173.6	60	48	55	1.1
14.1	172.6	62	45	47	1.3
15.1	171.6	50	43	49	1.0
16.1	170.6	64	45	47	1.3
17.1	169.6	60	39	51	1.2
18.1	168.6	52	35	45	1.2
19.1	167.6	60	35	53	1.1
20.1	166.6	71	33	45	1.6
21.1	165.6	58	20	42	1.4
22.1	164.6	60	19	49	1.2
23.1	163.6	43	34		

**Field Vane Location 7 (Borehole BH-7)**

6.1	177.1	108	93	76	1.4
7.1	176.1	81	58	47	1.7
8.1	175.1	80	51	36	2.2
9.1	174.1	69	41	28	2.4
10.1	173.1	61	48	17	3.6
11.1	172.1	64	47	30	2.1
12.1	171.1	65	44	32	2.0
13.1	170.1	53	28	23	2.3
14.1	169.1	50	31	19	2.6
15.1	168.1	59	44	30	1.9
16.1	167.1	46	16	15	3.1
17.1	166.1	40	17	21	1.9
18.1	165.1	22	13	15	1.5
19.1	164.1	61	36	40	1.5

**Field Vane Location 14 (Borehole BH-14)**

6.0	176.0	93	62	35	2.6
7.0	175.0	57	29	15	3.8
8.0	174.0	62	37	29	2.1
9.0	173.0	51	28	24	2.2
10.0	172.0	48	26	24	2.0
11.0	171.0	49	26	24	2.1
12.0	170.0	44	26	23	2.0
13.0	169.0	42	24	21	2.0
14.0	168.0	64	50	22	3.0
15.0	167.0	38	13	16	2.4
16.0	166.0	38	8	14	2.7

**NILCON FIELD VANE SHEAR TEST RESULTS****Windsor-Essex Parkway**

Depth (m)	Elevation (m)	Undrained Shear Strength (kPa)			Sensitivity
		Natural	Post-Peak	Remoulded	
17.0	165.0	35	12	9	3.7
18.0	164.0	45	13	16	2.8
19.0	163.0	33	13	22	1.5
20.0	162.0	39	34	28	1.4

**Field Vane Location 23 (Borehole BH-23)**

5.0	173.9	47	21	15	3.1
6.0	172.9	38	16	9	4.4
7.0	171.9	29	15	10	2.8
8.0	170.9	29	15	10	2.8
9.0	169.9	26	14	9	2.7
10.0	168.9	27	15	8	3.6
11.0	167.9	27	18	6	4.8
12.0	166.9	34	9	5	7.2
13.0	165.9	22	19	7	3.3
14.0	164.9	22	19	4	5.8
15.0	163.9	22	12	14	1.5
16.0	162.9	31	22	17	1.8
17.0	161.9	46	27	26	1.8

**Field Vane Location 105 (Borehole BH-105)**

4.9	181.3	95	79	57	1.7
5.9	180.3	123	93	78	1.6
6.9	179.3	83	62	53	1.6
7.9	178.3	68	49	40	1.7
8.9	177.3	98	57	53	1.9
9.9	176.3	51	32	28	1.8
10.9	175.3	49	36	32	1.5
11.9	174.3	47	25	28	1.7
12.9	173.3	53	26	32	1.6
13.9	172.3	45	30	26	1.7
14.9	171.3	49	34	19	2.6
15.9	170.3	51	42	28	1.8
16.9	169.3	49	30	23	2.2
17.9	168.3	51	25	13	3.9
18.9	167.3	47	19	13	3.6
19.9	166.3	49	26	21	2.4
20.9	165.3	83	45	40	2.1
21.9	164.3	83	55	57	1.5

**Field Vane Location 112 (Borehole BH-112)**

6.8	177.8	81	43	40	2.0
7.8	176.8	79	32	42	1.9
8.8	175.8	45	43	26	1.7
9.8	174.8	59	40	32	1.8
10.8	173.8	51	30	28	1.8
11.8	172.8	47	26	28	1.7
12.8	171.8	53	42	32	1.6
13.8	170.8	43	26	21	2.1



**NILCON FIELD VANE SHEAR TEST RESULTS****Windsor-Essex Parkway**

Depth (m)	Elevation (m)	Undrained Shear Strength (kPa)			Sensitivity
		Natural	Post-Peak	Remoulded	
14.8	169.8	47	38	17	2.8
15.8	168.8	59	38	43	1.3
16.8	167.8	43	15	21	2.1
17.8	166.8	45	21	21	2.2
18.8	165.8	53	13	15	3.5
19.9	164.7	60	40	32	1.9
21.0	163.6	43	25		

**Field Vane Location 119 (Borehole BH-119)**

5.6	176.9	119	83	59	2.0
6.6	175.9	115	91	40	2.9
9.6	172.9	64	53	32	2.0
10.6	171.9	60	47	30	2.0
11.6	170.9	43	23	31	1.4
12.6	169.9	45	32	30	1.5
13.6	168.9	51	38	25	2.1
14.6	167.9	43		16	2.8
15.6	166.9	51	28	21	2.5
16.6	165.9	51	30	15	3.4
17.7	164.9	45		26	1.7
18.7	163.9	42	26	23	1.8
19.7	162.9	45	42	26	1.7
20.7	161.9	76		49	1.5

**Field Vane Location 122 (Borehole BH-122)**

5.8	175.9	117	74	53	2.2
6.8	174.9	79	51	40	2.0
7.8	173.9	62	42	26	2.4
8.8	172.9	59	32	26	2.2
9.8	171.9	51	34	21	2.5
10.8	170.9	59	26	23	2.6
11.8	169.9	53	32	26	2.0
12.8	168.9	45	19	9	4.8
13.8	167.9	43	23	13	3.3
14.8	166.9	43	28	19	2.3
15.8	165.9	45	36	26	1.7
16.8	164.9	83	68	47	1.8
17.8	163.9	70	62	59	1.2
18.8	162.9	59	38	47	1.2

**Field Vane Location 129 (Borehole BH-129)**

4.7	176.1	117	55		
5.7	175.1	93	62	40	2.3
6.7	174.1	95	32	42	2.3
7.7	173.1	70	43	8	9.3
8.7	172.1	93	26	38	2.5
9.7	171.1	57	23	25	2.3
10.7	170.1	55	23	25	2.2
11.7	169.1	51	34	21	2.5

**NILCON FIELD VANE SHEAR TEST RESULTS****Windsor-Essex Parkway**

Depth (m)	Elevation (m)	Undrained Shear Strength (kPa)			Sensitivity
		Natural	Post-Peak	Remoulded	
12.7	168.1	49	26	21	2.4
13.7	167.1	38	15	11	3.3
14.7	166.1	42	34	23	1.8
15.7	165.1	55	40	30	1.8
16.7	164.1	40	28	21	1.9
17.7	163.1	76	59	55	1.4
18.7	162.1	74	60	66	1.1

**Field Vane Location 132 (Borehole BH-132)**

4.8	176.7	117	79	60	1.9
5.8	175.7	81	51	49	1.7
6.8	174.7	59	15	13	4.4
7.8	173.7	62	42	26	2.4
8.8	172.7	57	25	19	3.0
9.8	171.7	55	25	25	2.2
10.8	170.7	38	28	17	2.2
11.8	169.7	43	25	21	2.1
12.8	168.7	42	26	23	1.8
13.8	167.7	47	38	25	1.9
14.8	166.7	42	19	15	2.8
15.8	165.7	68	25	21	3.3
16.8	164.7	45	26	26	1.7
17.8	163.7	45	38	45	1.0
18.8	162.7	49	32		
19.8	161.7	55	38	43	1.3
20.8	160.7	70	34	62	1.1

**Field Vane Location 135 (Borehole BH-135)**

4.7	177.3	125	91	59	2.1
5.7	176.3	68	47	28	2.4
6.7	175.3	68	45	30	2.3
7.7	174.3	59	34	25	2.4
8.7	173.3	55	30	15	3.6
9.7	172.3	55	36	21	2.6
10.7	171.3	38	21	19	2.0
11.7	170.3	47	30	32	1.5
12.7	169.3	59	36	30	1.9
13.7	168.3	42	21	25	1.7
14.7	167.3	45	36	8	6.0
15.7	166.3	36	9	15	2.4
16.7	165.3	55	19	15	3.6
17.7	164.3	40	8	19	2.1
18.7	163.3	30	19	19	1.6
19.7	162.3	36	25	30	1.2

**Field Vane Location 145 (Borehole BH-145)**

4.6	177.7	146	104	100	1.5
5.6	176.7	130	104	91	1.4
6.6	175.7	108	76	79	1.4

**NILCON FIELD VANE SHEAR TEST RESULTS****Windsor-Essex Parkway**

Depth (m)	Elevation (m)	Undrained Shear Strength (kPa)			Sensitivity
		Natural	Post-Peak	Remoulded	
7.6	174.7	99	82	78	1.3
8.6	173.7	70	59	61	1.1
9.6	172.7	62	53	57	1.1
10.6	171.7	59	45	49	1.2
11.6	170.7	60	49	57	1.1
12.6	169.7	53	53		
13.6	168.7	55	45	55	1.0
14.6	167.7	51	40	43	1.2
15.6	166.7	64	19	42	1.5
16.6	165.7	43	38		
17.6	164.7	30	13		
18.6	163.7	34	30		
19.6	162.7	30	30		

**Field Vane Location 154 (Borehole BH-154)**

5.6	175.3	91	57	57	1.6
6.6	174.3	66	40	47	1.4
7.6	173.3	76	68	64	1.2
8.6	172.3	57	26		
9.6	171.3	74	40	21	3.5
10.6	170.3	70	55	30	2.3
11.6	169.3	44	25	28	1.6
12.6	168.3	53	30		
13.6	167.3	57	40	40	1.4
14.6	166.3	51	45	28	1.8

**Field Vane Location 158 (Borehole BH-158)**

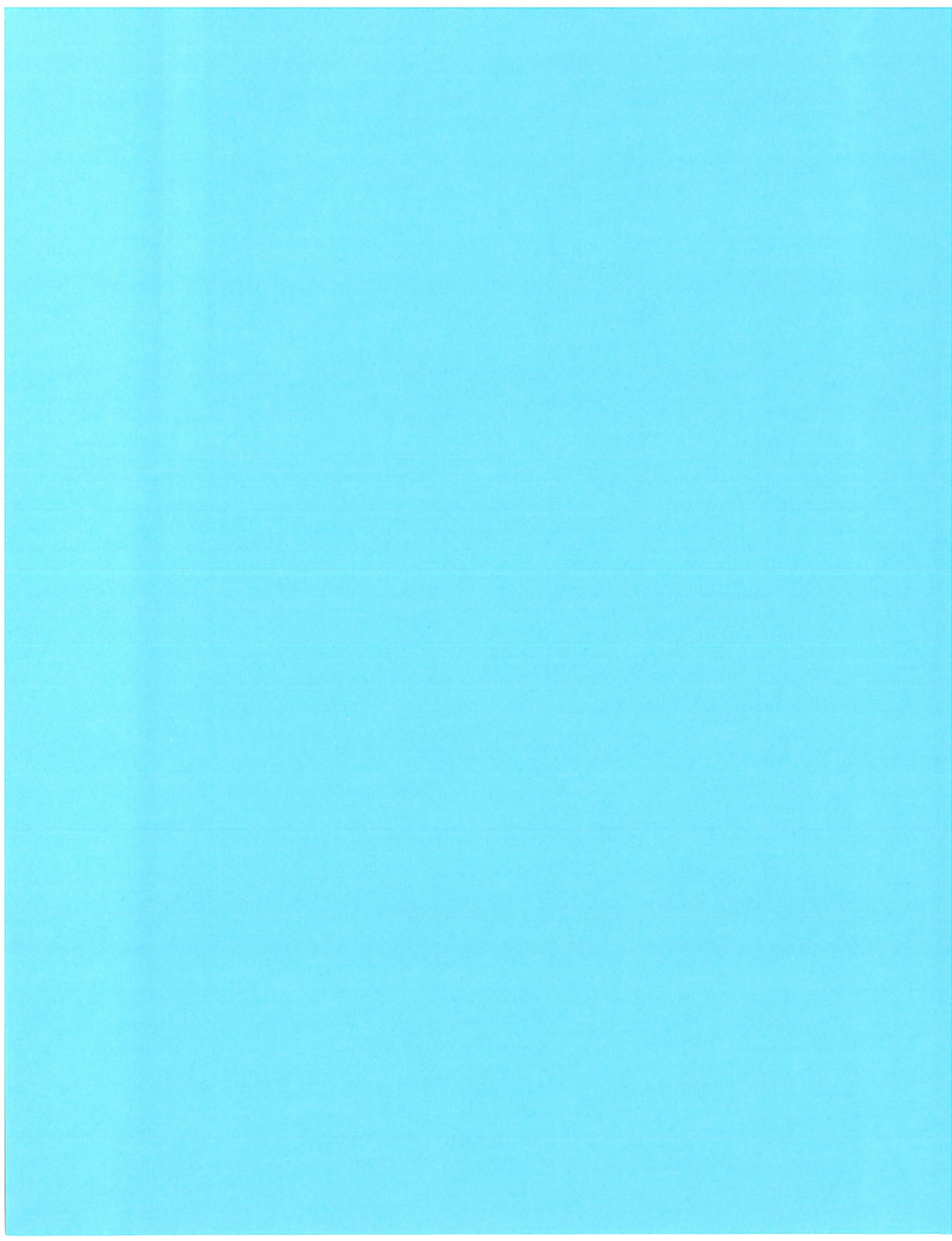
3.7	175.6	110	64	55	2.0
5.7	173.6	57	21	28	2.0
6.7	172.6	57	13	38	1.5
7.7	171.6	62	34	42	1.5
8.7	170.6	51	17	38	1.4
9.7	169.6	62	17	38	1.7
10.7	168.6	53	43	40	1.3
11.7	167.6	40	19		
12.7	166.6	32	11	26	1.2
13.7	165.6	26	15	23	1.2
14.7	164.6	45	13	25	1.8
15.7	163.6	55	28	34	1.6
16.7	162.6	26	8		
17.7	161.6	25	13	13	1.9

**Field Vane Location 160 (Borehole BH-160)**

3.7	175.0	54	23	15	3.5
5.7	173.0	32	13	11	2.8
6.7	172.0	19	2	11	1.7
7.7	171.0	34	13	13	2.6
8.7	170.0	23	6	17	1.3
9.7	169.0	38	15	20	1.9

**NILCON FIELD VANE SHEAR TEST RESULTS**  
**Windsor-Essex Parkway**

Depth (m)	Elevation (m)	Undrained Shear Strength (kPa)			Sensitivity
		Natural	Post-Peak	Remoulded	
10.7	168.0	23	6	19	1.2
11.7	167.0	17	4	15	1.1
12.7	166.0	36	9	11	3.2
13.7	165.0	32	21	21	1.5
14.7	164.0	25	6	11	2.2
15.7	163.0	25	19	23	1.1
16.7	162.0	28	19	8	3.8
17.7	161.0	83	74	60	1.4







# APPENDIX E

## Record of Cone Penetration Test sheets

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-1

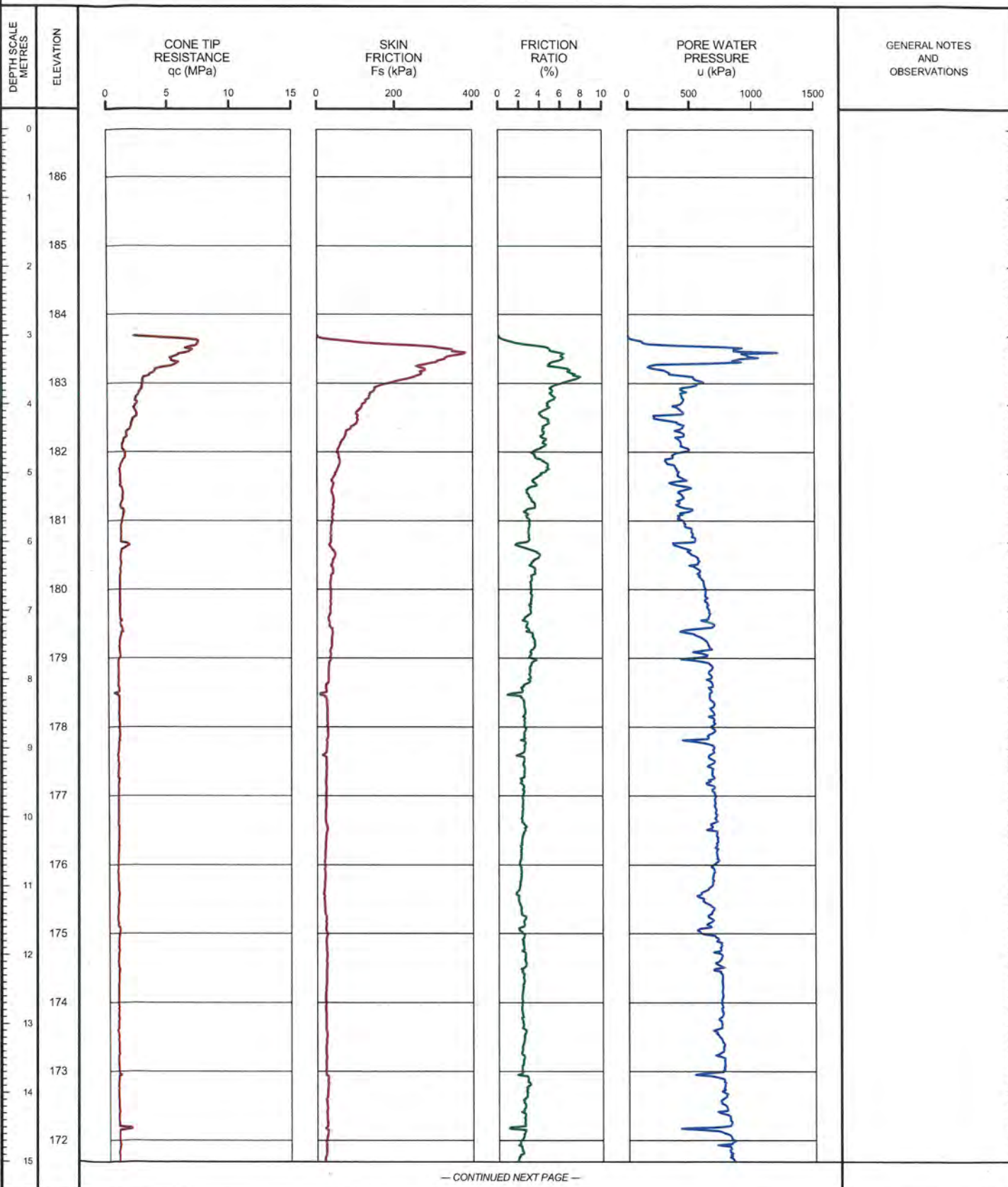
SHEET 1 OF 2

LOCATION: N 4677739.0 ; E 335502.0

TEST DATE: November 6, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.00m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT\_01 07-1130-207-0-CPT.GPJ GLDR LONGDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-1**

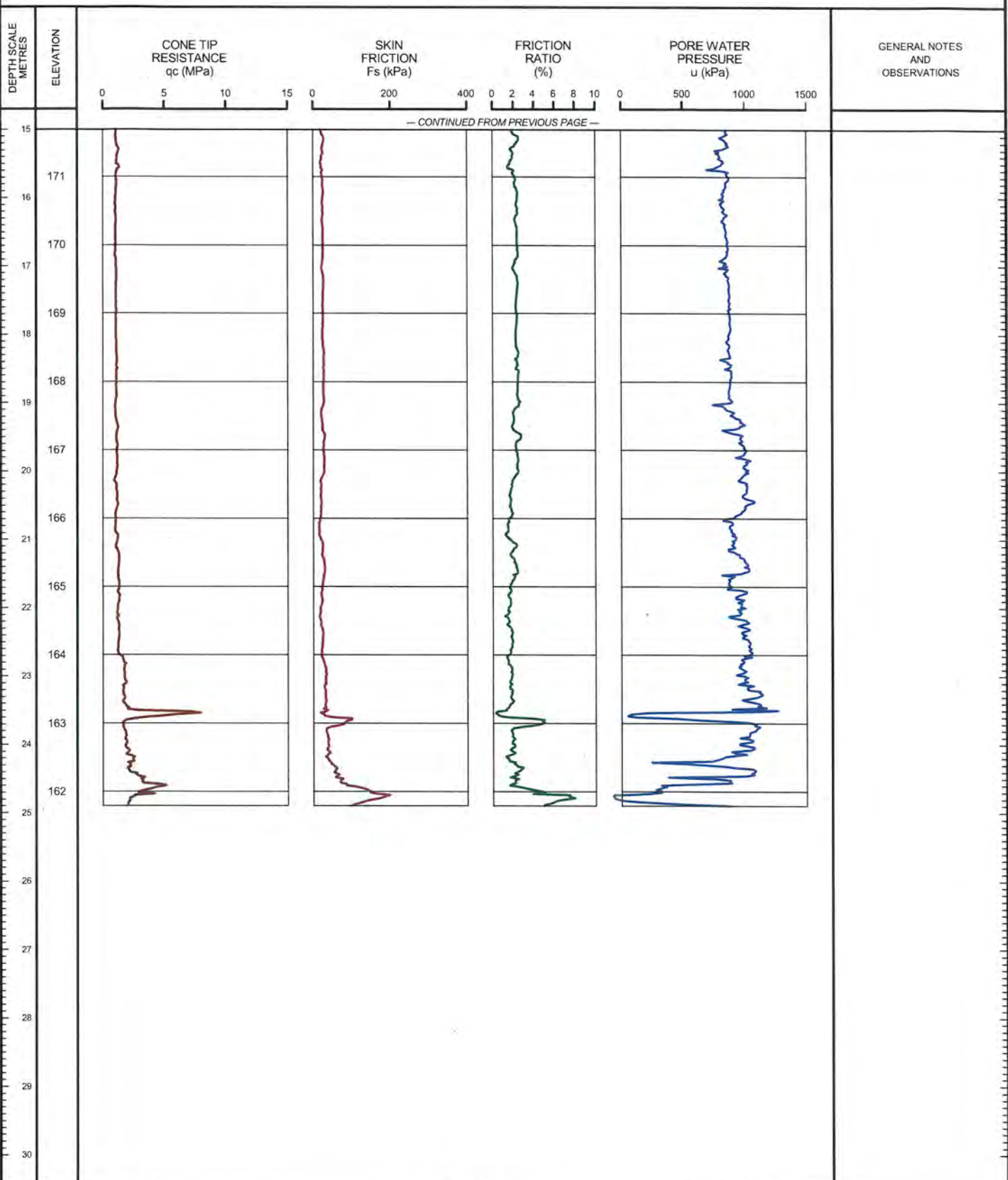
SHEET 2 OF 2

LOCATION: N 4677739.0 ; E 335502.0

TEST DATE: November 6, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.00m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-2**

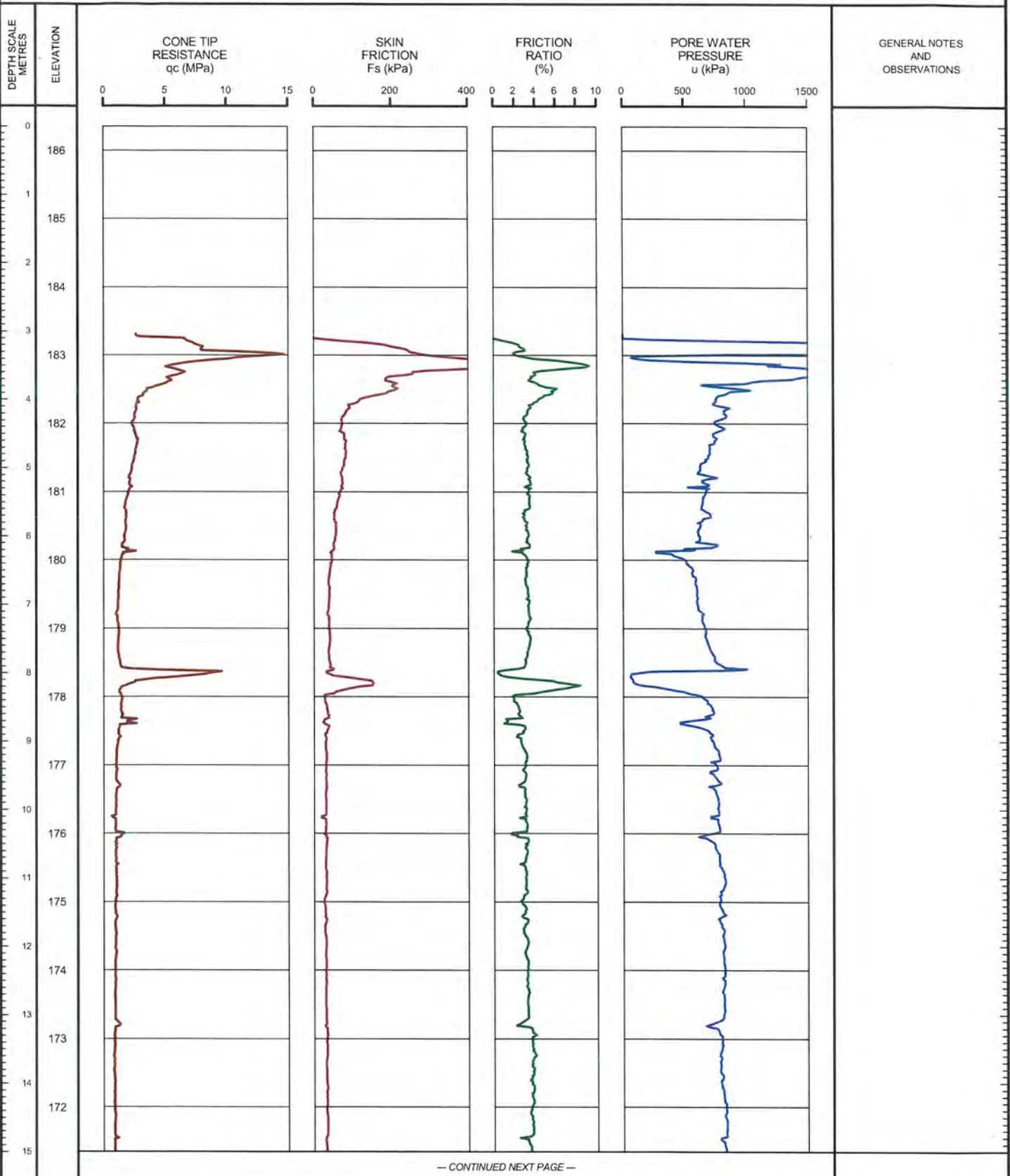
SHEET 1 OF 2

LOCATION: N 4677841.0, E 335185.0

TEST DATE: November 12, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.05m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB



PROJECT: 07-1130-207-0

# RECORD OF CONE PENETRATION TEST CPT-2

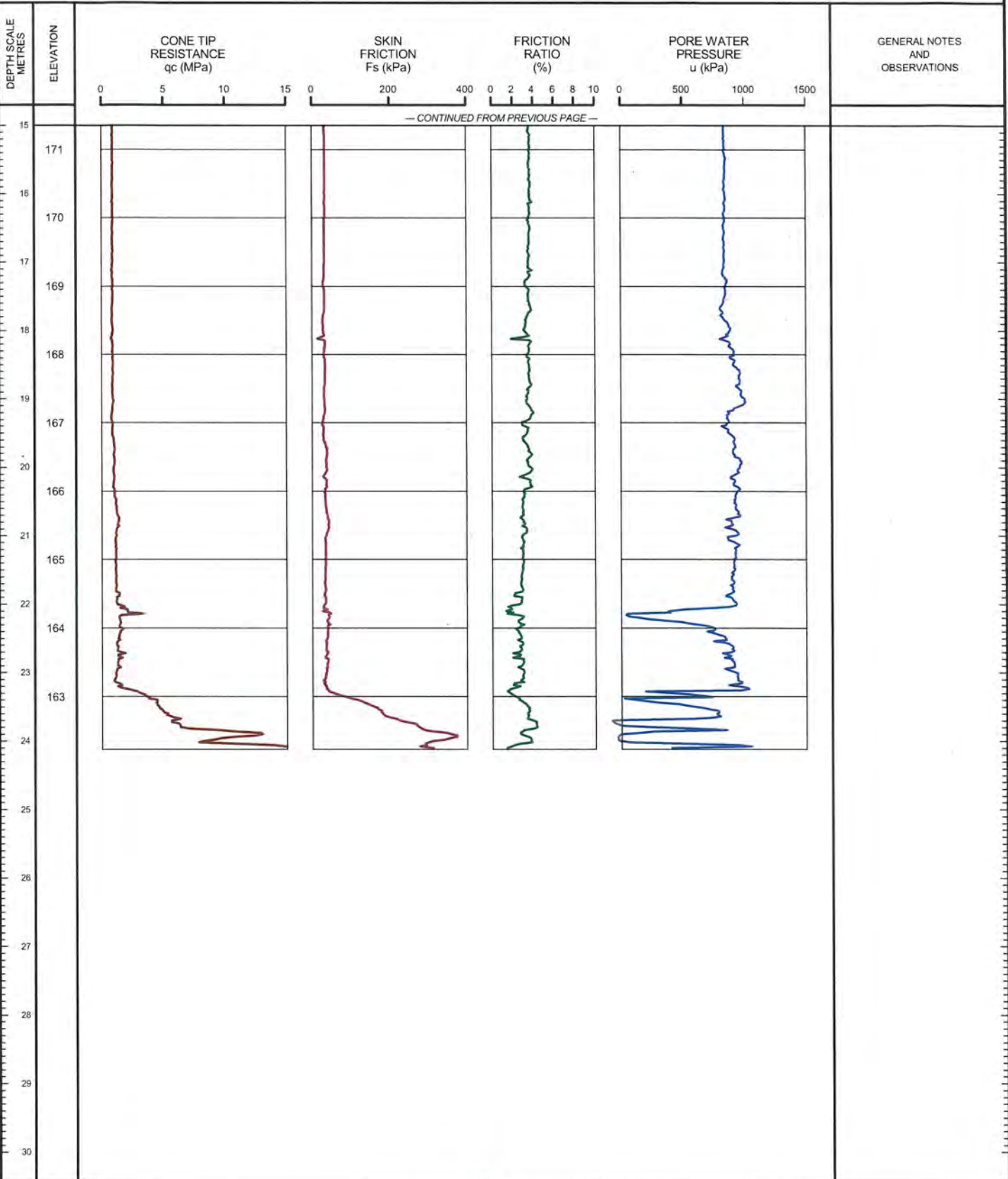
SHEET 2 OF 2

LOCATION: N 4677841.0 :E 335185.0

TEST DATE: November 12, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.05m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-3**

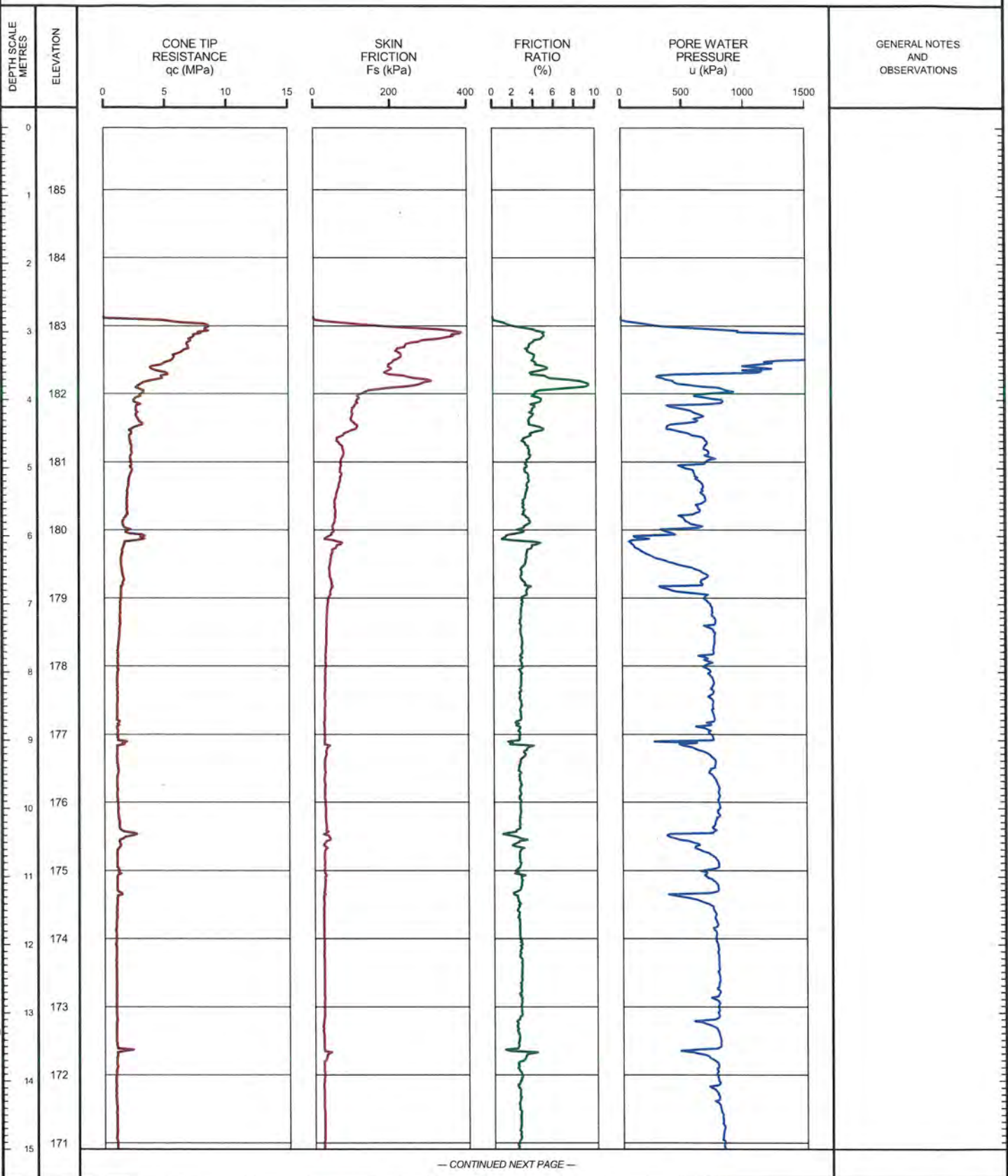
SHEET 1 OF 2

LOCATION: N 4678022.0 E 334957.0

TEST DATE: November 13, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 2.80m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75

OPERATOR: CC  
CHECKED: SSB

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-3**

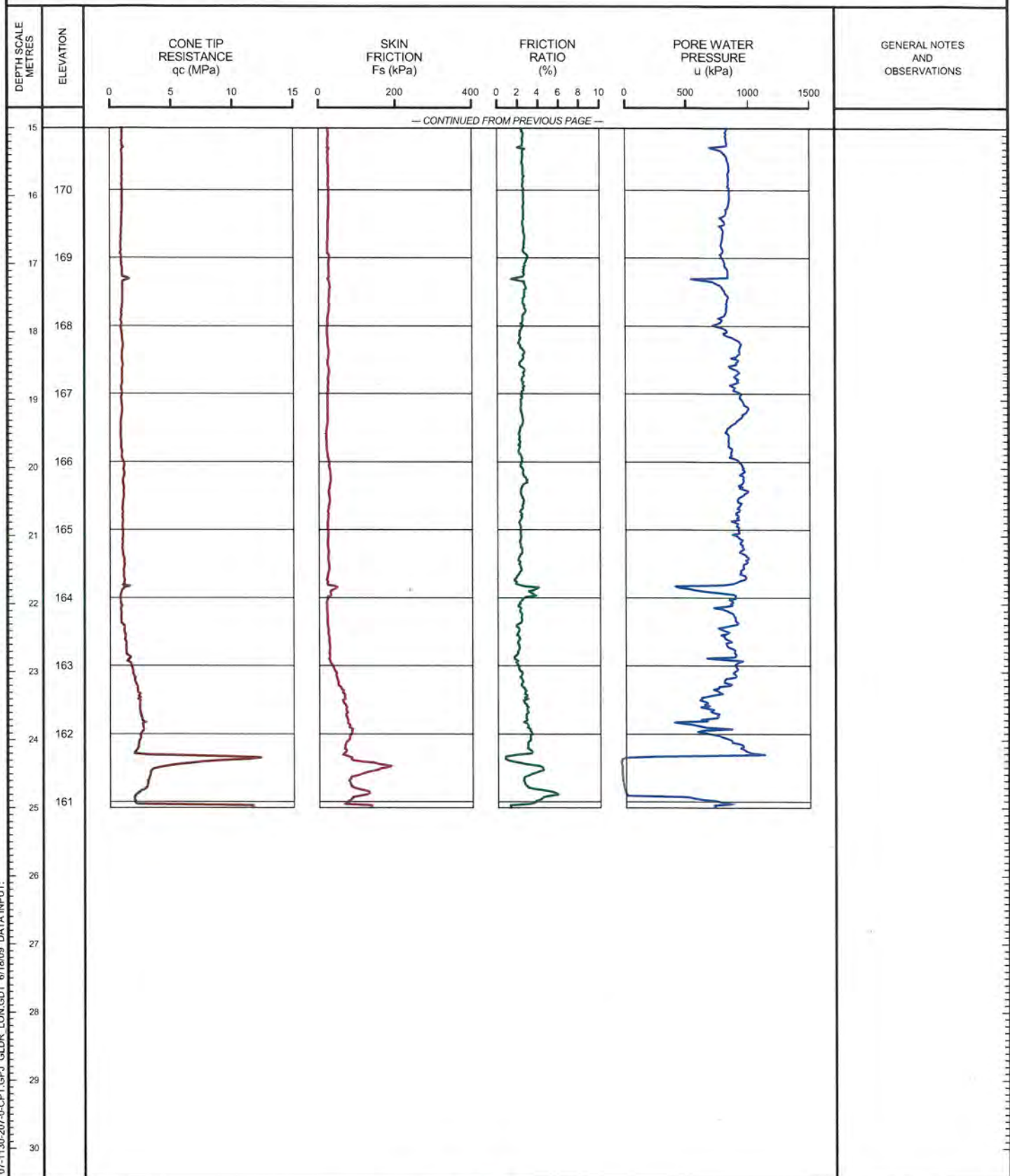
SHEET 2 OF 2

LOCATION: N 4678022.0 ; E 334957.0

TEST DATE: November 13, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 2.80m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN\_CPT\_01 07-1130-207-0-CPT.GPJ GILDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSB*

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-4

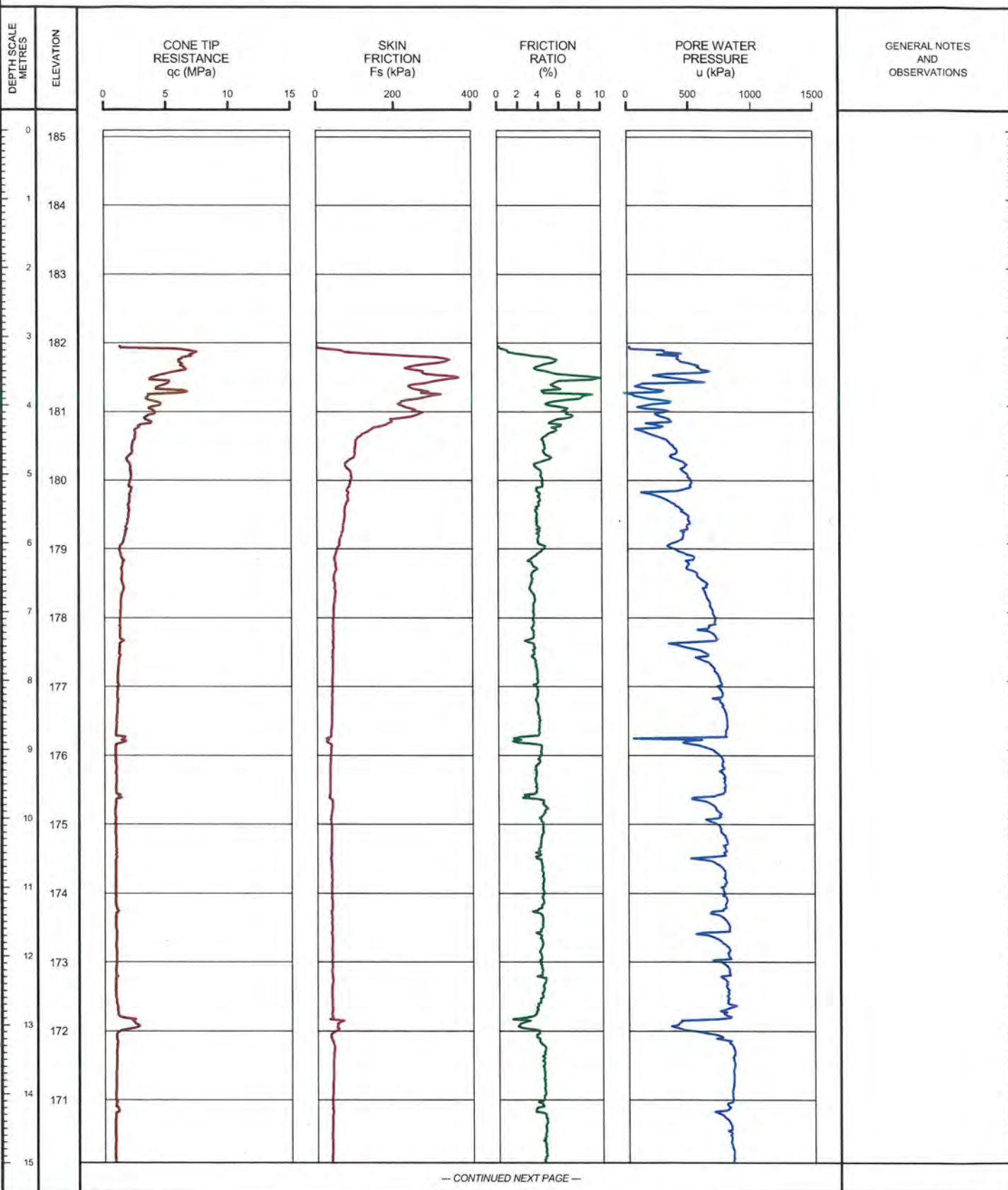
SHEET 1 OF 2

LOCATION: N 4678208.0 E 334516.0

TEST DATE: November 14, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.14m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1:75



OPERATOR: CC

CHECKED: *SB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-4**

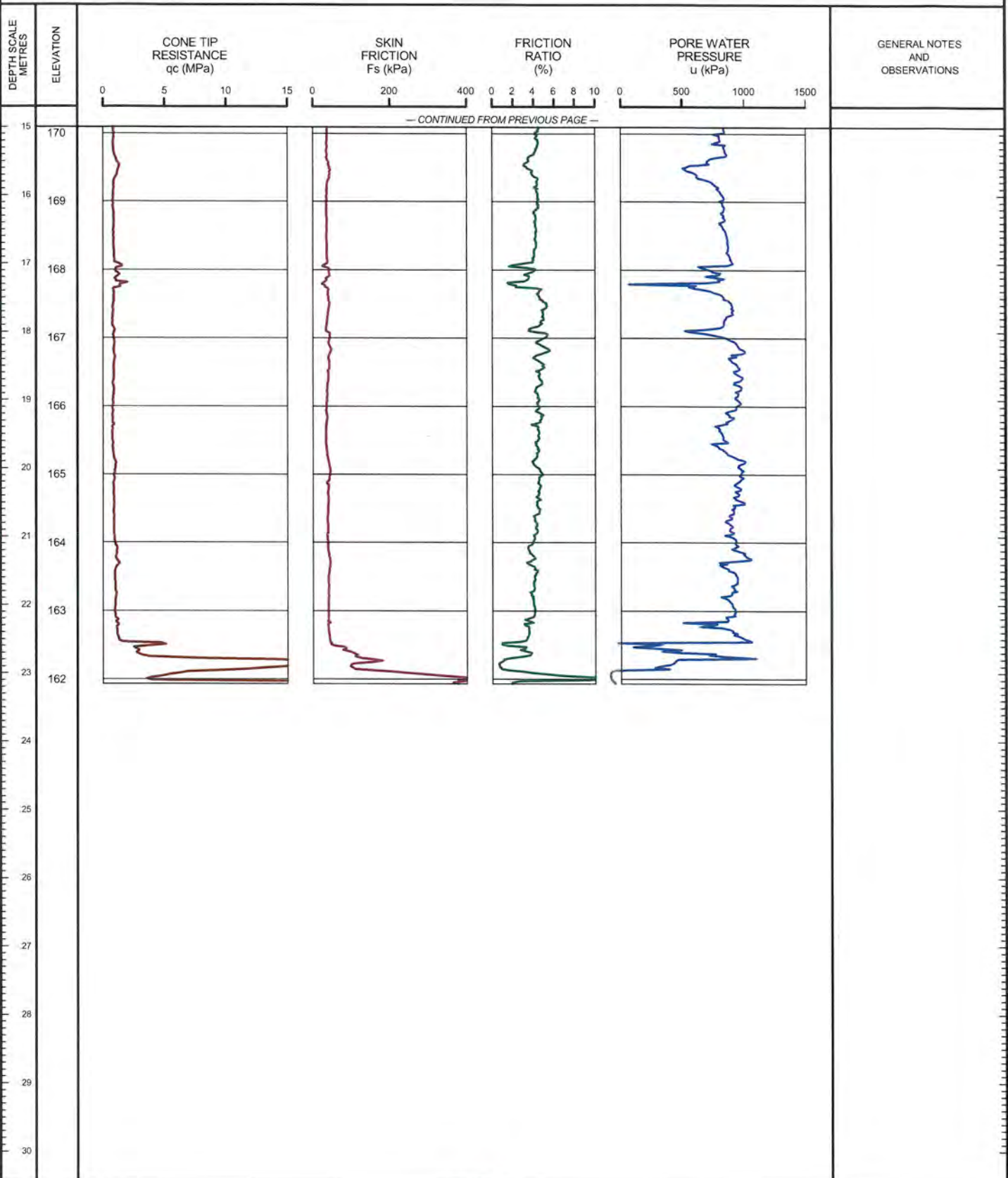
SHEET 2 OF 2

LOCATION: N 4678208.0 E 334516.0

TEST DATE: November 14, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.14m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-5**

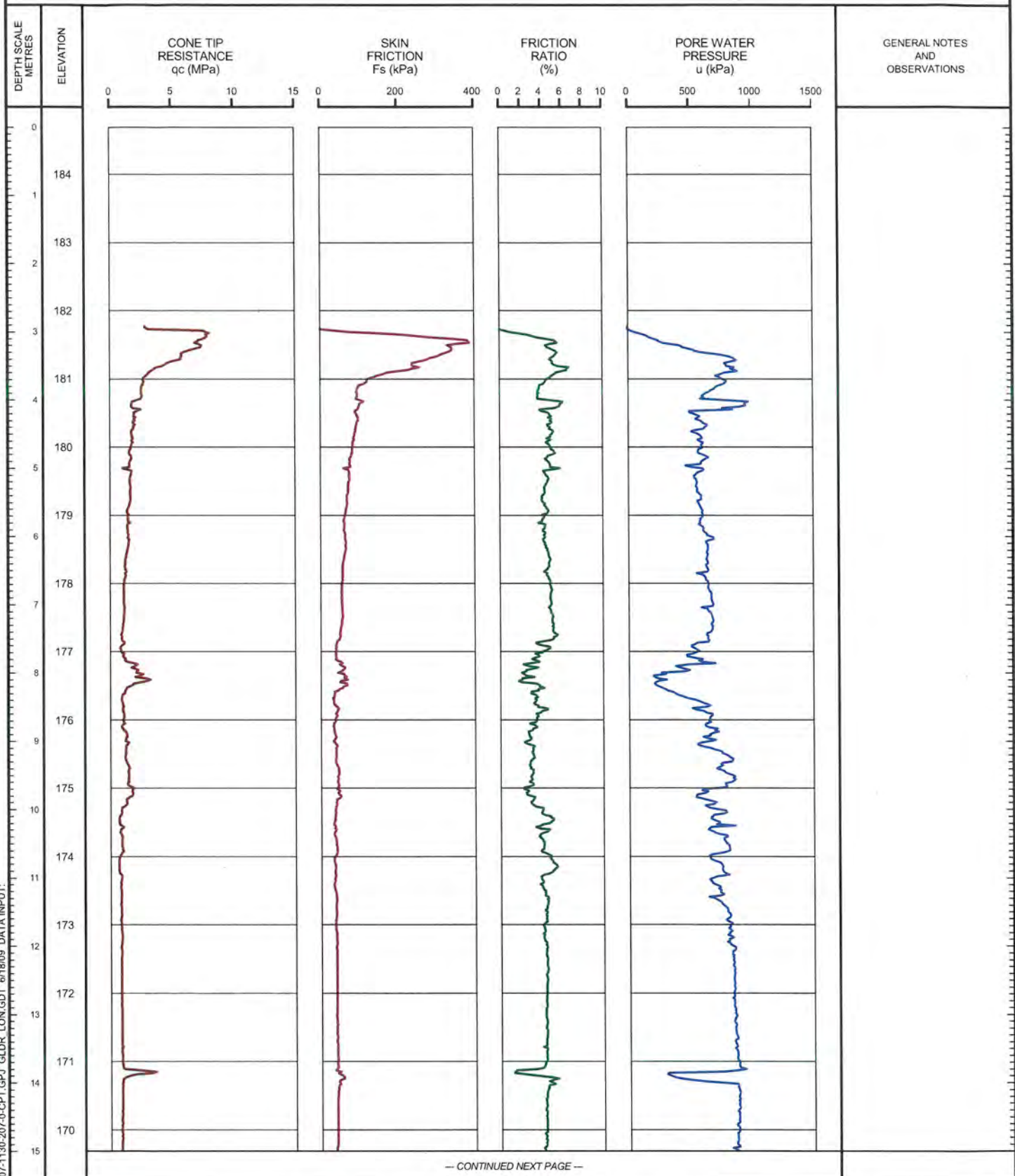
SHEET 1 OF 2

LOCATION: N 4678413.0 ; E 334220.0

TEST DATE: November 13, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 2.94m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-5**

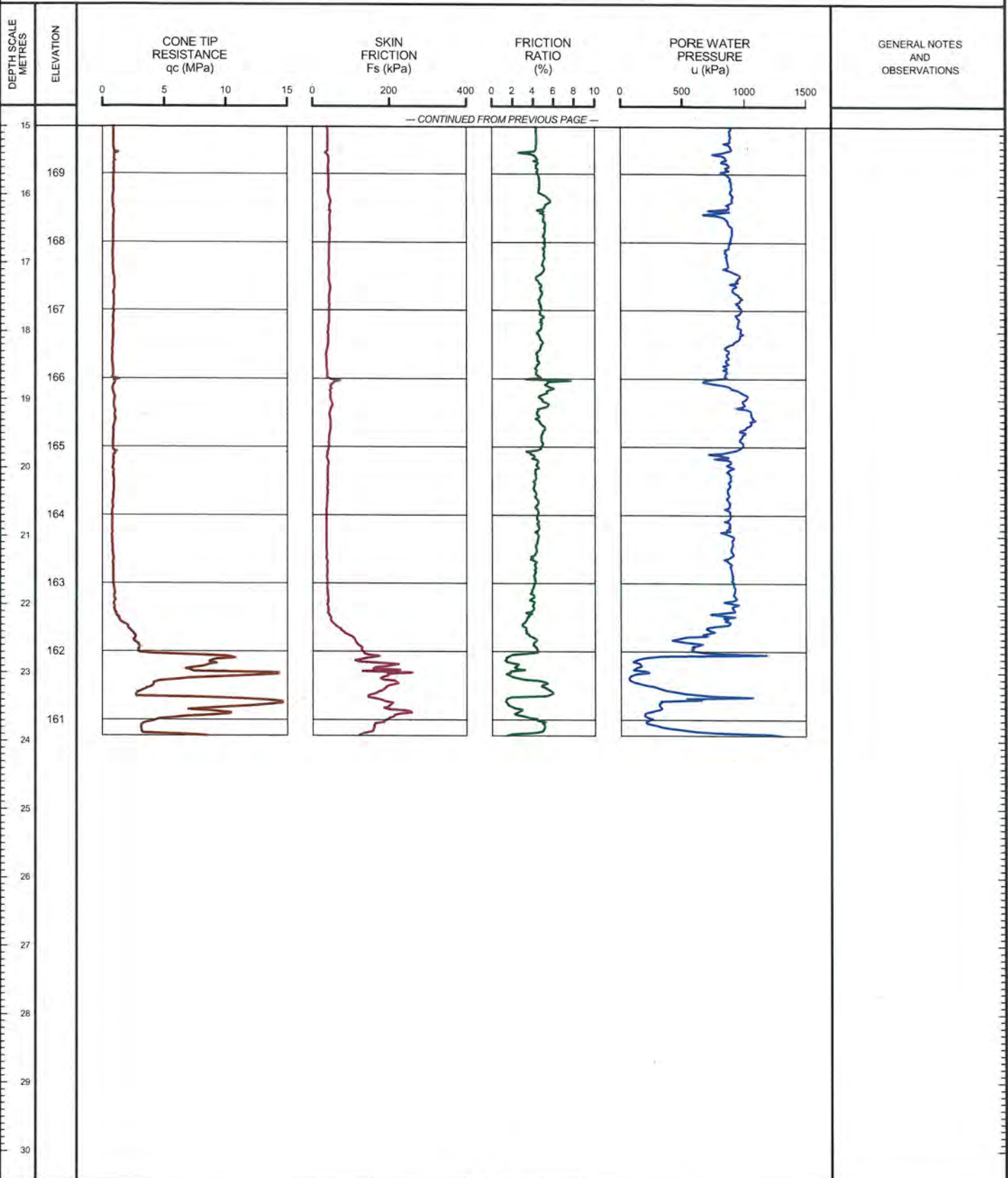
SHEET 2 OF 2

LOCATION: N 4678413.0, E 334220.0

TEST DATE: November 13, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 2.94m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN\_CPT\_01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/19/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSS*

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-6

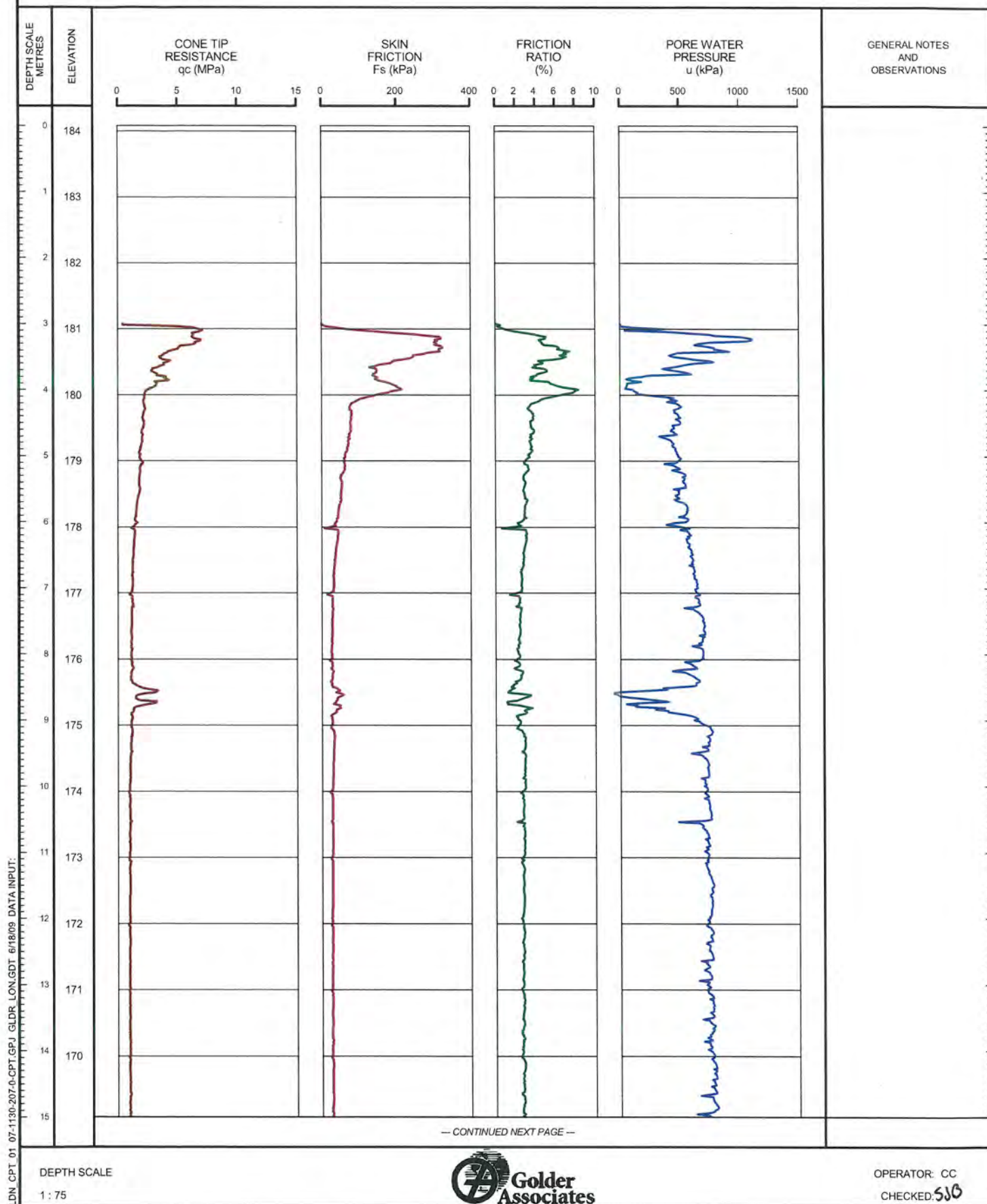
SHEET 1 OF 2

LOCATION: N 4678621.0 ; E 333844.0

TEST DATE: November 13, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.00m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-6**

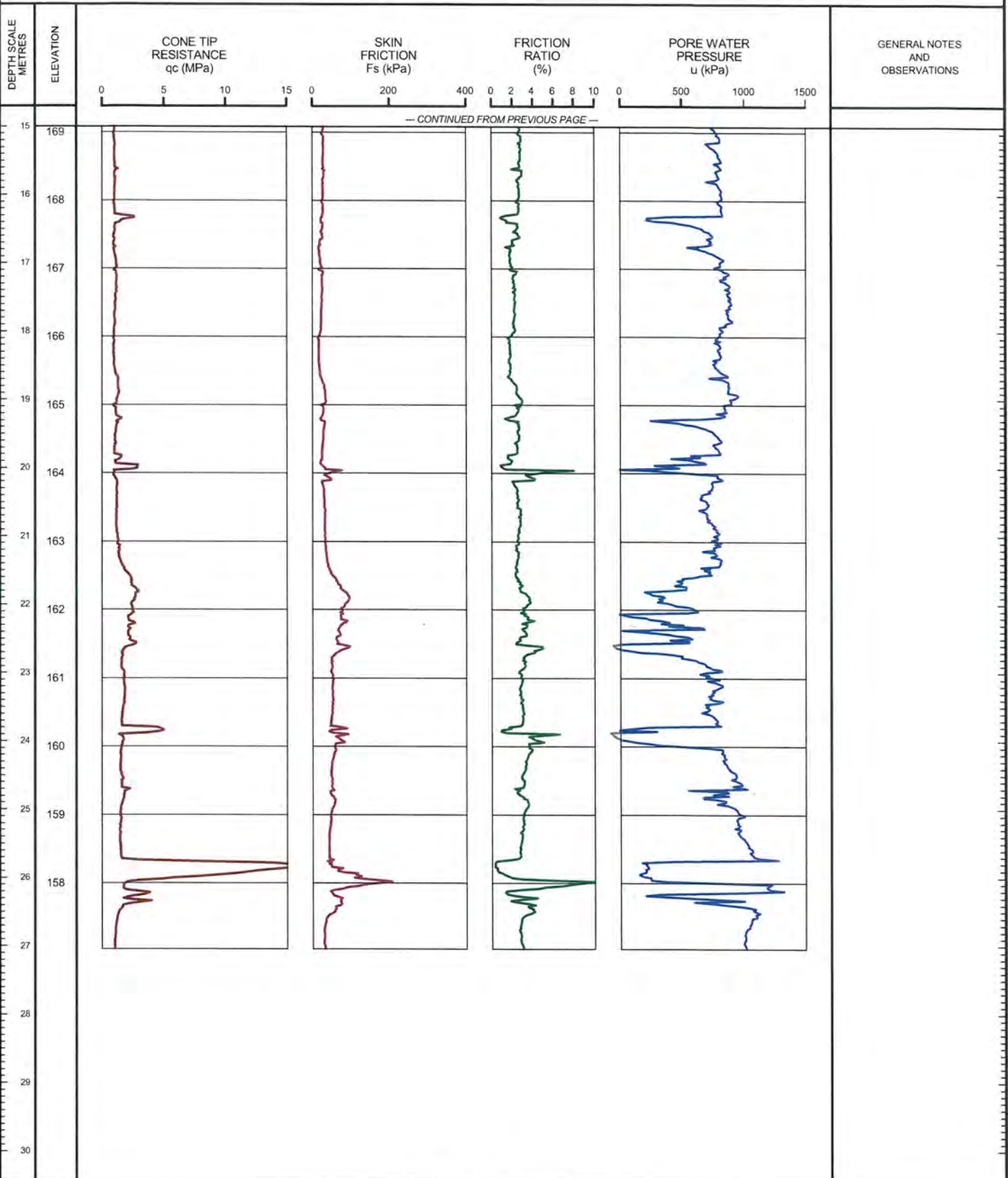
SHEET 2 OF 2

LOCATION: N 4678621.0; E 333844.0

TEST DATE: November 13, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.00m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SVB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-7**

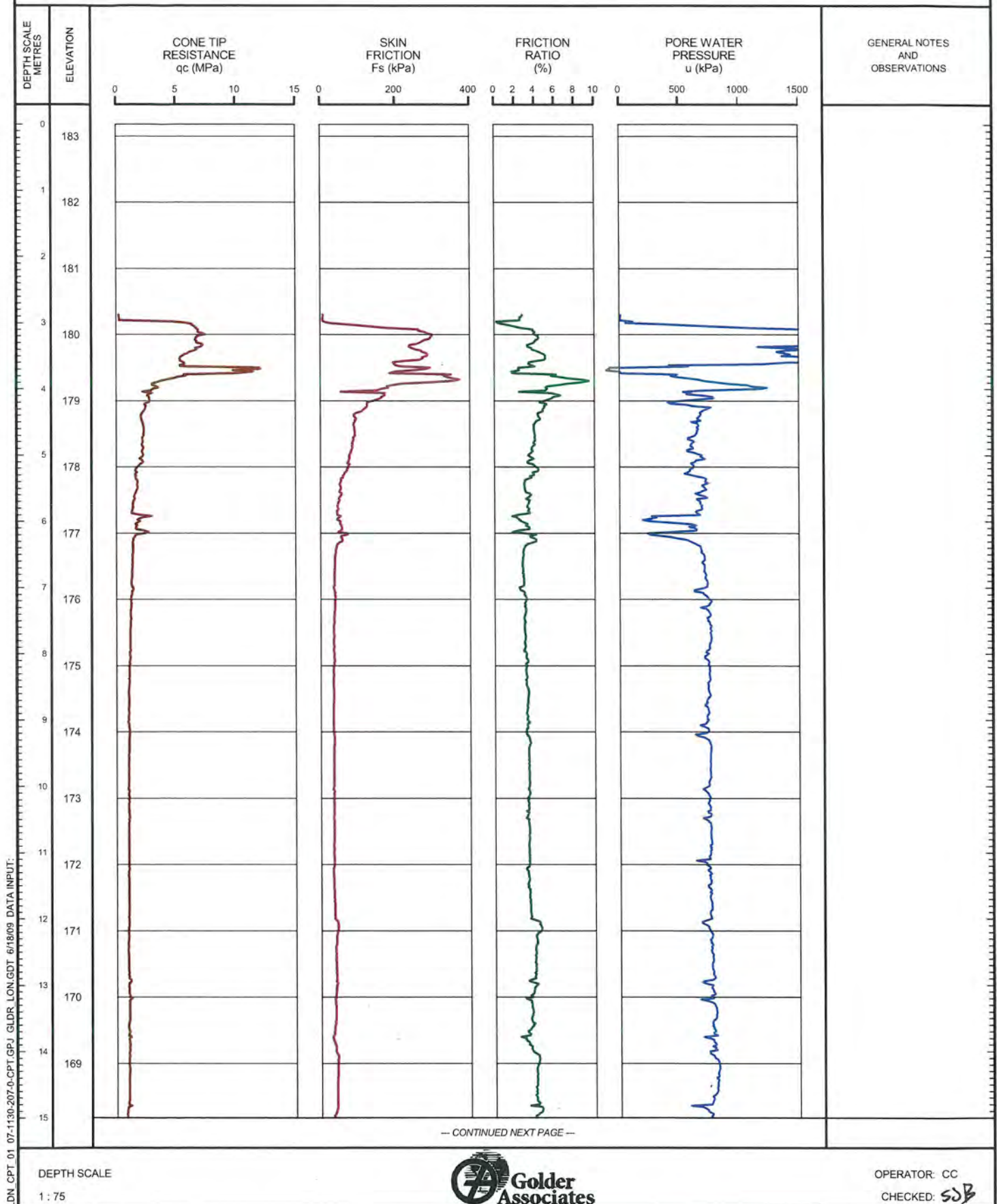
SHEET 1 OF 2

LOCATION: N 4678844.0 ;E 333327.0

TEST DATE: November 12, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 2.90m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-7**

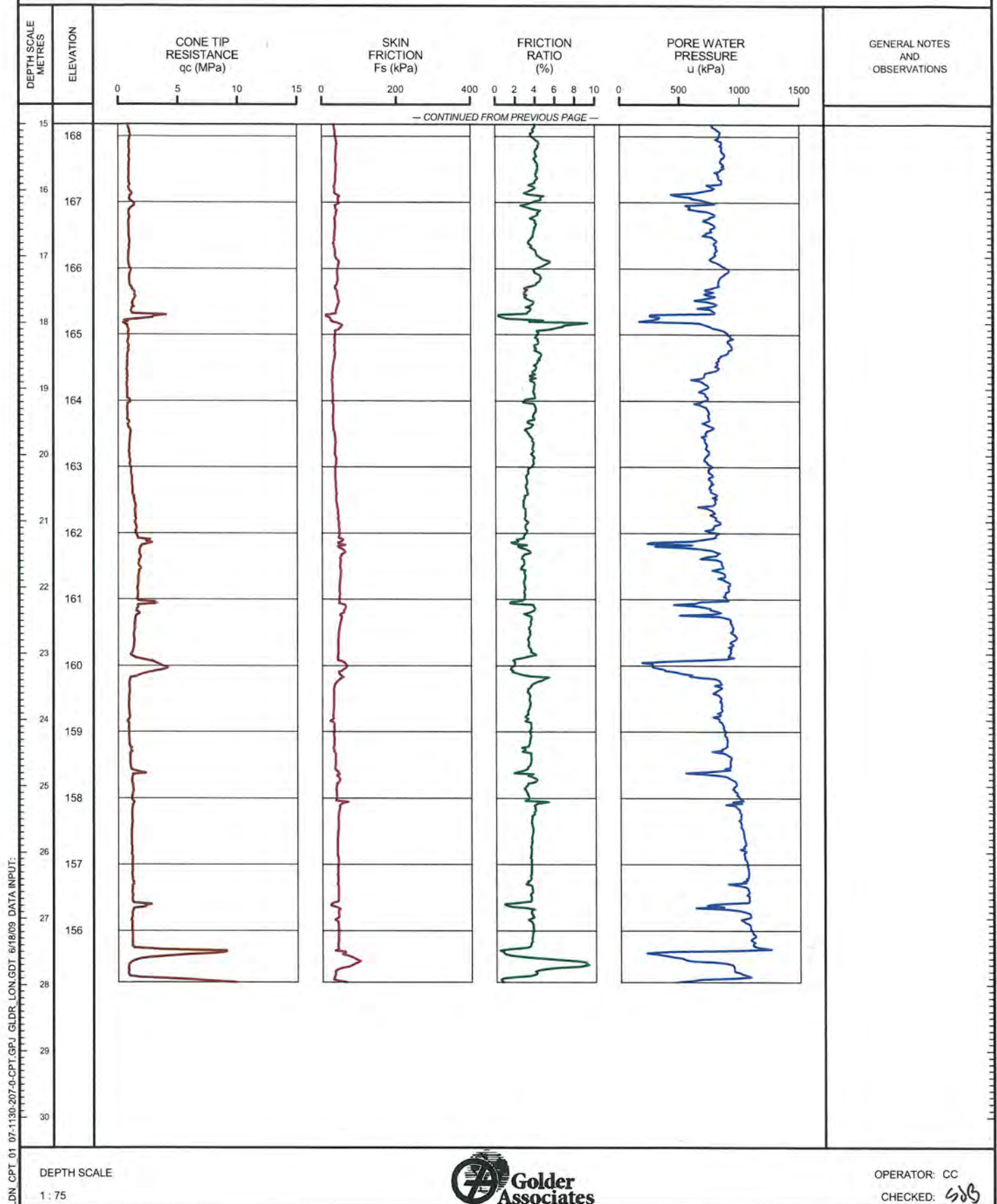
SHEET 2 OF 2

LOCATION: N 4678844.0 :E 333327.0

TEST DATE: November 12, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 2.90m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012





PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-8**

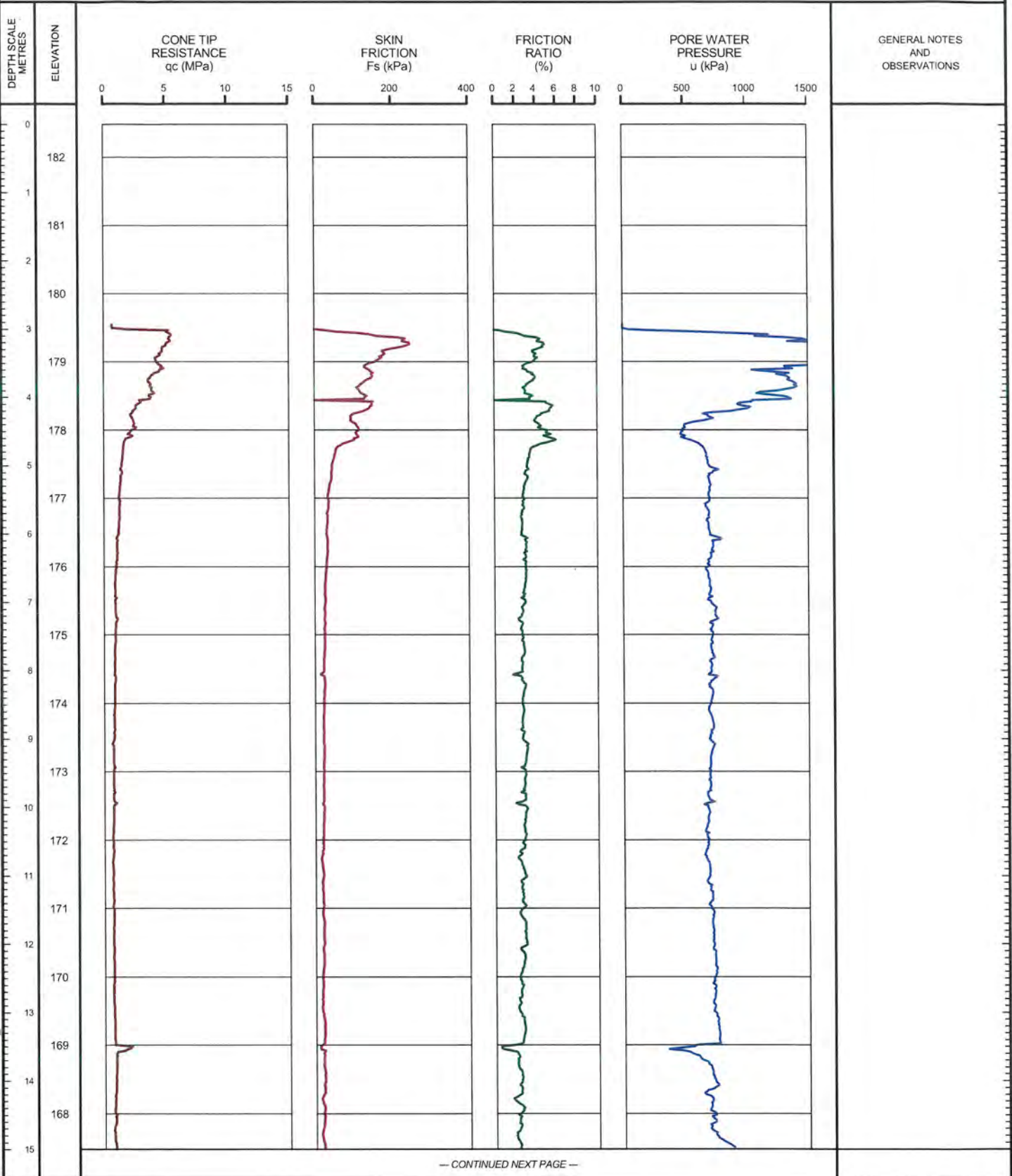
SHEET 1 OF 2

LOCATION: N 4678967.0 :E 333109.0

TEST DATE: November 11, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 2.95m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SJB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-8**

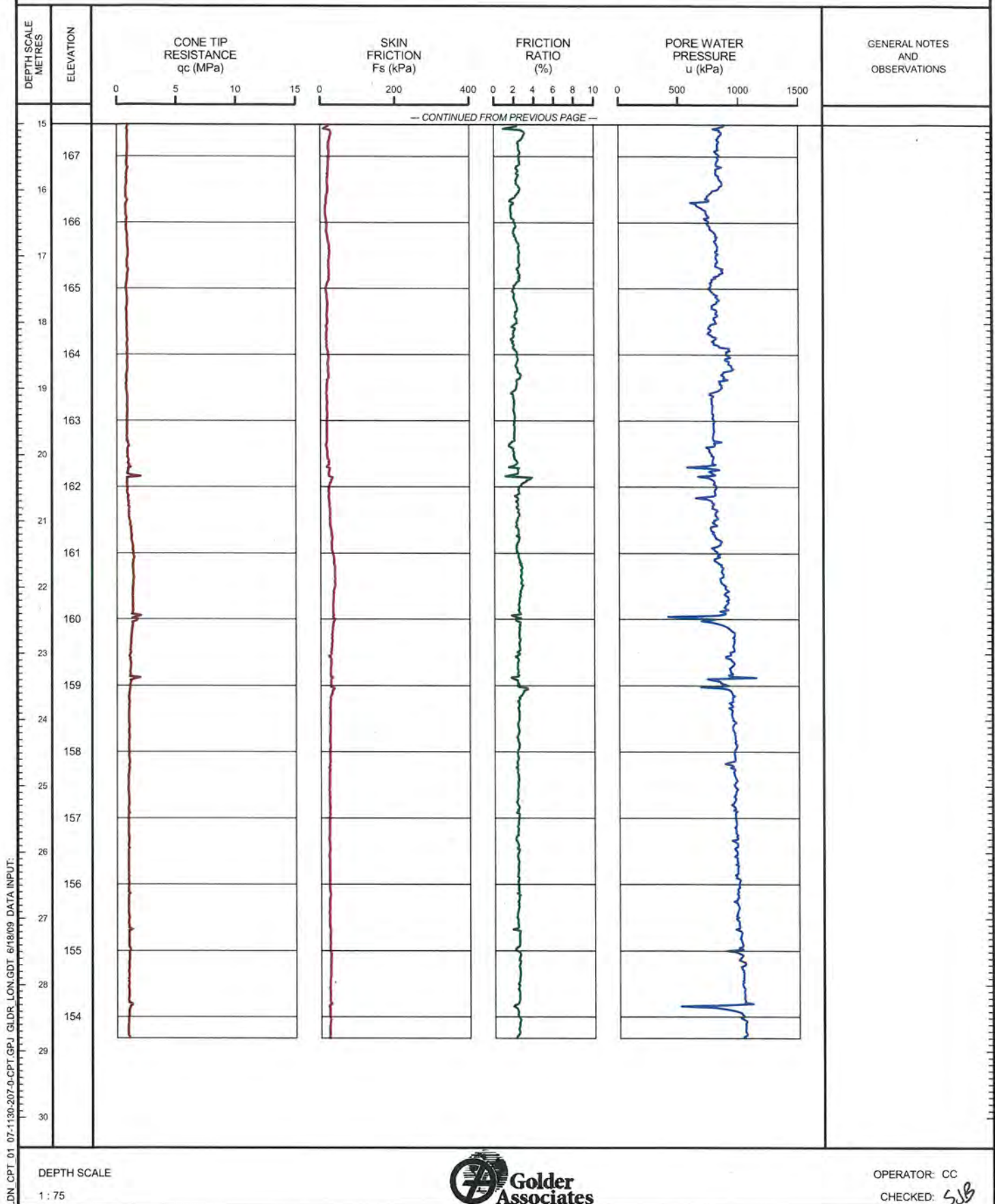
SHEET 2 OF 2

LOCATION: N 4678967.0 ; E 333109.0

TEST DATE: November 11, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 2.95m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-9**

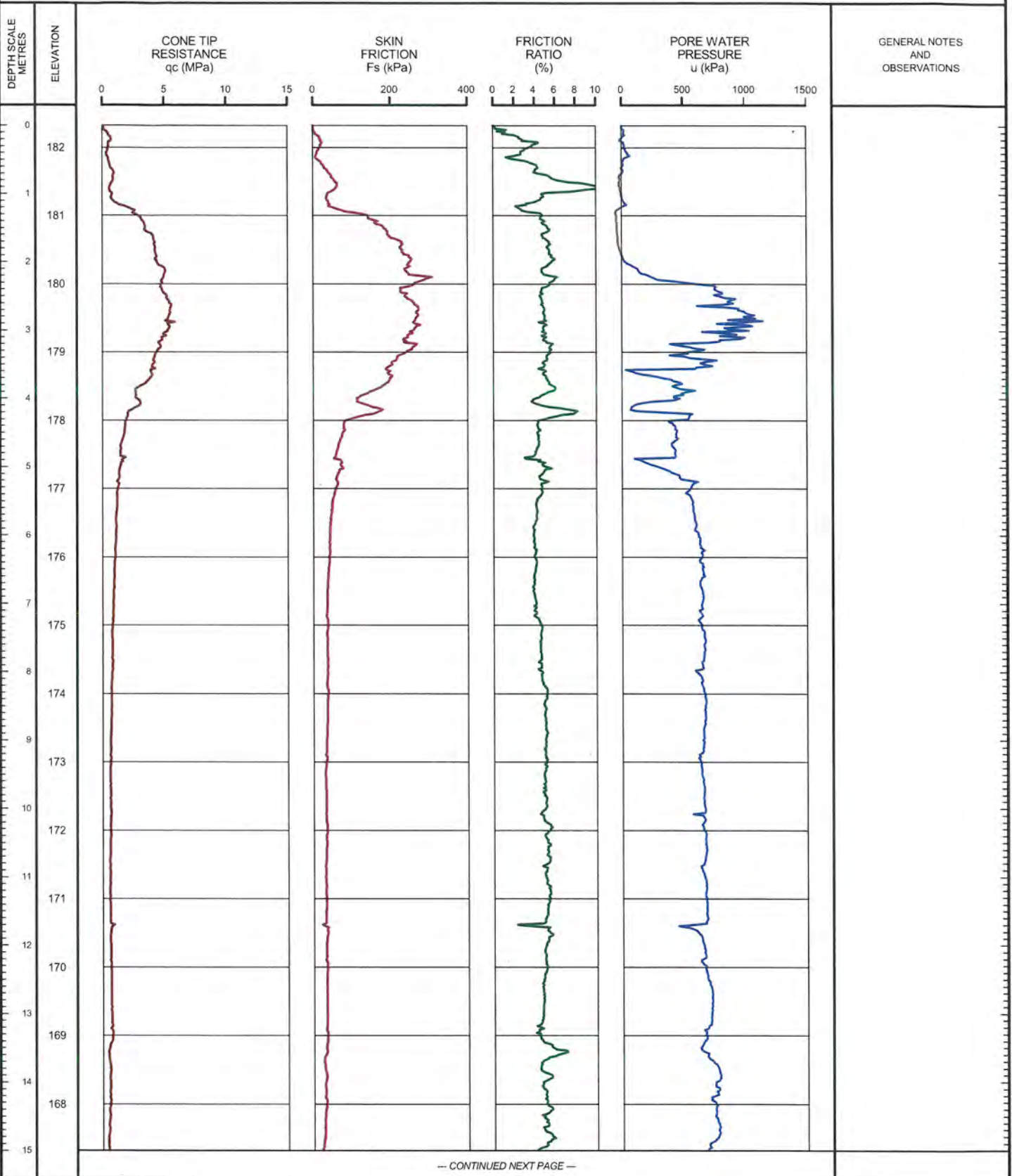
SHEET 1 OF 2

LOCATION: N 4679105.0 ; E 332828.0

TEST DATE: November 11, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 0.00m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SSB



PROJECT: 07-1130-207-0

LOCATION: N 4679105.0 :E 332828.0

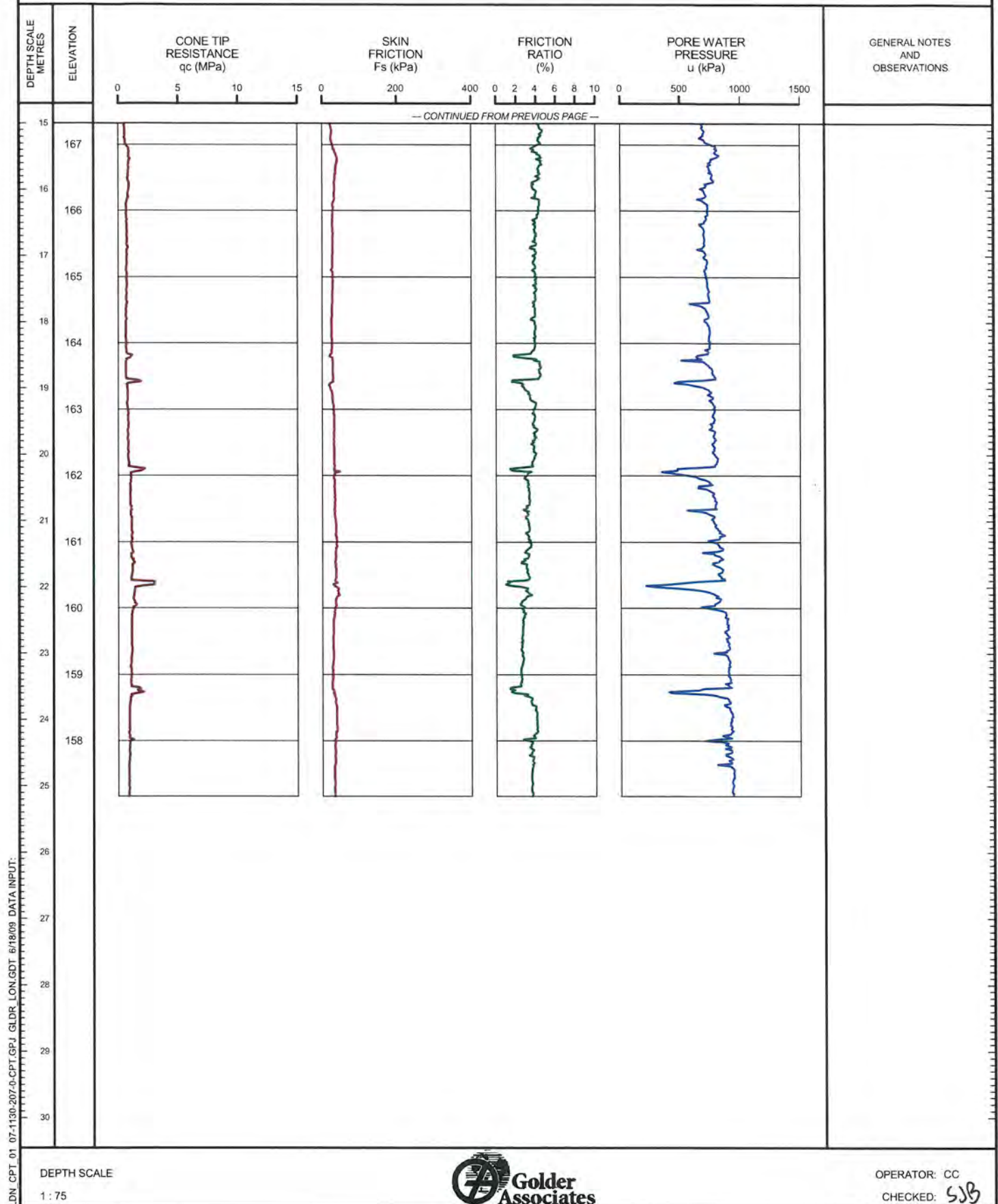
**RECORD OF CONE PENETRATION TEST CPT-9**

TEST DATE: November 11, 2006

SHEET 2 OF 2

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 0.00m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-10**

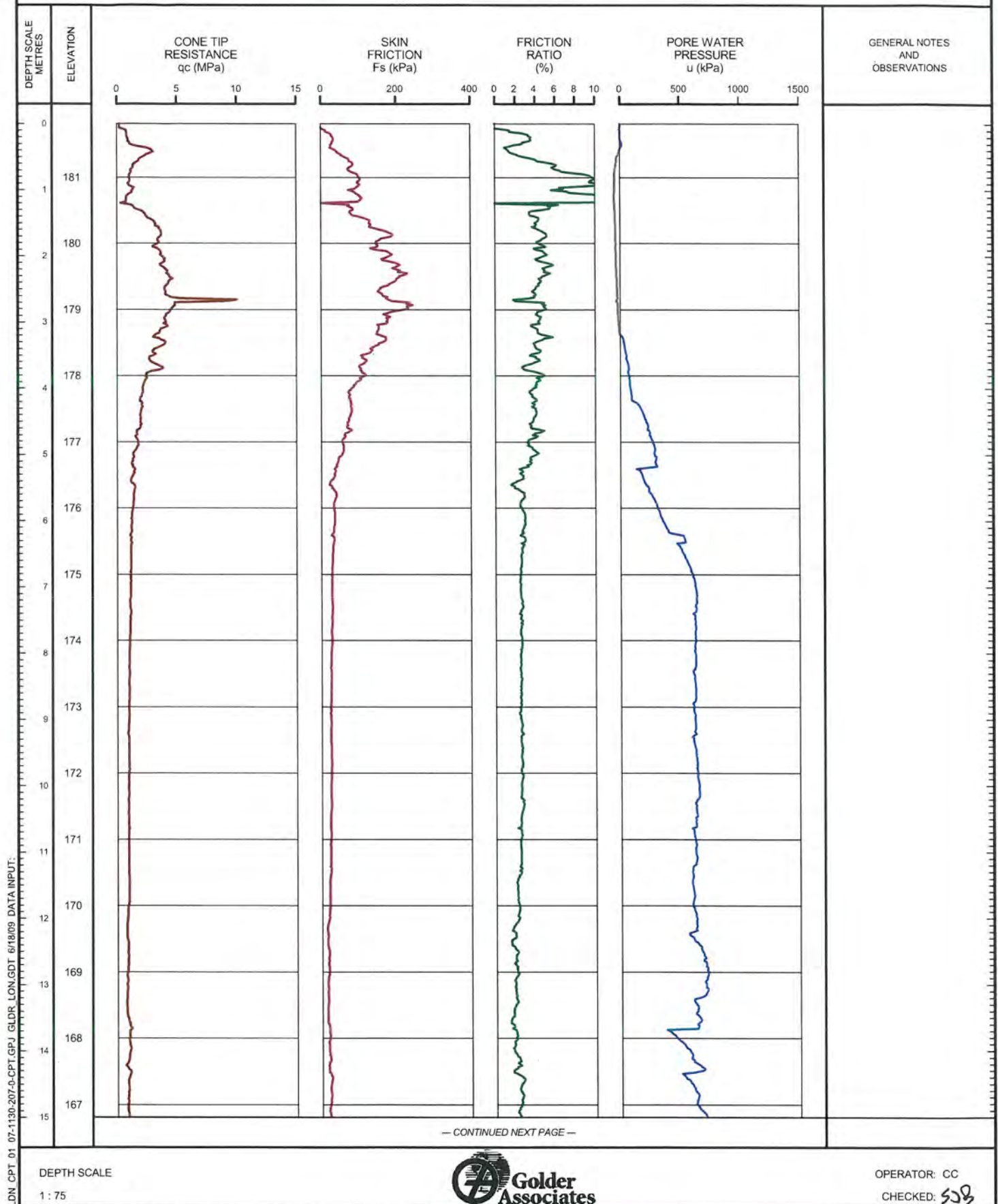
SHEET 1 OF 2

LOCATION: N 4679264.0 ; E 332533.0

TEST DATE: November 10, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012





PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-10**

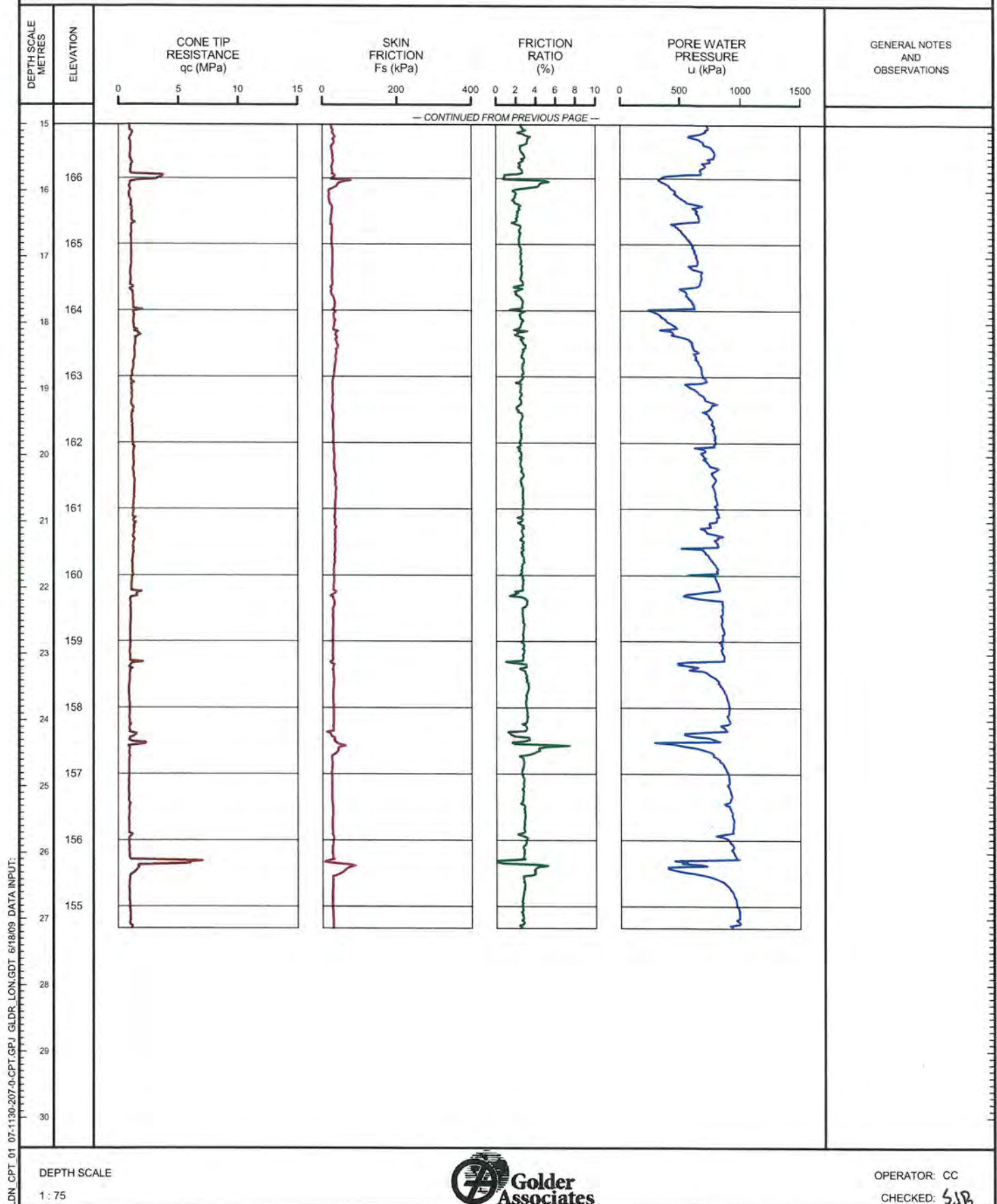
SHEET 2 OF 2

LOCATION: N 4679264.0 :E 332533.0

TEST DATE: November 10, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-11**

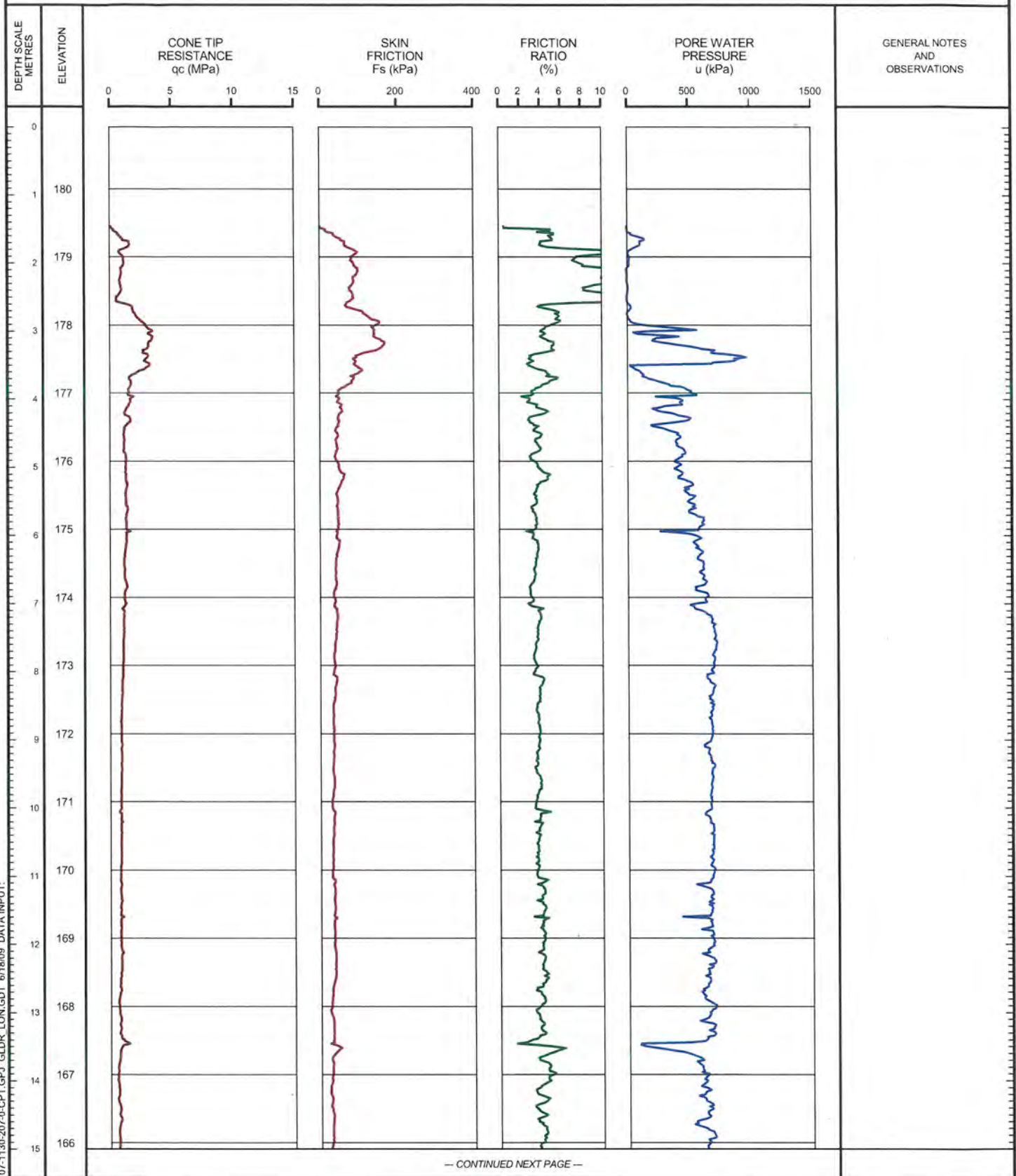
SHEET 1 OF 2

LOCATION: N 4679634.0 ; E 332110.0

TEST DATE: November 10, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.46m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

# RECORD OF CONE PENETRATION TEST CPT-11

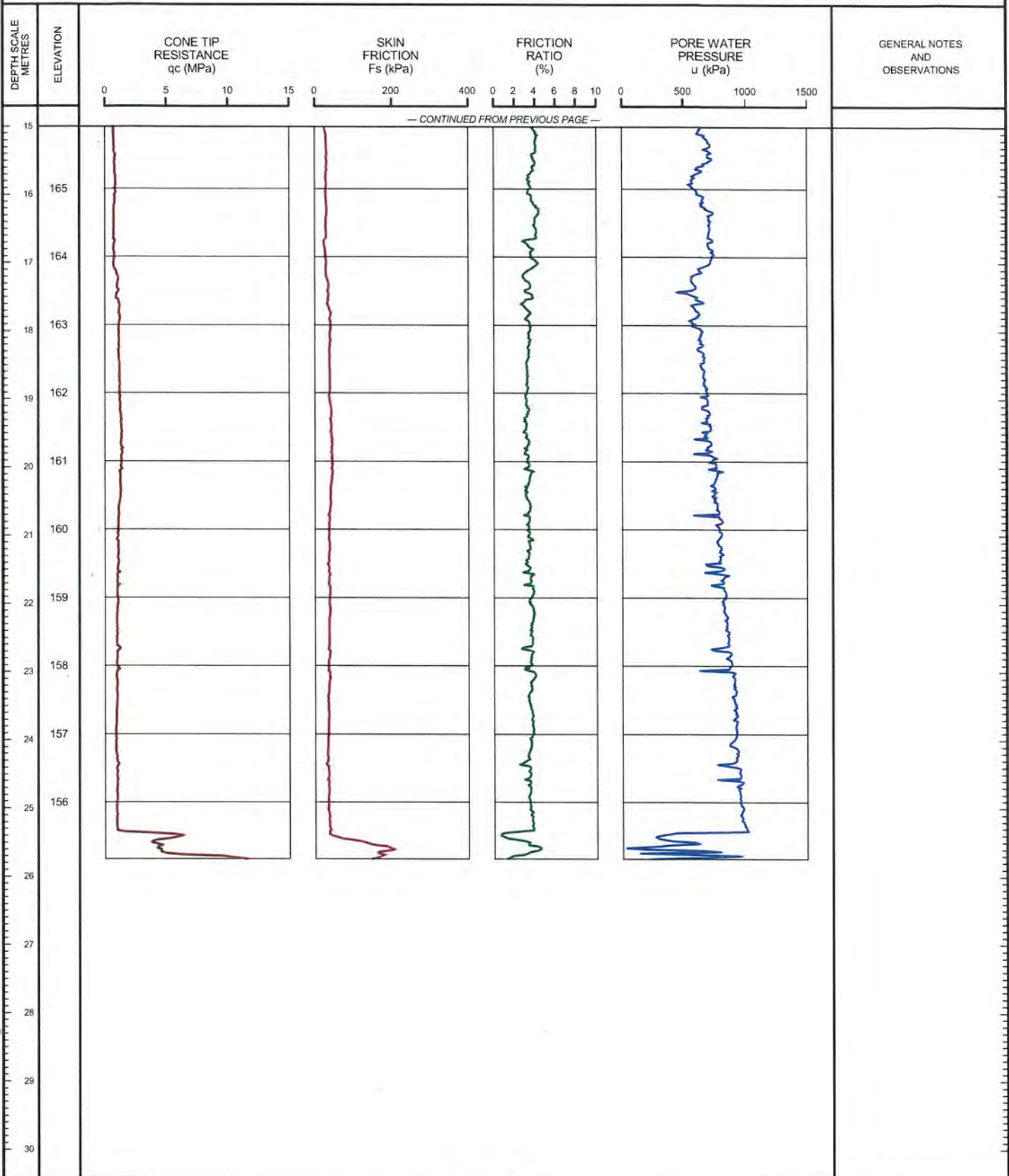
SHEET 2 OF 2

LOCATION: N 4679634.0 :E 332110.0

TEST DATE: November 10, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.46m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE  
1 : 75



OPERATOR: CC  
CHECKED: *SSB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-12**

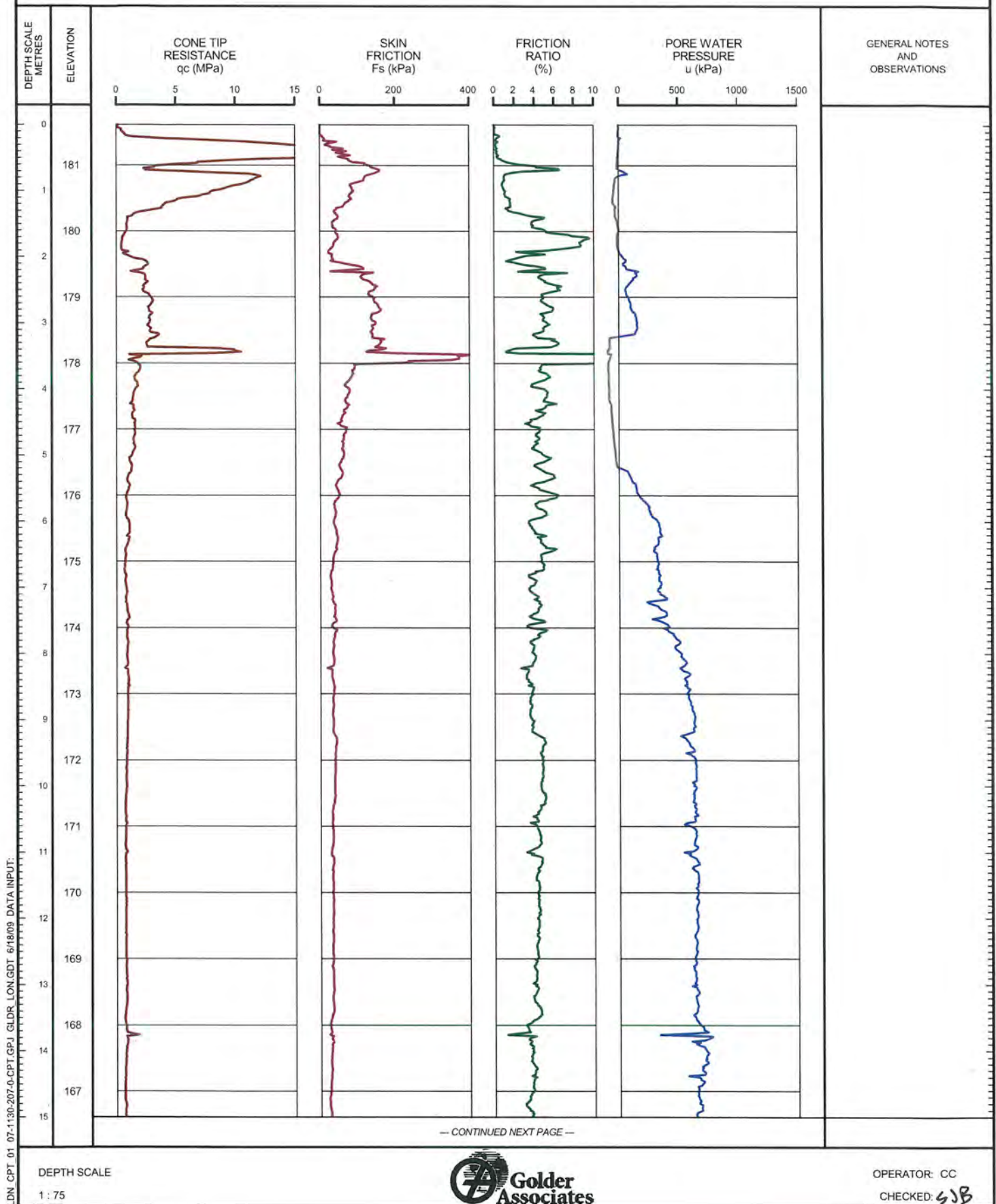
SHEET 1 OF 2

LOCATION: N 4680072.0 ; E 331924.0

TEST DATE: November 10, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

# RECORD OF CONE PENETRATION TEST CPT-12

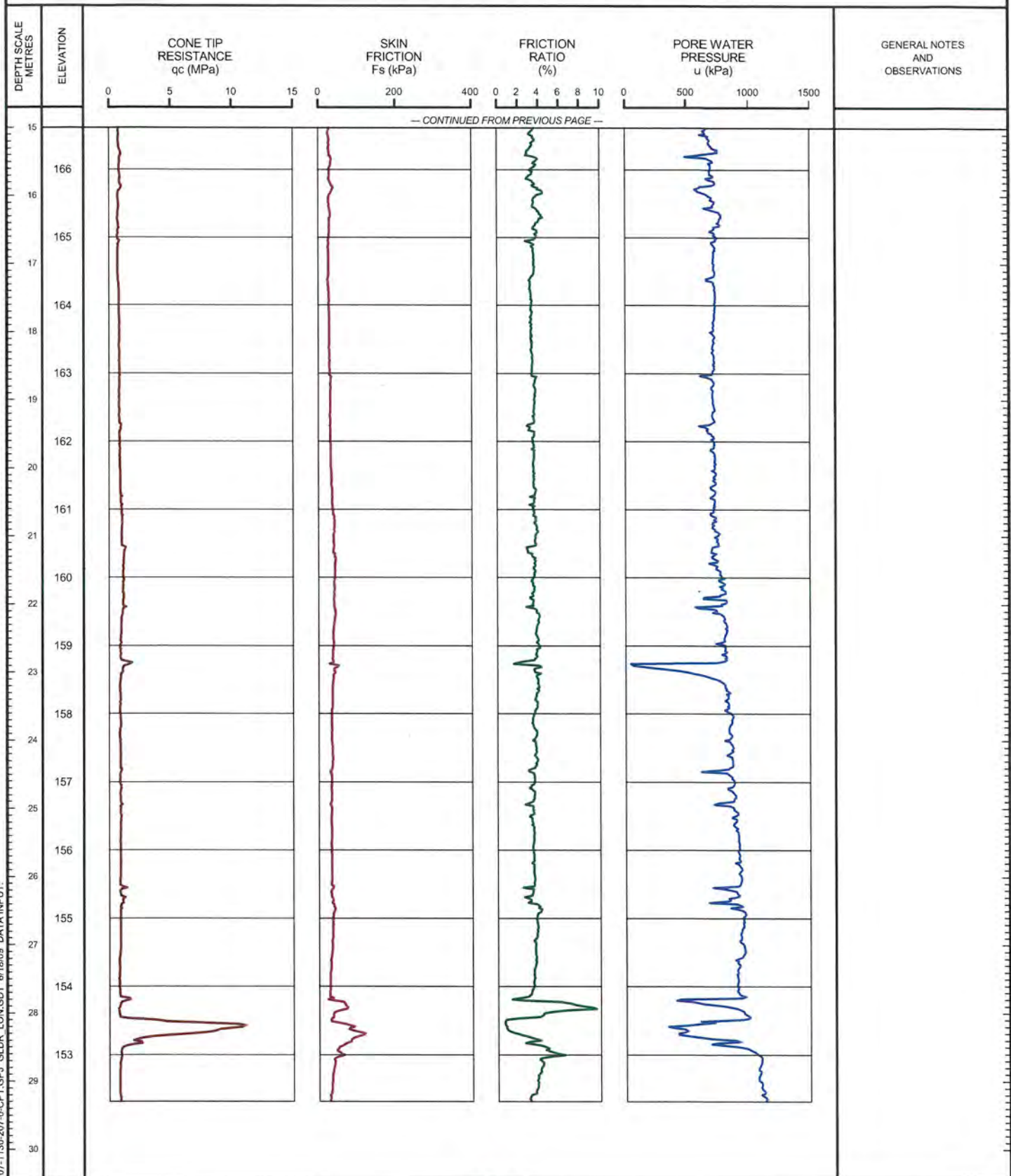
SHEET 2 OF 2

LOCATION: N 4680072.0 ;E 331924.0

TEST DATE: November 10, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LON\_CPT\_01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *Sub*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-13**

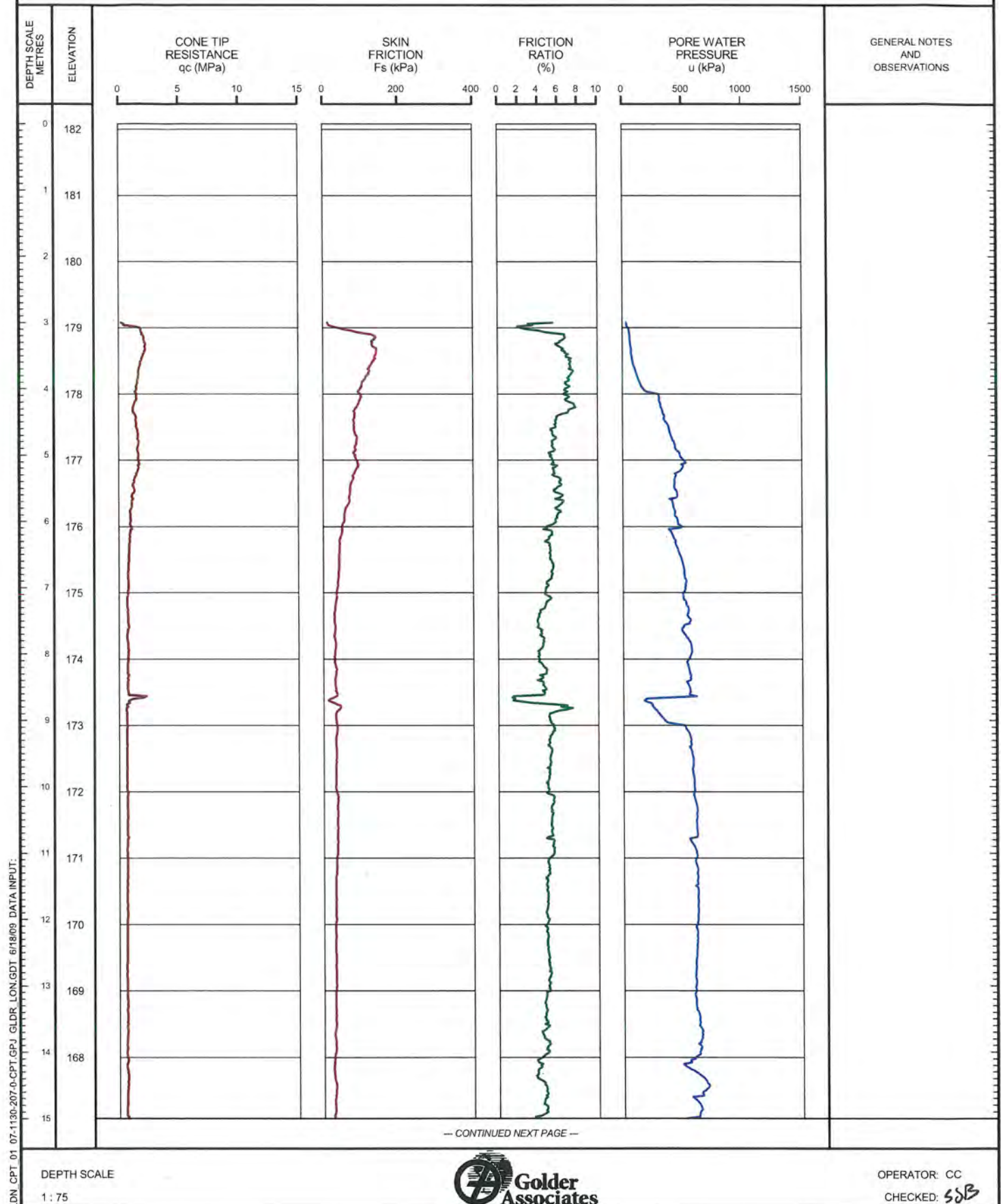
SHEET 1 OF 2

LOCATION: N 4680350.0 ; E 331749.0

TEST DATE: November 8, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.00m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-13**

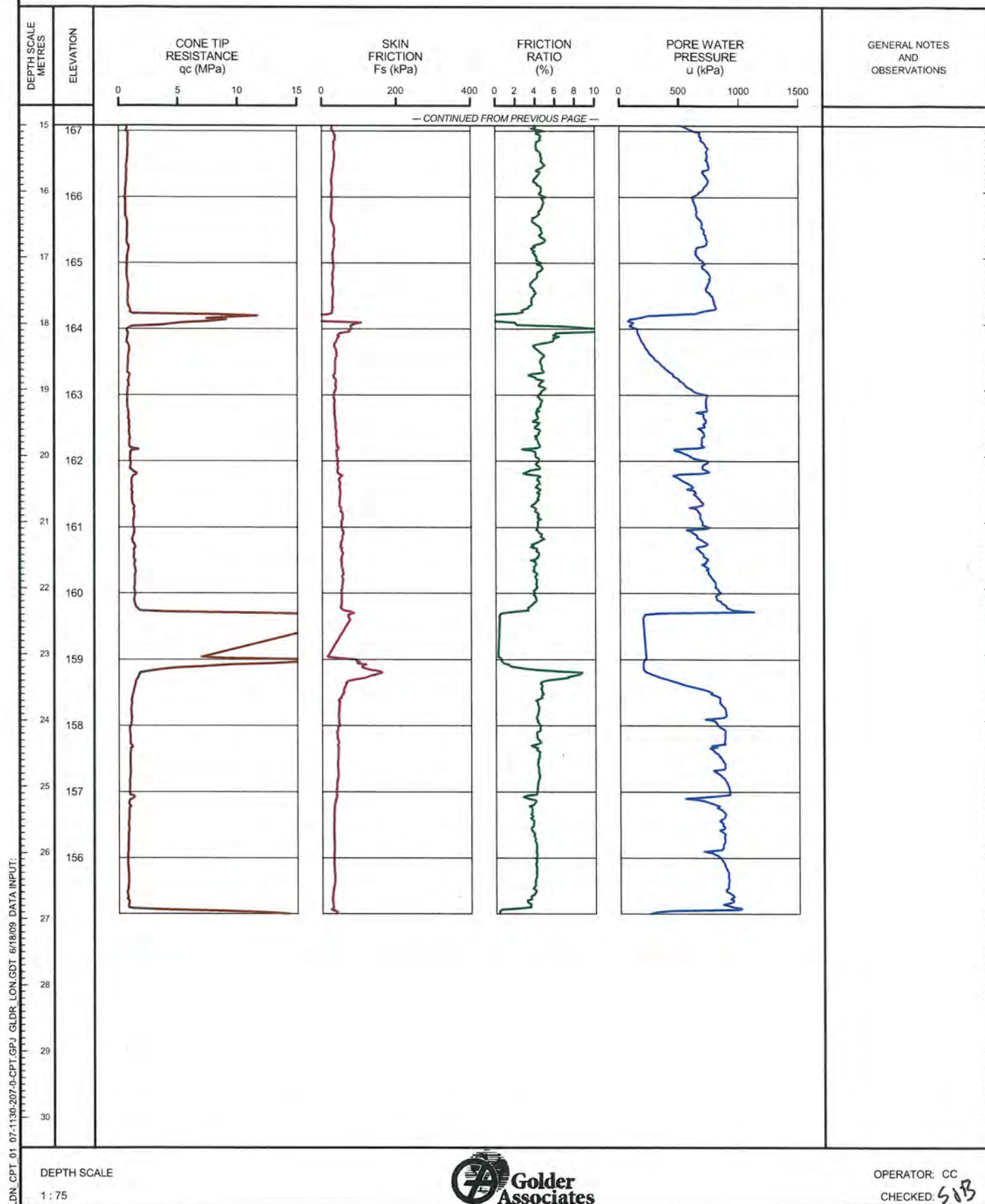
SHEET 2 OF 2

LOCATION: N 4680350.0 ; E 331749.0

TEST DATE: November 8, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.00m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

# RECORD OF CONE PENETRATION TEST CPT-14

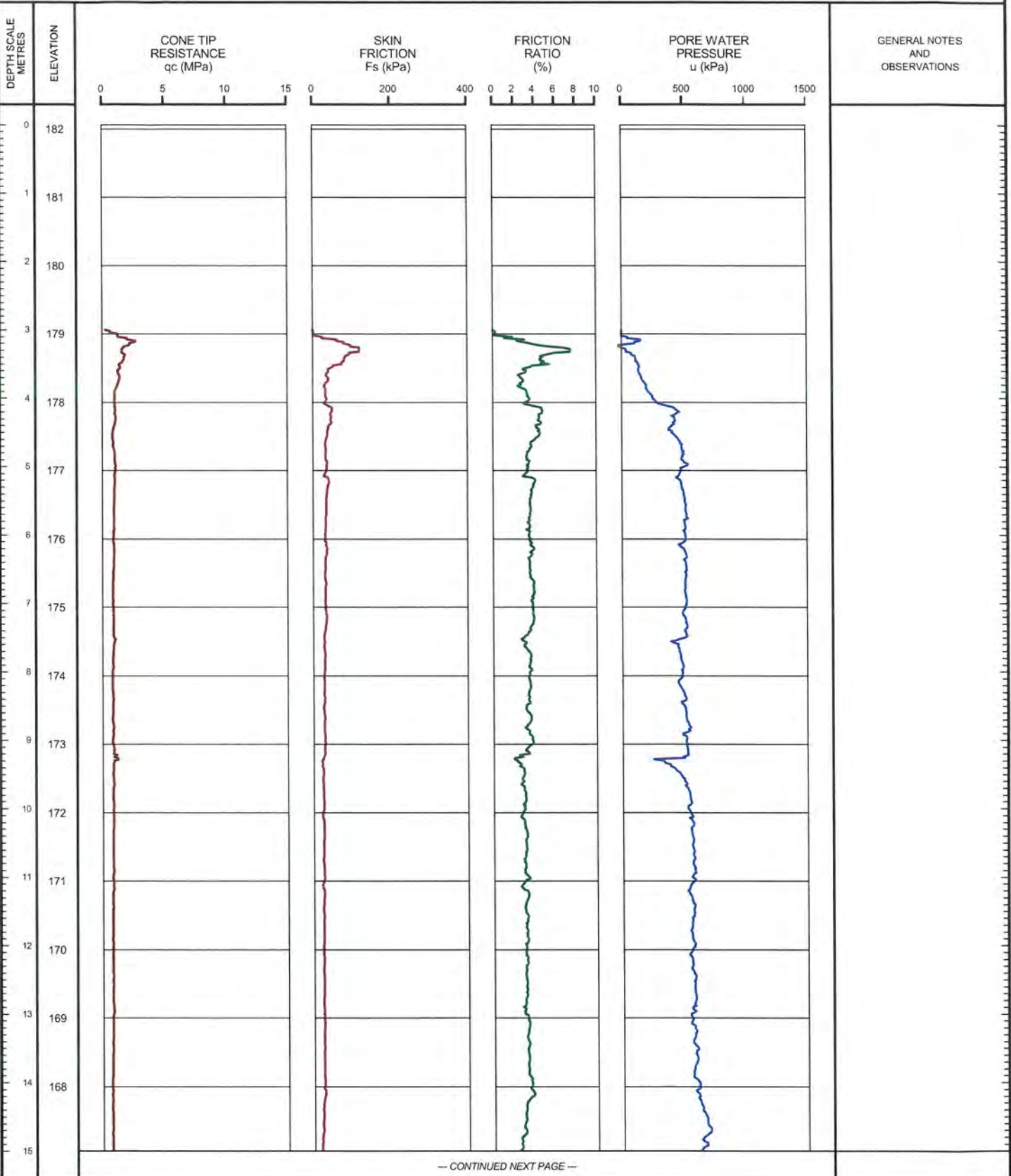
SHEET 1 OF 2

LOCATION: N 4680652.0 ; E 331651.0

TEST DATE: November 7, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.00m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



— CONTINUED NEXT PAGE —

LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-14**

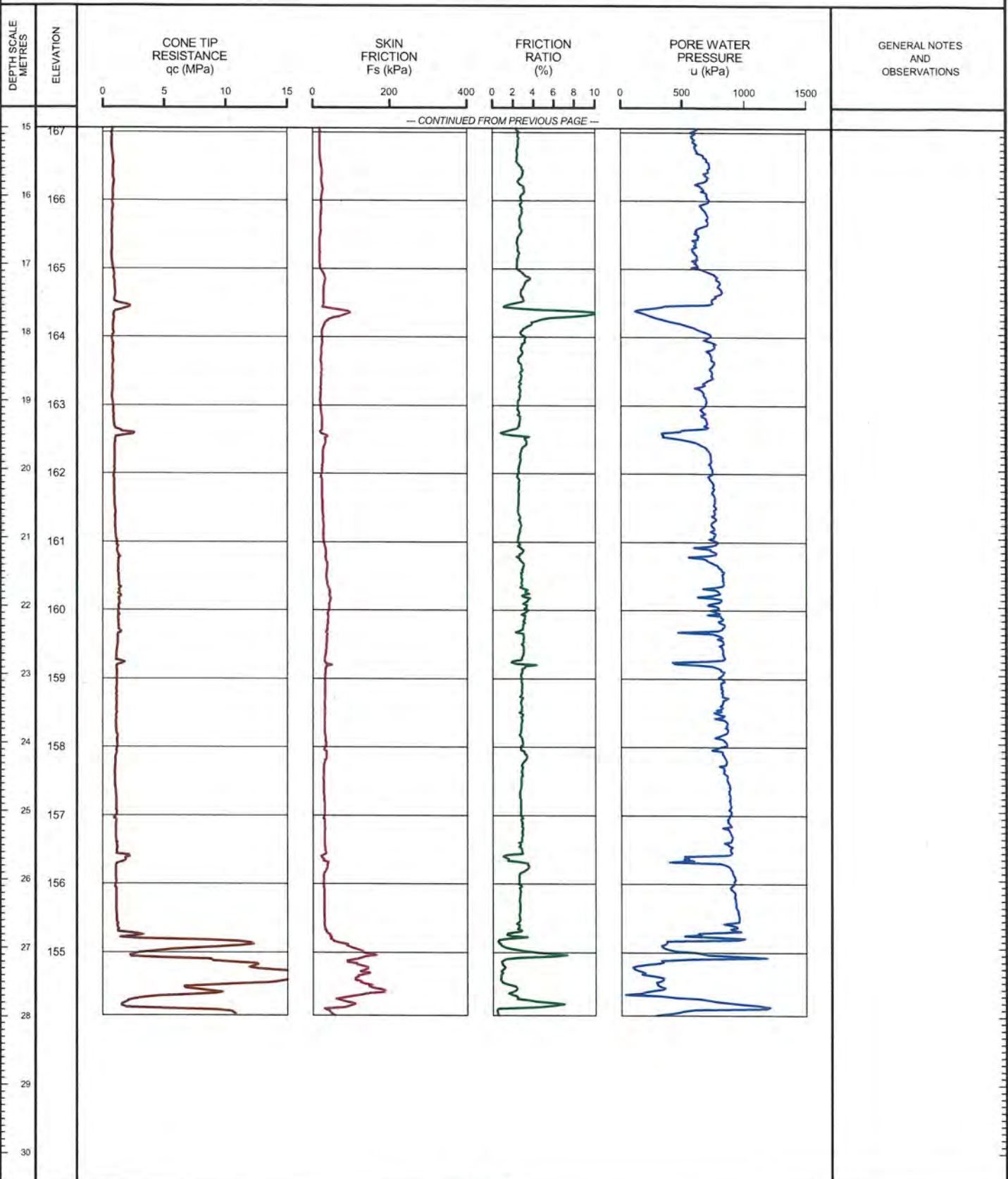
SHEET 2 OF 2

LOCATION: N 4680652.0 ; E 331651.0

TEST DATE: November 7, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.00m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LON\_CPT\_01 07-1130-207-0-CPT.GPJ GLDR\_LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-15**

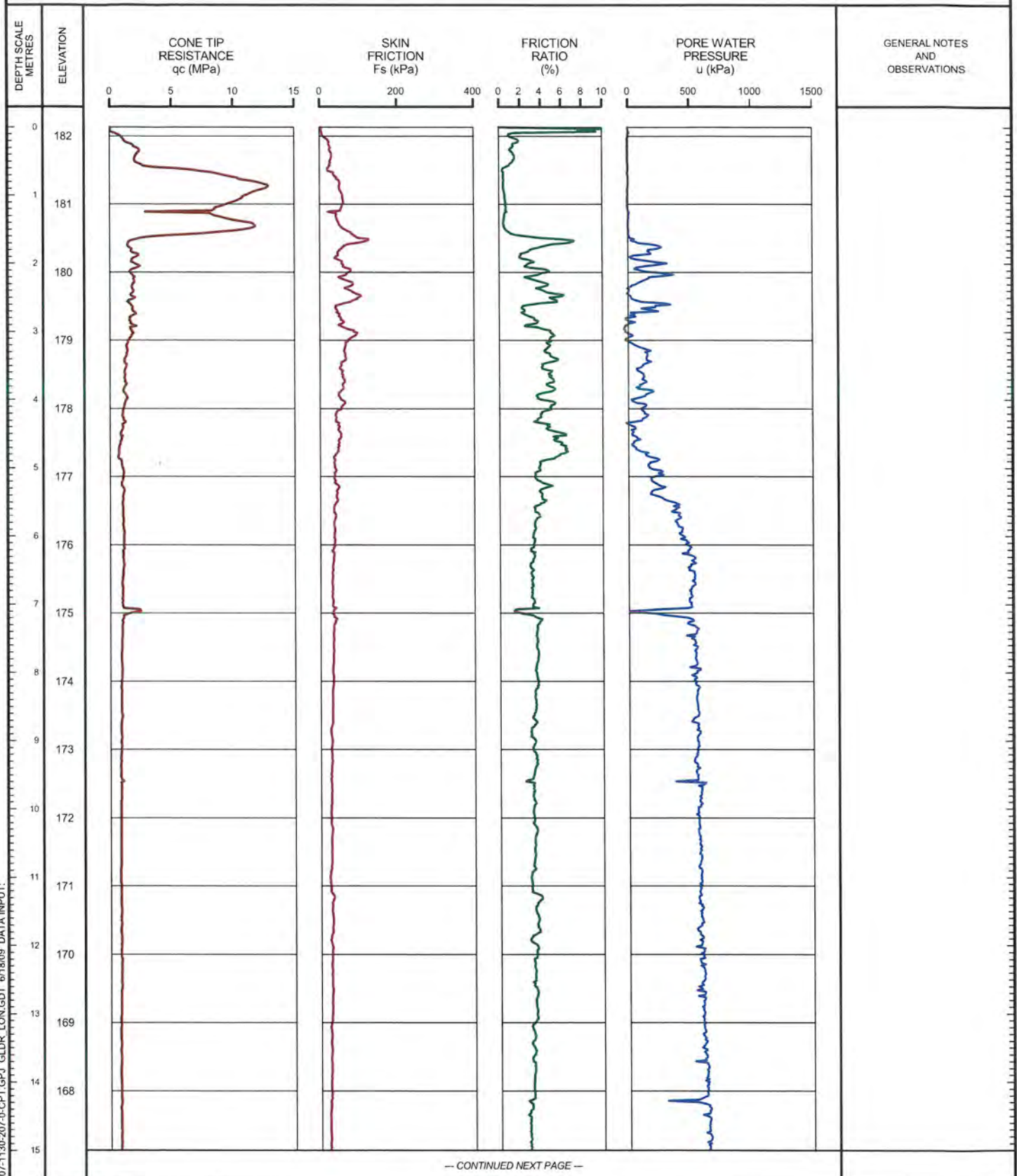
SHEET 1 OF 2

LOCATION: N 4681049.0 ; E 331480.0

TEST DATE: November 9, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 0.00m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LON CPT\_01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-15**

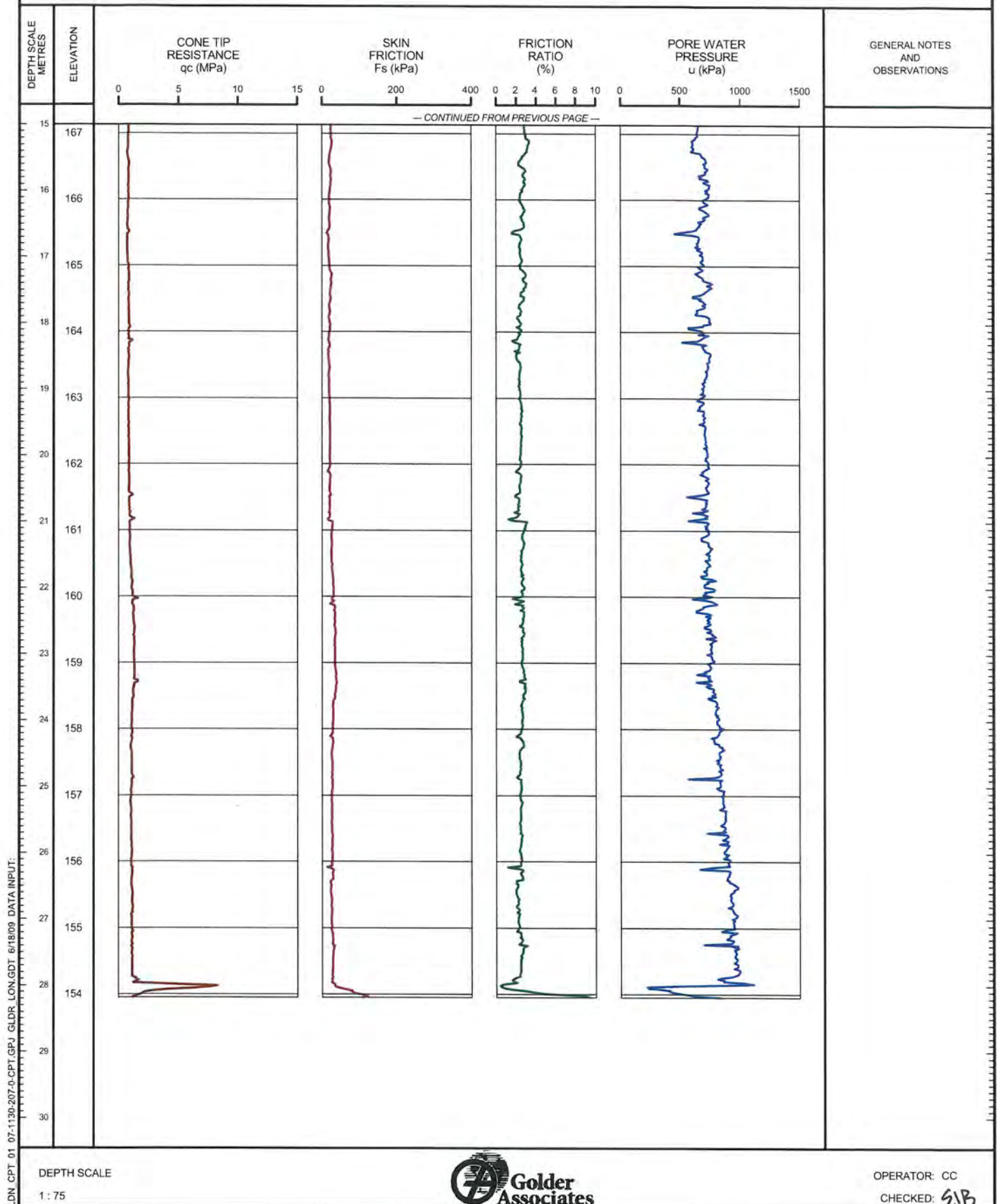
SHEET 2 OF 2

LOCATION: N 4681049.0 E 331480.0

TEST DATE: November 9, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 0.00m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-16**

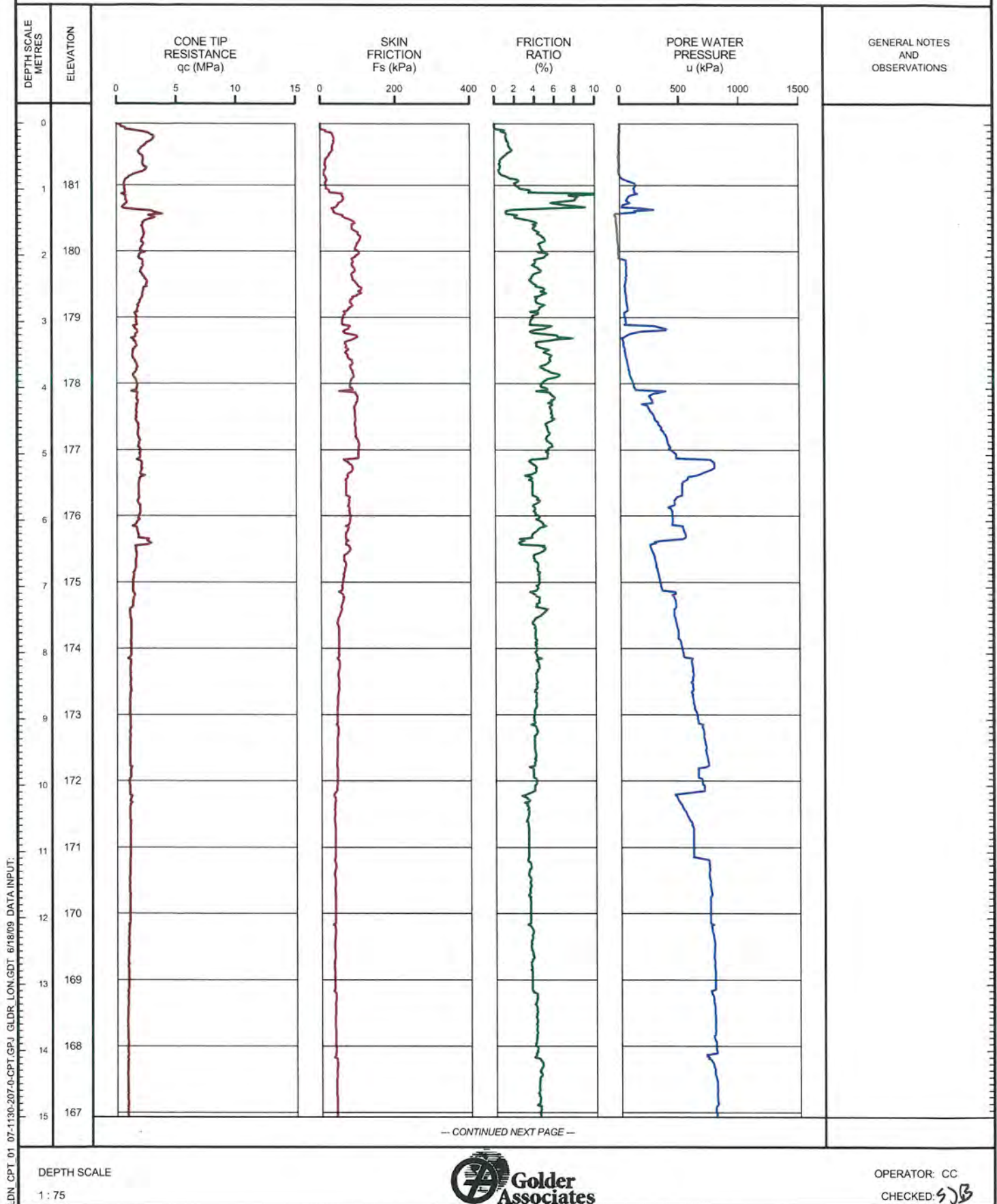
SHEET 1 OF 2

LOCATION: N 4681417.0; E 331376.0

TEST DATE: November 3, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-16**

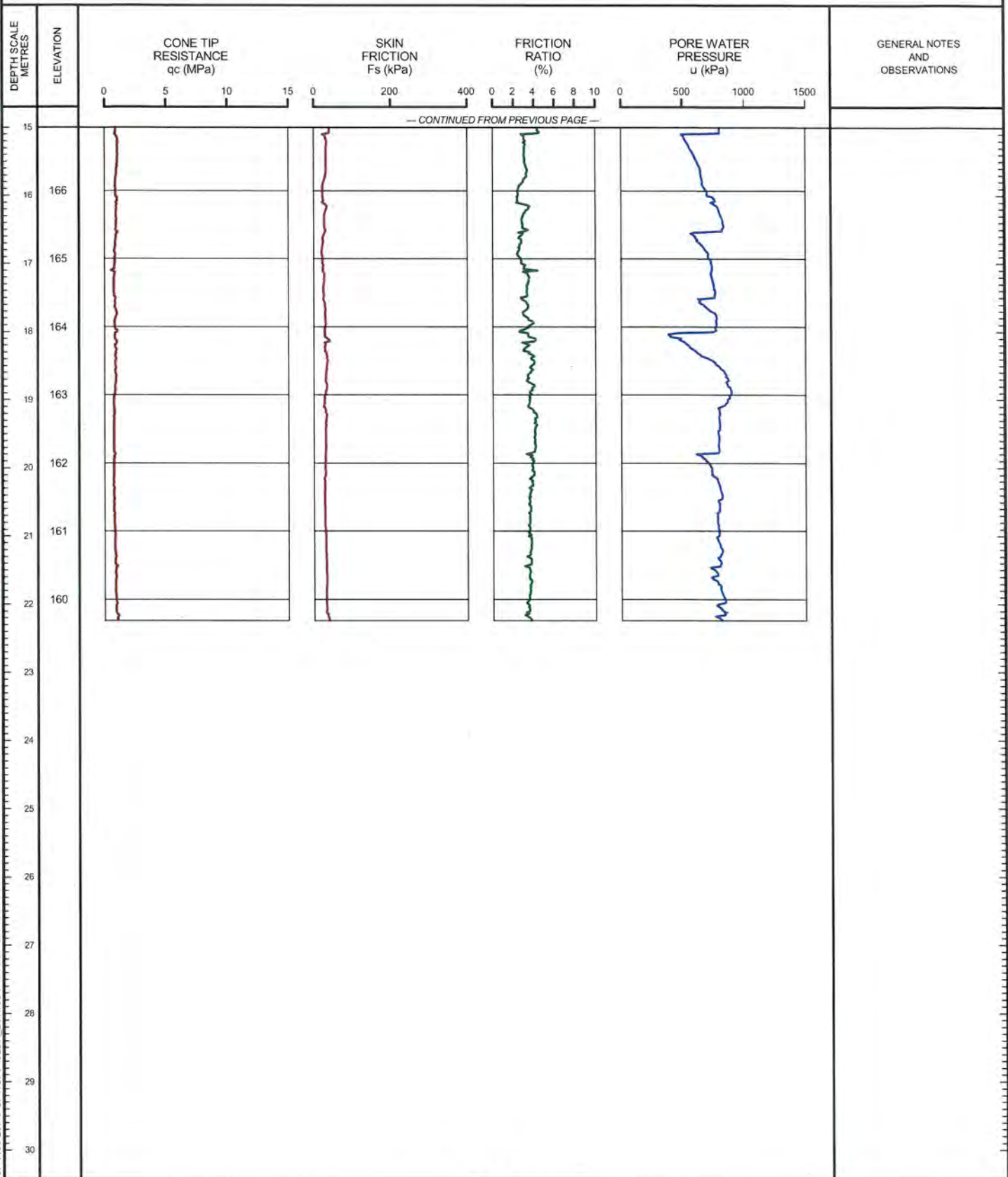
SHEET 2 OF 2

LOCATION: N 4681417.0 ;E 331376.0

TEST DATE: November 3, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-17**

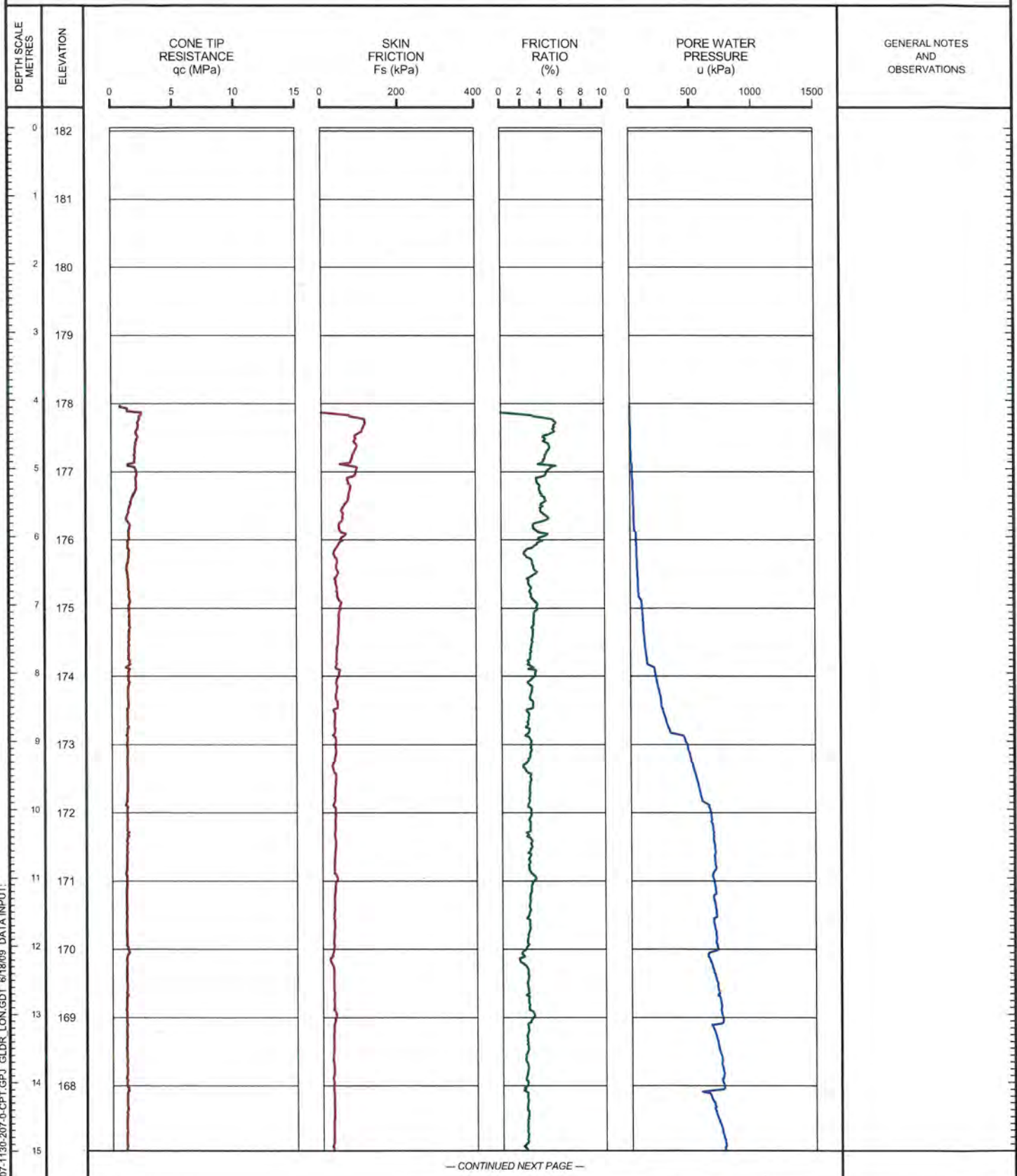
SHEET 1 OF 2

LOCATION: N 4681625.0 ; E 331208.0

TEST DATE: November 2, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 4.10m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SJB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-17**

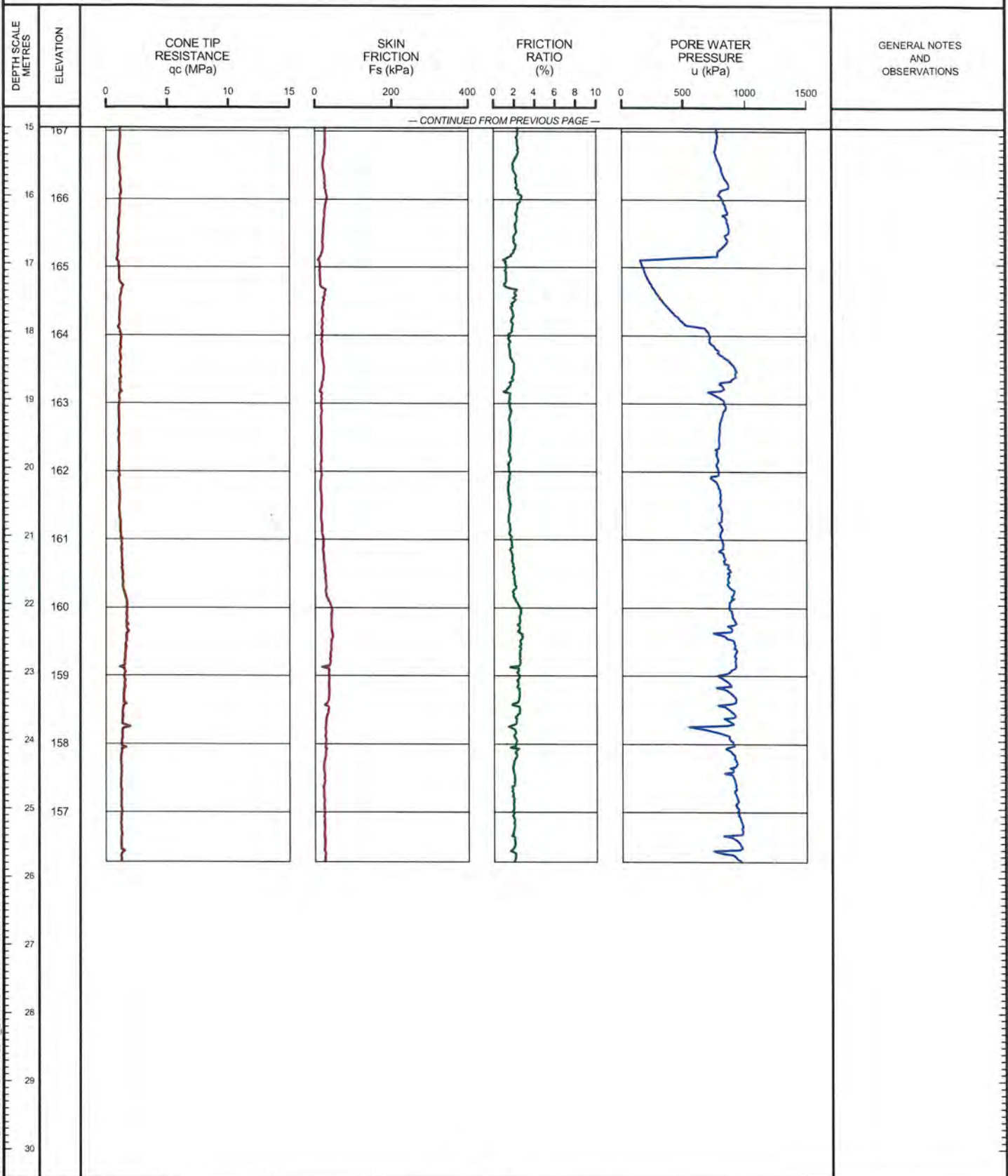
SHEET 2 OF 2

LOCATION: N 4681625.0 ,E 331208.0

TEST DATE: November 2, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 4.10m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE  
1 : 75OPERATOR: CC  
CHECKED: SJS



PROJECT: 07-1130-207-0

# RECORD OF CONE PENETRATION TEST CPT-18

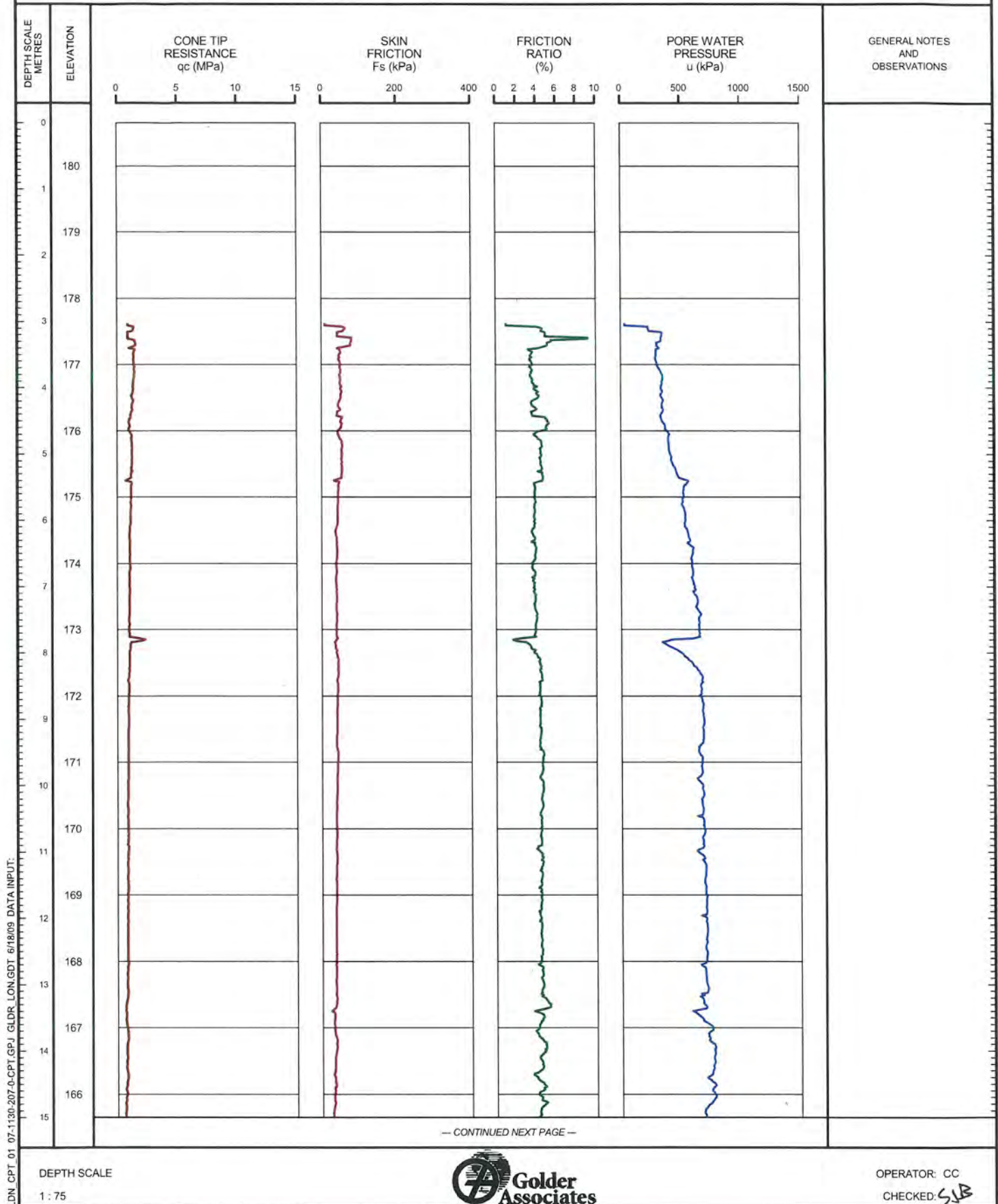
SHEET 1 OF 2

LOCATION: N 4681547.0 ; E 330938.0

TEST DATE: November 9, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.05m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LON CPT\_01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-18**

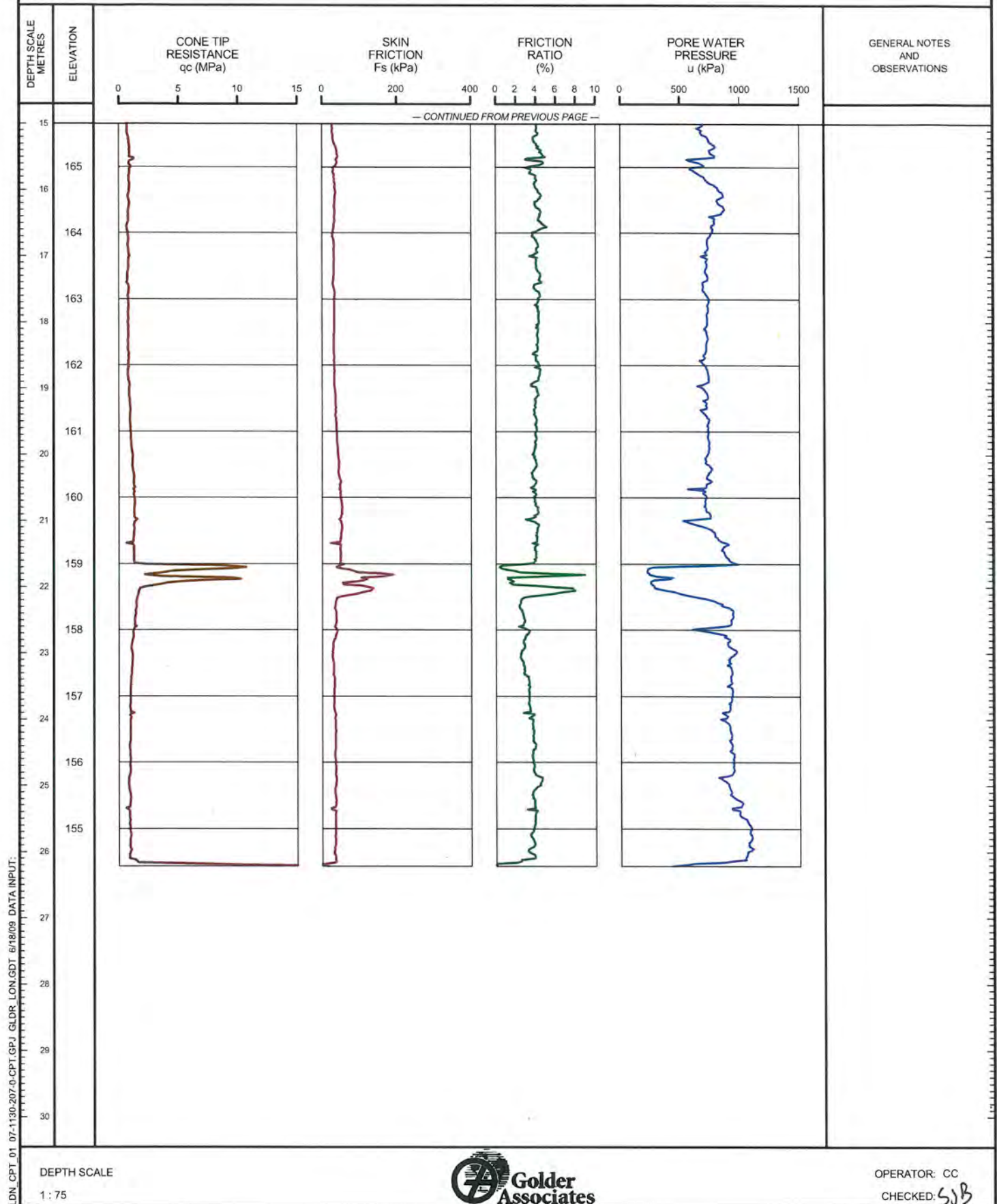
SHEET 2 OF 2

LOCATION: N 4681547.0 ; E 330938.0

TEST DATE: November 9, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.05m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

# RECORD OF CONE PENETRATION TEST CPT-19

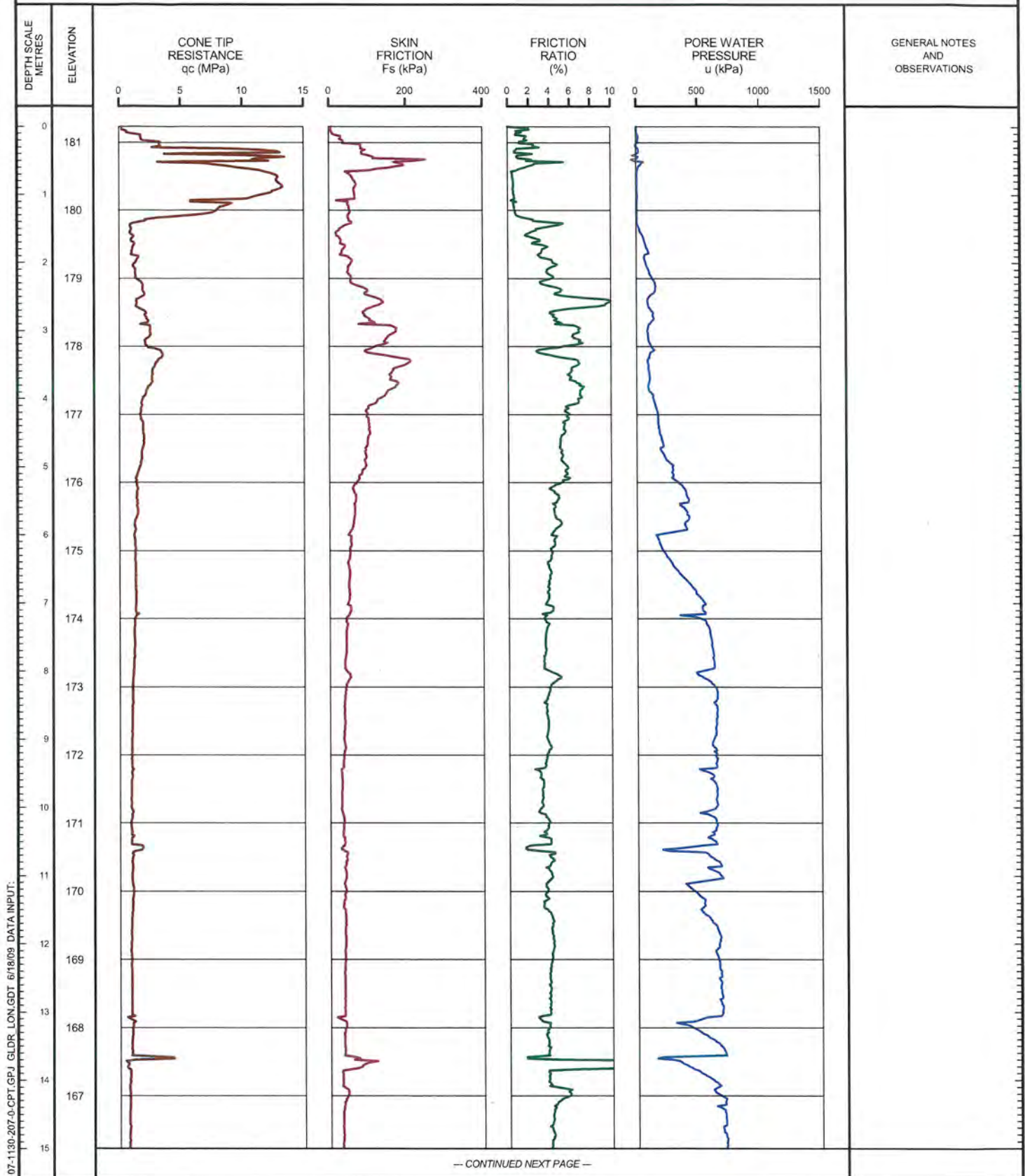
SHEET 1 OF 2

LOCATION: N 4681906.0 ; E 330413.0

TEST DATE: November 2, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SJB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-19**

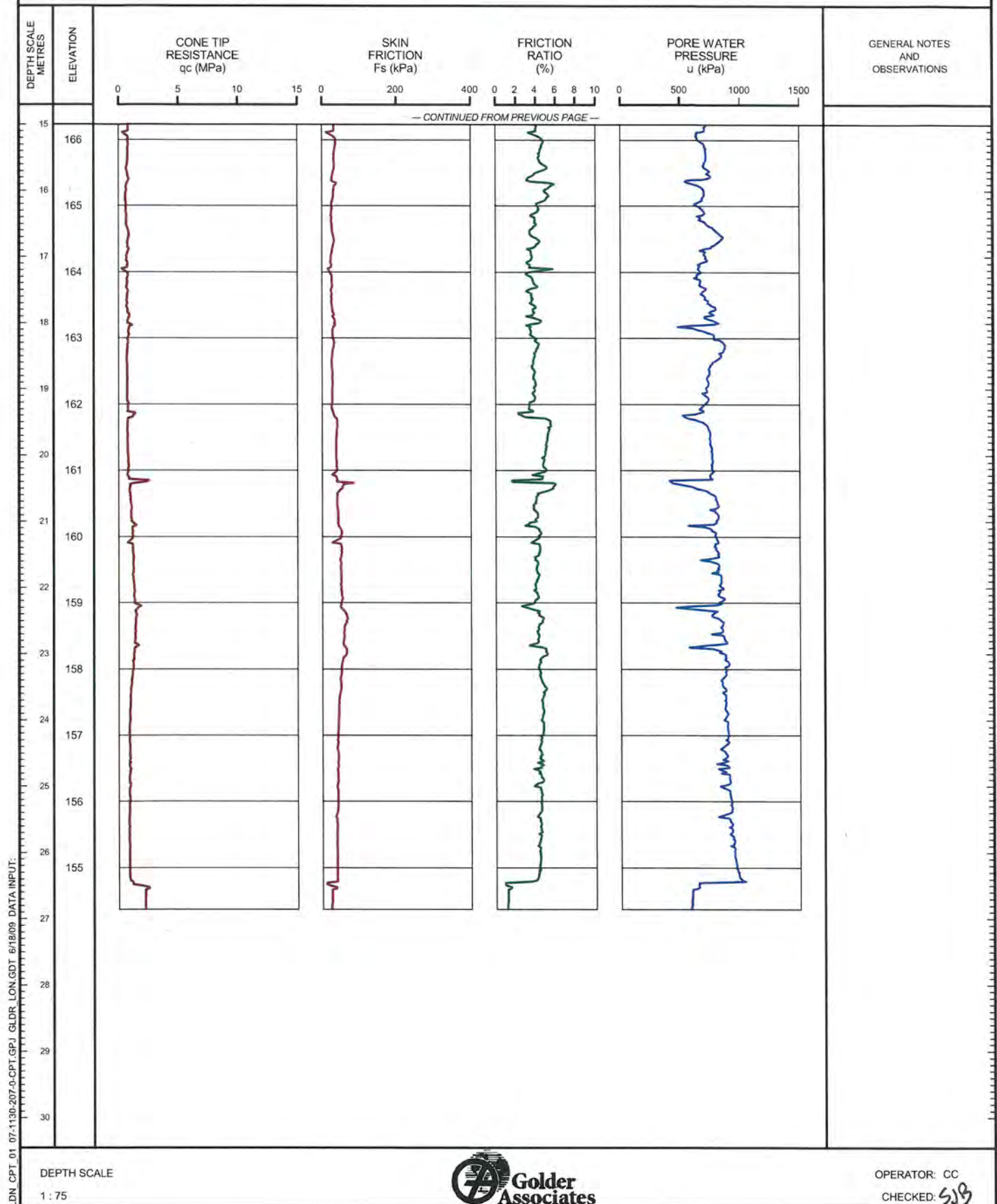
SHEET 2 OF 2

LOCATION: N 4681906.0 ; E 330413.0

TEST DATE: November 2, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 0.00m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT\_01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-20**

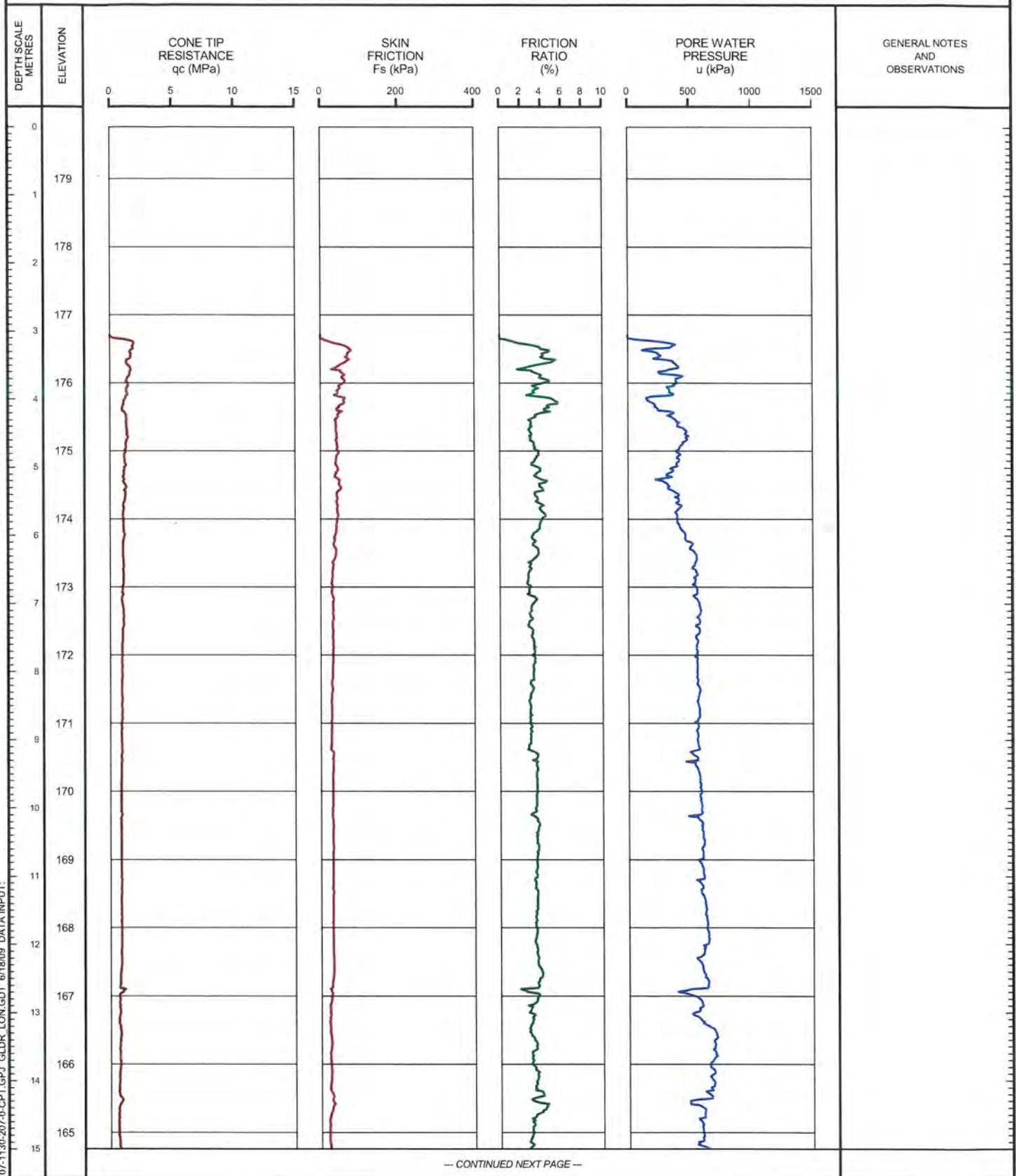
SHEET 1 OF 2

LOCATION: N 4681775.0 ; E 329868.0

TEST DATE: November 9, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.07m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SS*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-20**

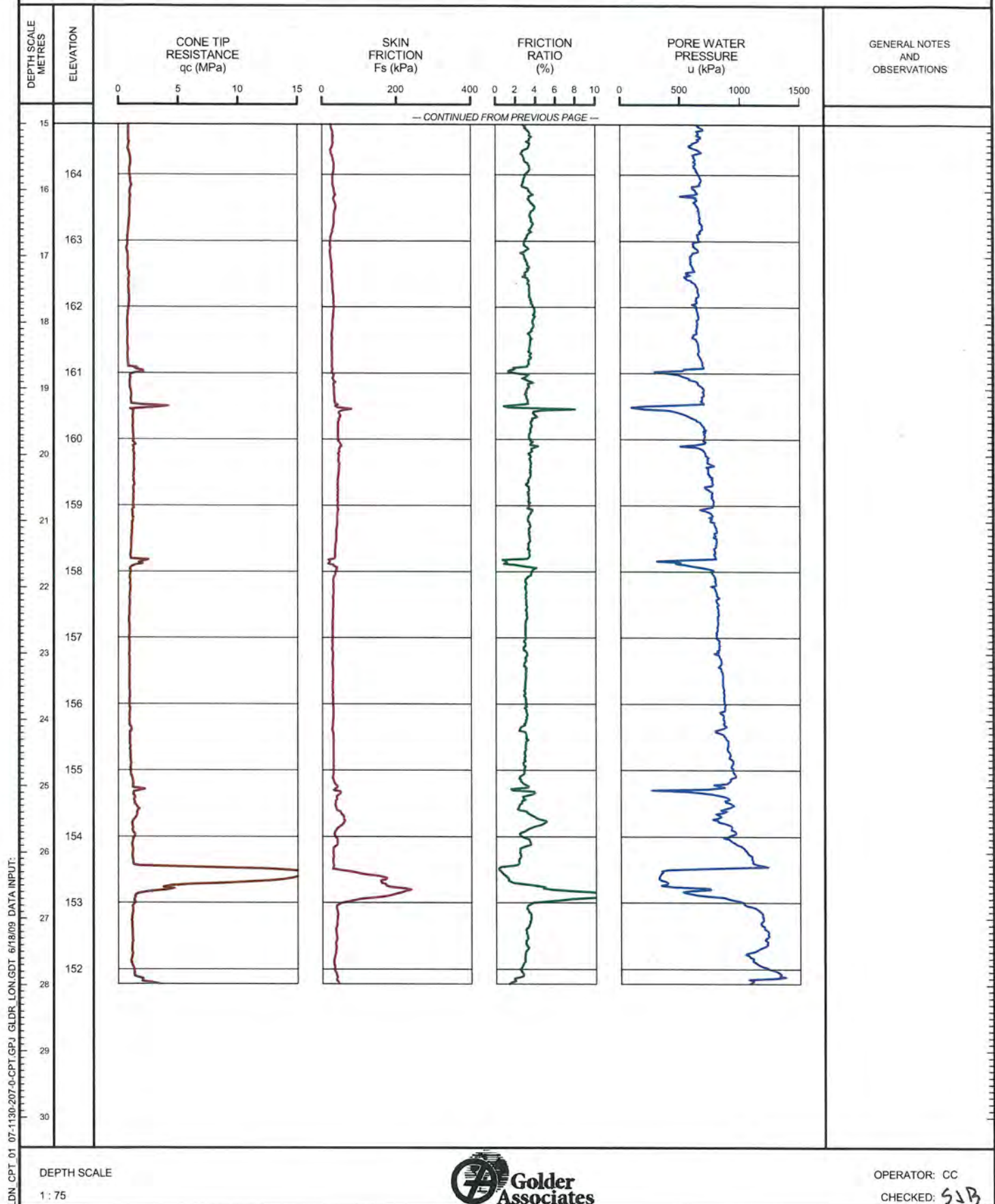
SHEET 2 OF 2

LOCATION: N 4681775.0 ; E 329868.0

TEST DATE: November 9, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.07m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-21**

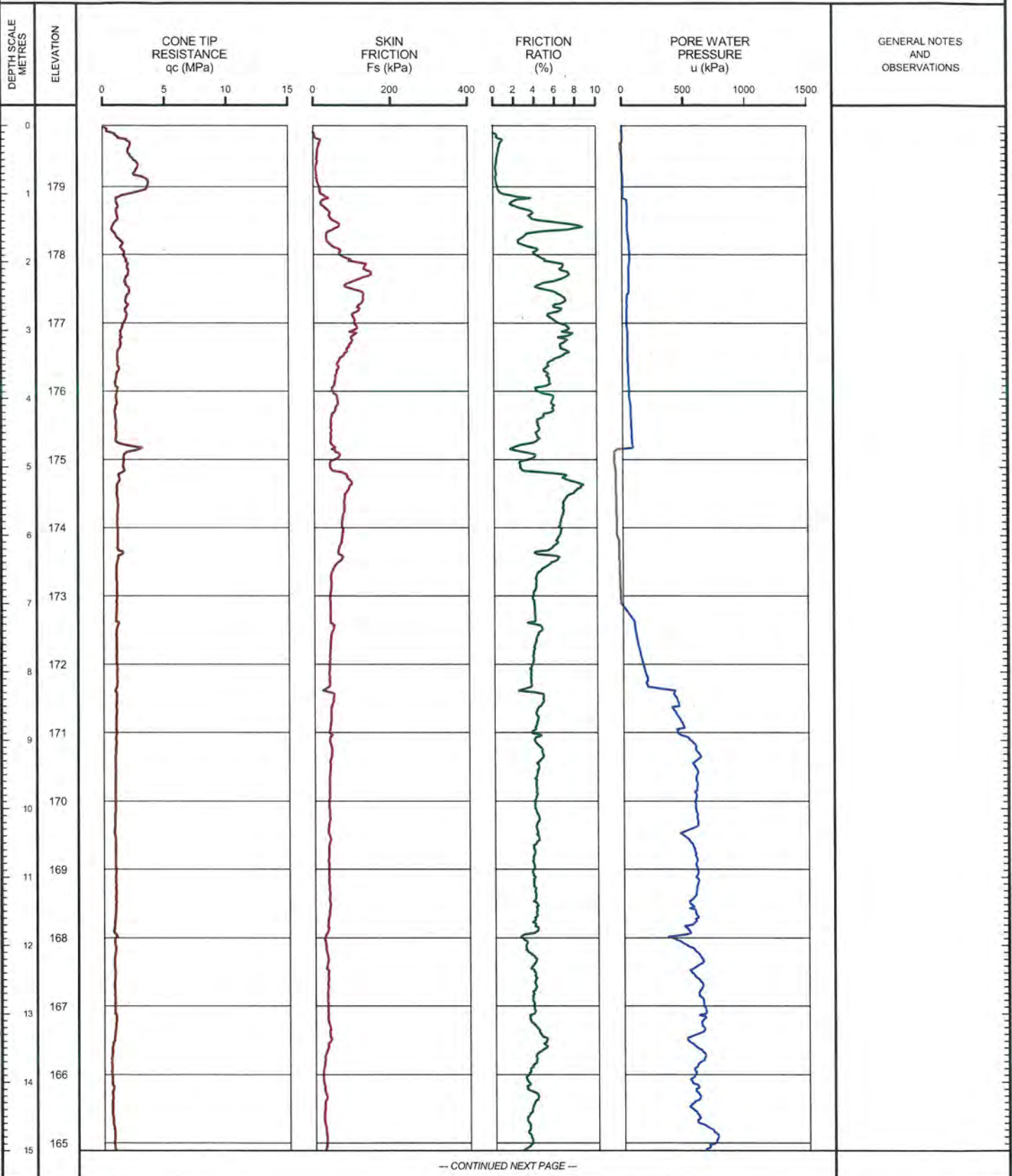
SHEET 1 OF 2

LOCATION: N 4682147.0 ; E 329759.0

TEST DATE: November 1, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *503*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-21**

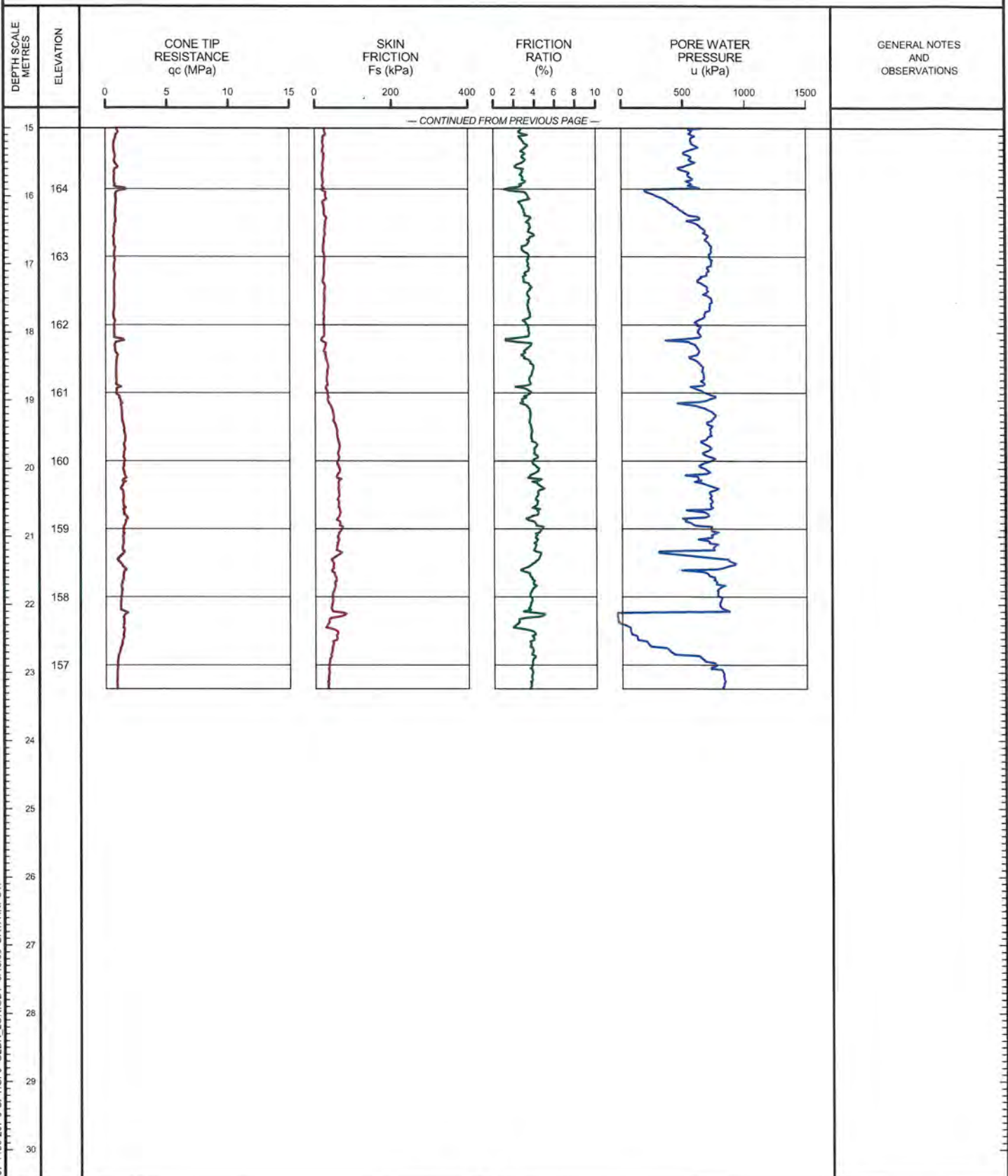
SHEET 2 OF 2

LOCATION: N 4682147.0 ; E 329759.0

TEST DATE: November 1, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 0.00m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SJB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-22**

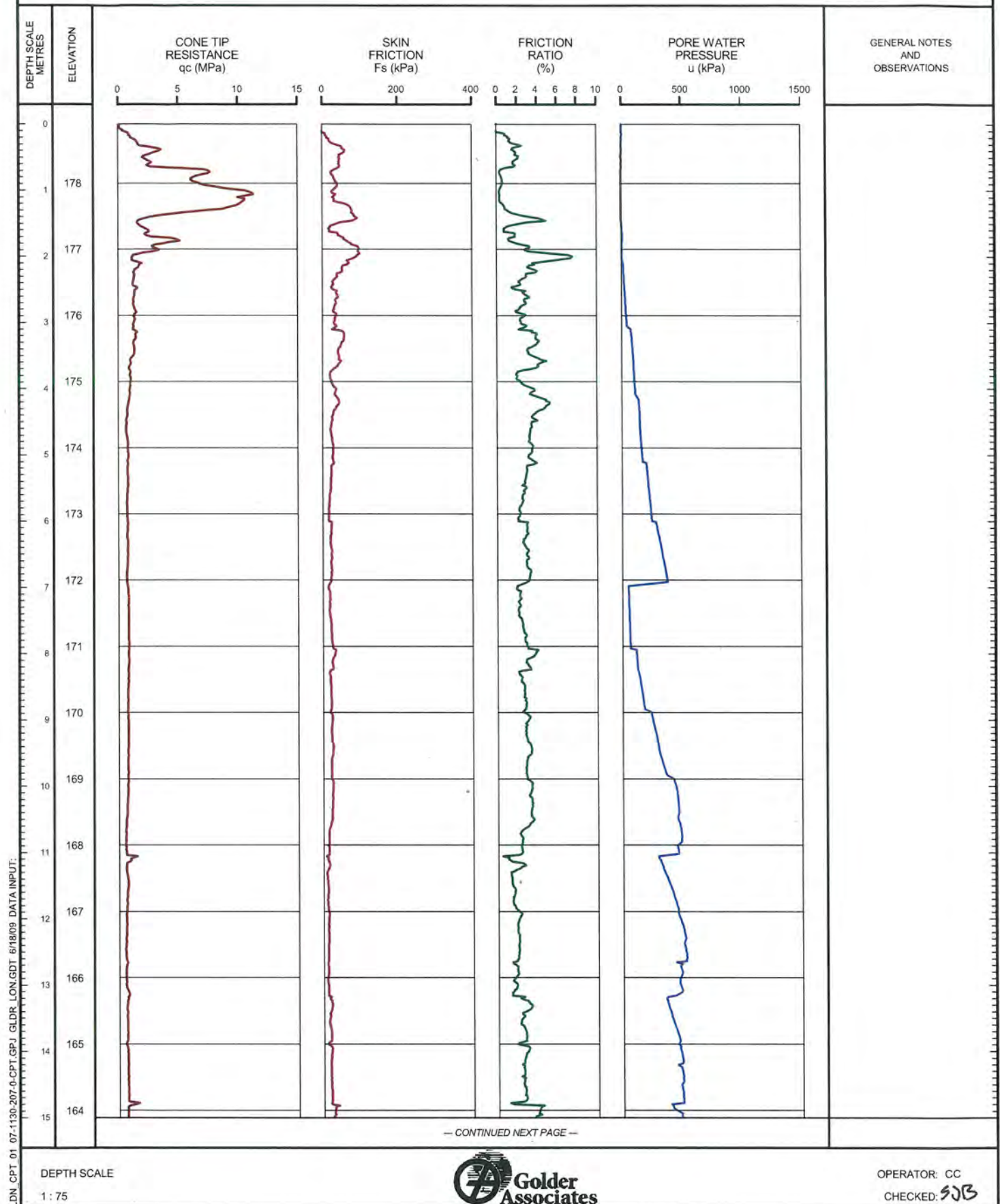
SHEET 1 OF 2

LOCATION: N 4682412.0 ; E 328986.0

TEST DATE: November 1, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 0.00m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-22**

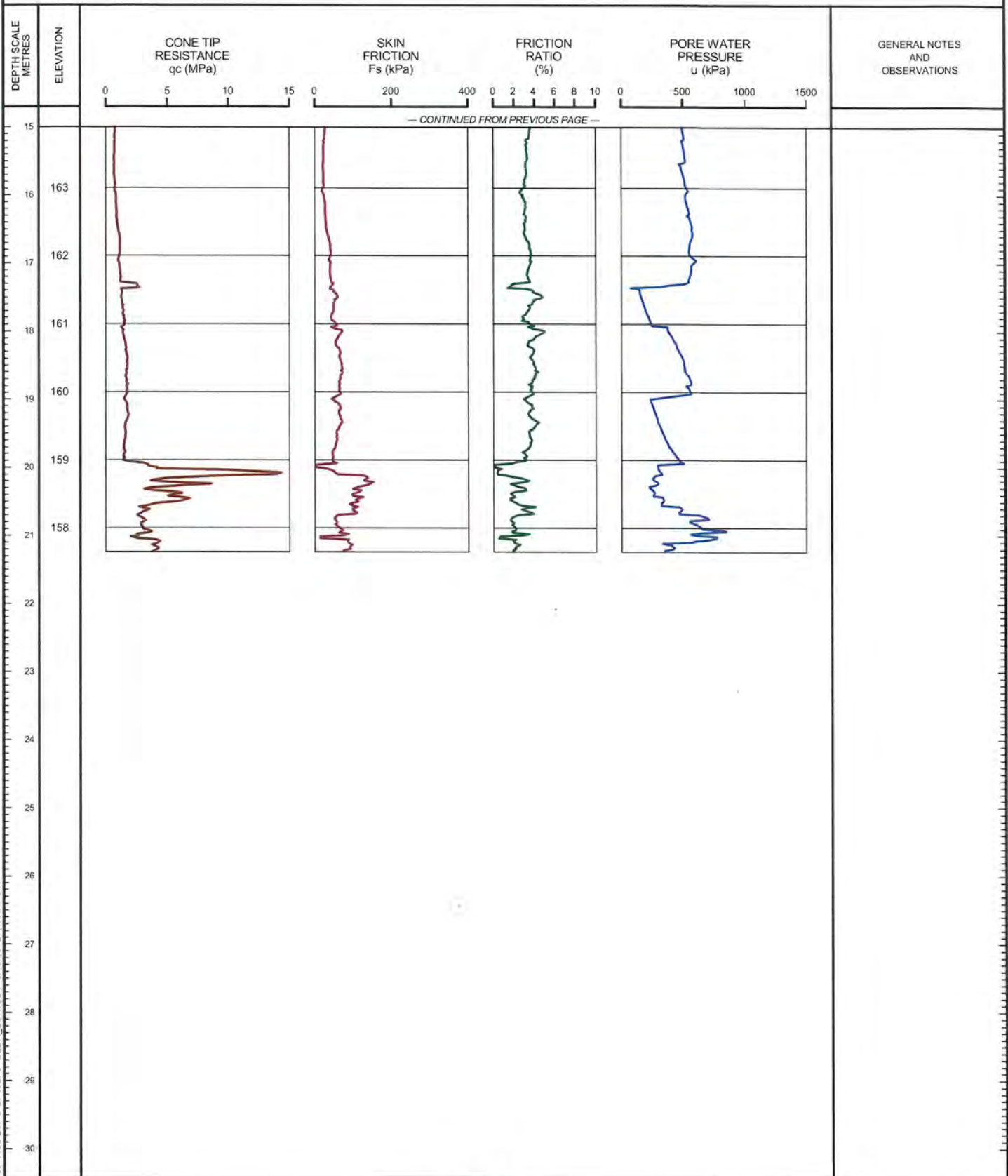
SHEET 2 OF 2

LOCATION: N 4682412.0 :E 328986.0

TEST DATE: November 1, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN\_CPT\_01\_07-1130-207-0-CPT.GPJ GLDR\_LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-23**

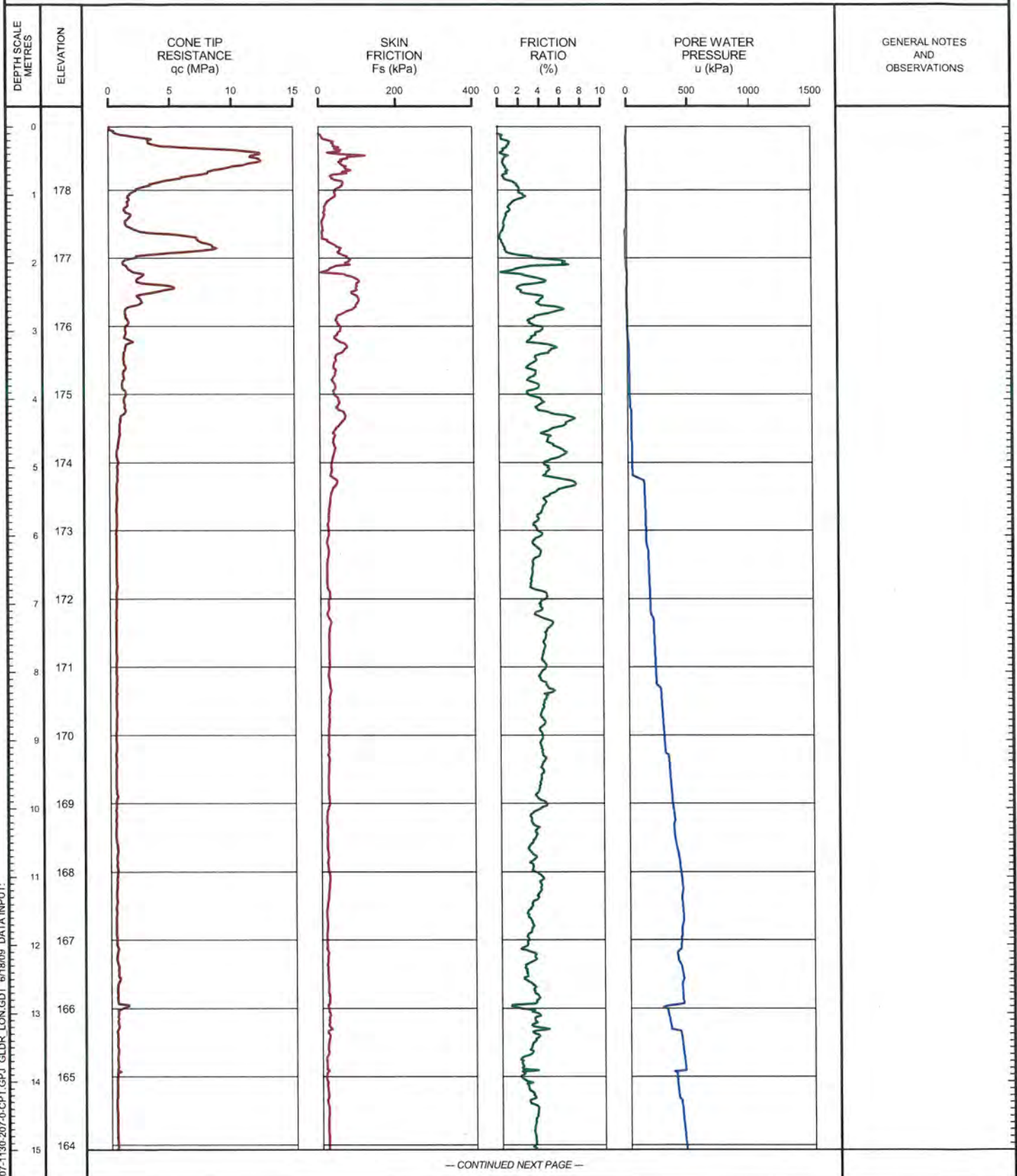
SHEET 1 OF 2

LOCATION: N 4682329.0 ; E 328523.0

TEST DATE: October 31, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 0.00m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-23**

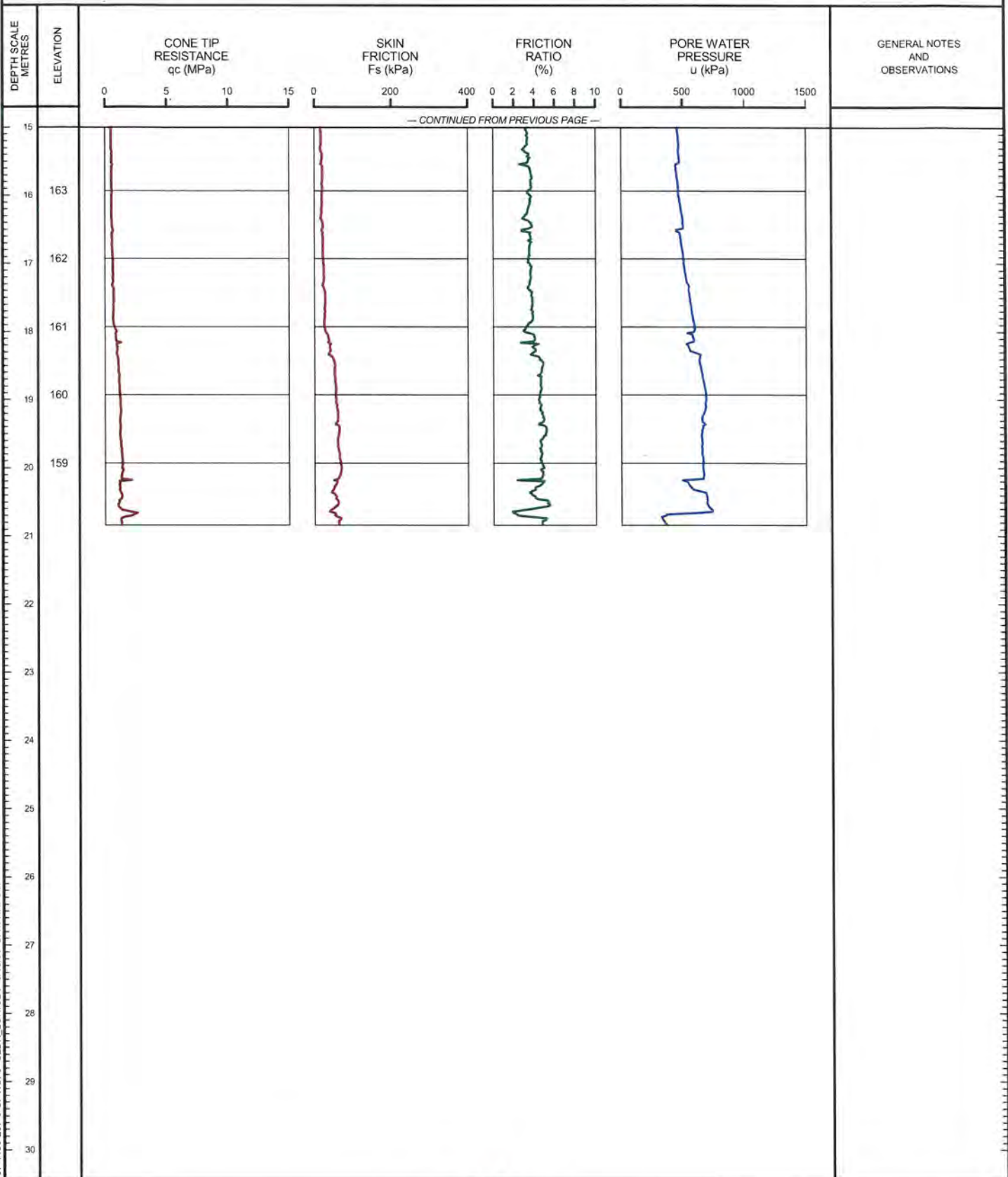
SHEET 2 OF 2

LOCATION: N 4682329.0 :E 328523.0

TEST DATE: October 31, 2006

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 0.00m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/19/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *CCB*

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-103

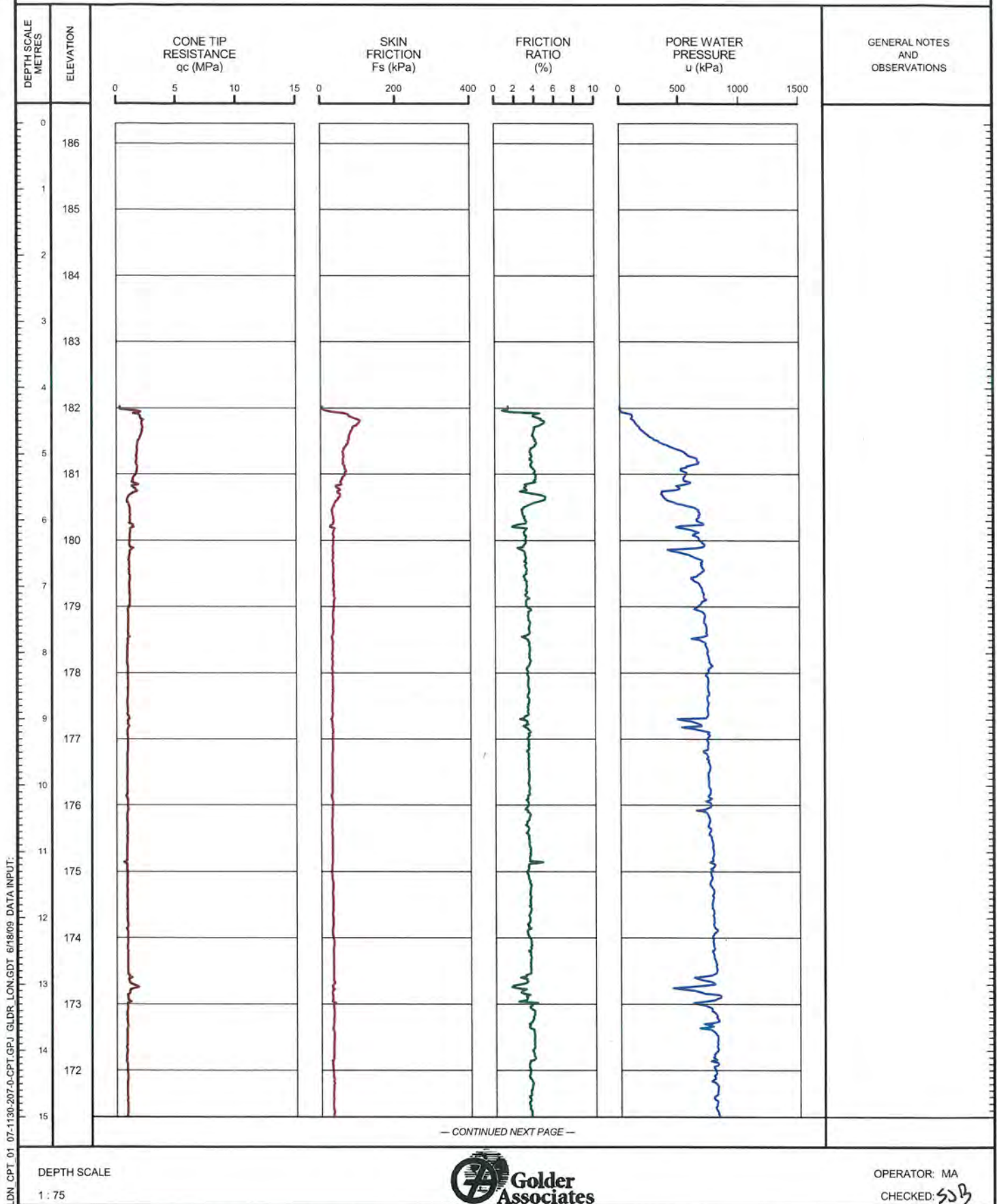
SHEET 1 OF 2

LOCATION: N 4677620.0 :E 335400.7

TEST DATE: March 31, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 4.30m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012





PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-103**

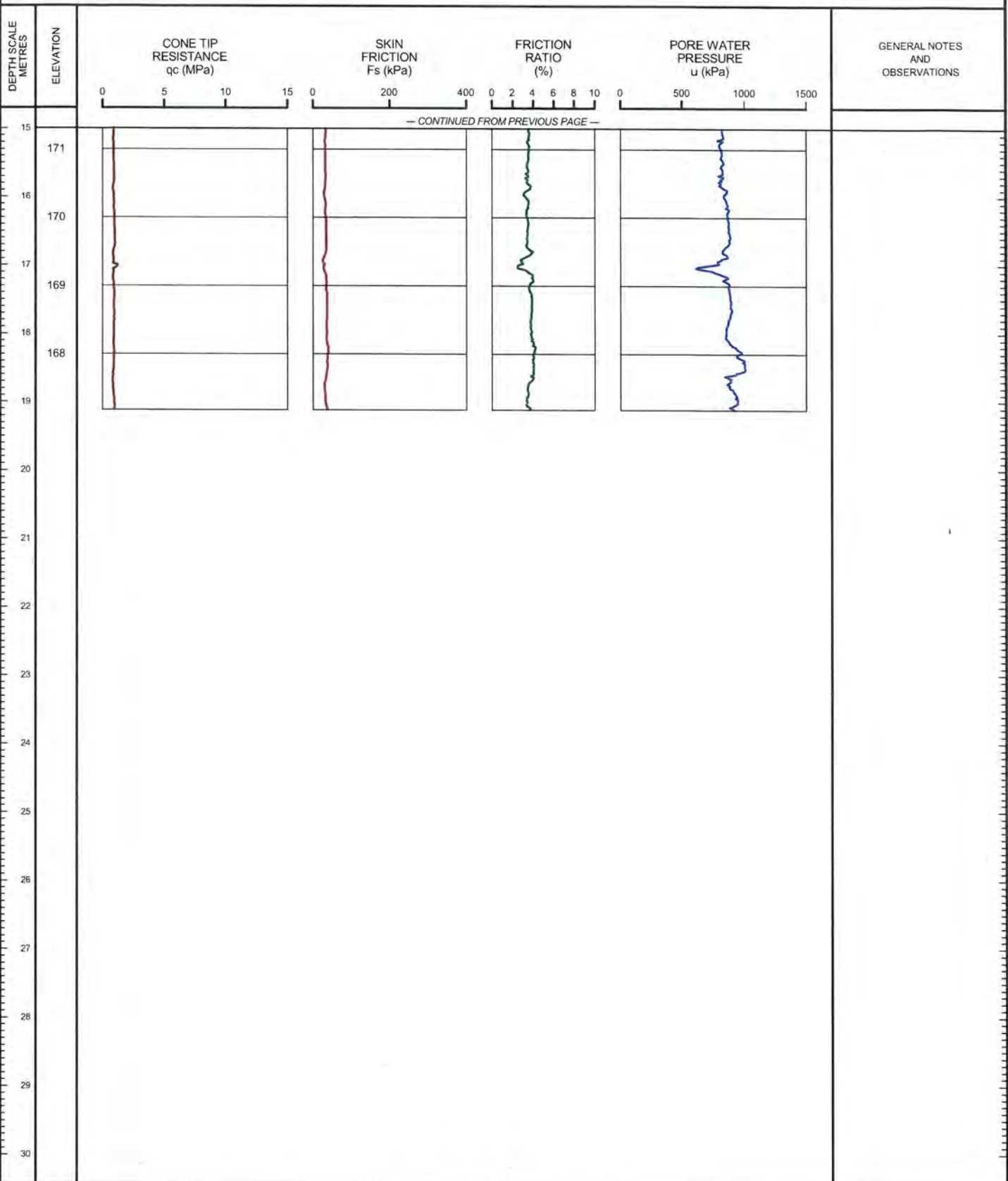
SHEET 2 OF 2

LOCATION: N 4677620.0 ; E 335400.7

TEST DATE: March 31, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 4.30m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/19/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: MA

CHECKED: *GSB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-106**

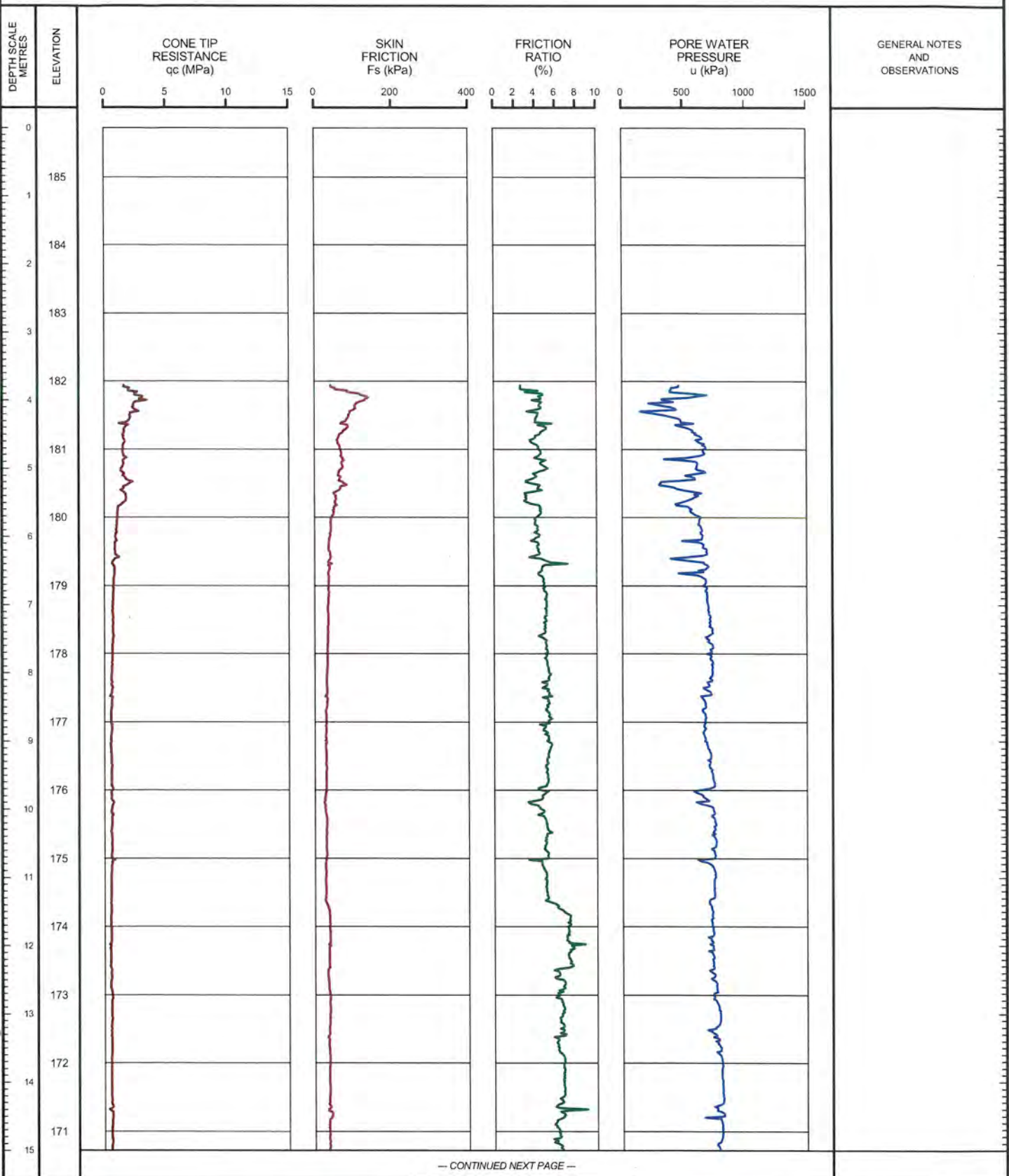
SHEET 1 OF 2

LOCATION: N 4677846.1 E 335039.9

TEST DATE: September 9, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.80m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-106**

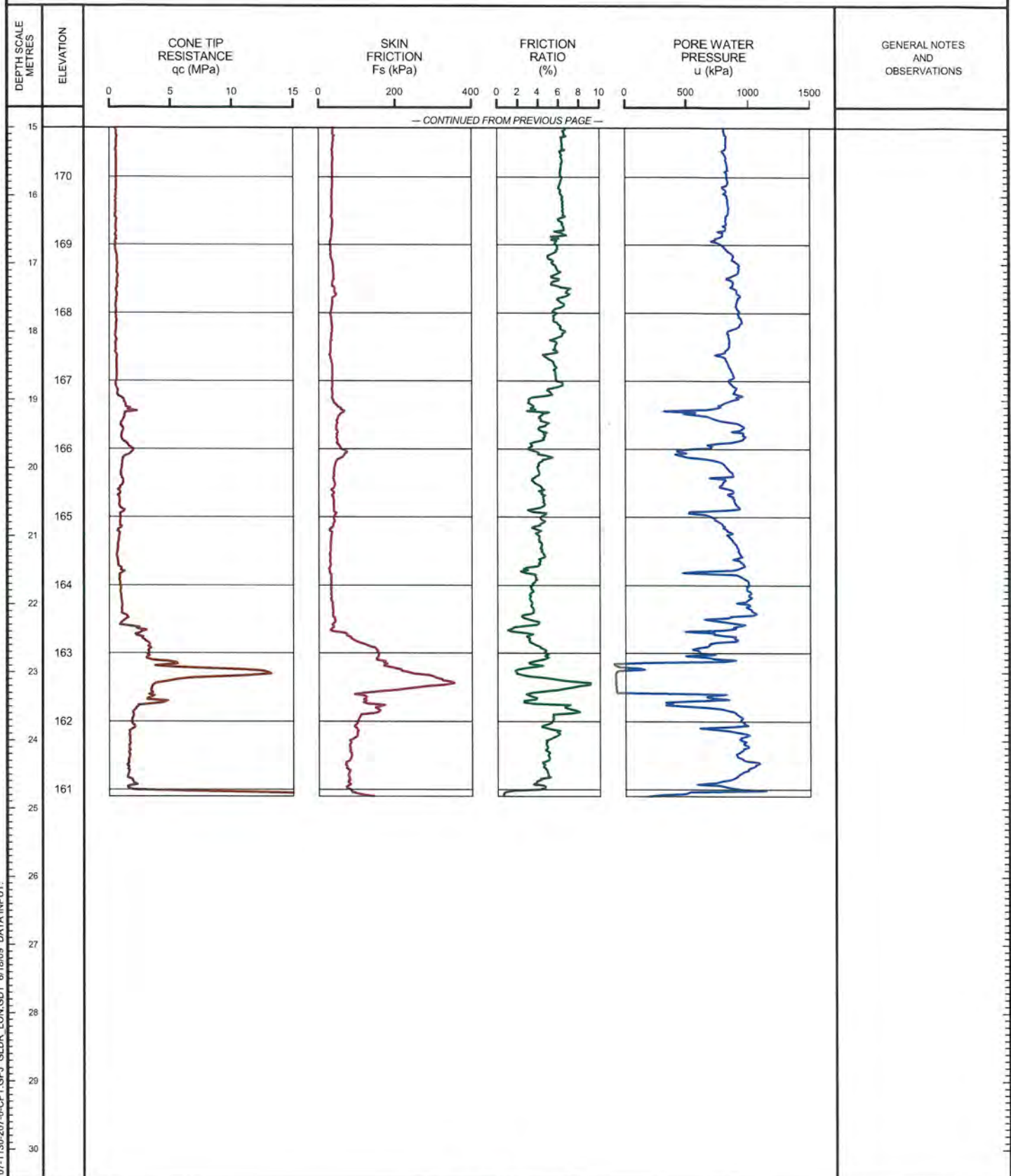
SHEET 2 OF 2

LOCATION: N 4677846.1 :E 335039.9

TEST DATE: September 9, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.80m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/19/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SD*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-108**

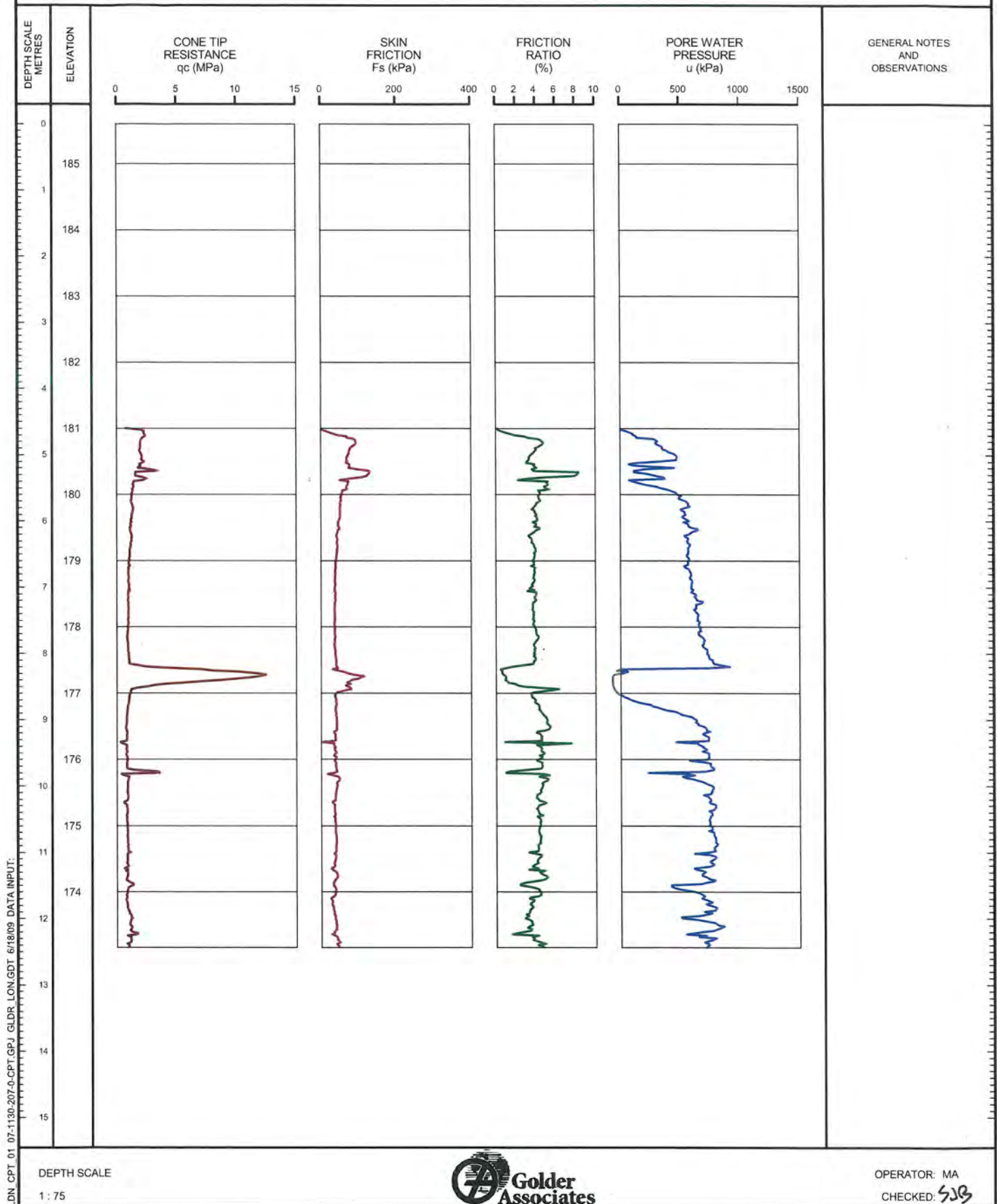
SHEET 1 OF 1

LOCATION: N 4678051.6 ; E 334826.8

TEST DATE: March 31, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 4.60m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-110**

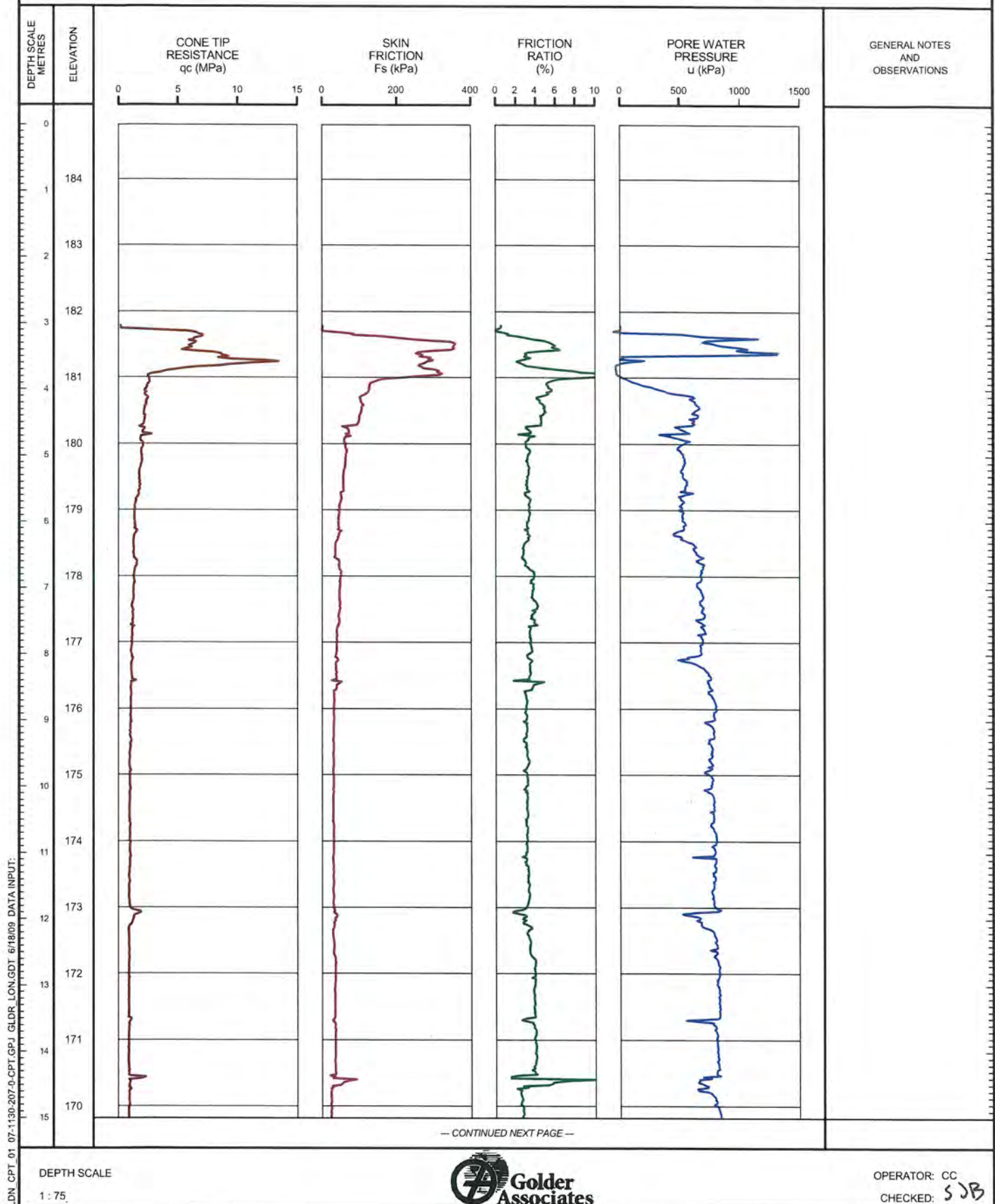
SHEET 1 OF 2

LOCATION: N 4678297.8, E 334448.6

TEST DATE: September 9, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.05m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012





PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-110**

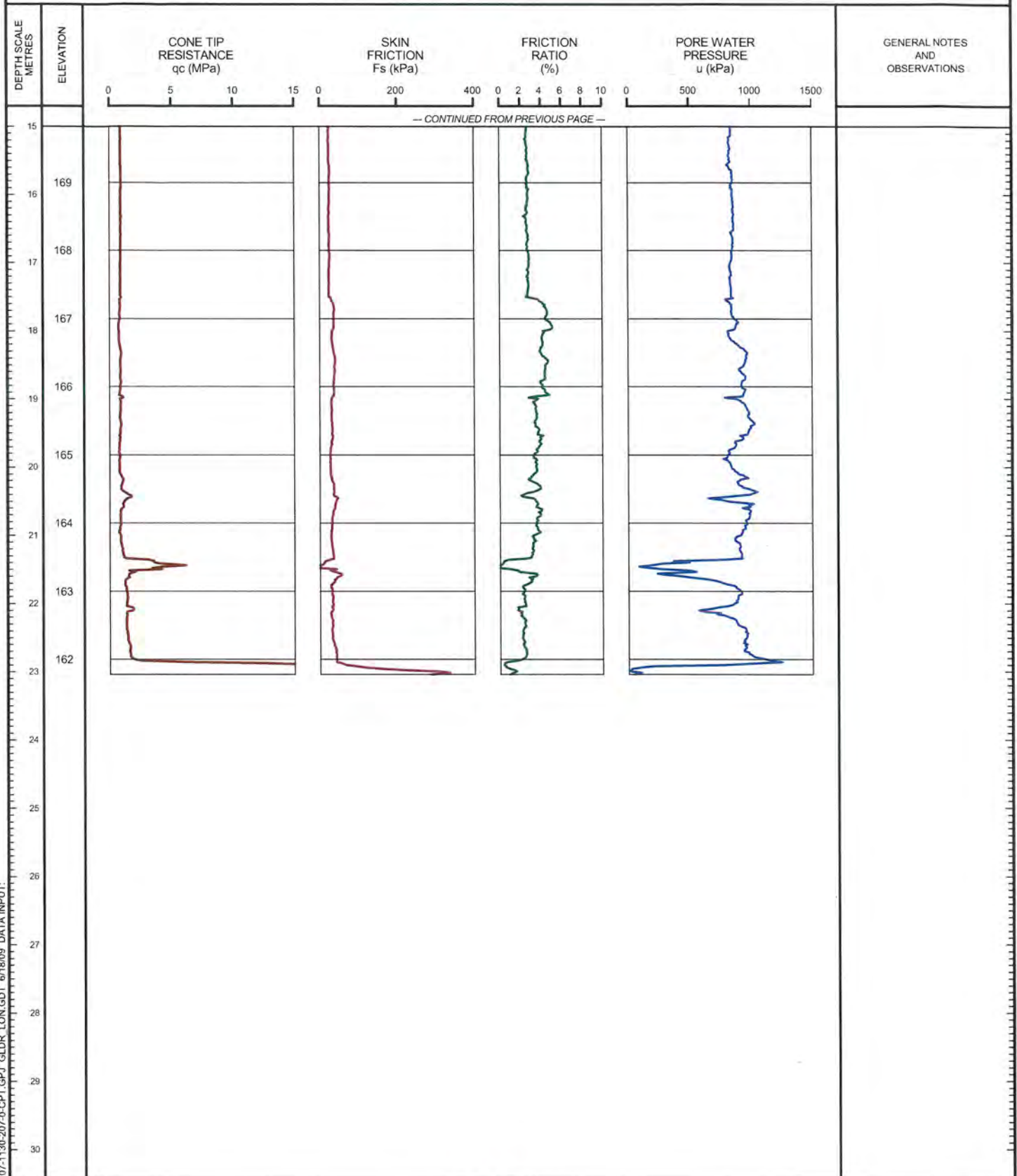
SHEET 2 OF 2

LOCATION: N 4678297.8 :E 334448.6

TEST DATE: September 9, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.05m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SJB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-111**

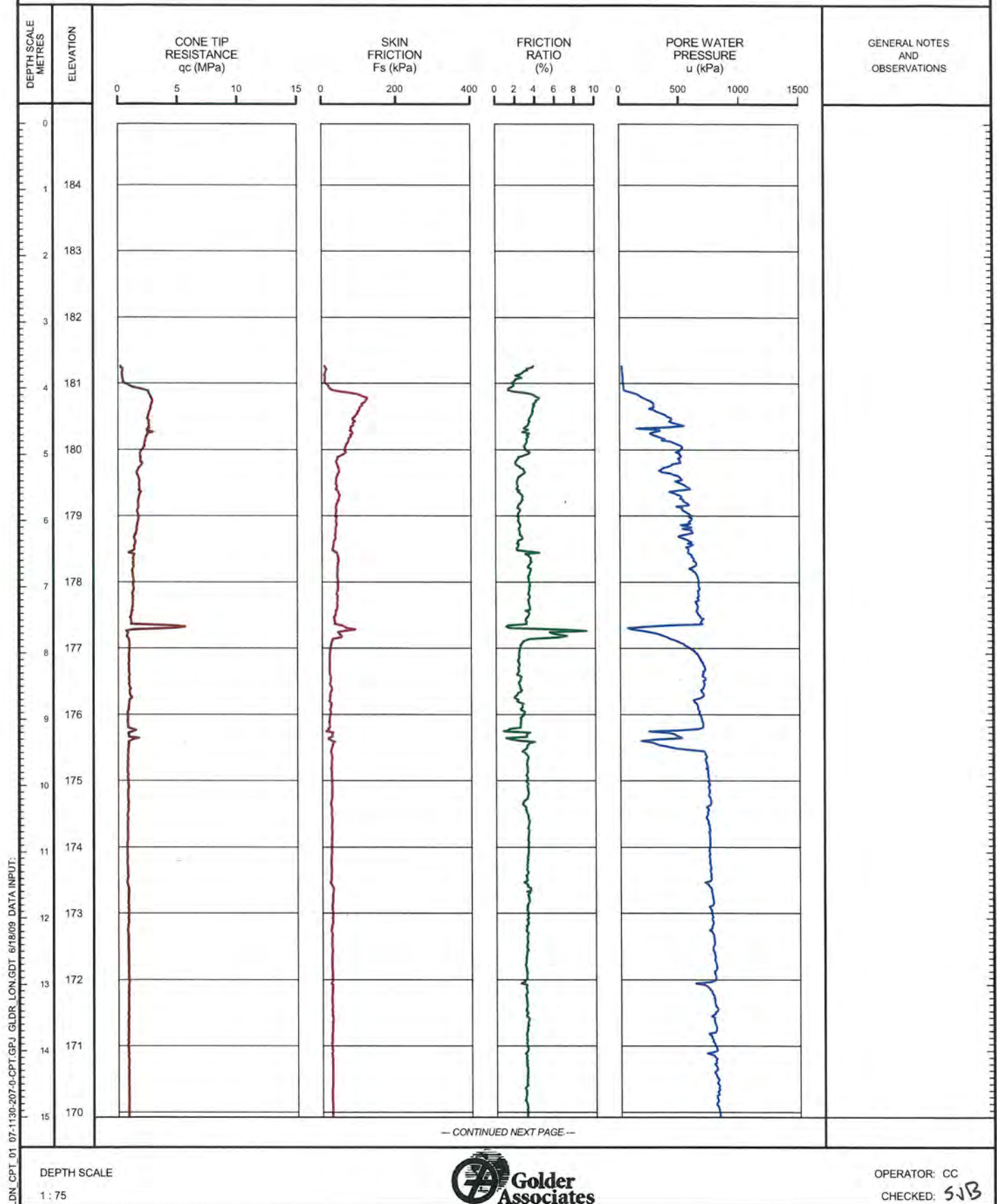
SHEET 1 OF 2

LOCATION: N 4678351.4 :E 334347.6

TEST DATE: September 9, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.66m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:



PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-111

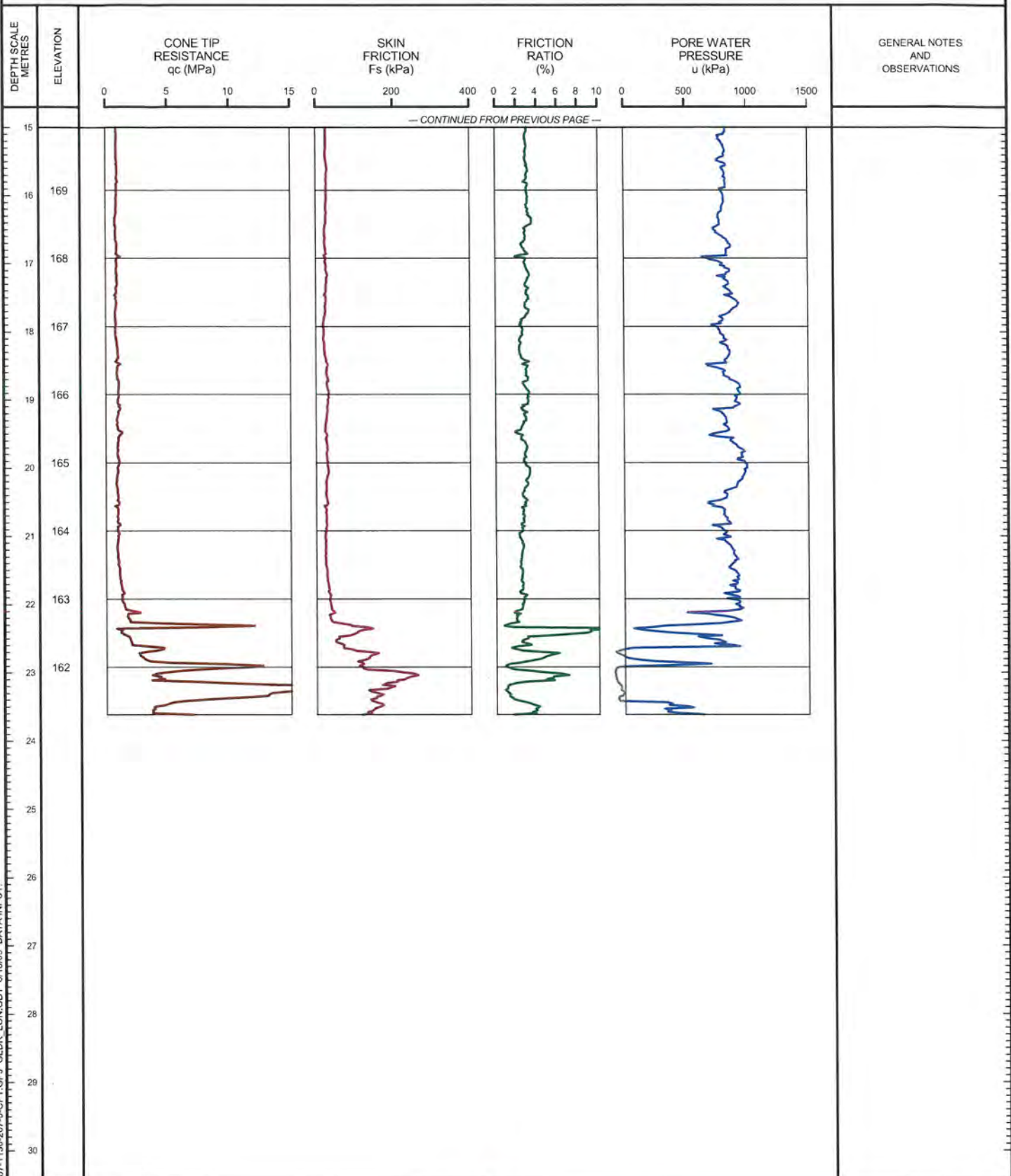
SHEET 2 OF 2

LOCATION: N 4678351.4 ; E 334347.6

TEST DATE: September 9, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.66m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *JSB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-114**

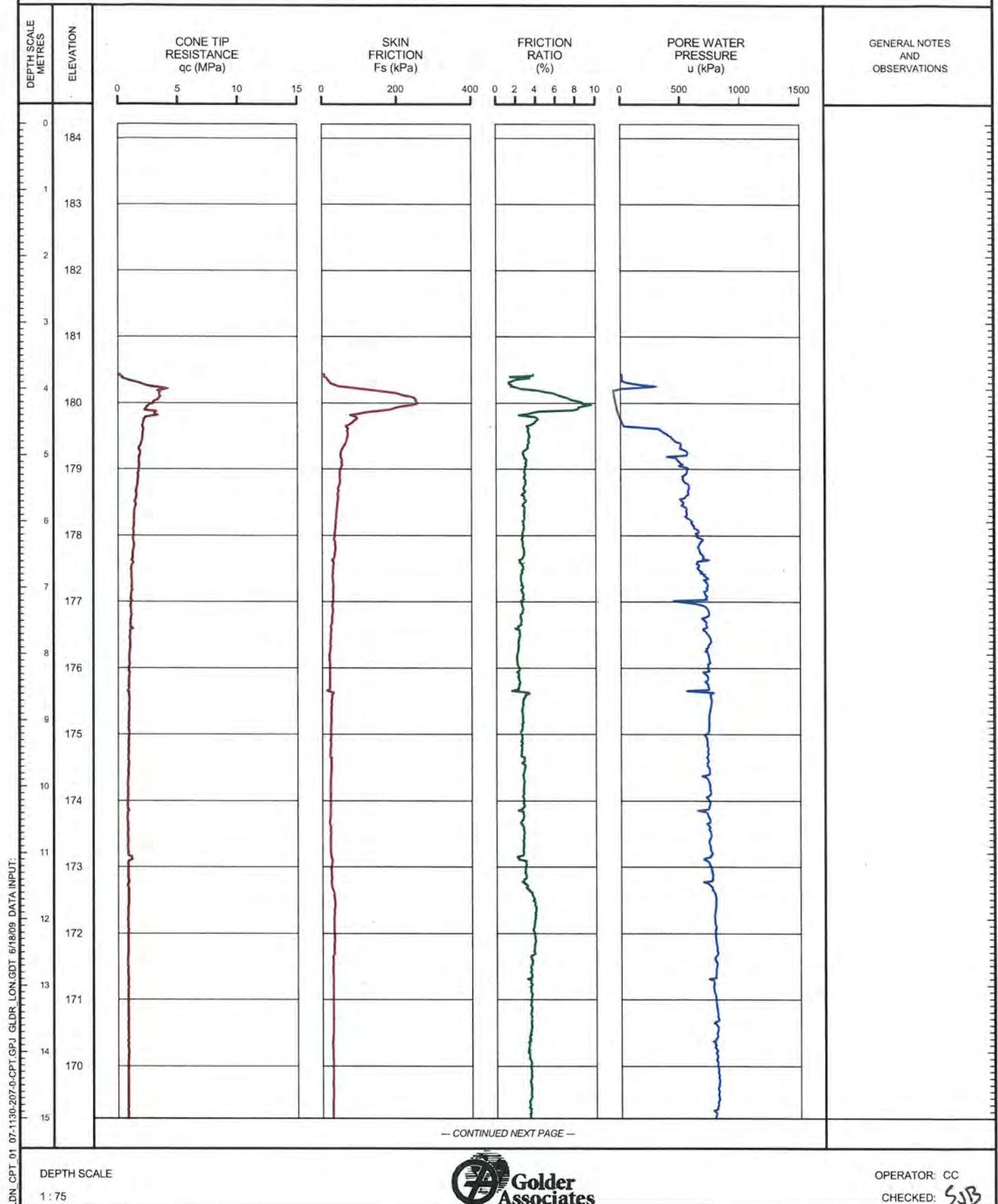
SHEET 1 OF 2

LOCATION: N 4678526.7 ,E 334018.6

TEST DATE: September 10, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.80m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-114**

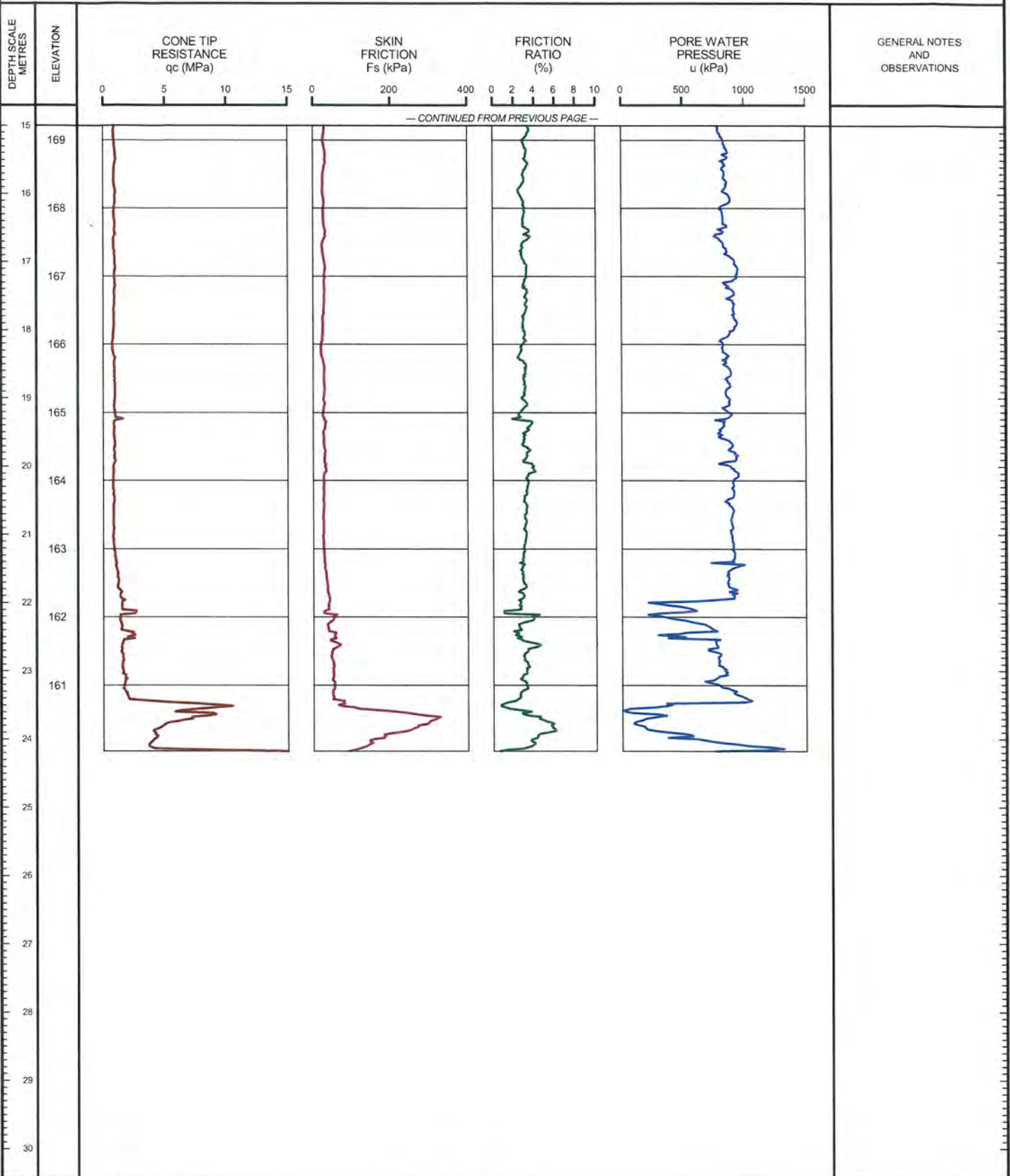
SHEET 2 OF 2

LOCATION: N 4678526.7 ;E 334018.6

TEST DATE: September 10, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.80m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SJB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-117**

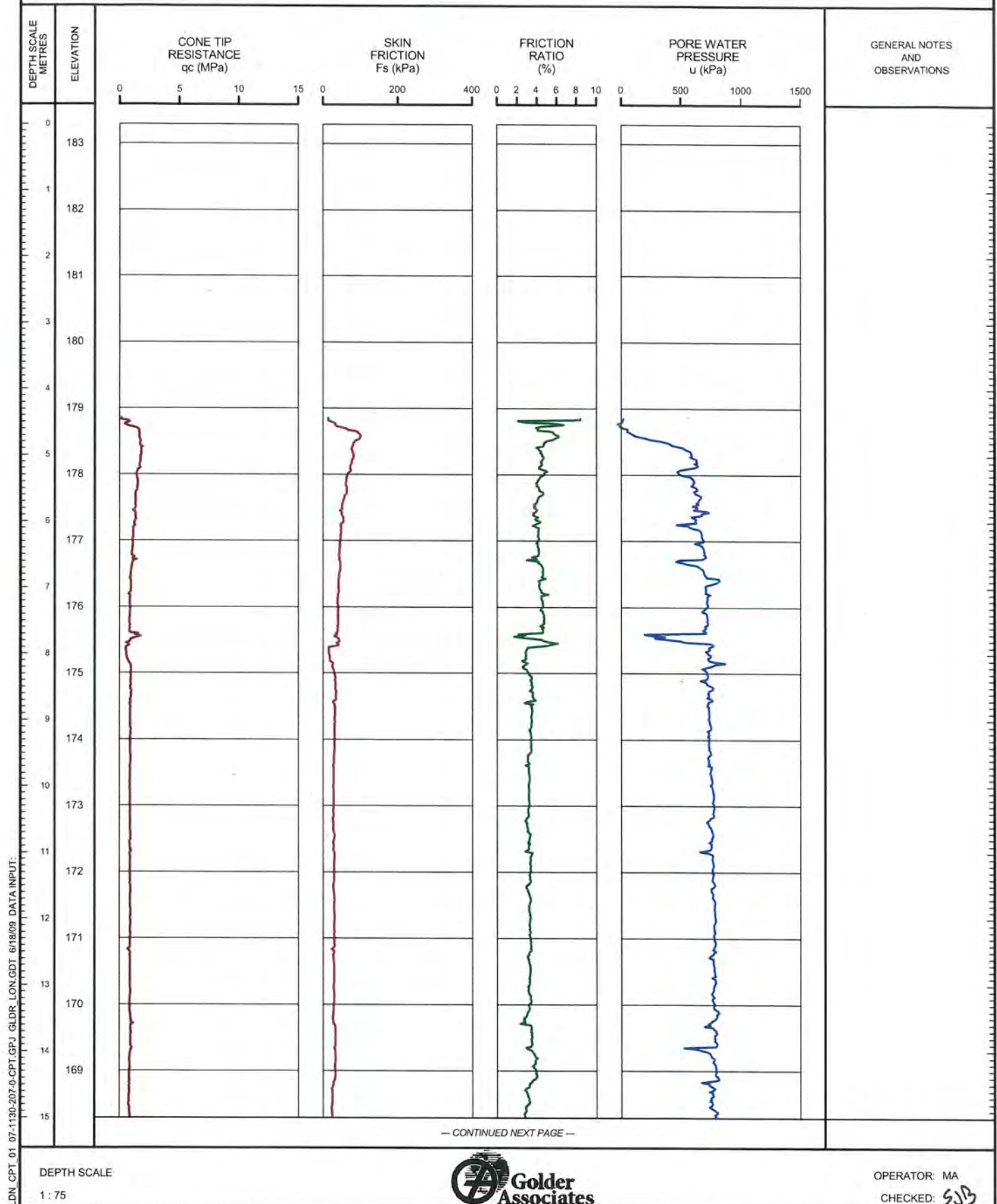
SHEET 1 OF 2

LOCATION: N 4678744.1 ; E 333601.5

TEST DATE: March 27, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 4.45m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/19/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-117**

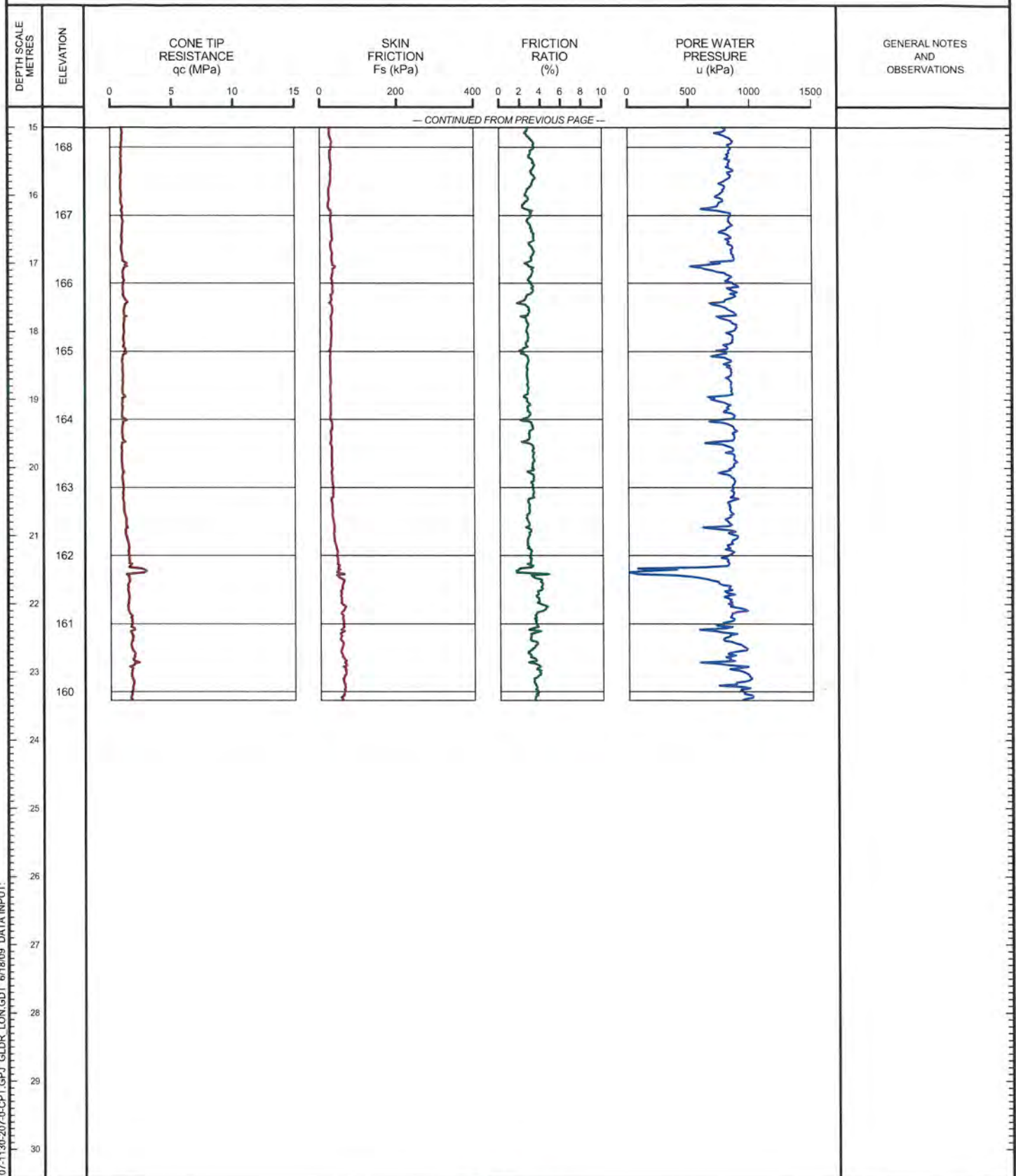
SHEET 2 OF 2

LOCATION: N 4678744.1 ; E 333601.5

TEST DATE: March 27, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 4.45m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: MA

CHECKED: *SJB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-120**

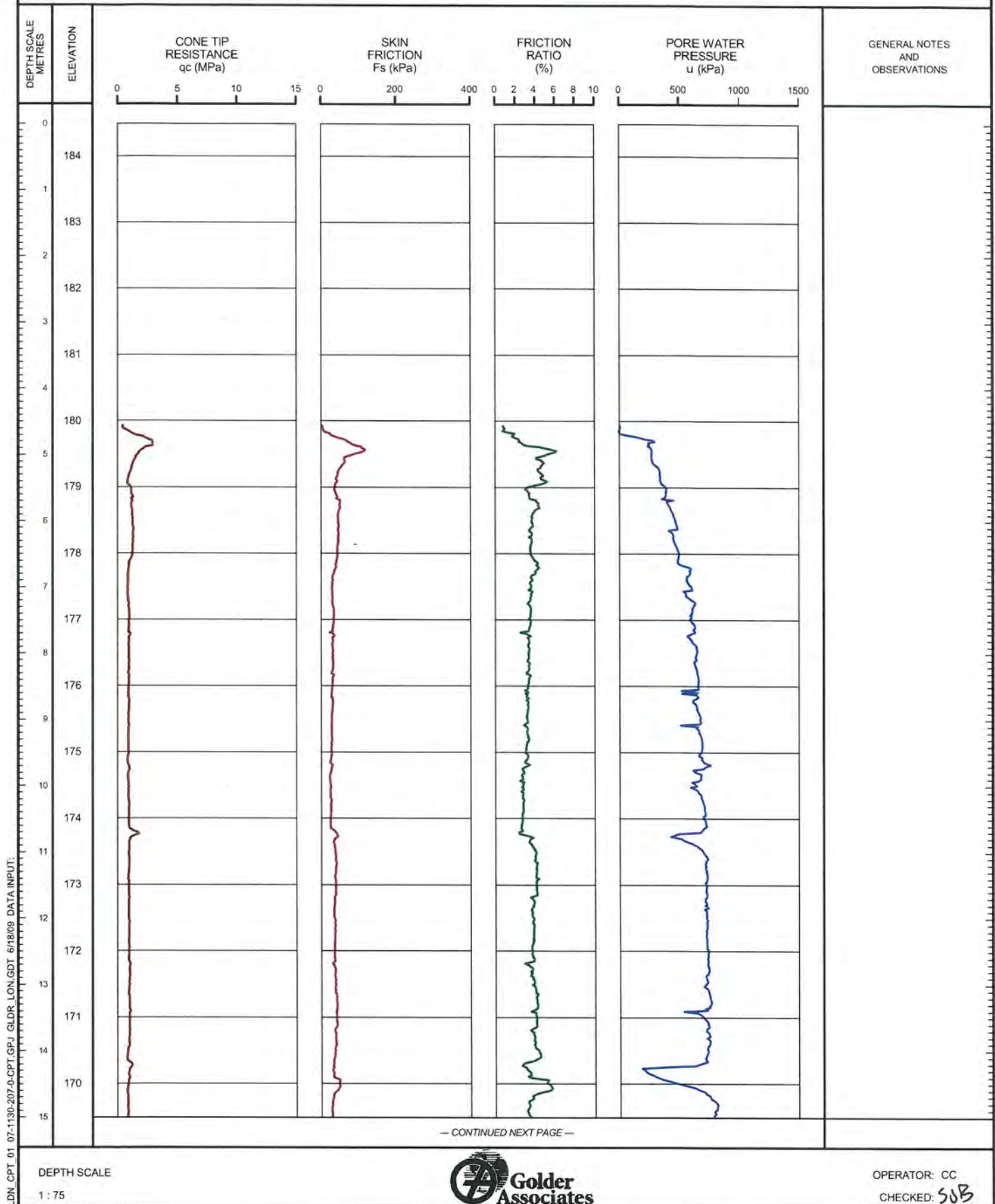
SHEET 1 OF 2

LOCATION: N 4678947.2 :E 333029.8

TEST DATE: September 8, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 4.57m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-120**

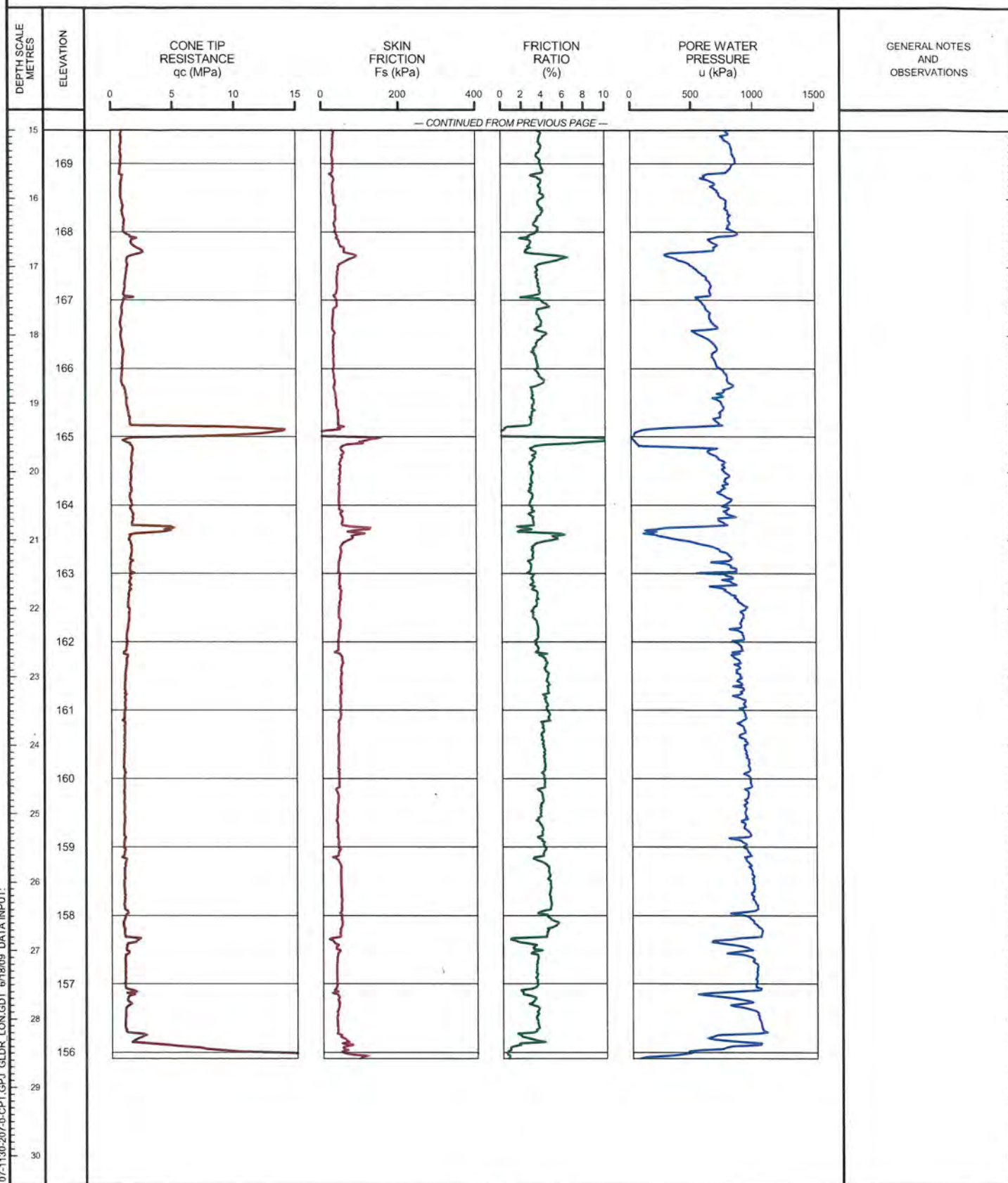
SHEET 2 OF 2

LOCATION: N 4678947.2 ; E 333029.8

TEST DATE: September 8, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 4.57m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SJB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-121**

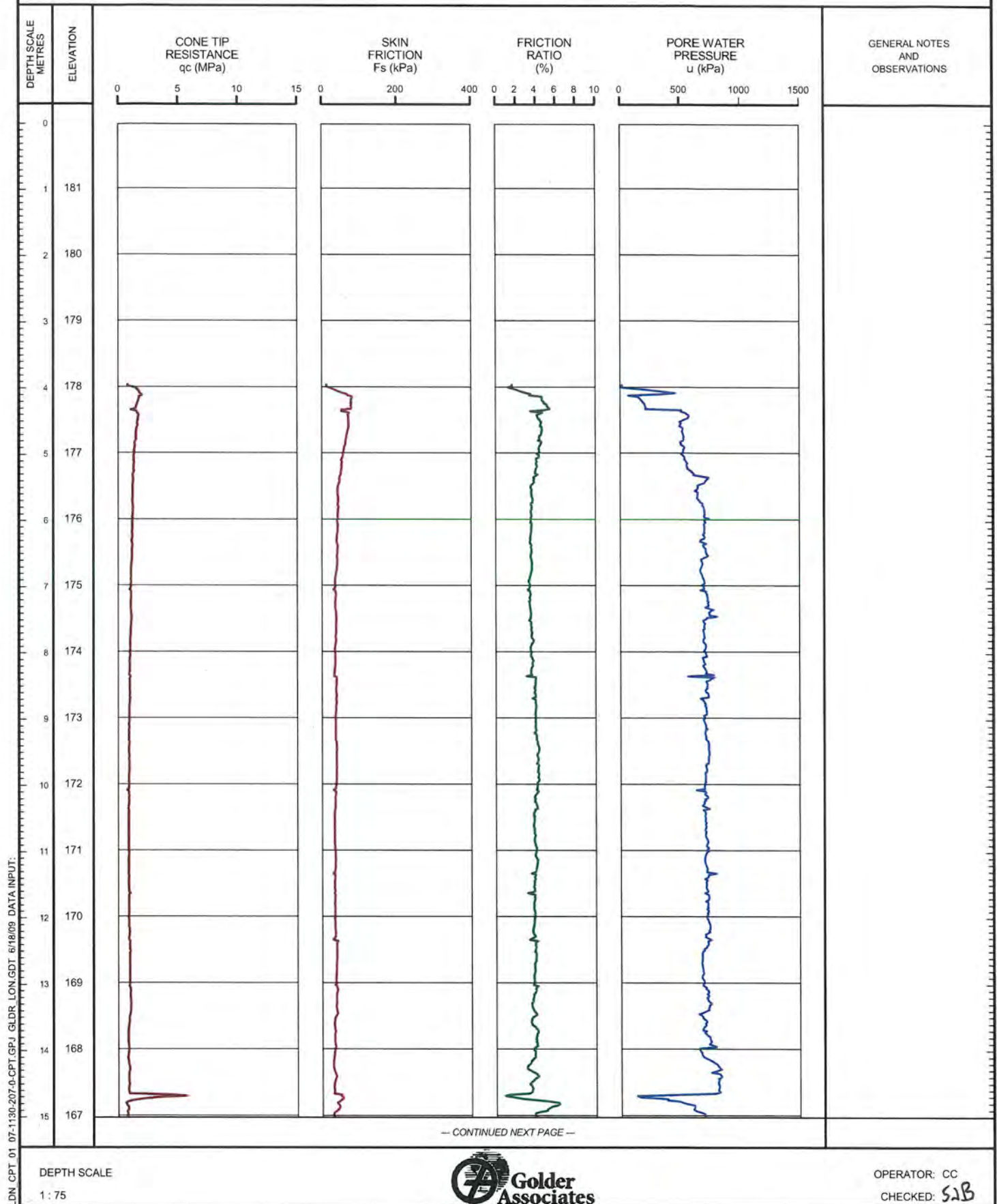
SHEET 1 OF 3

LOCATION: N 4679024.8 :E 333077.4

TEST DATE: September 10, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.96m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-121**

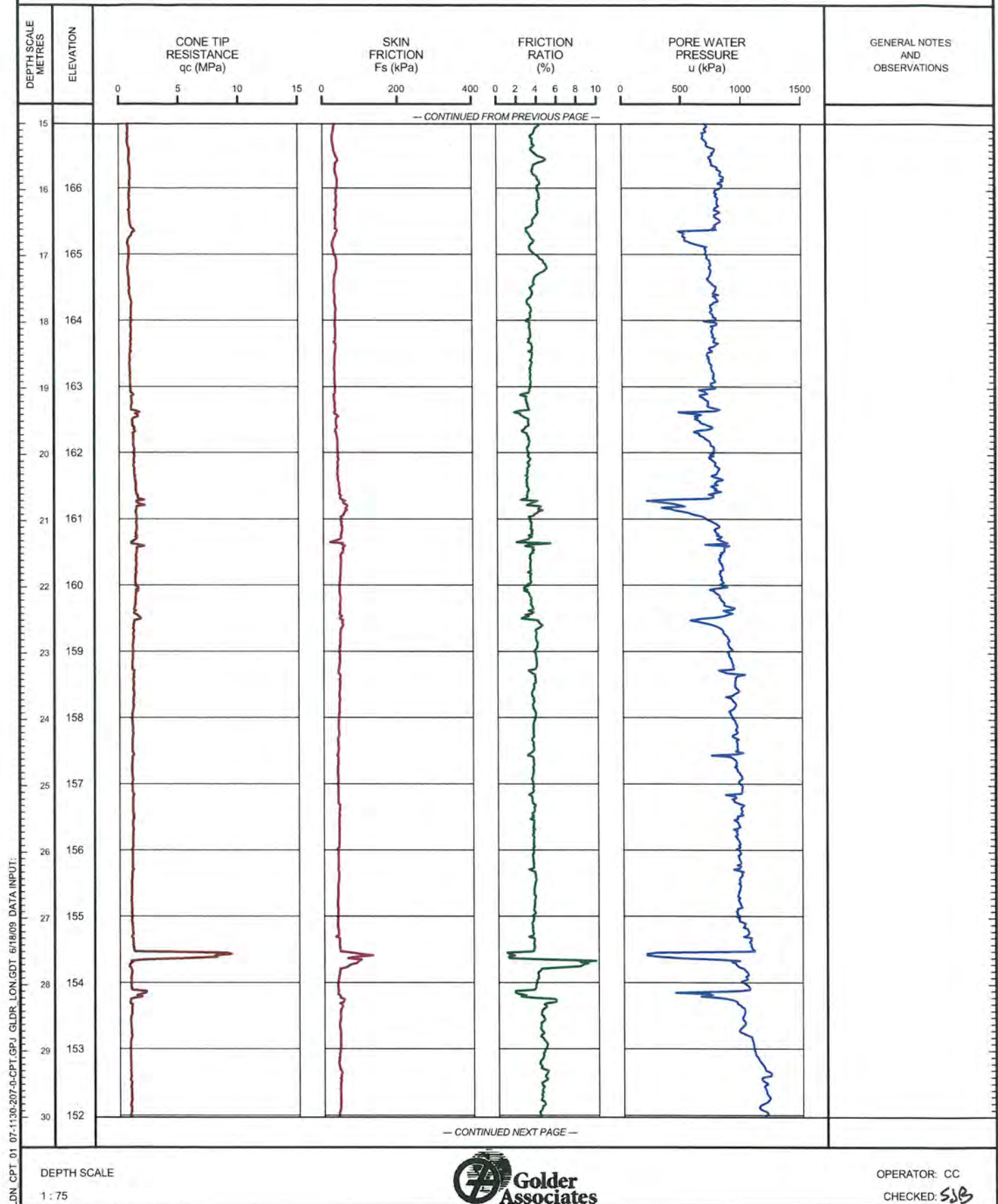
SHEET 2 OF 3

LOCATION: N 4679024.8 :E 333077.4

TEST DATE: September 10, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.96m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/19/09 DATA INPUT:

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-121

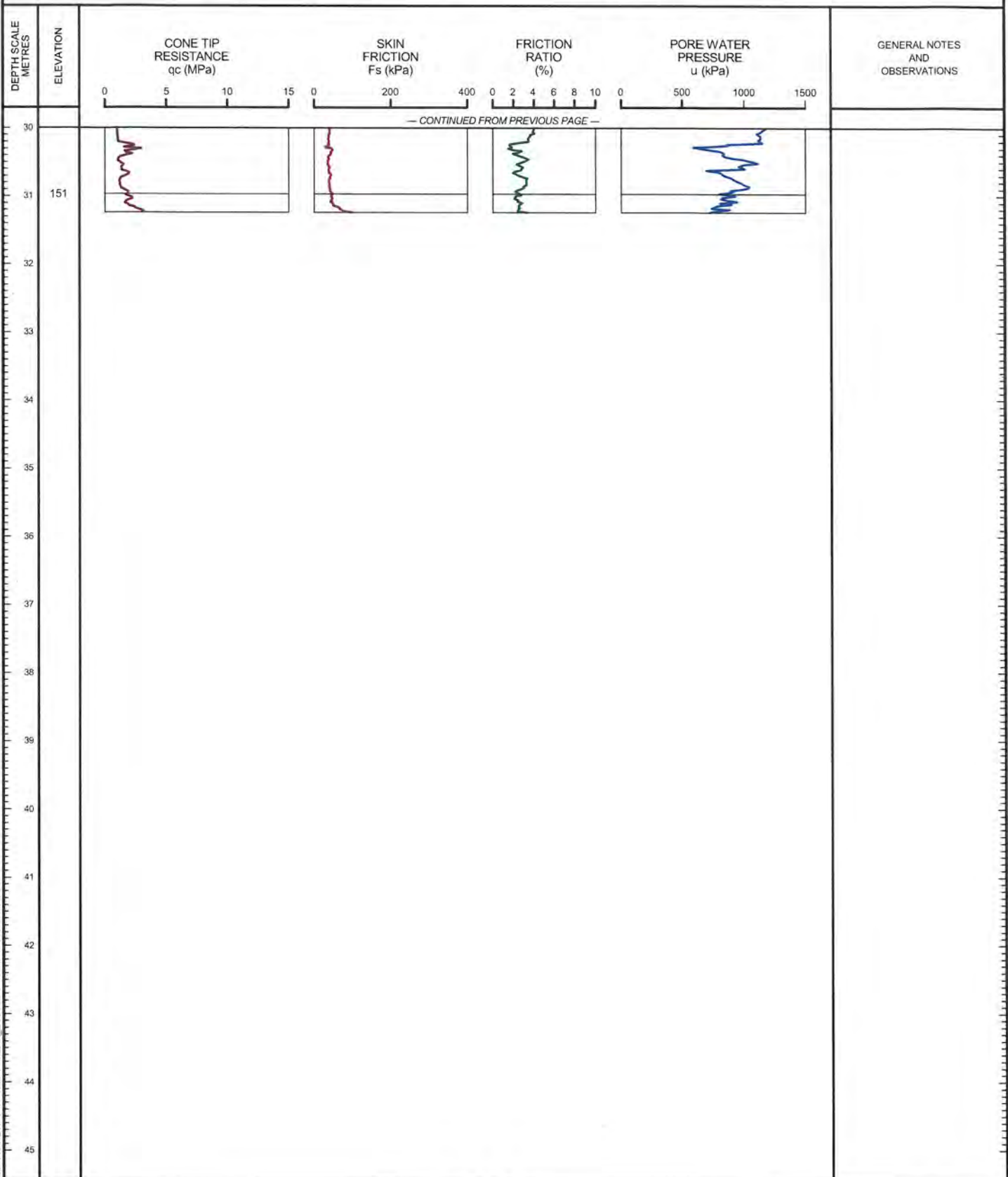
SHEET 3 OF 3

LOCATION: N 4679024.8 :E 333077.4

TEST DATE: September 10, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 3.96m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SJB*



PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-123

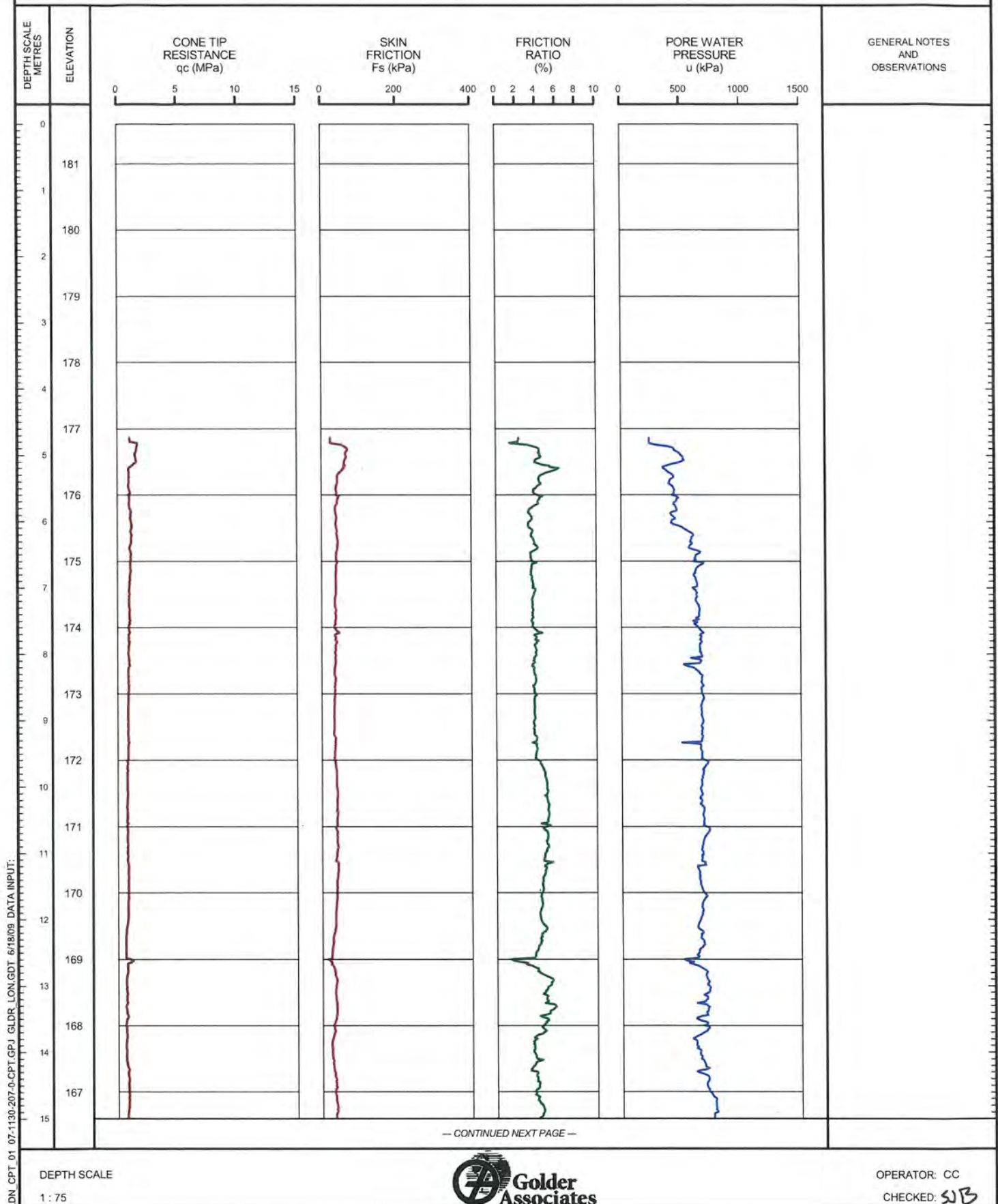
SHEET 1 OF 2

LOCATION: N 4679309.7 ; E 332536.3

TEST DATE: September 29, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 4.75m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-123**

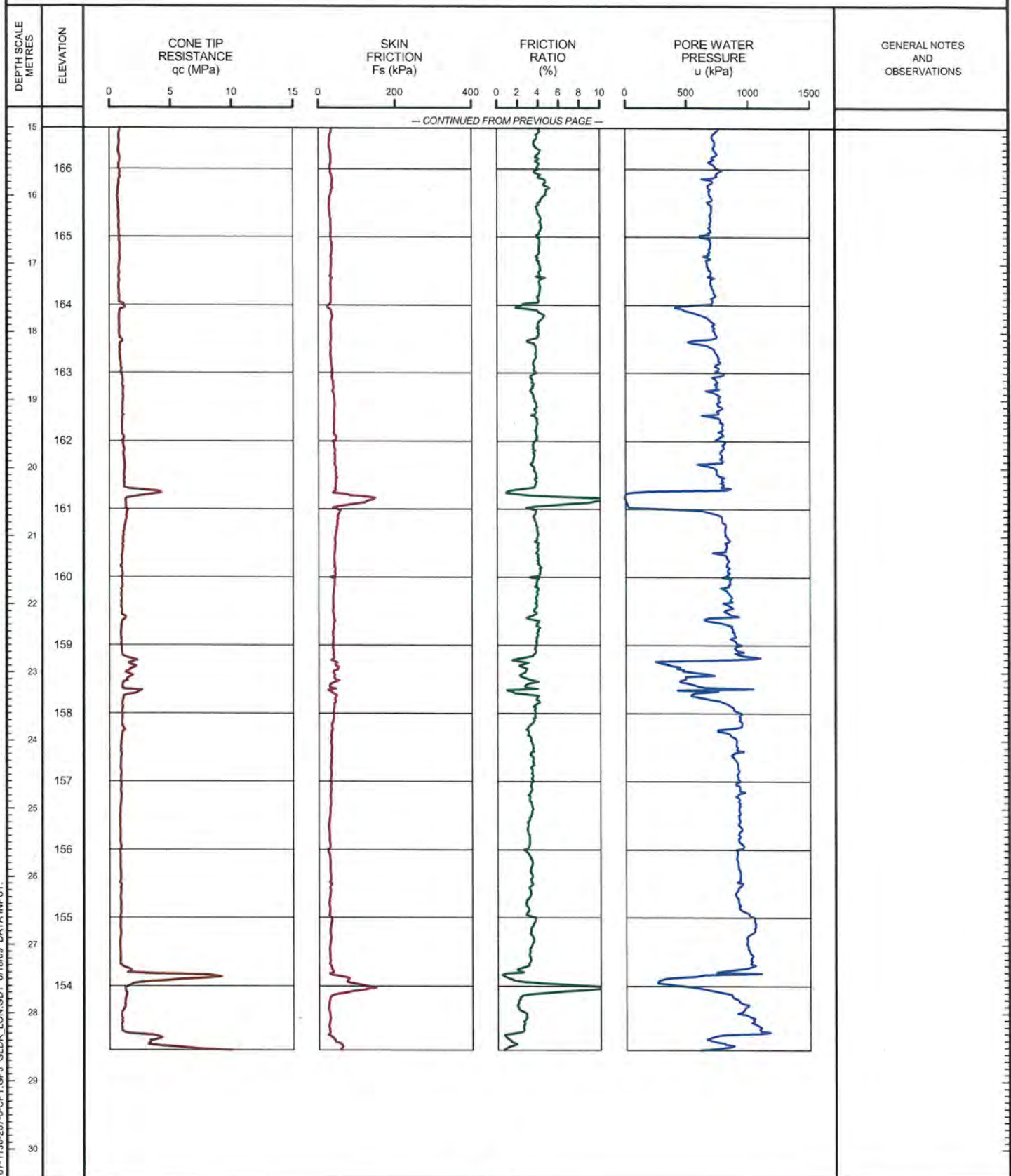
SHEET 2 OF 2

LOCATION: N 4679309.7 ; E 332536.3

TEST DATE: September 29, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 4.75m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-124**

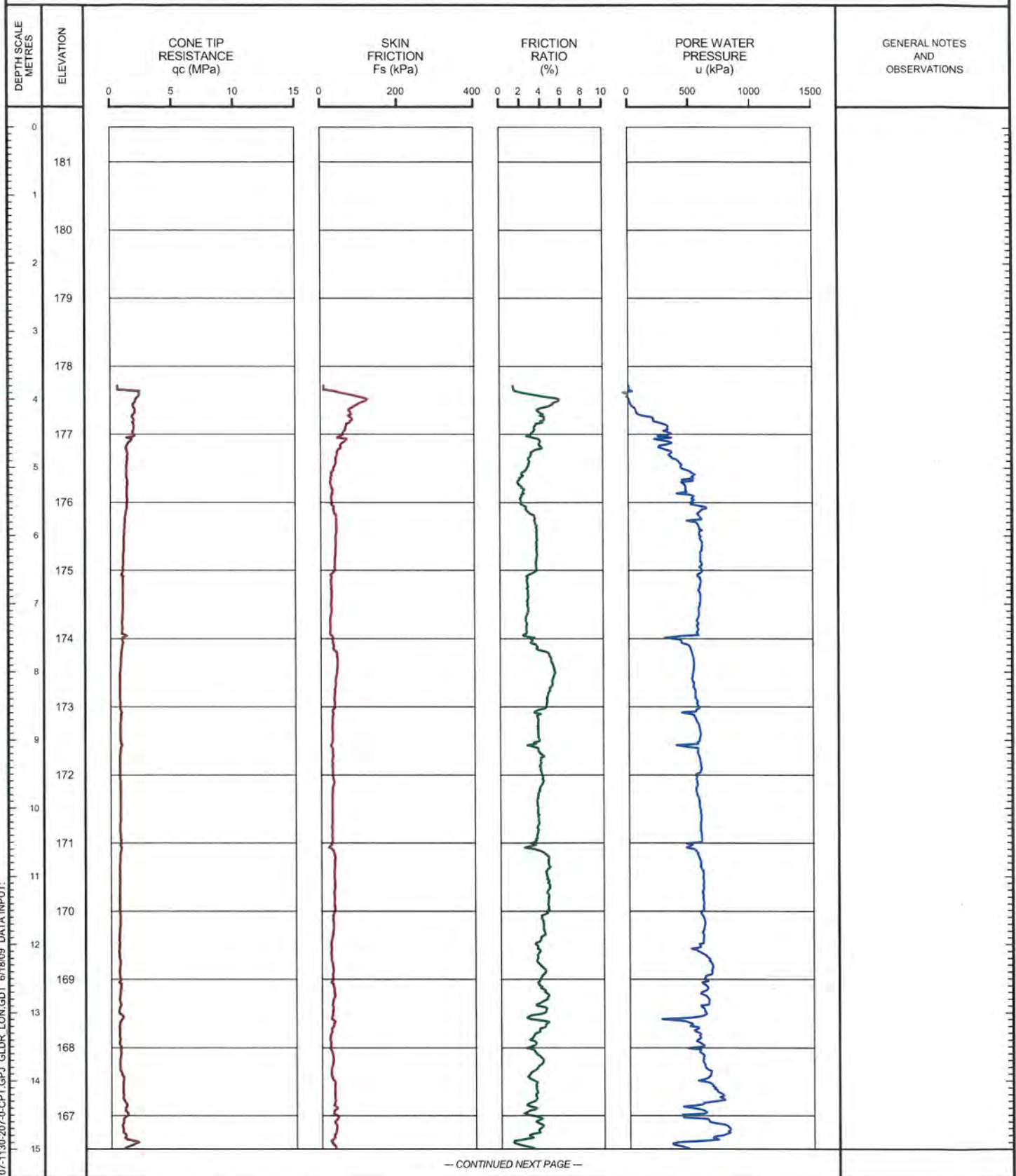
SHEET 1 OF 2

LOCATION: N 4679354.6 :E 332455.0

TEST DATE: September 29, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.81m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-124**

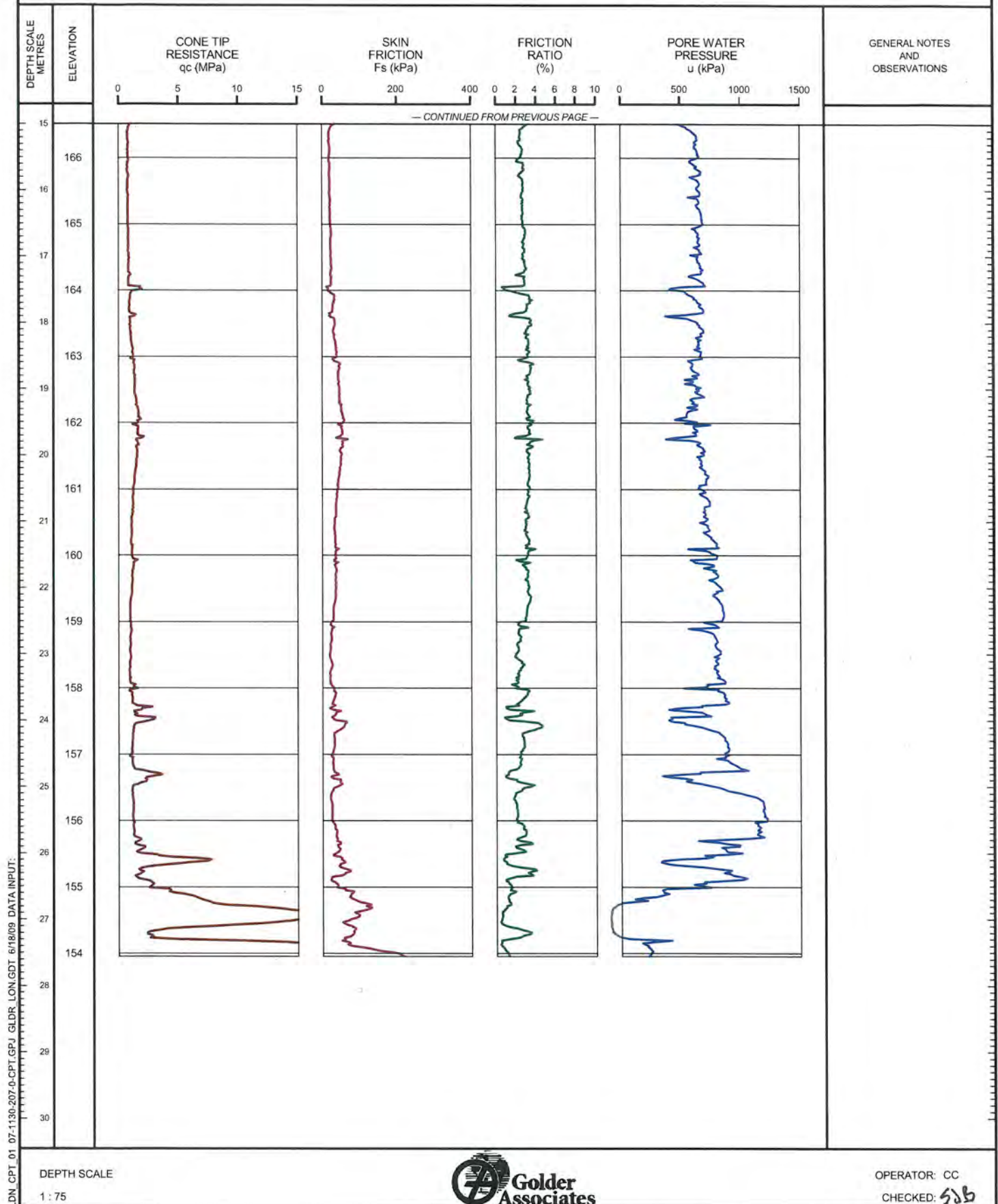
SHEET 2 OF 2

LOCATION: N 4679354.6 :E 332455.0

TEST DATE: September 29, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.81m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-128**

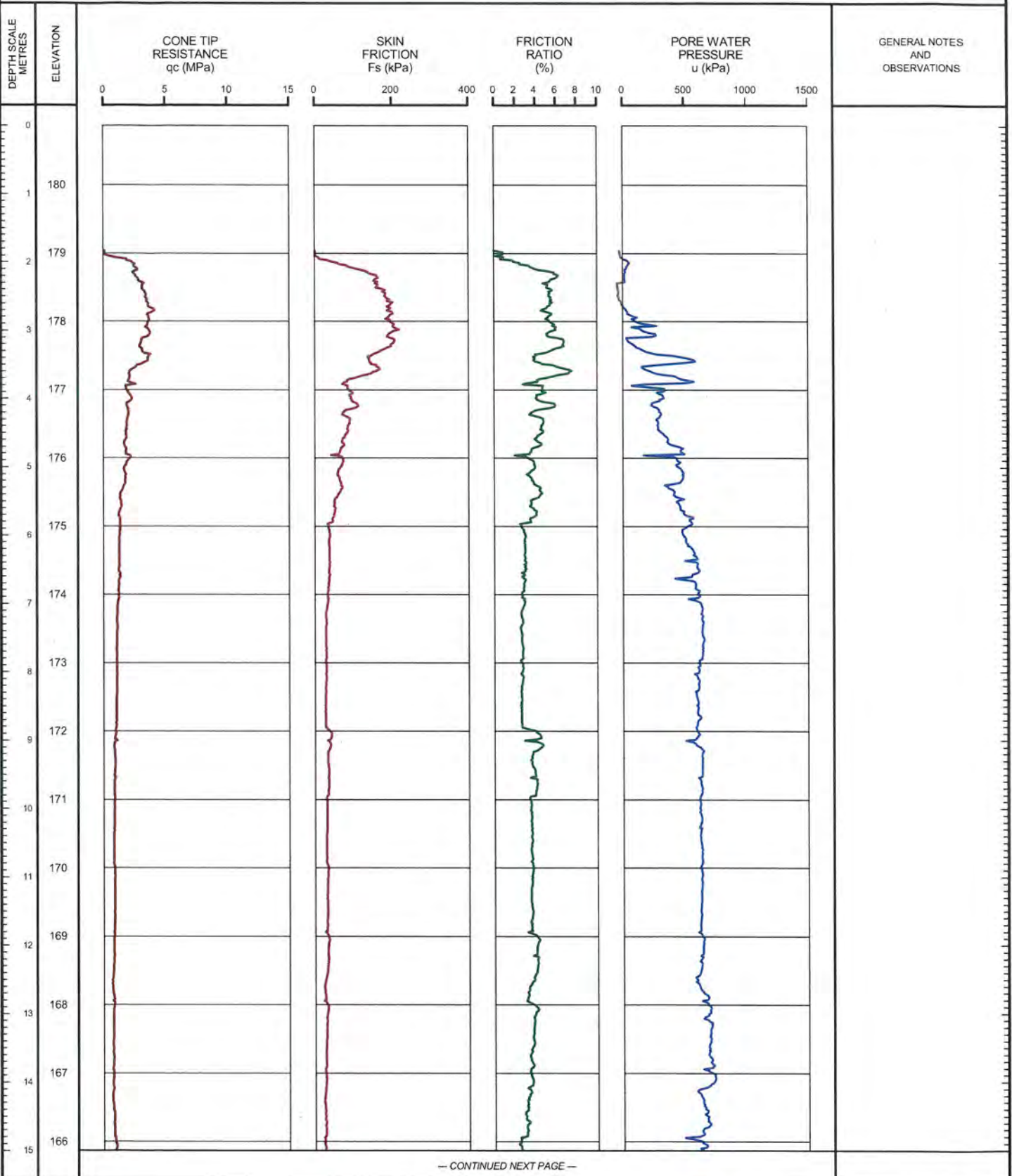
SHEET 1 OF 3

LOCATION: N 4679490.6 E 332200.8

TEST DATE: September 5, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.83m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-128**

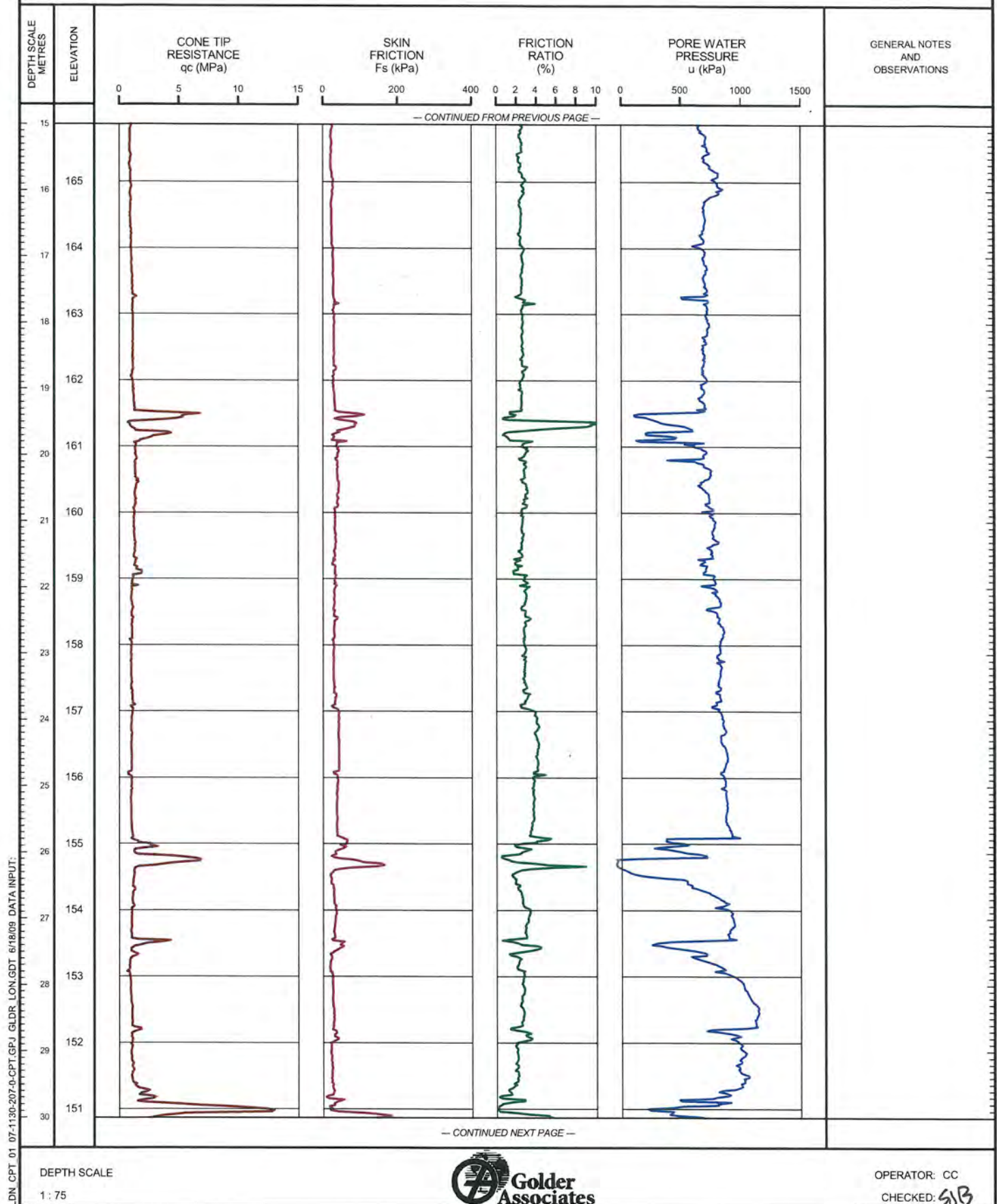
SHEET 2 OF 3

LOCATION: N 4679490.6 ; E 332200.8

TEST DATE: September 5, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.83m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-128

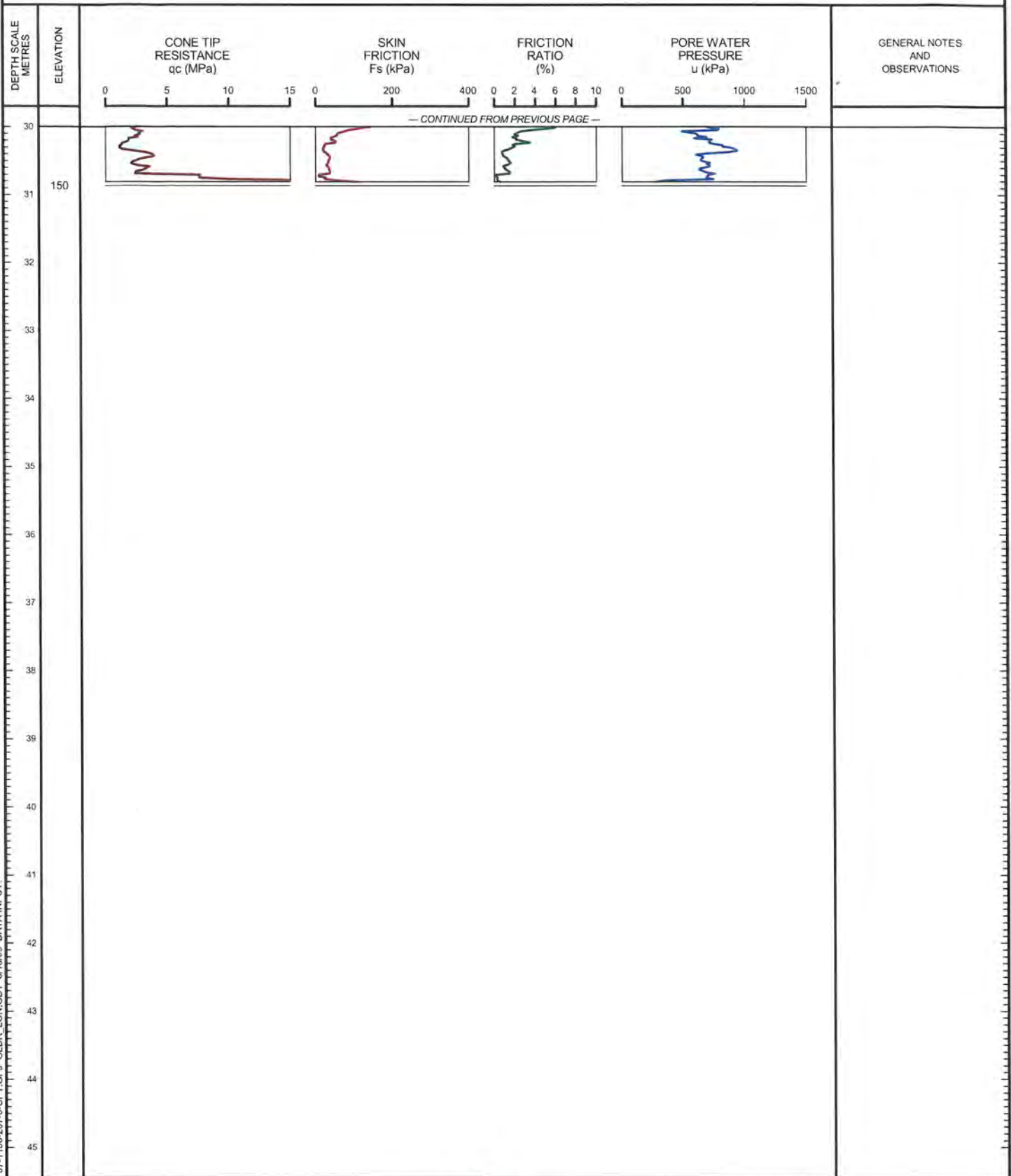
SHEET 3 OF 3

LOCATION: N 4679490.6 E 332200.8

TEST DATE: September 5, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.83m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT\_01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SSB

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-130**

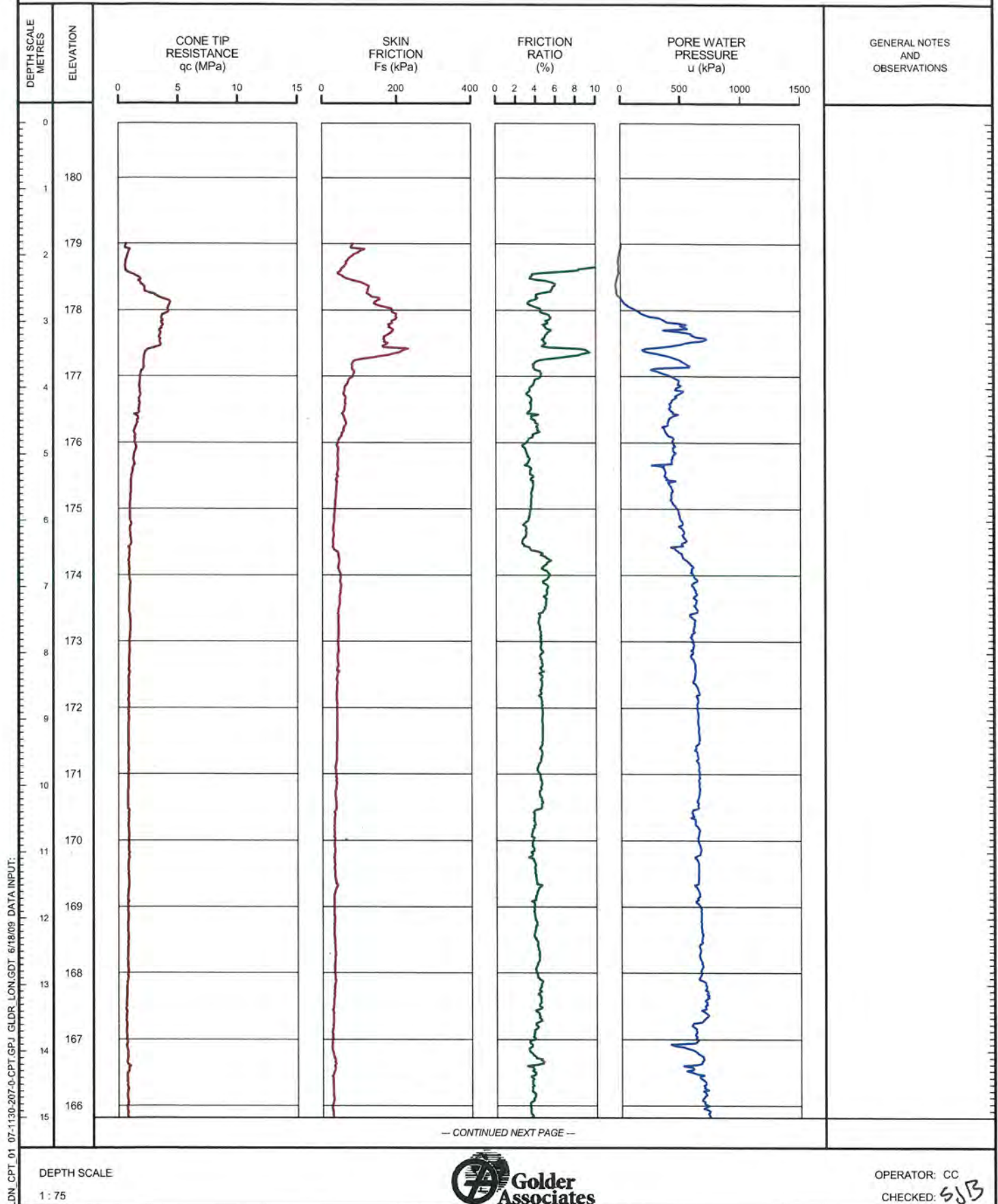
SHEET 1 OF 3

LOCATION: N 4679821.8 :E 332036.1

TEST DATE: September 4, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.83m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013





PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-130**

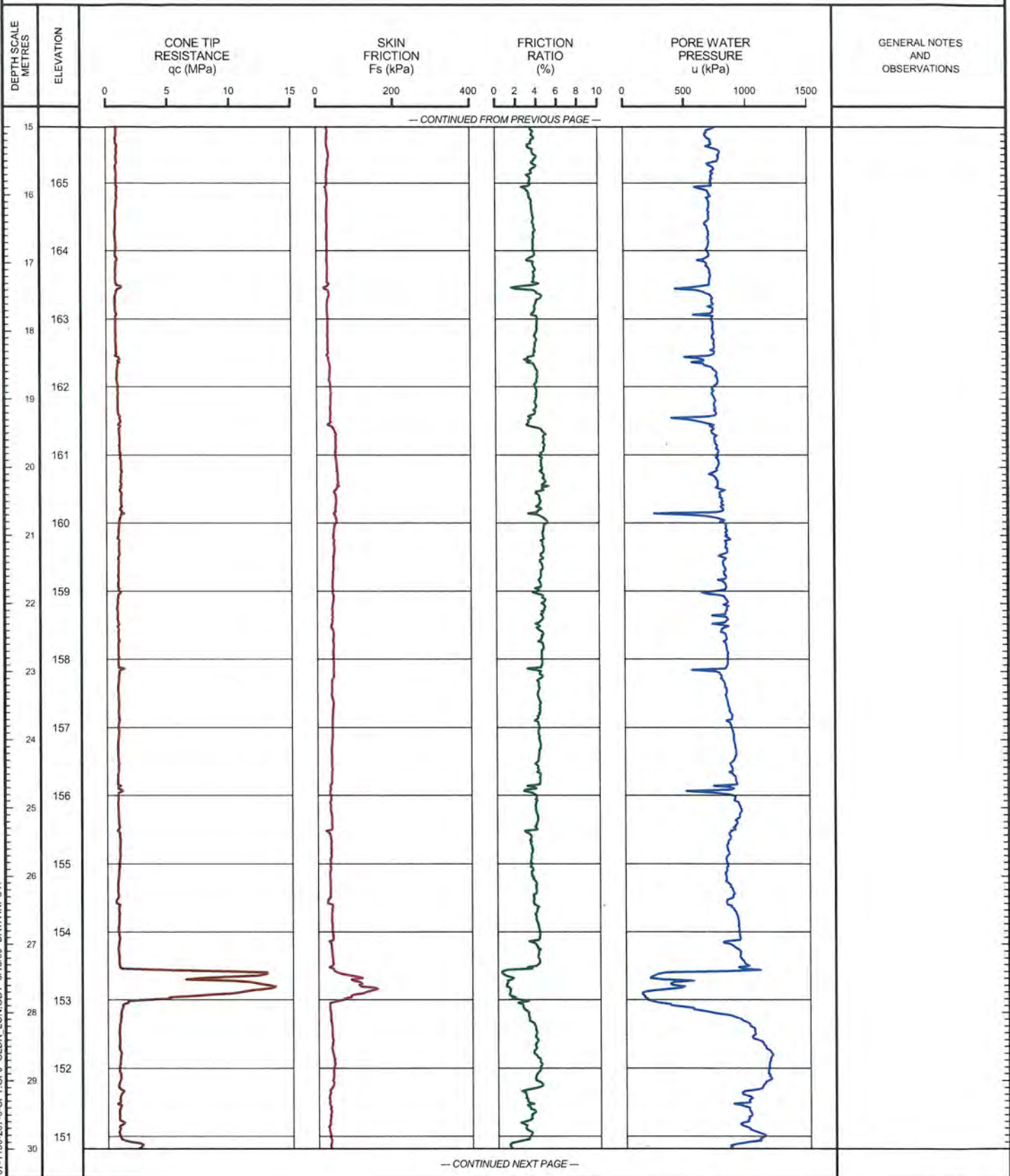
SHEET 2 OF 3

LOCATION: N 4679821.8 ; E 332036.1

TEST DATE: September 4, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.83m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-130**

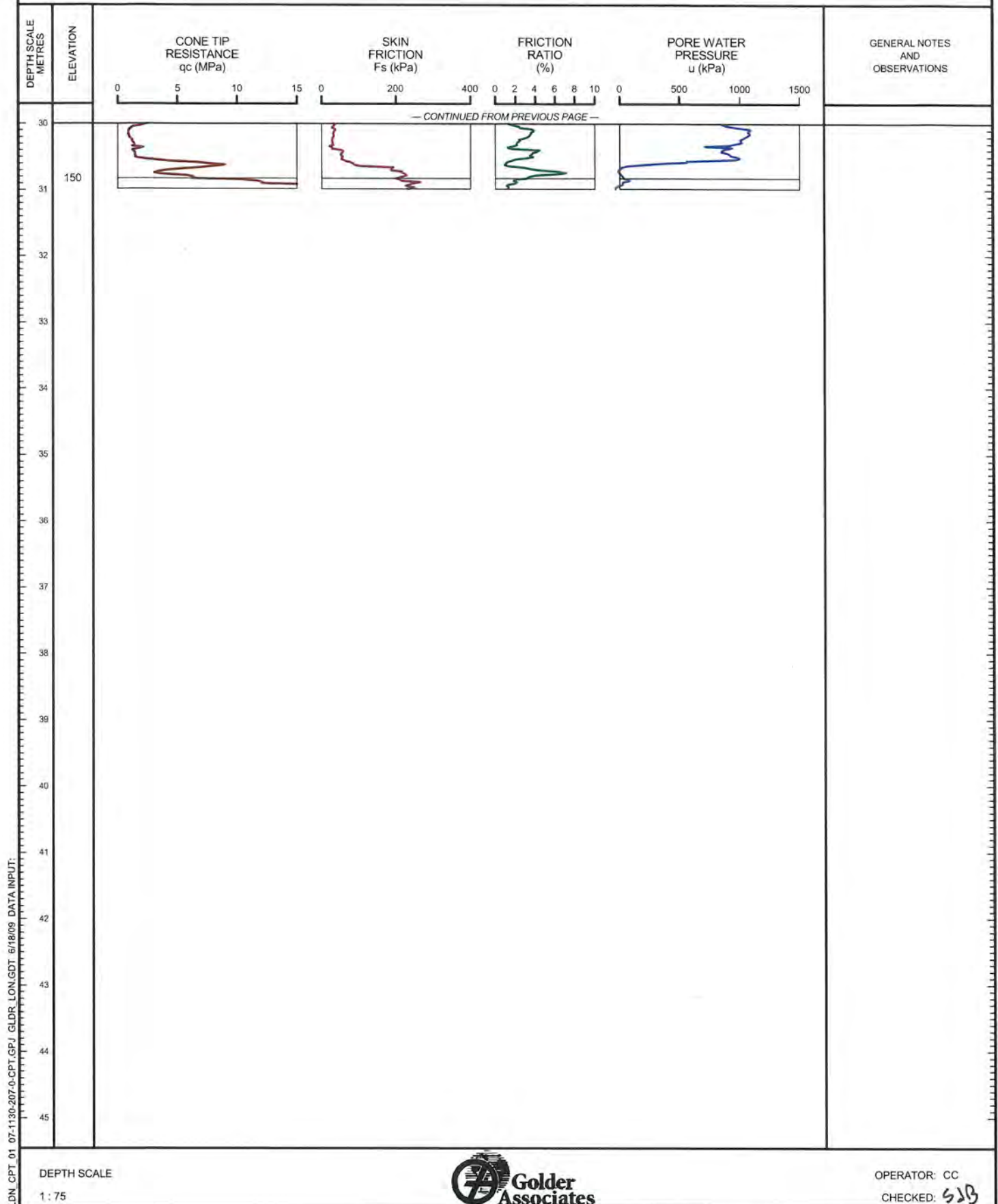
SHEET 3 OF 3

LOCATION: N 4679821.8 :E 332036.1

TEST DATE: September 4, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.83m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013





PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-133**

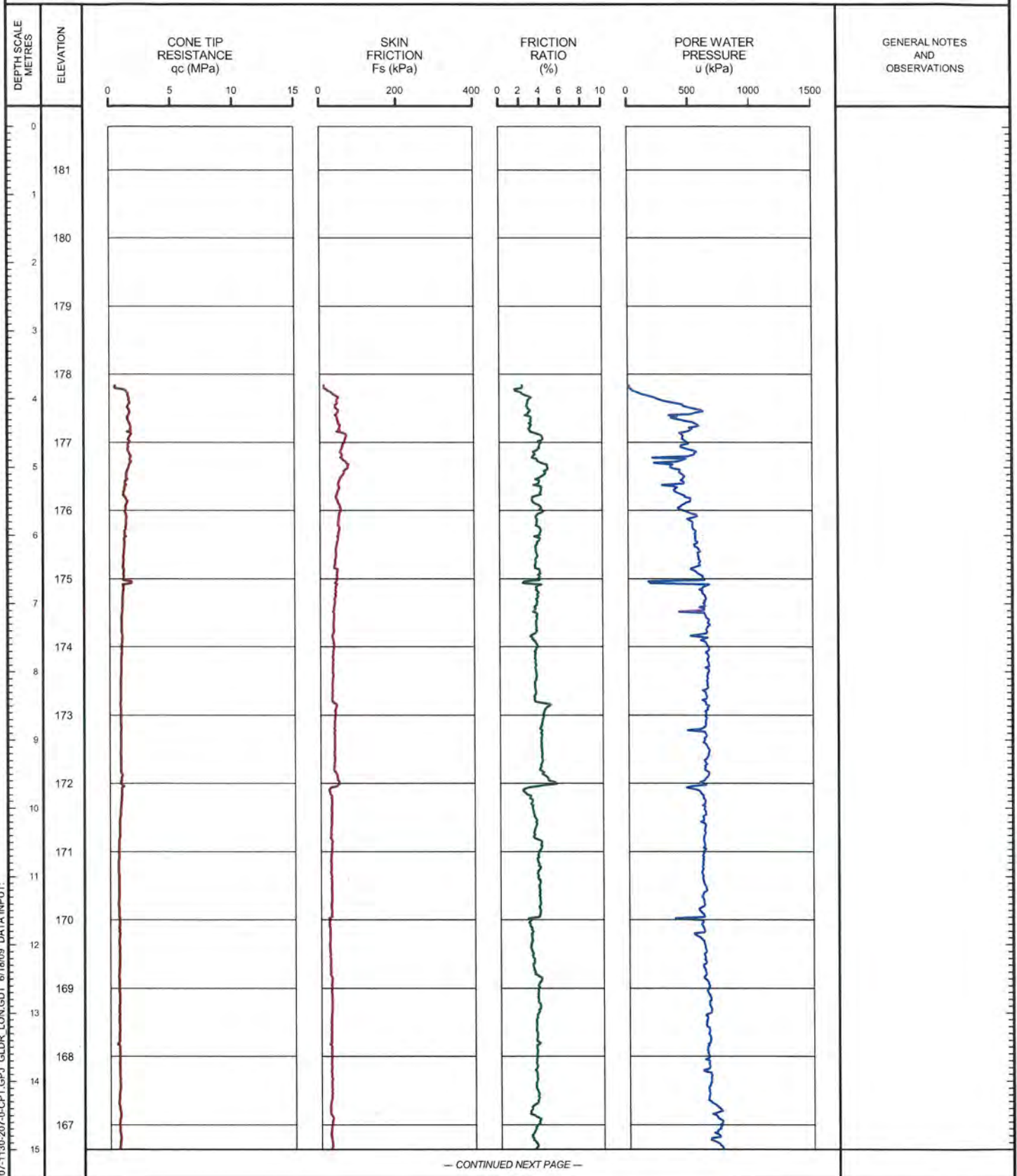
SHEET 1 OF 3

LOCATION: N 4680184.7 ; E 331953.4

TEST DATE: September 30, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.81m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-133

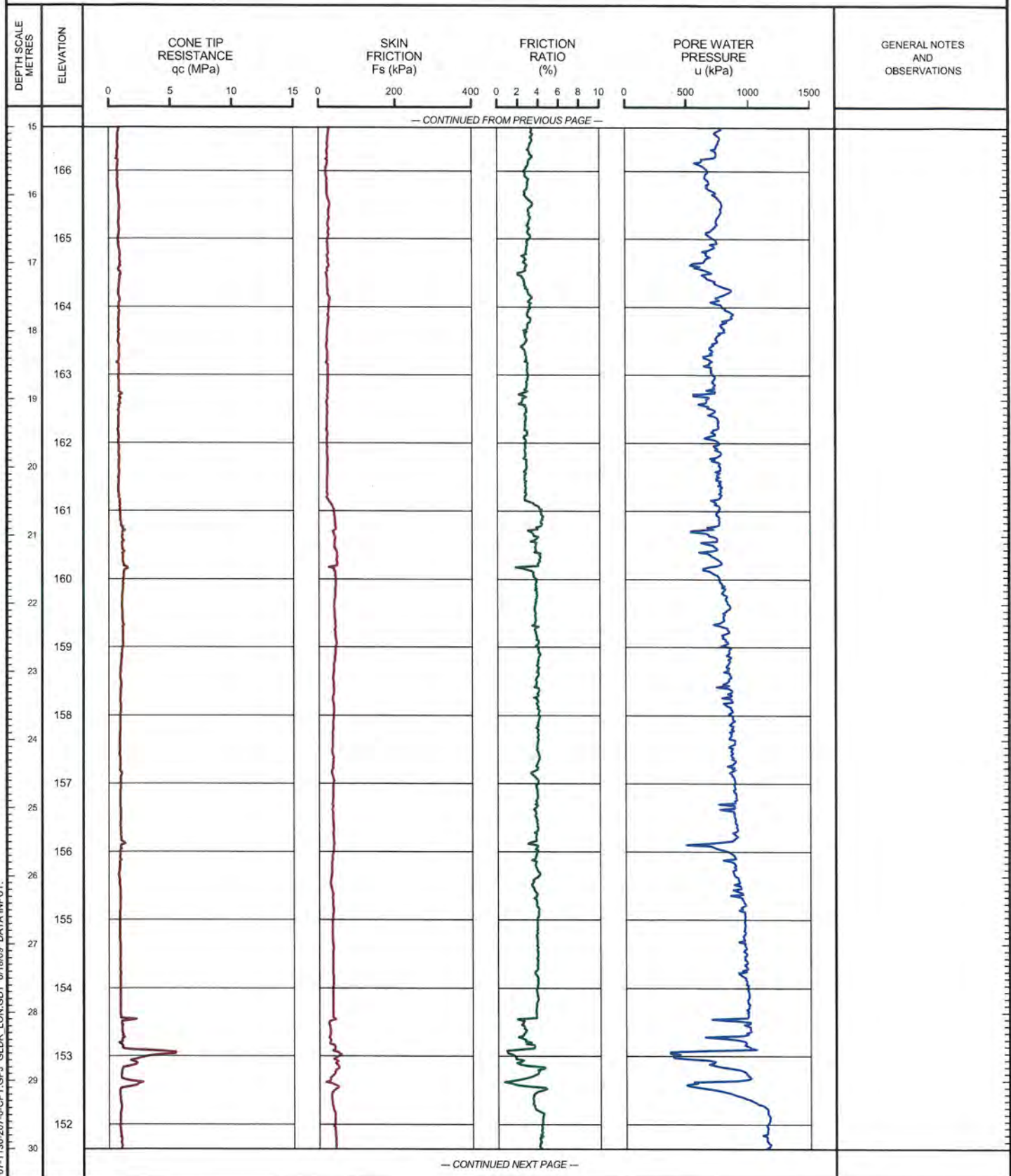
SHEET 2 OF 3

LOCATION: N 4680184.7 ; E 331953.4

TEST DATE: September 30, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.81m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SSB

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-133**

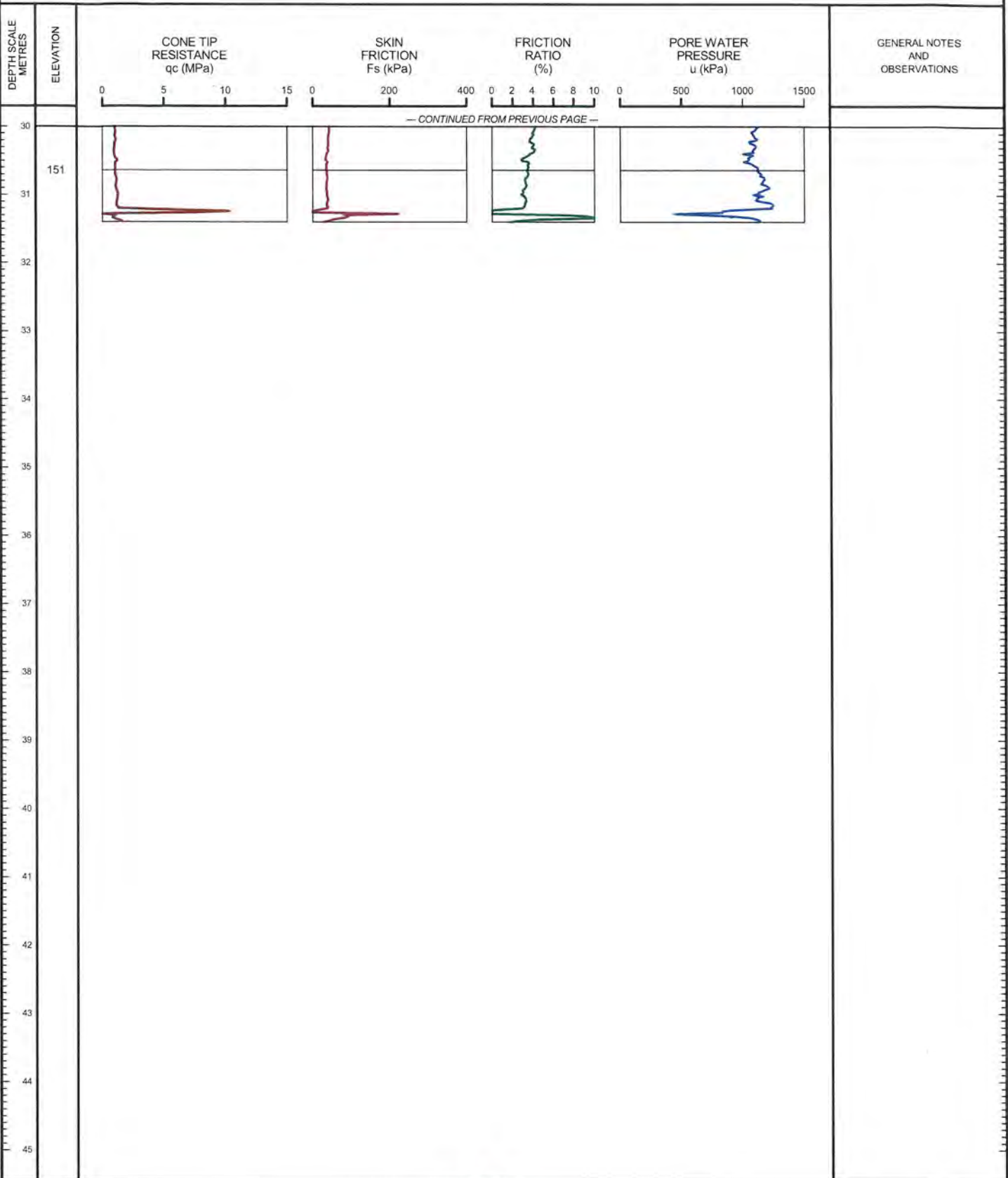
SHEET 3 OF 3

LOCATION: N 4680184.7 E 331953.4

TEST DATE: September 30, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 3.81m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SSB



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-134**

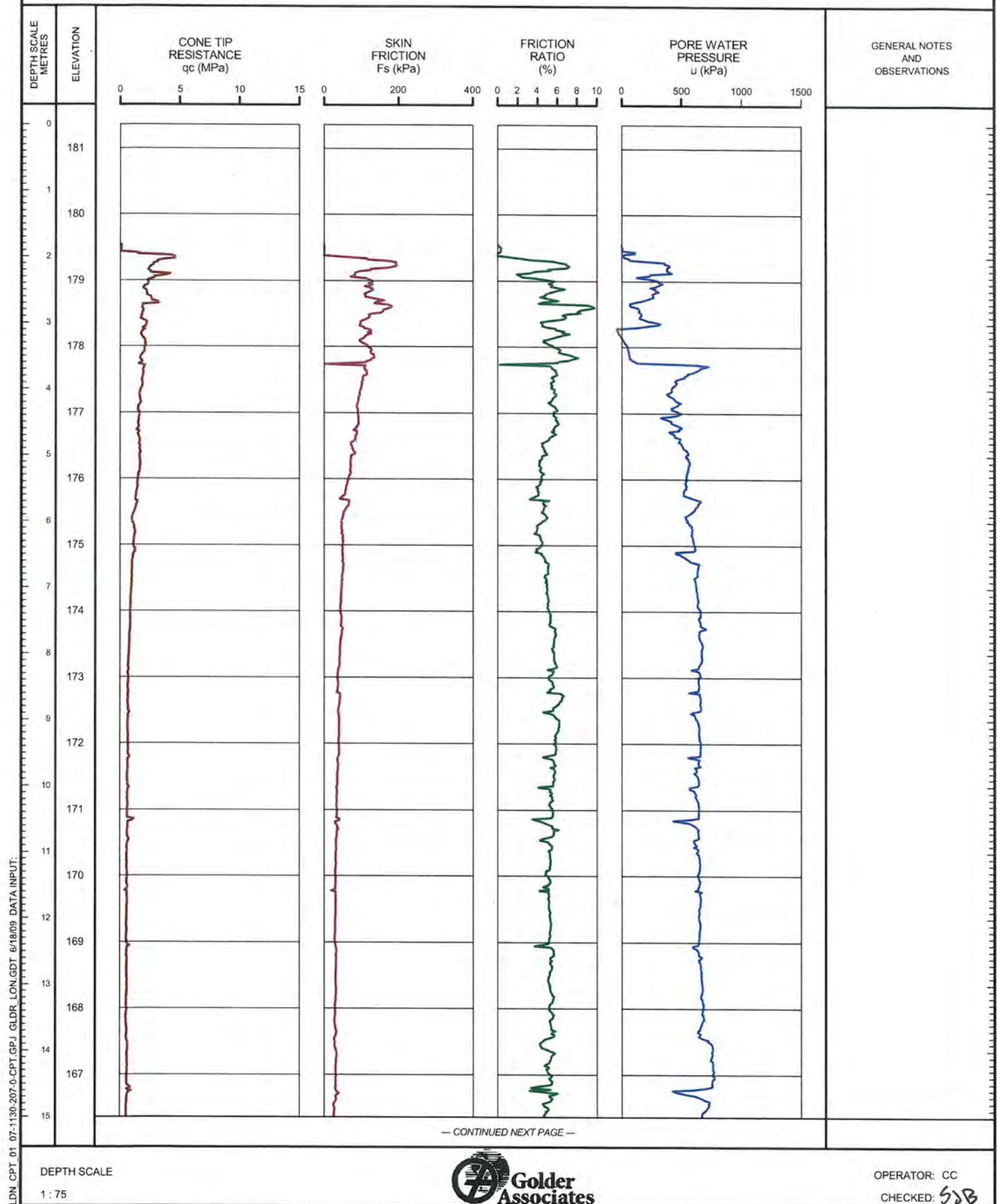
SHEET 1 OF 2

LOCATION: N 4680151.4 :E 331888.7

TEST DATE: September 4, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.83m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-134**

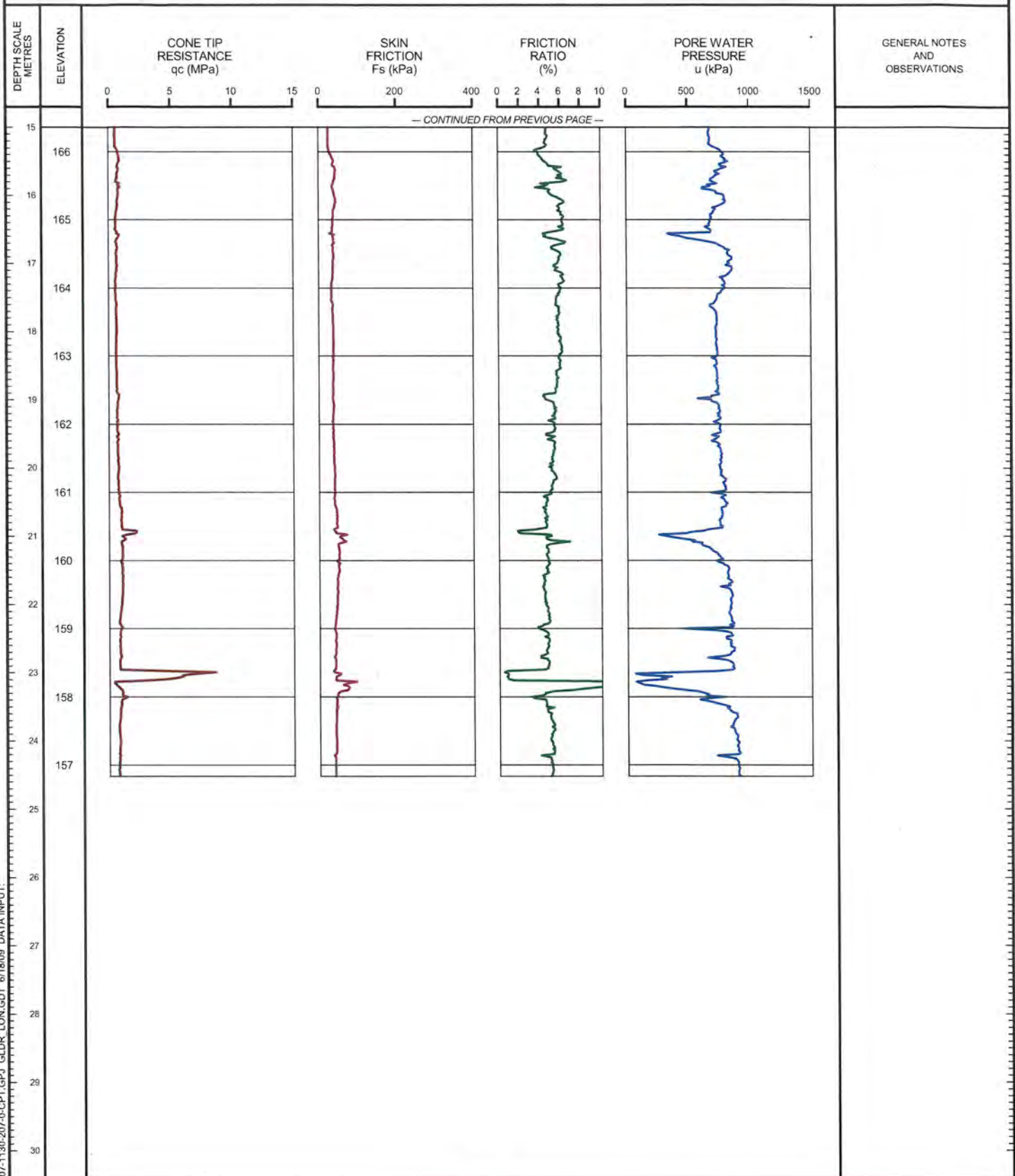
SHEET 2 OF 2

LOCATION: N 4680151.4 ;E 331888.7

TEST DATE: September 4, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.83m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB



PROJECT: 07-1130-207-0

# RECORD OF CONE PENETRATION TEST CPT-137

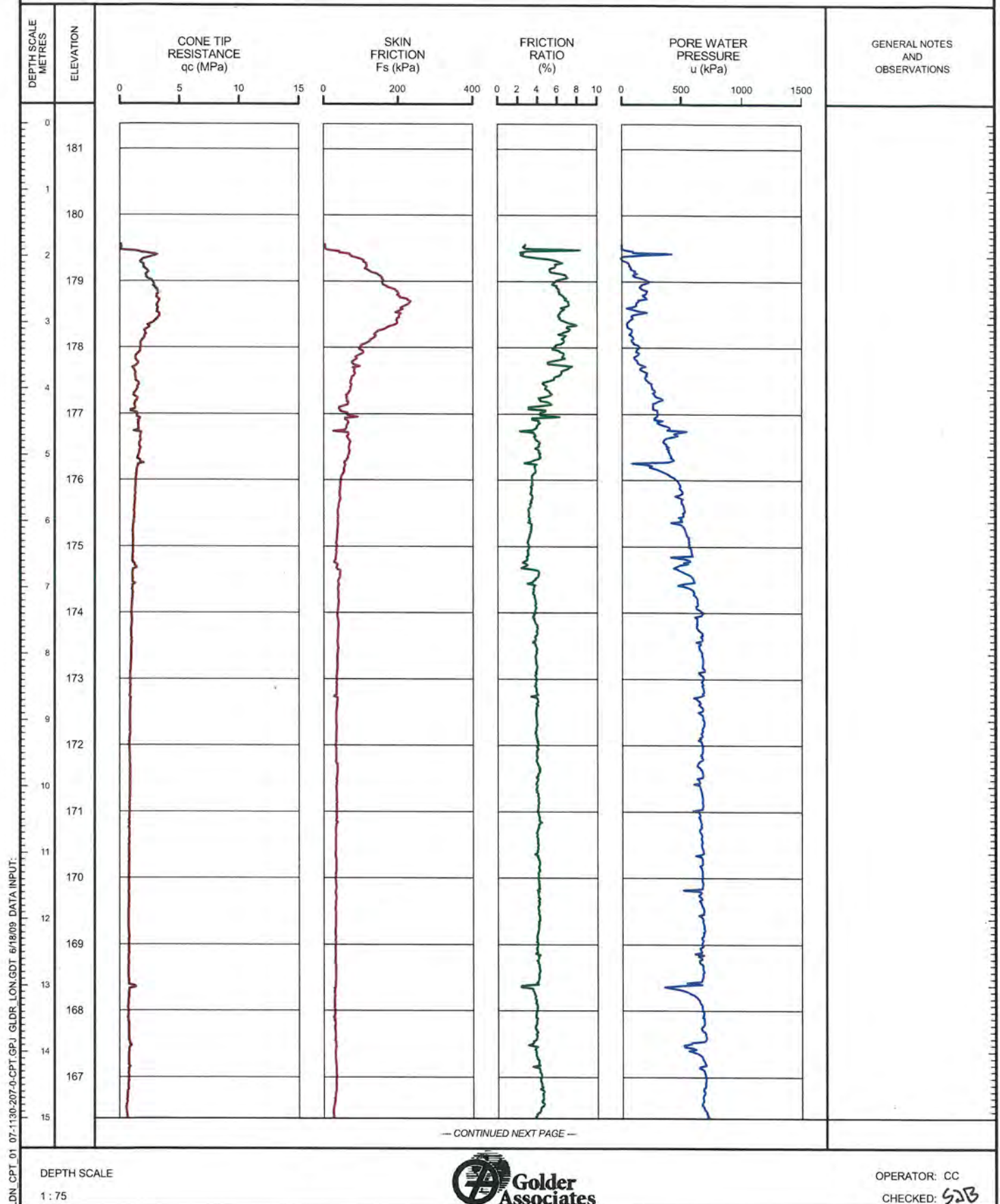
SHEET 1 OF 2

LOCATION: N 4680541.5 ; E 331710.2

TEST DATE: September 4, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.83m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-137**

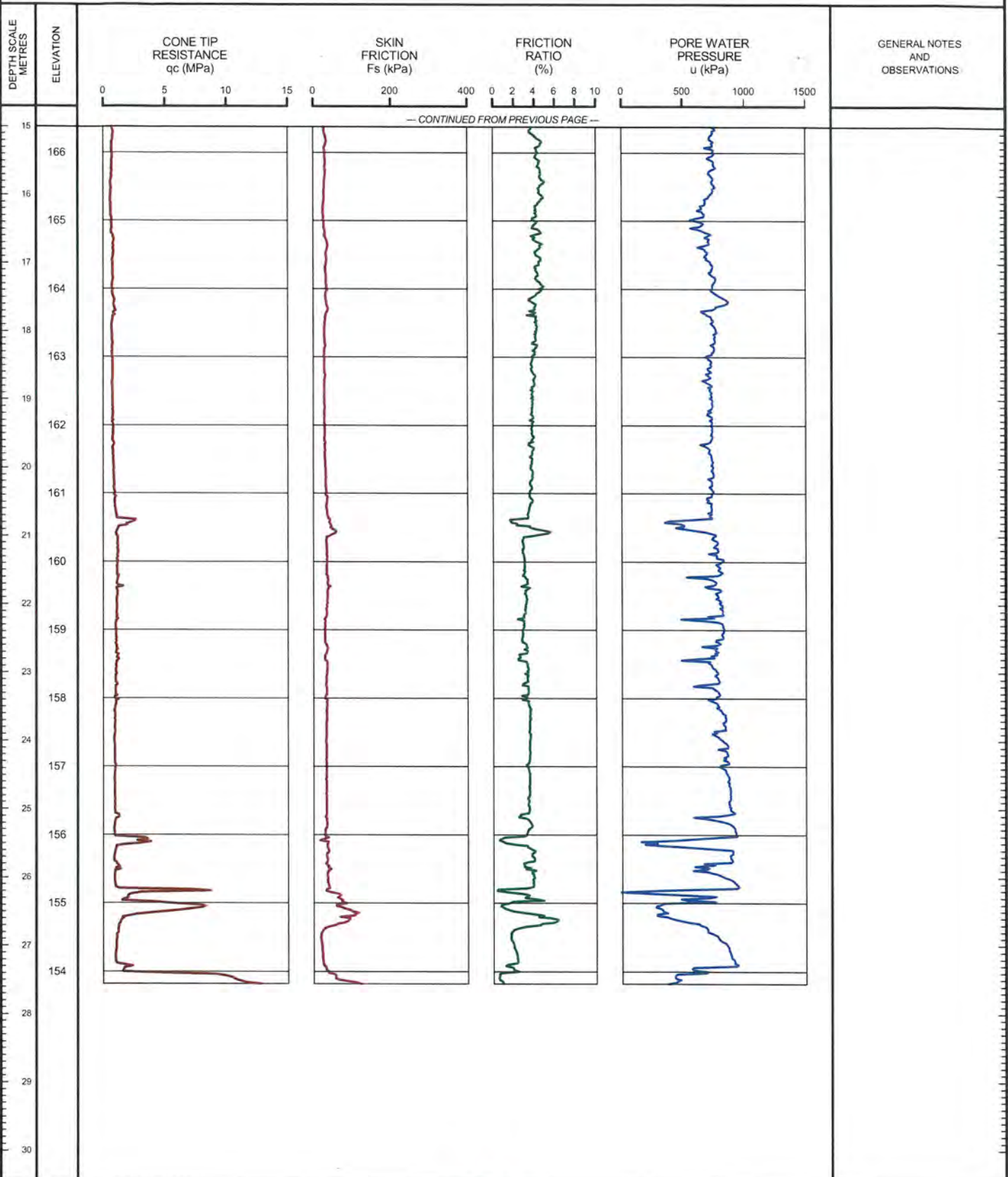
SHEET 2 OF 2

LOCATION: N 4680541.5 ; E 331710.2

TEST DATE: September 4, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.83m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN\_CPT\_01\_07-1130-207-0-CPT.GPJ GLDR\_LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-144**

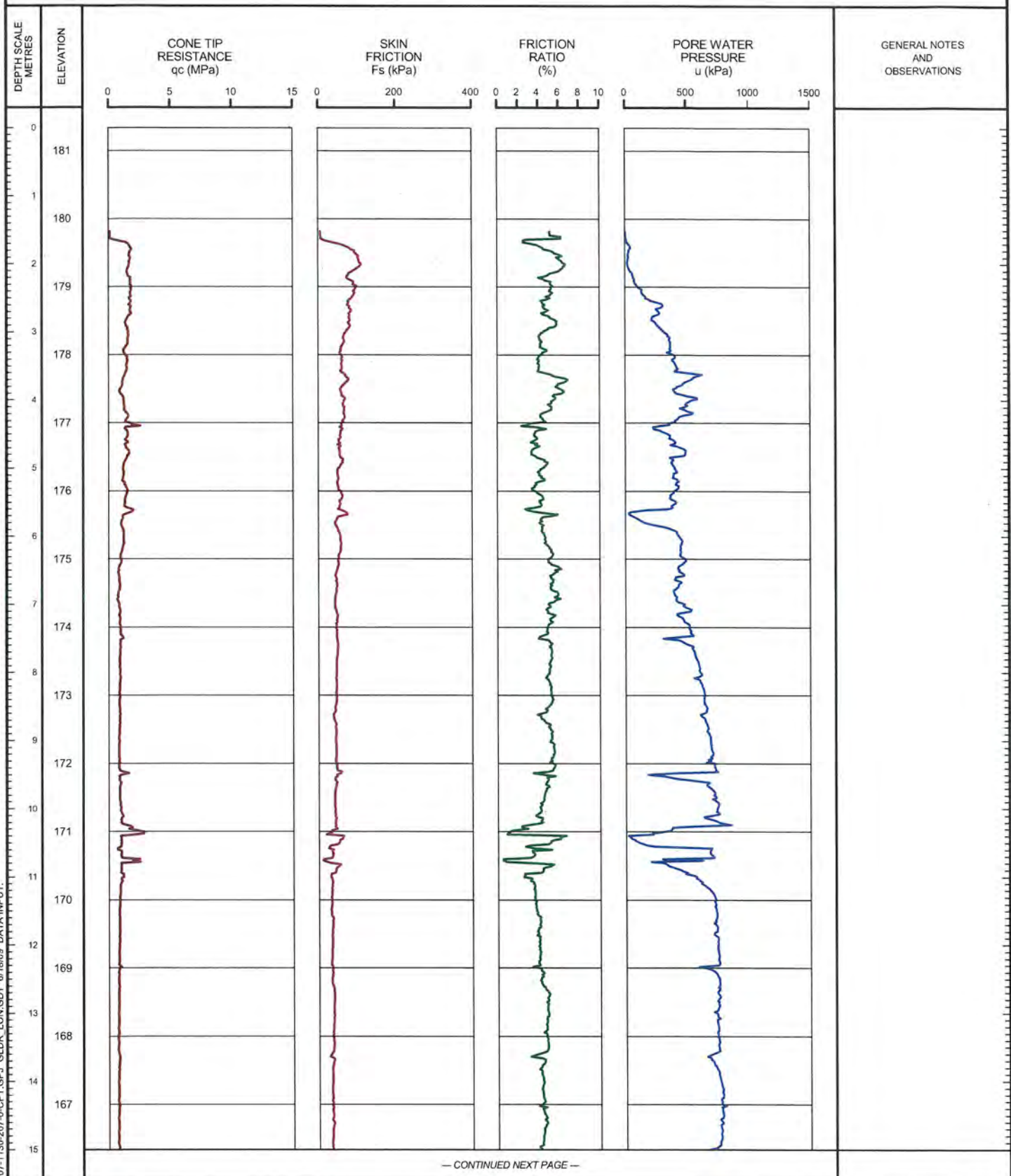
SHEET 1 OF 2

LOCATION: N 4681363.6 ; E 331279.2

TEST DATE: August 1, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.53m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1: 75



OPERATOR: CC

CHECKED: *SS*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-144**

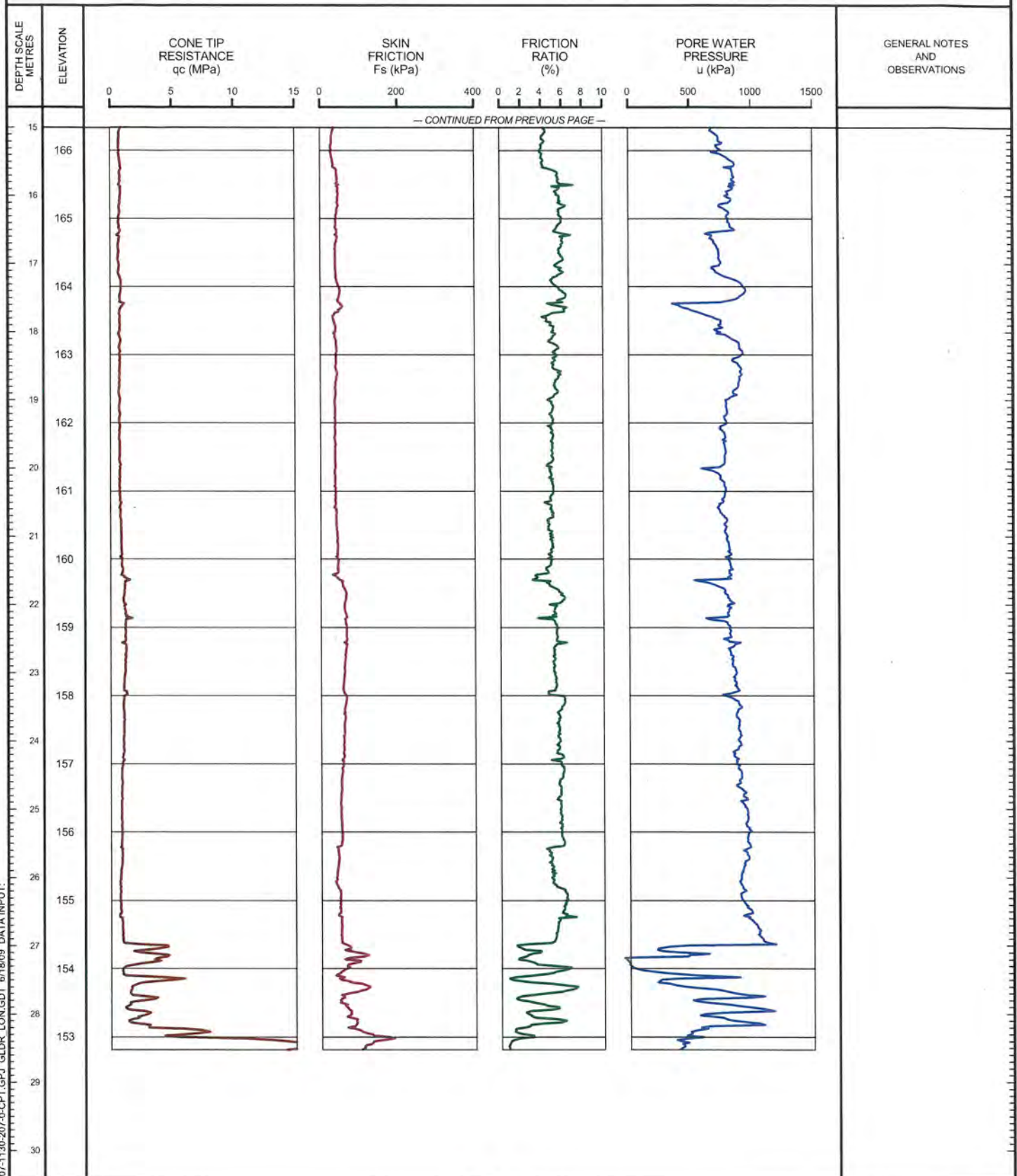
SHEET 2 OF 2

LOCATION: N 4681363.6 ; E 331279.2

TEST DATE: August 1, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.53m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSB*

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-145**

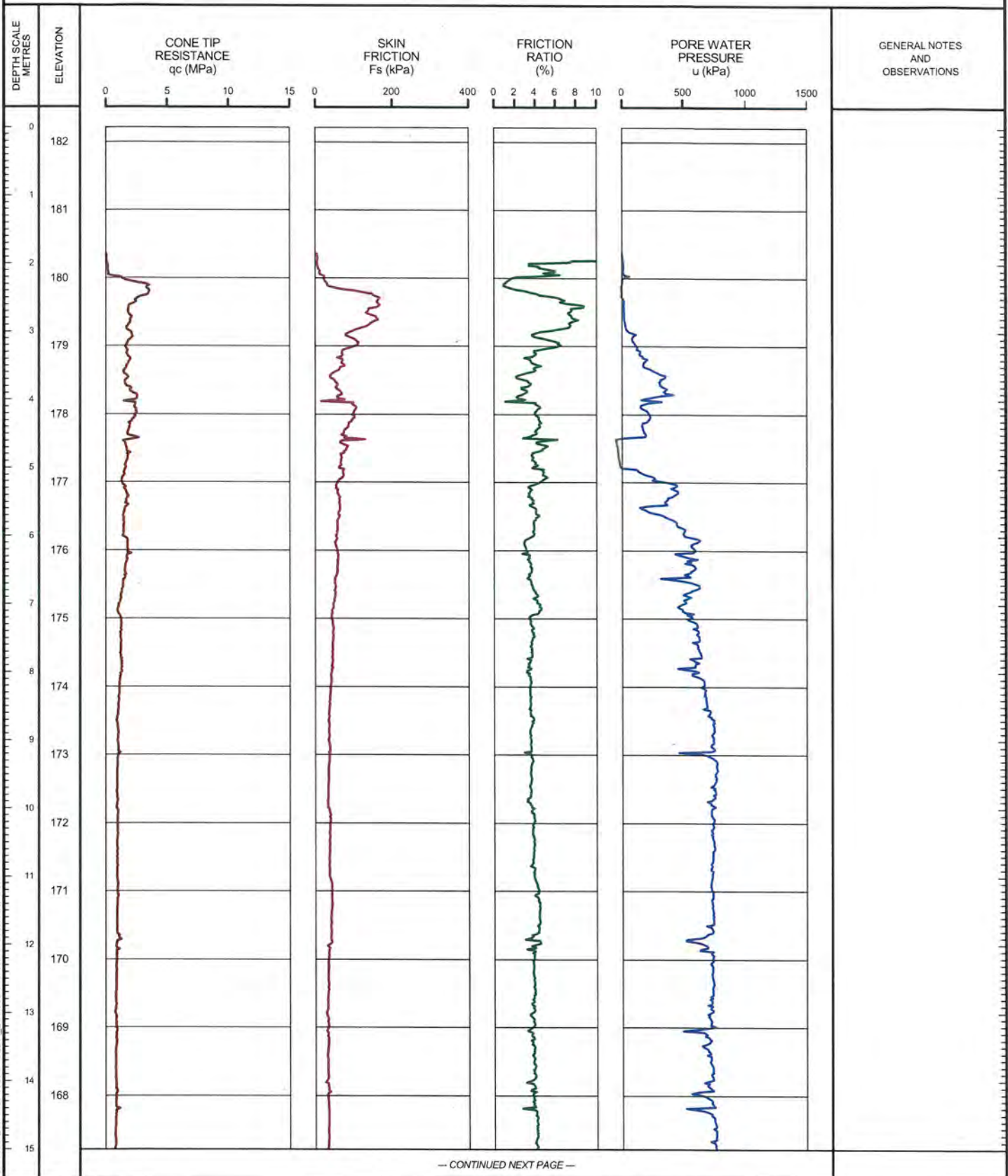
SHEET 1 OF 2

LOCATION: N 4681442.8 E 331248.2

TEST DATE: September 3, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.88m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LON\_CPT\_01\_07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE  
1 : 75OPERATOR: CC  
CHECKED: *SJS*



PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-145

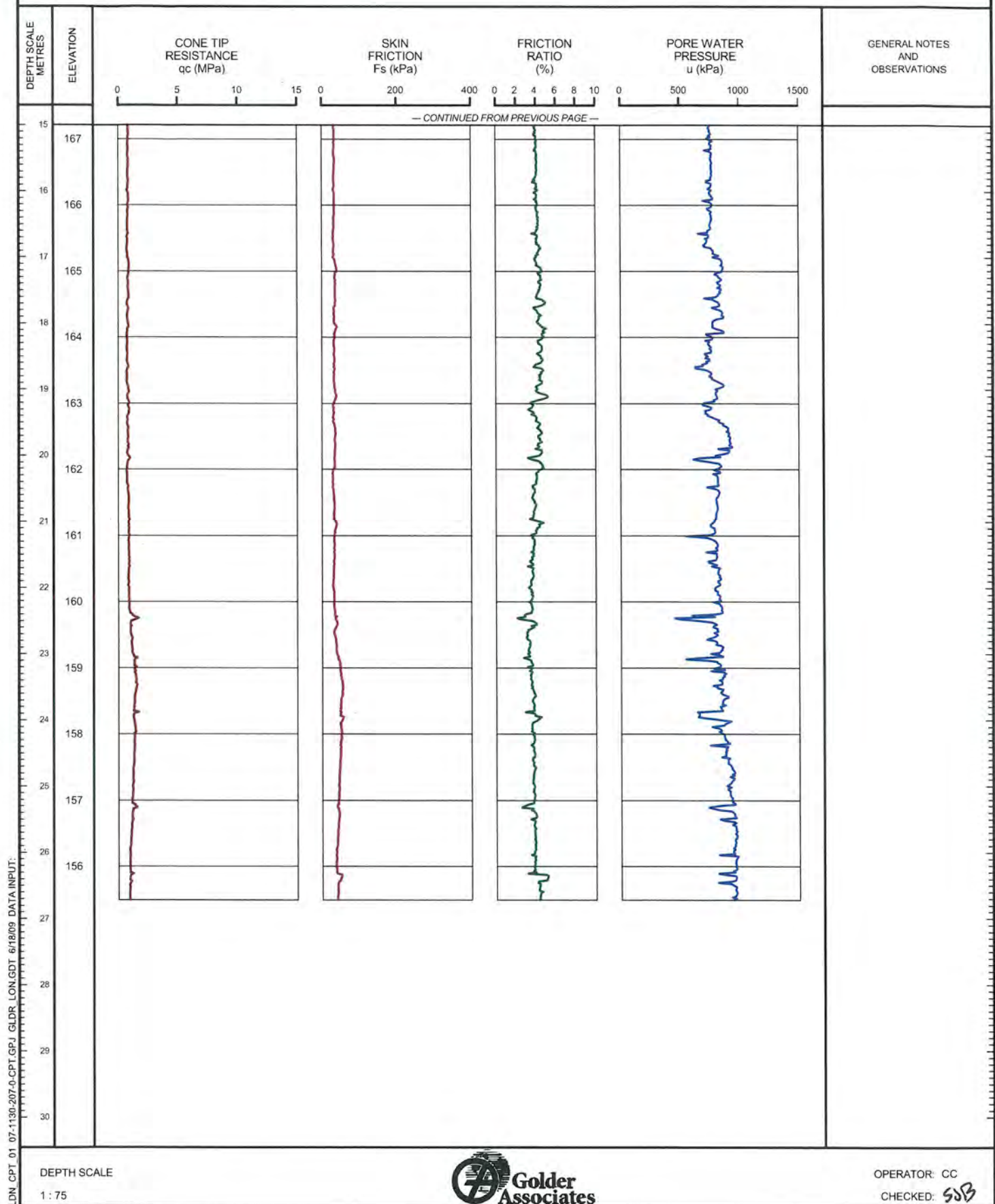
SHEET 2 OF 2

LOCATION: N 4681442.8 ; E 331248.2

TEST DATE: September 3, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.88m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-146

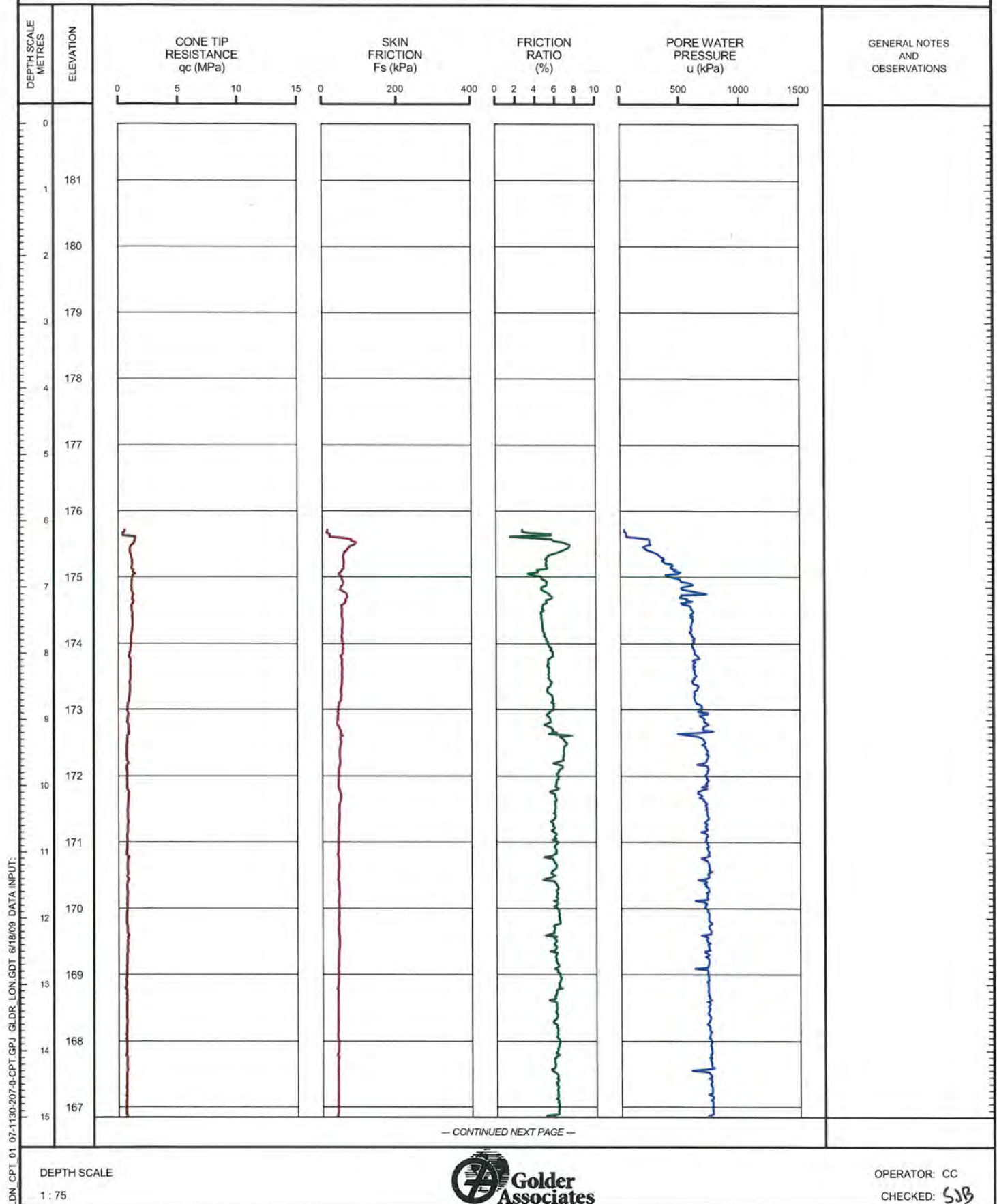
SHEET 1 OF 2

LOCATION: N 4681540.8 ; E 331126.5

TEST DATE: August 5, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 6.15m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-146**

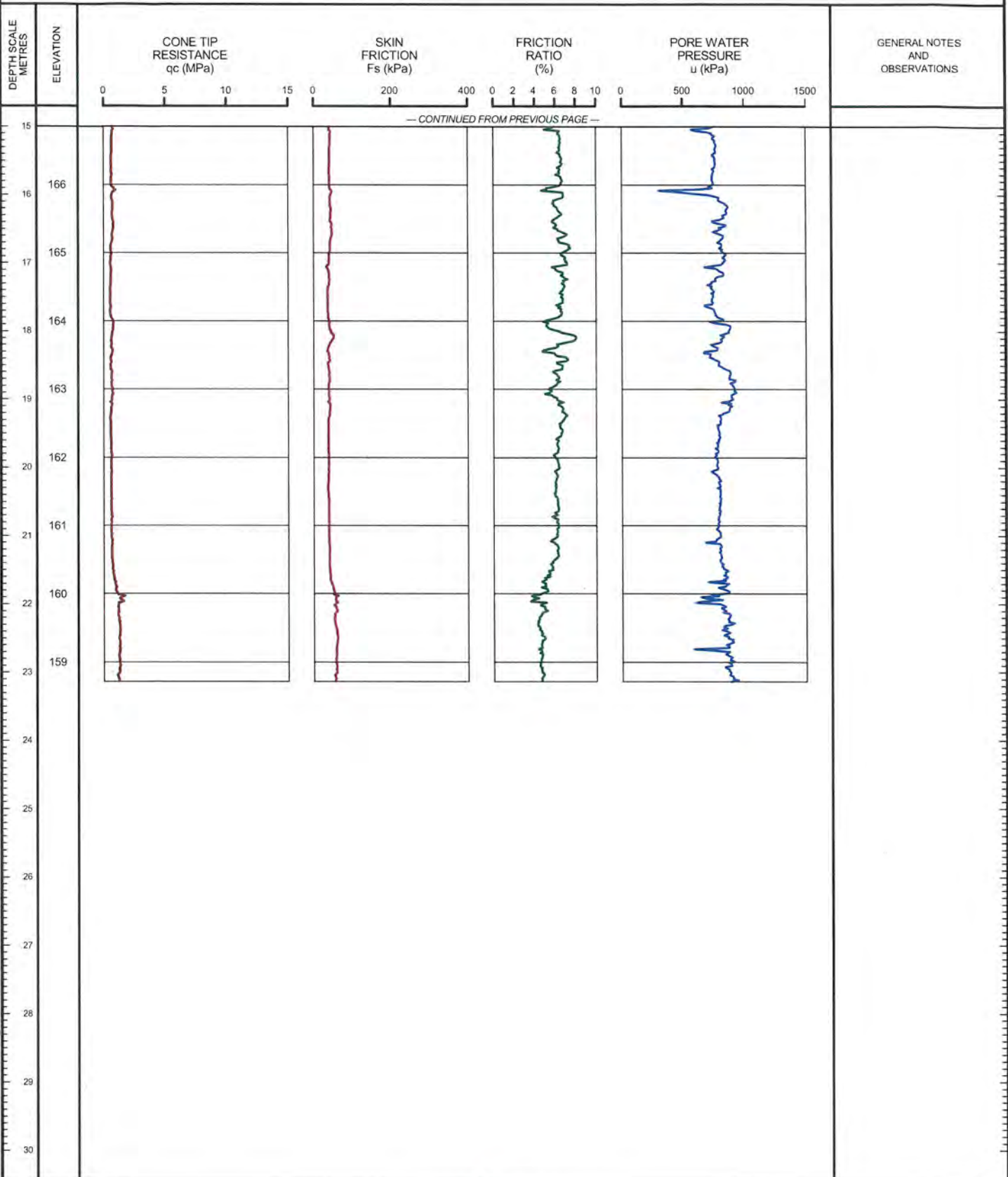
SHEET 2 OF 2

LOCATION: N 4681540.8, E 331126.5

TEST DATE: August 5, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 6.15m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-148**

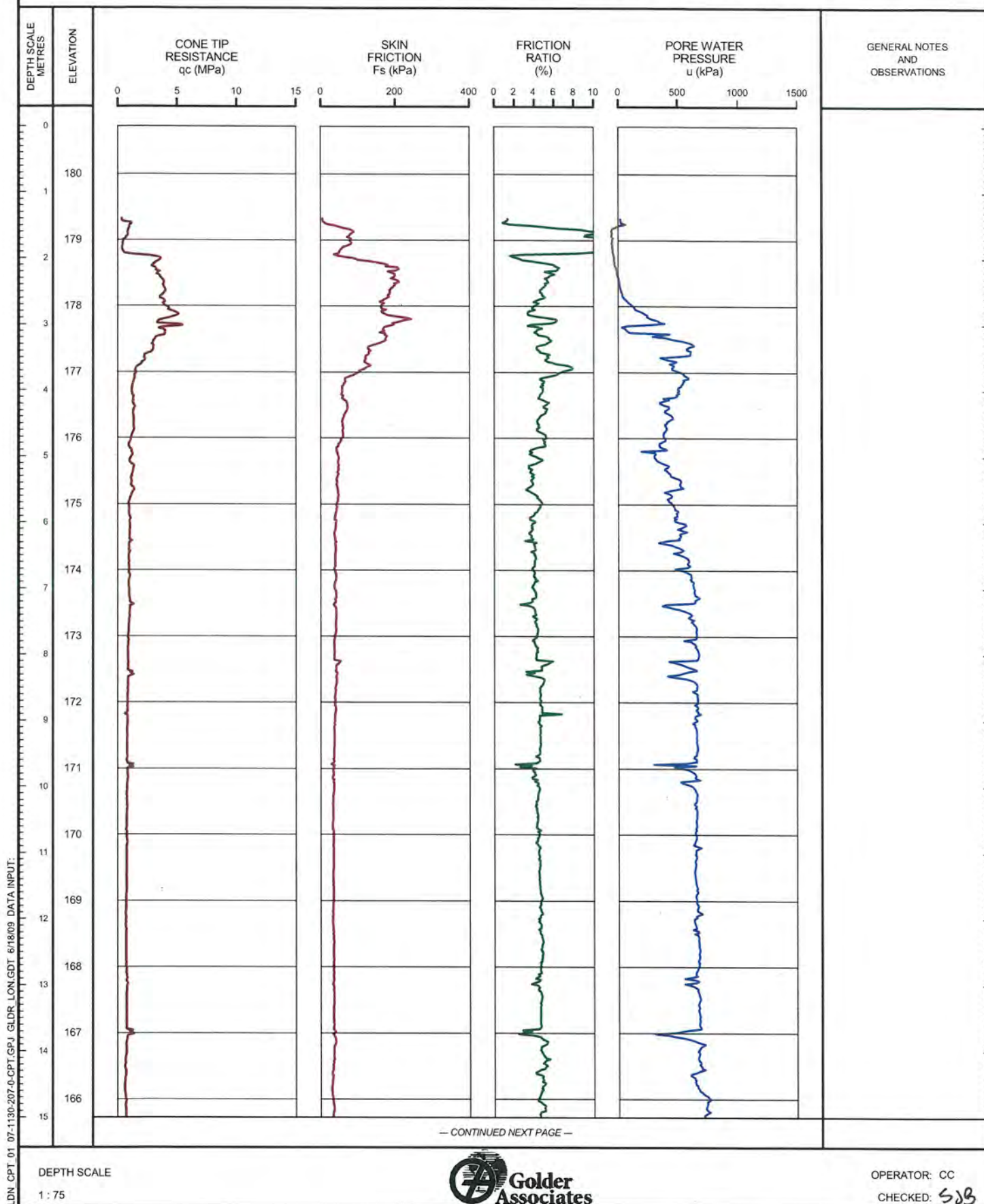
SHEET 1 OF 2

LOCATION: N 4681651.5 ; E 330951.4

TEST DATE: August 5, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.52m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-148

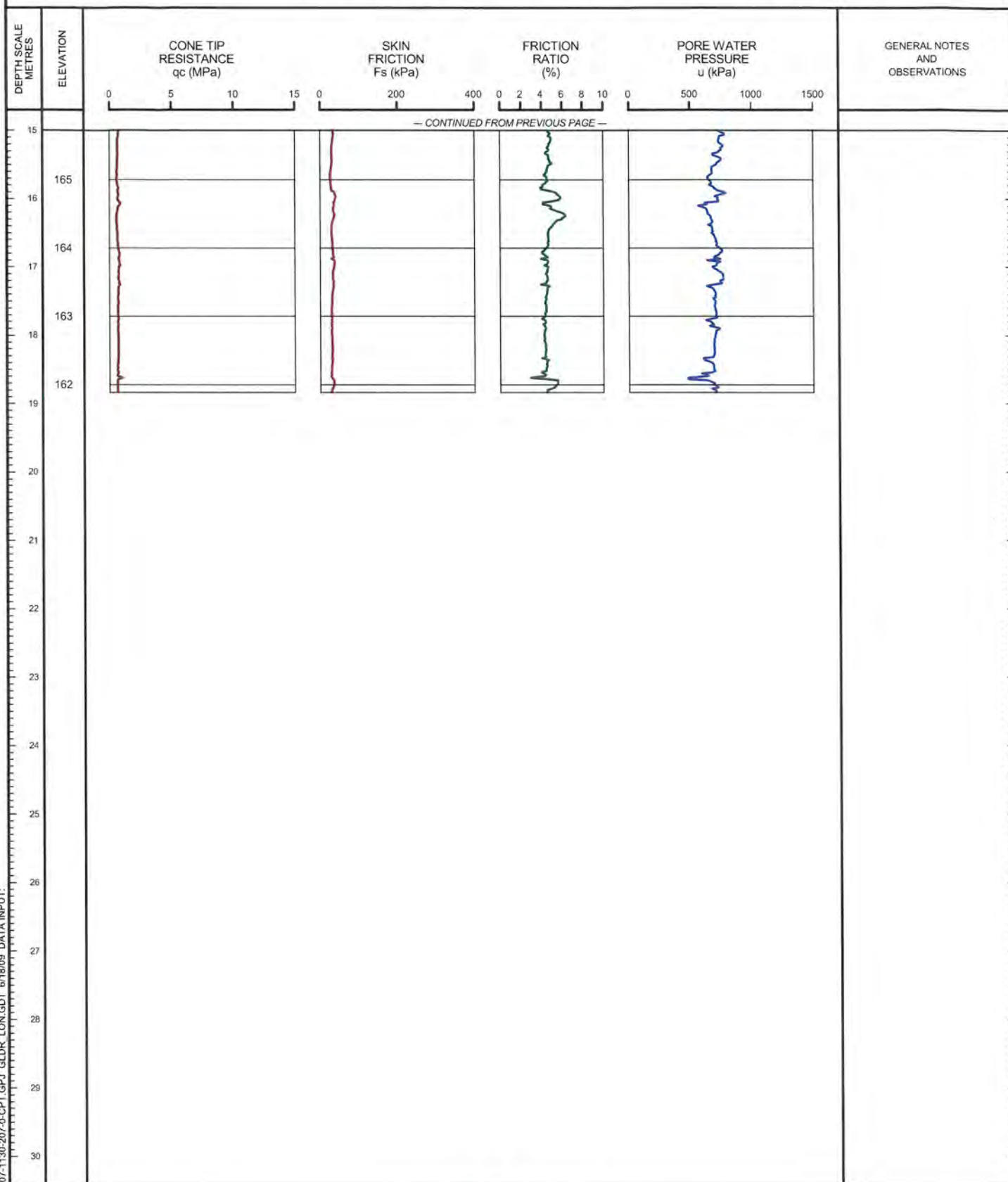
SHEET 2 OF 2

LOCATION: N 4681651.5 E 330951.4

TEST DATE: August 5, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.52m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT\_01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-150**

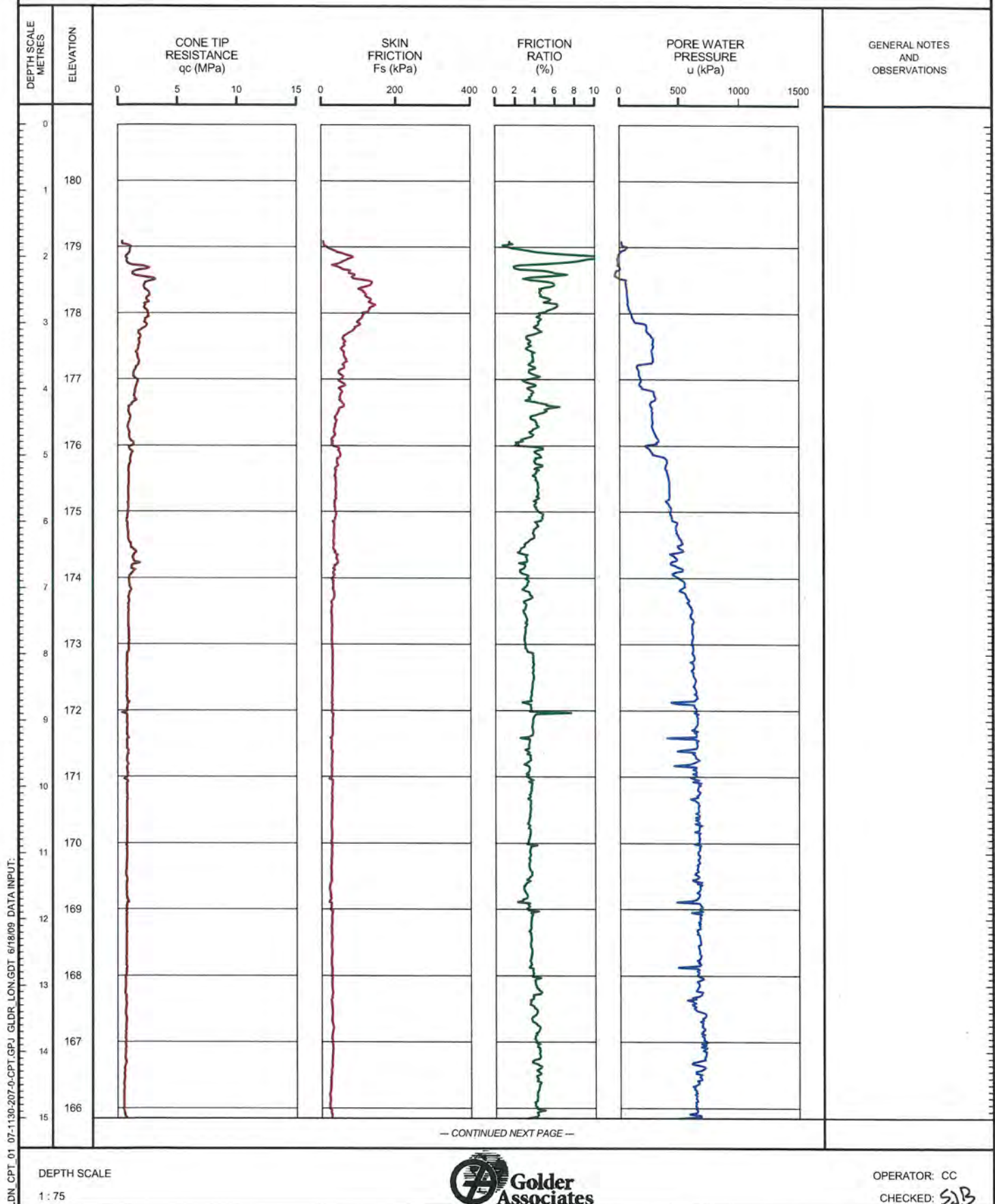
SHEET 1 OF 2

LOCATION: N 4681733.4 ; E 330757.6

TEST DATE: August 6, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.77m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT\_01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-150**

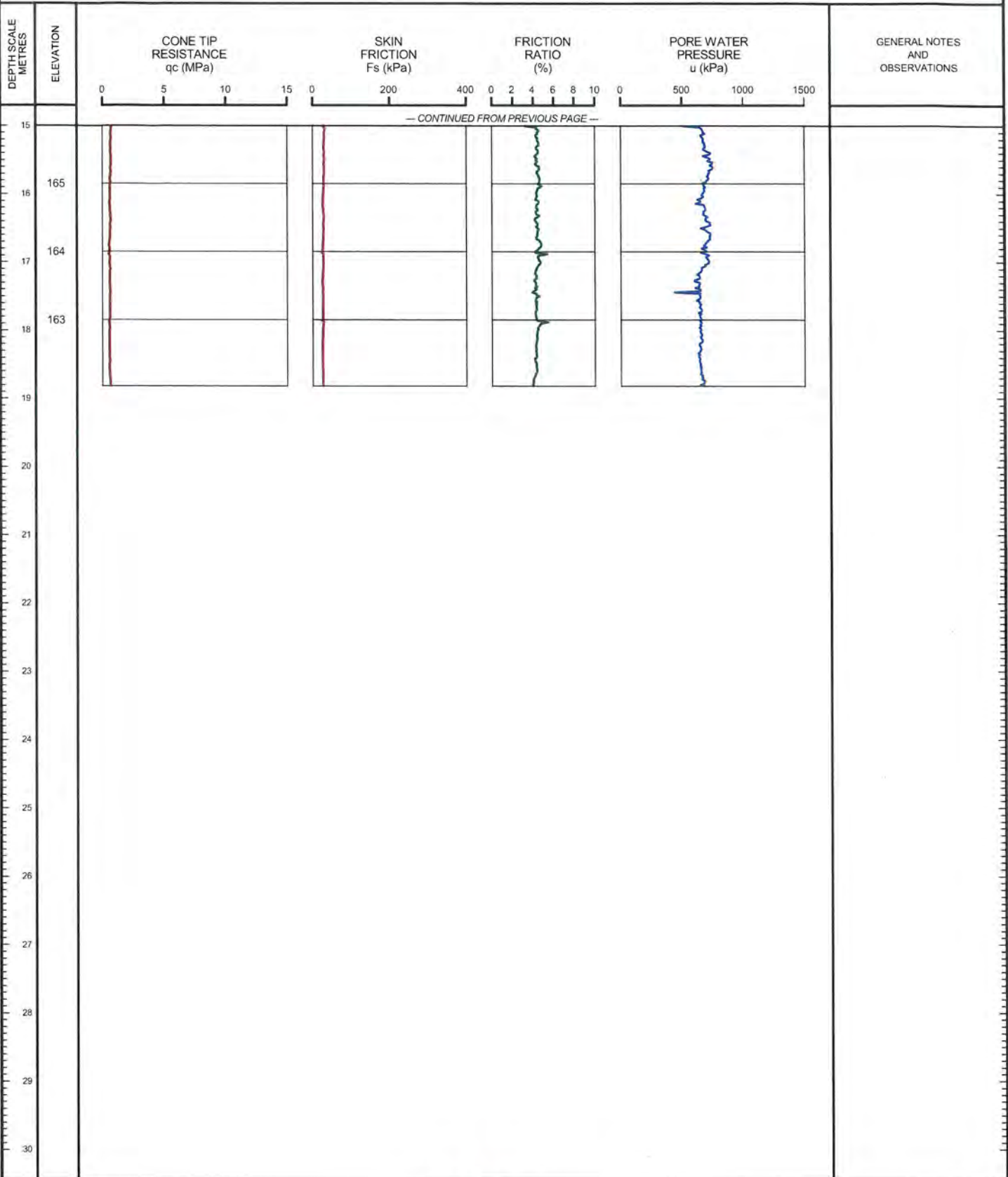
SHEET 2 OF 2

LOCATION: N 4681733.4 ;E 330757.6

TEST DATE: August 6, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.77m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-153**

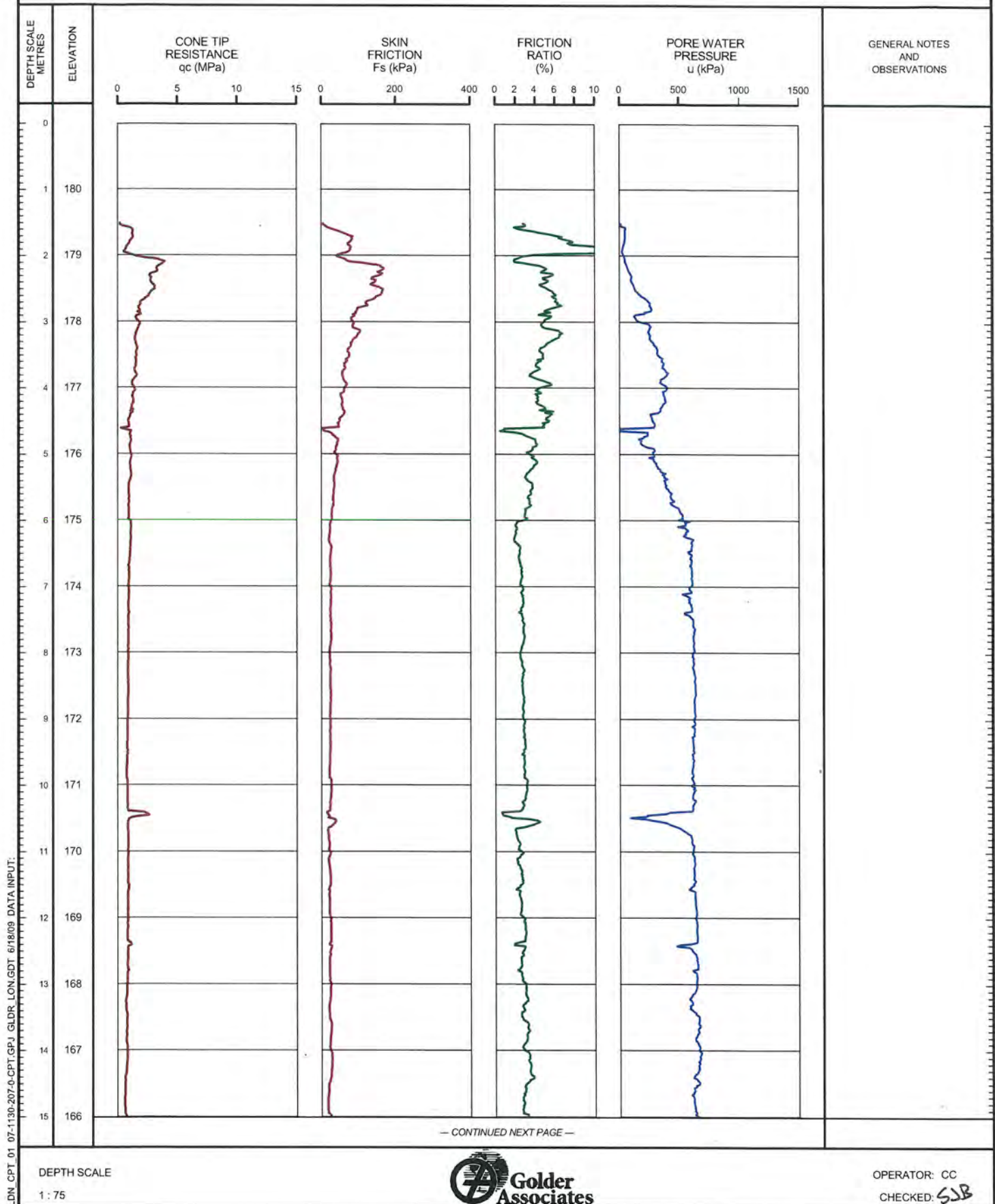
SHEET 1 OF 2

LOCATION: N 4681793.3 E 330575.8

TEST DATE: August 7, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.50m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT-GPJ GLDR LON.GDT 6/18/09 DATA INPUT:



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-153**

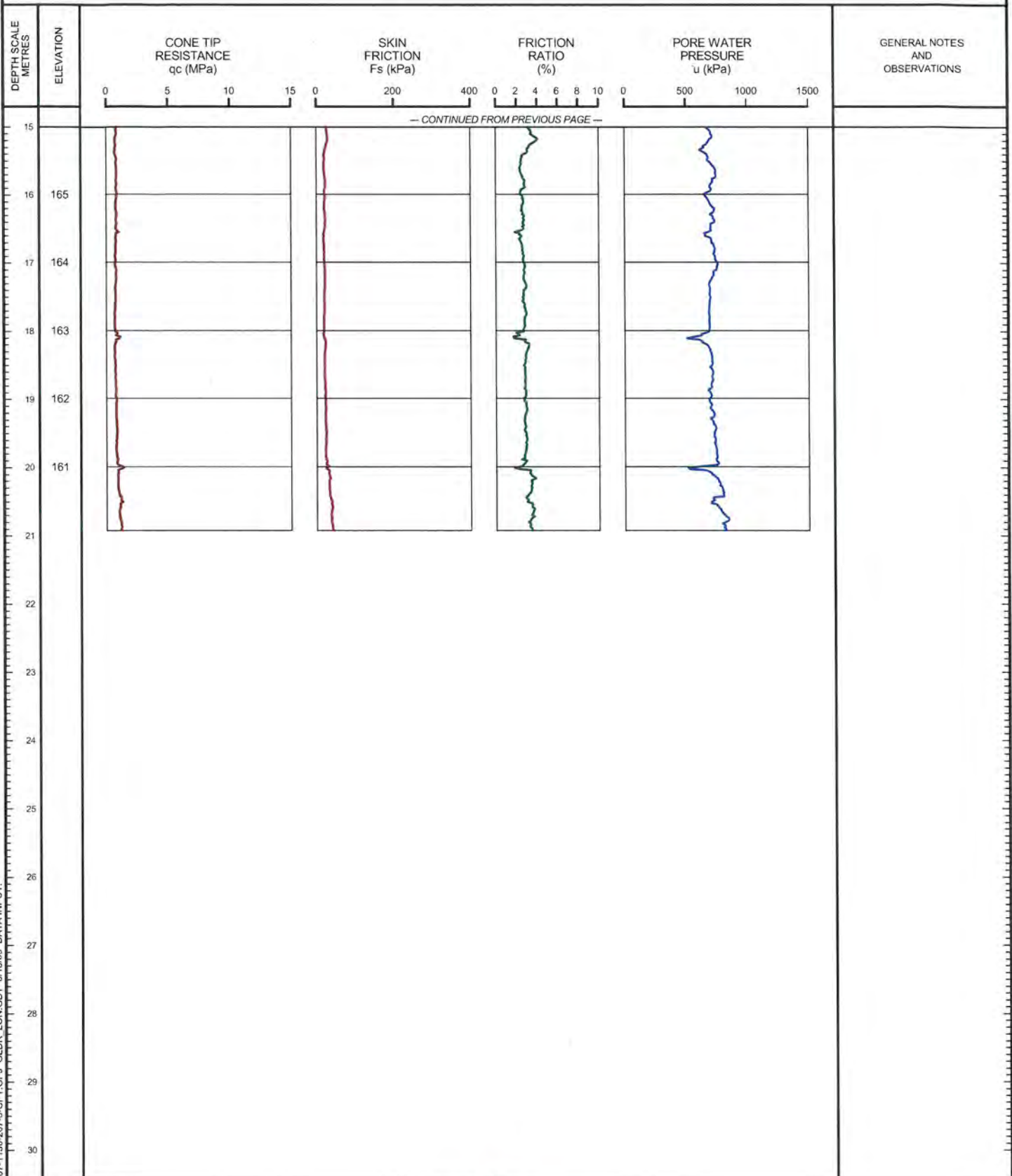
SHEET 2 OF 2

LOCATION: N 4681793.3 ; E 330575.8

TEST DATE: August 7, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.50m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LON CPT\_01\_07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-154**

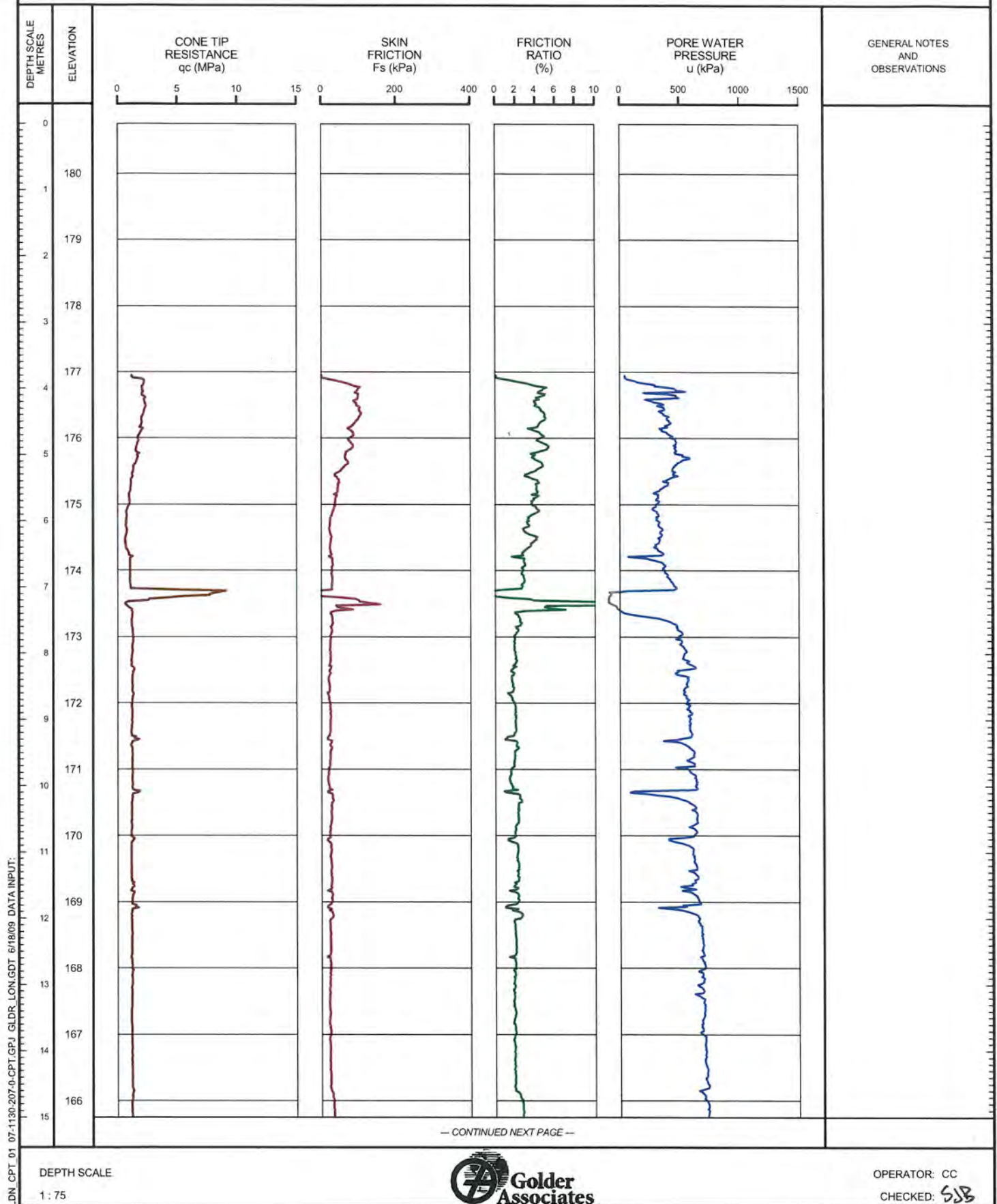
SHEET 1 OF 2

LOCATION: N 4681963.3 ; E 330191.0

TEST DATE:

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 4.58m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:



PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-154

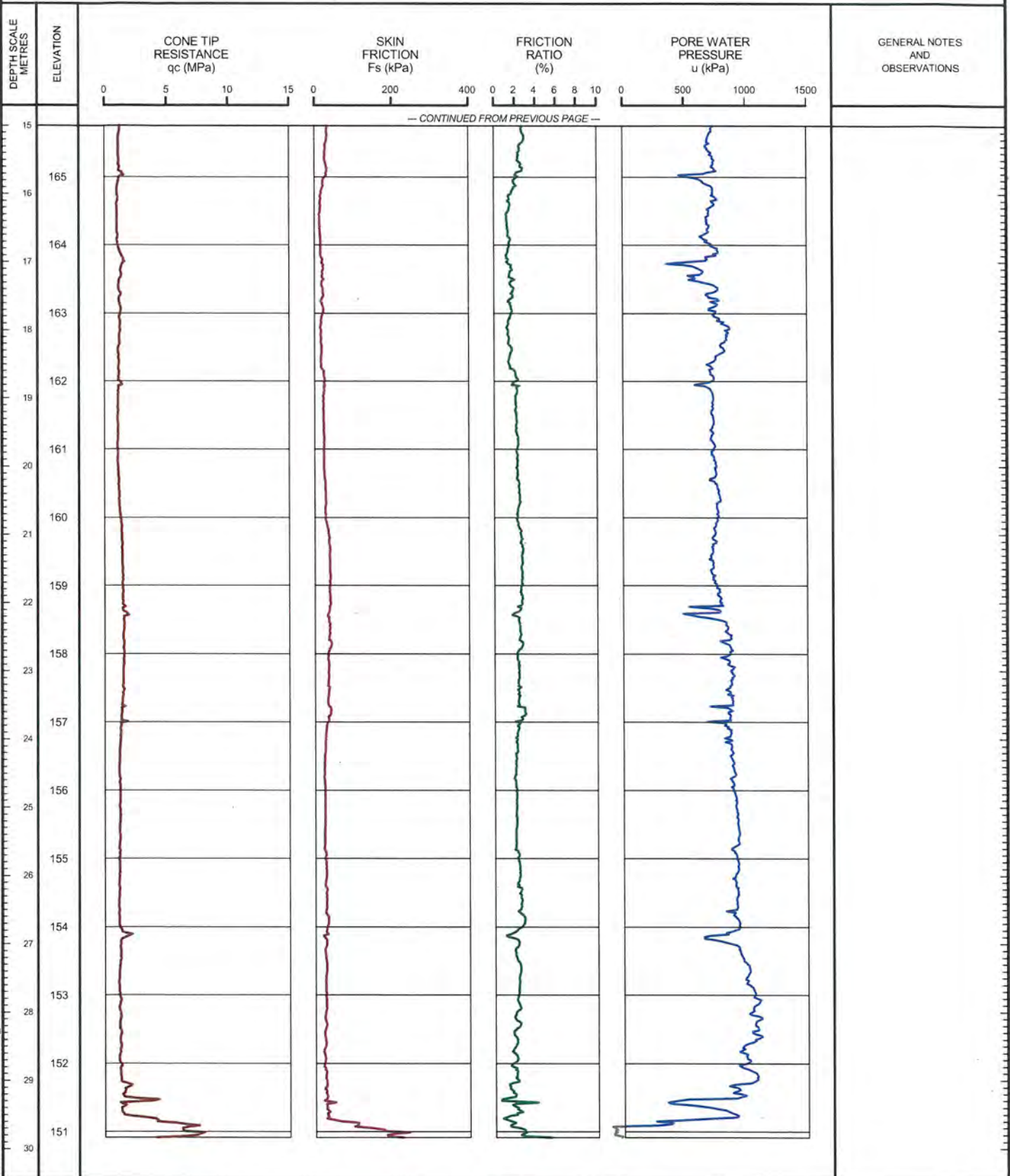
SHEET 2 OF 2

LOCATION: N 4681963.3 ; E 330191.0

TEST DATE:

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 4.58m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-155

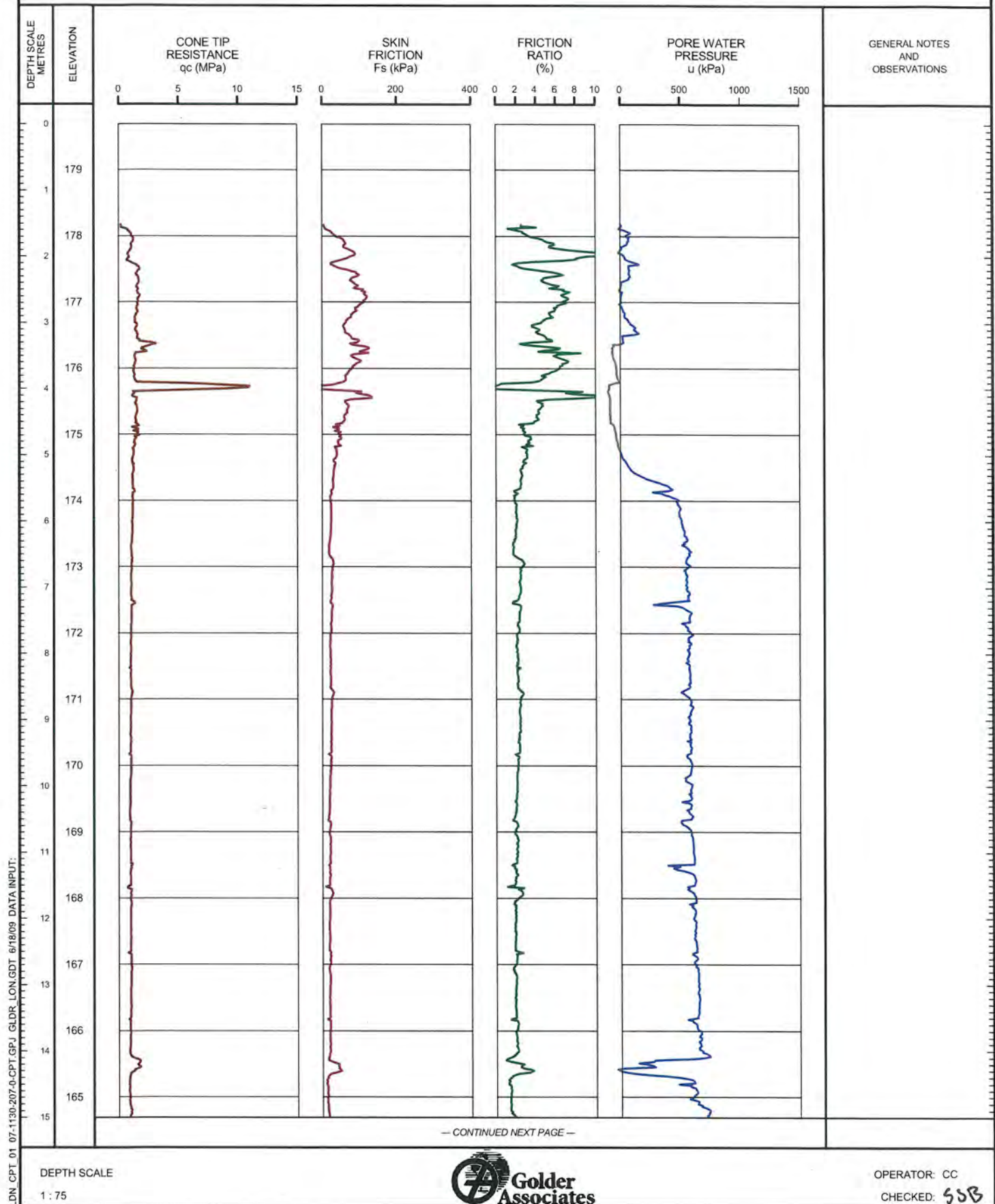
SHEET 1 OF 2

LOCATION: N 4682065.8 ; E 329981.7

TEST DATE: August 13, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.53m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-155

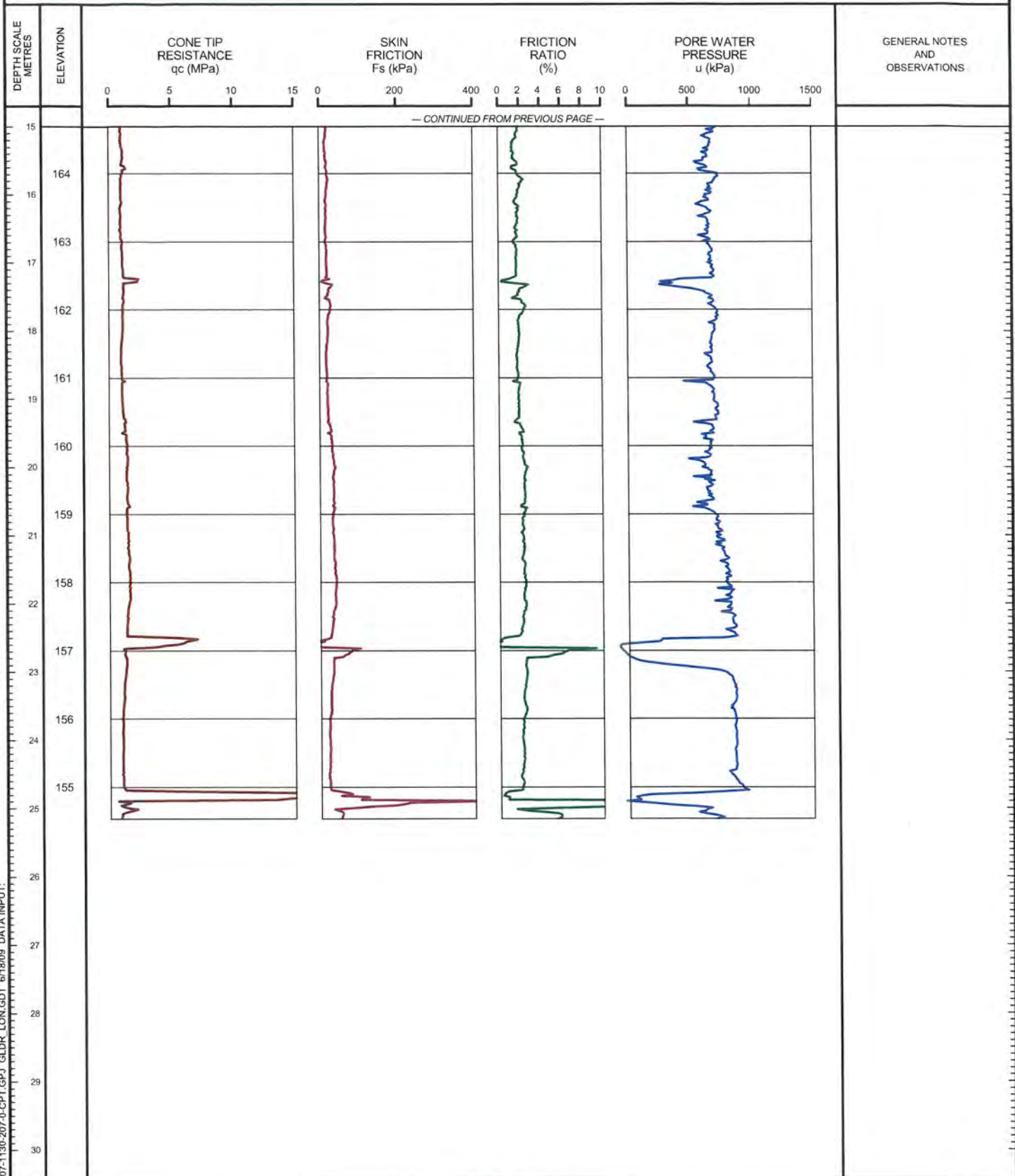
SHEET 2 OF 2

LOCATION: N 4682065.8 ; E 329981.7

TEST DATE: August 13, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.53m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *JSB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-159**

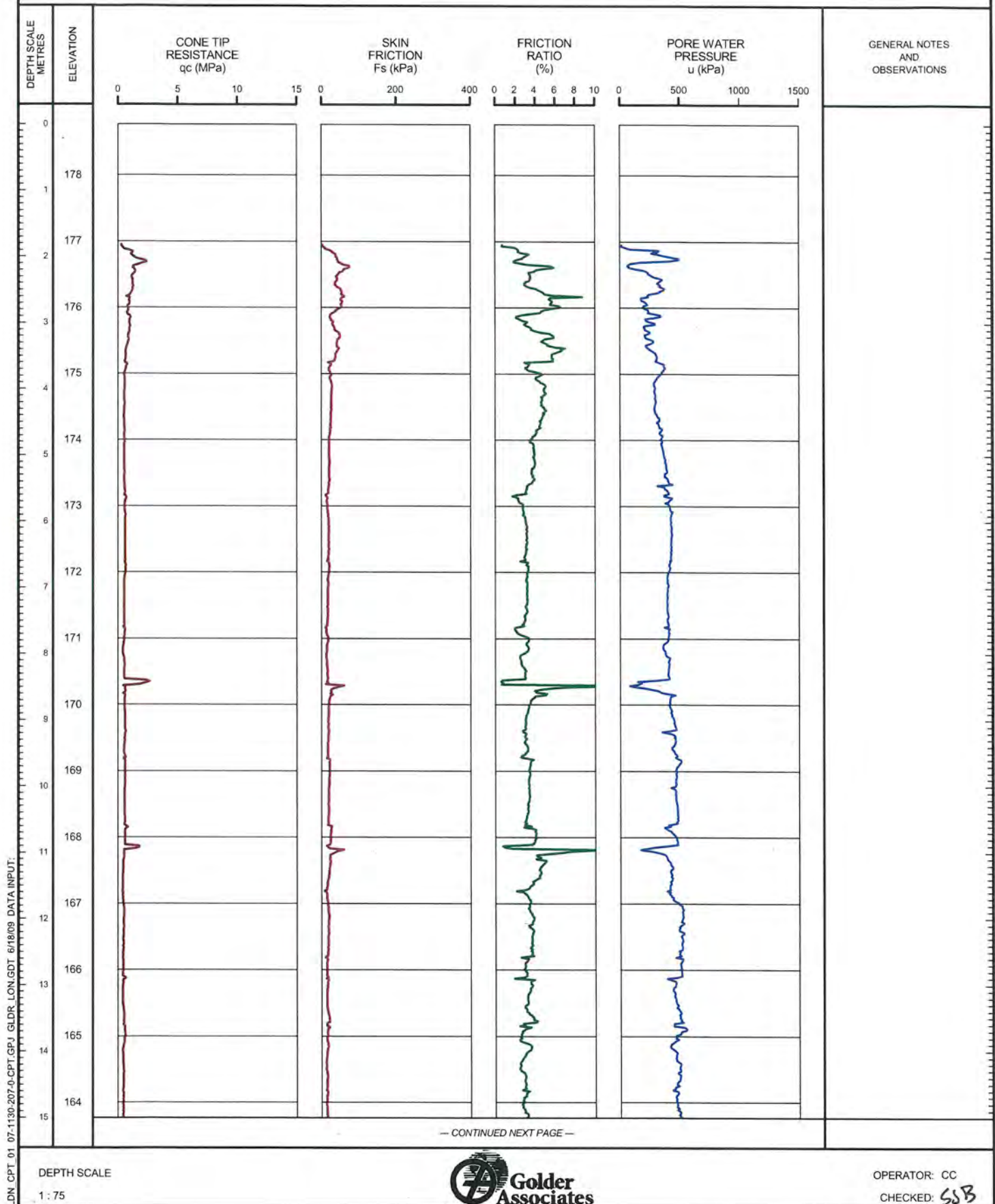
SHEET 1 OF 2

LOCATION: N 4682292.8 ; E 329332.1

TEST DATE: August 12, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.83m    CORRECTION FACTOR A: 0.584    CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/19/09 DATA INPUT:



PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-159

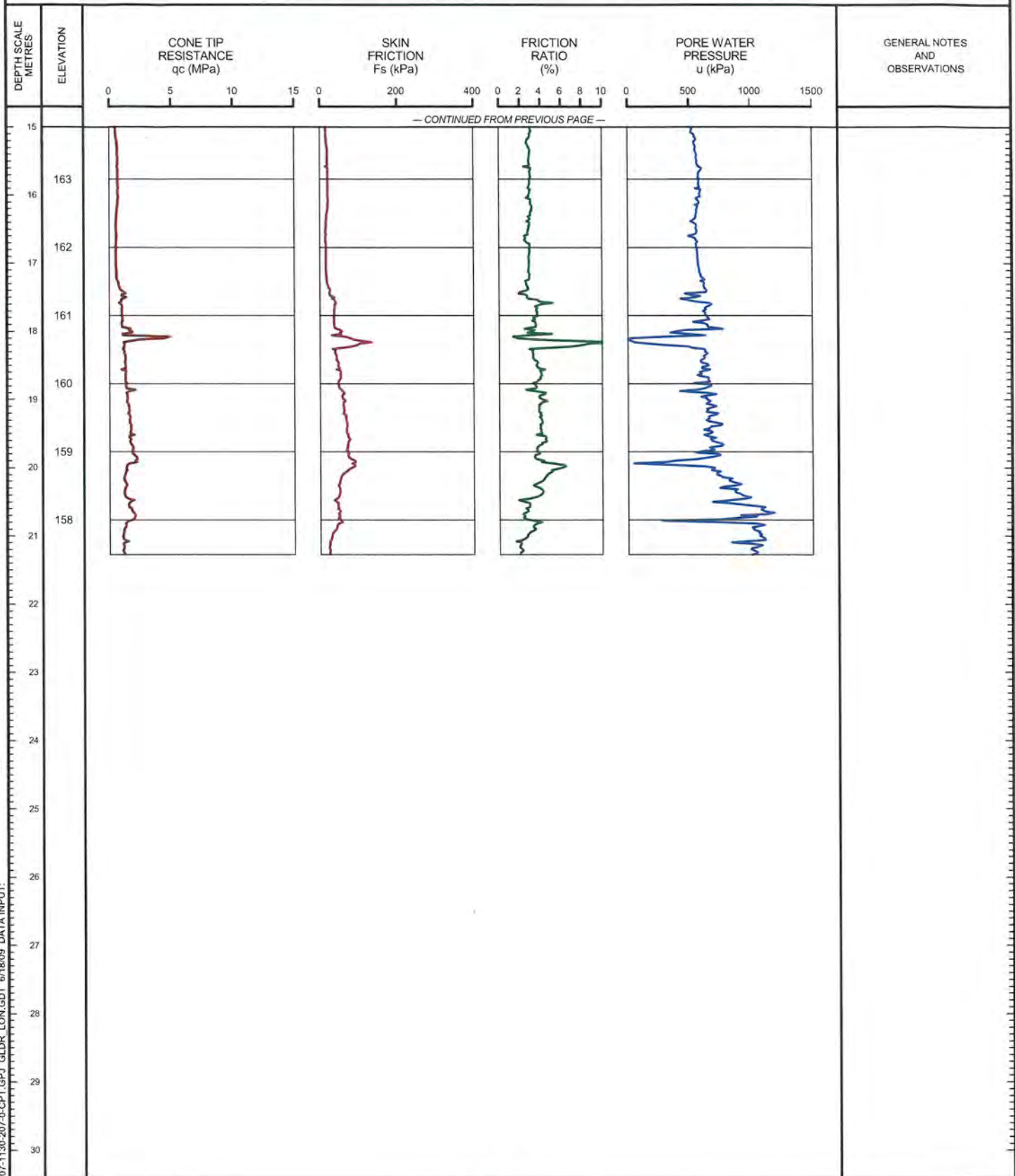
SHEET 2 OF 2

LOCATION: N 4682292.8 ; E 329332.1

TEST DATE: August 12, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.83m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT\_01\_07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-160**

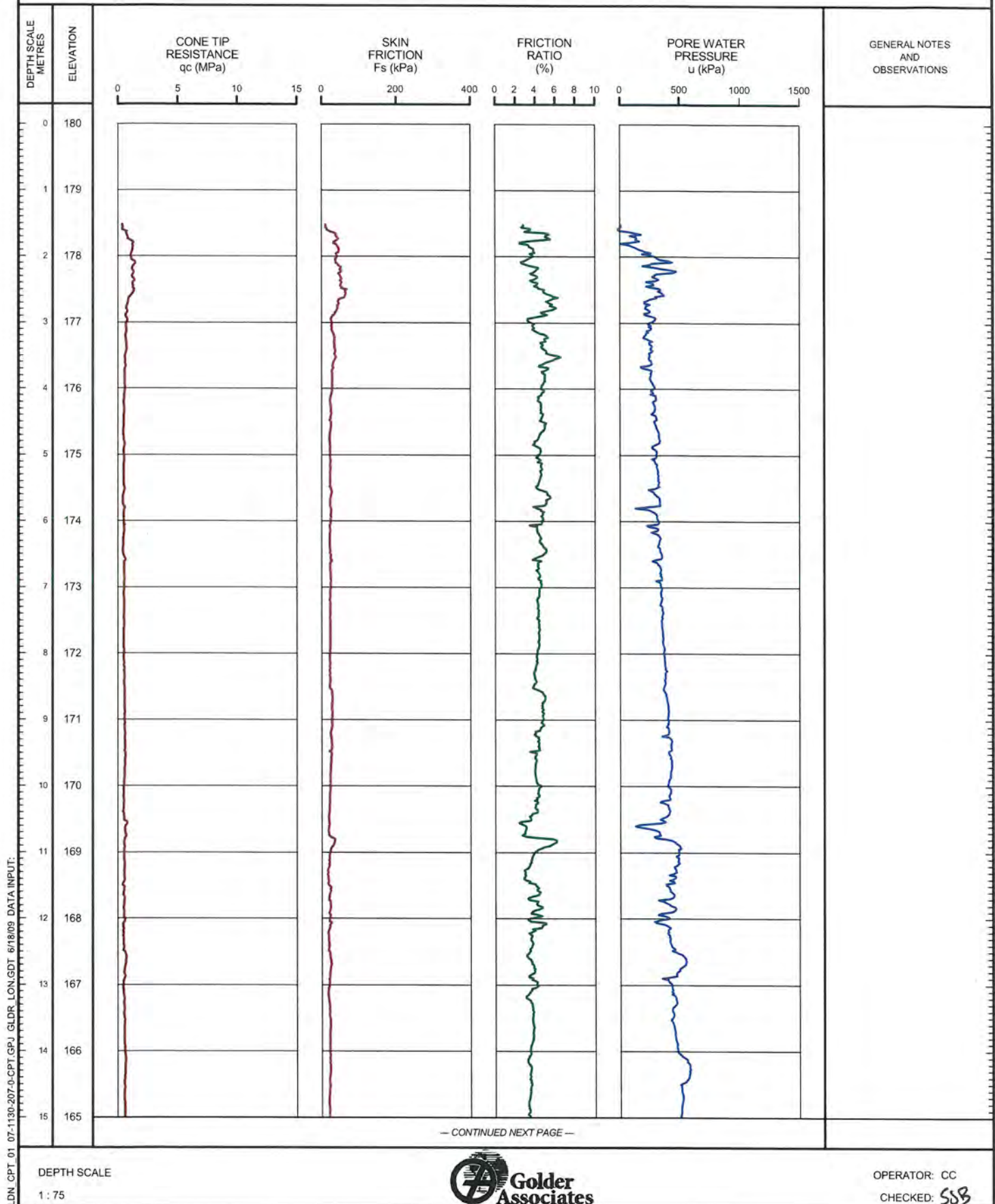
SHEET 1 OF 2

LOCATION: N 4682216.8 E 329156.2

TEST DATE: August 12, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 1.53m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-160

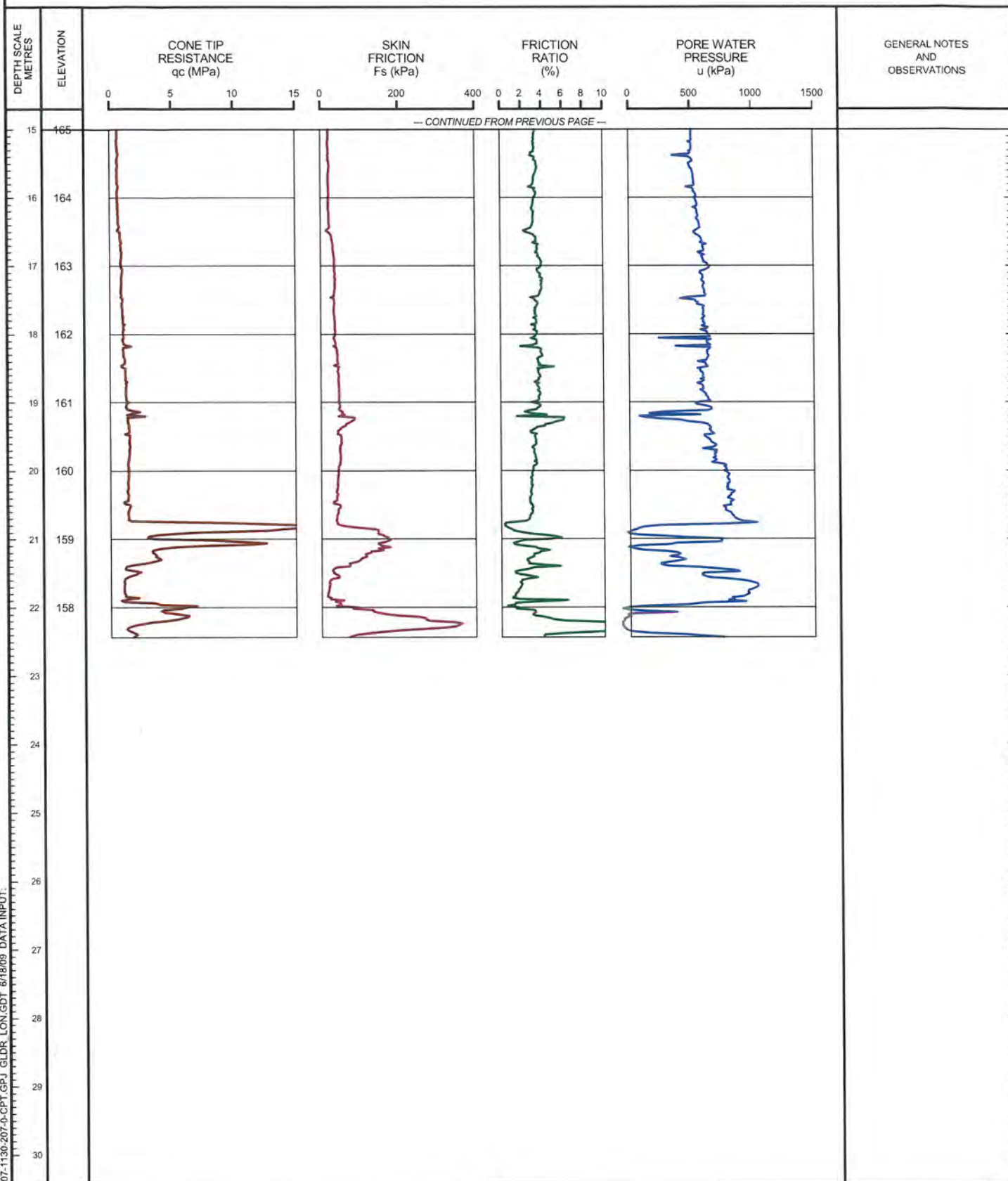
SHEET 2 OF 2

LOCATION: N 4682216 8 :E 329156.2

TEST DATE: August 12, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 1.53m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SJB*



PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-161

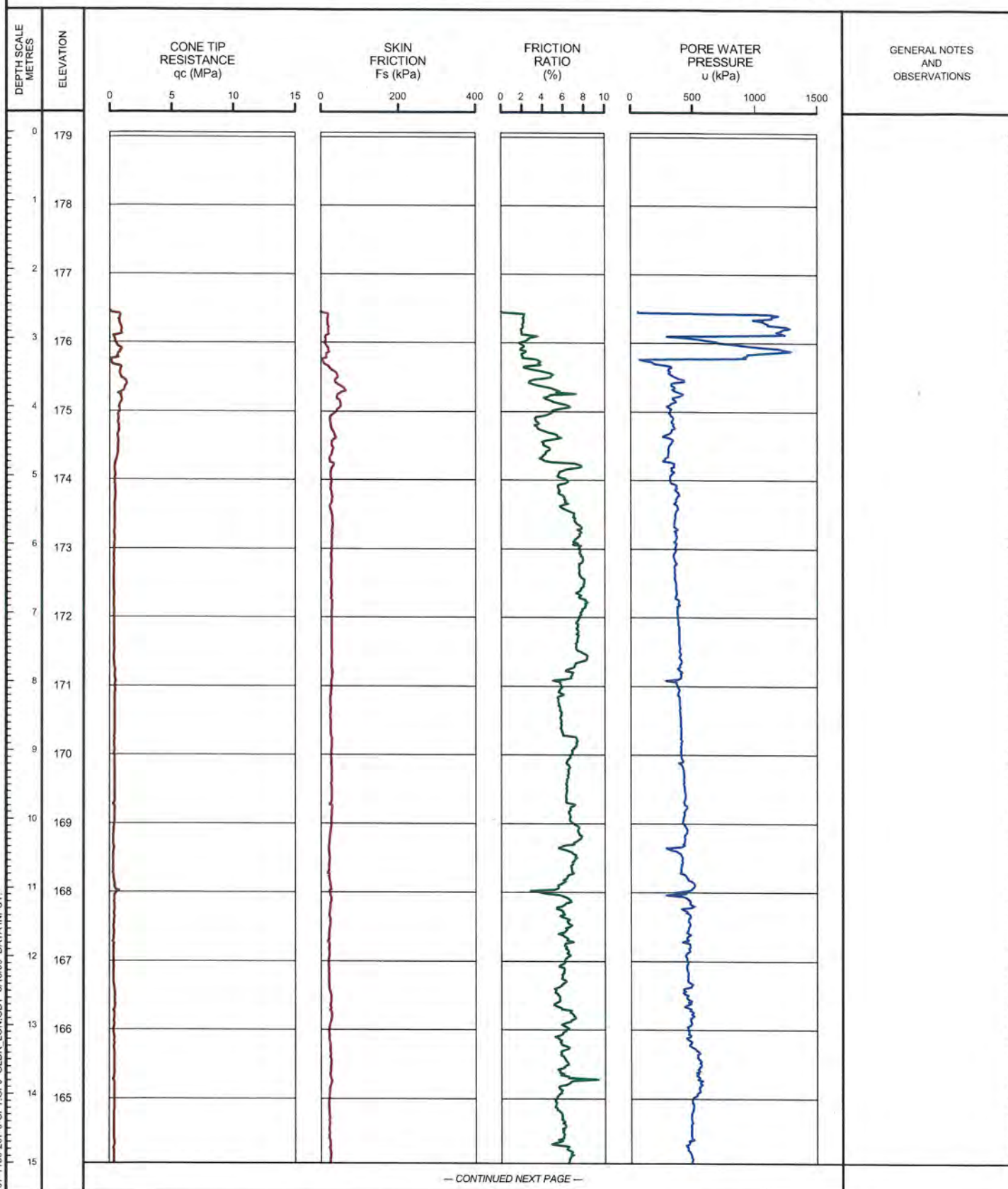
SHEET 1 OF 2

LOCATION: N 4682177.6 ; E 328793.9

TEST DATE: August 14, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 2.60m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE  
1 : 75

OPERATOR: CC

CHECKED: *SSB*



PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-161

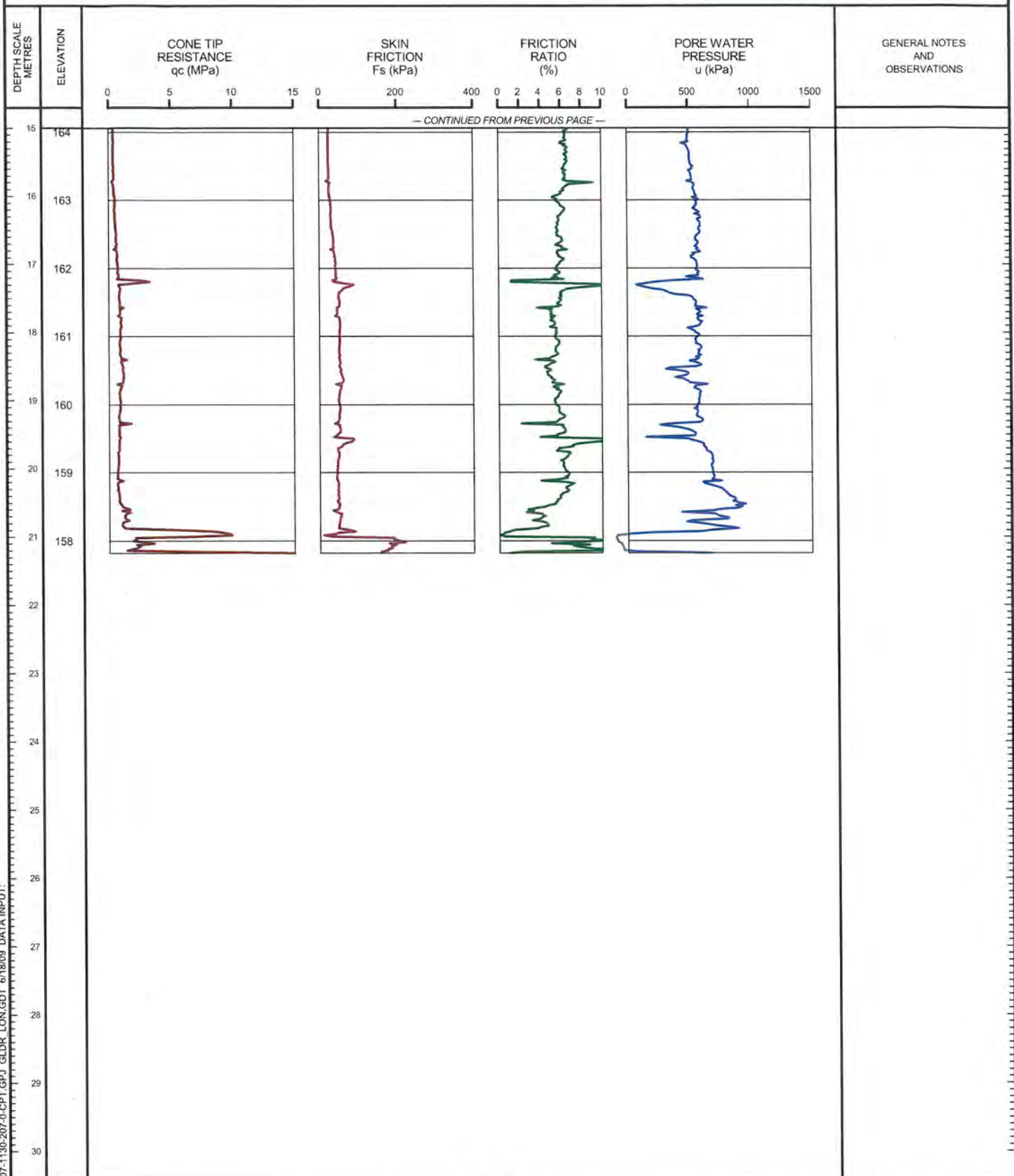
SHEET 2 OF 2

LOCATION: N 4682177.6 ; E 328793.9

TEST DATE: August 14, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 2.60m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: SJB

PROJECT: 07-1130-207-0

# RECORD OF CONE PENETRATION TEST CPT-162

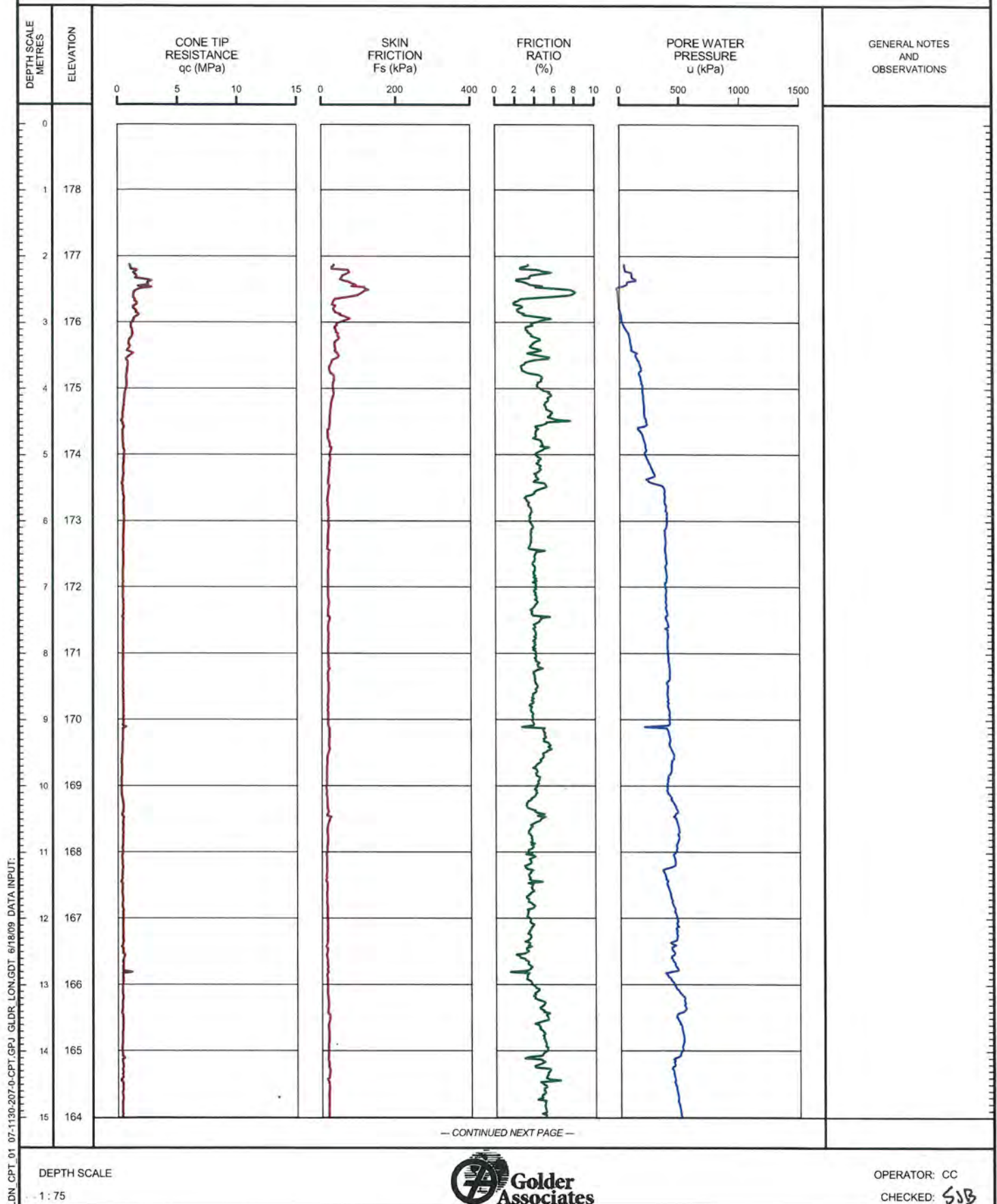
SHEET 1 OF 2

LOCATION: N 4682439.2 :E 328729.1

TEST DATE: September 3, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 2.13m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

PROJECT: 07-1130-207-0

## RECORD OF CONE PENETRATION TEST CPT-162

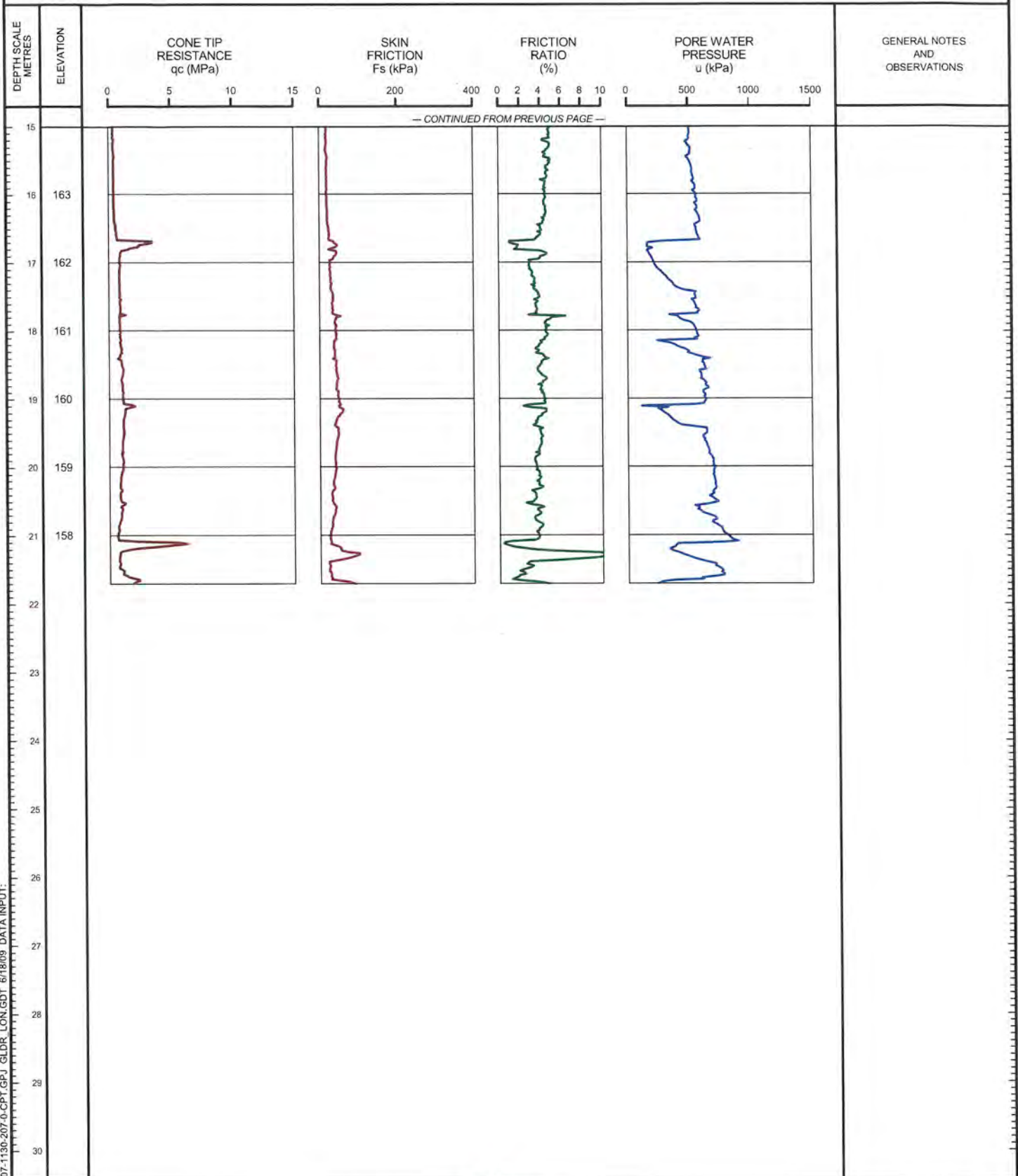
SHEET 2 OF 2

LOCATION: N 4682439.2; E 328729.1

TEST DATE: September 3, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 2.13m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LDN CPT\_01\_07-1130-207-0.CPT.GPJ GLDR LONGIT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SSB*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-165**

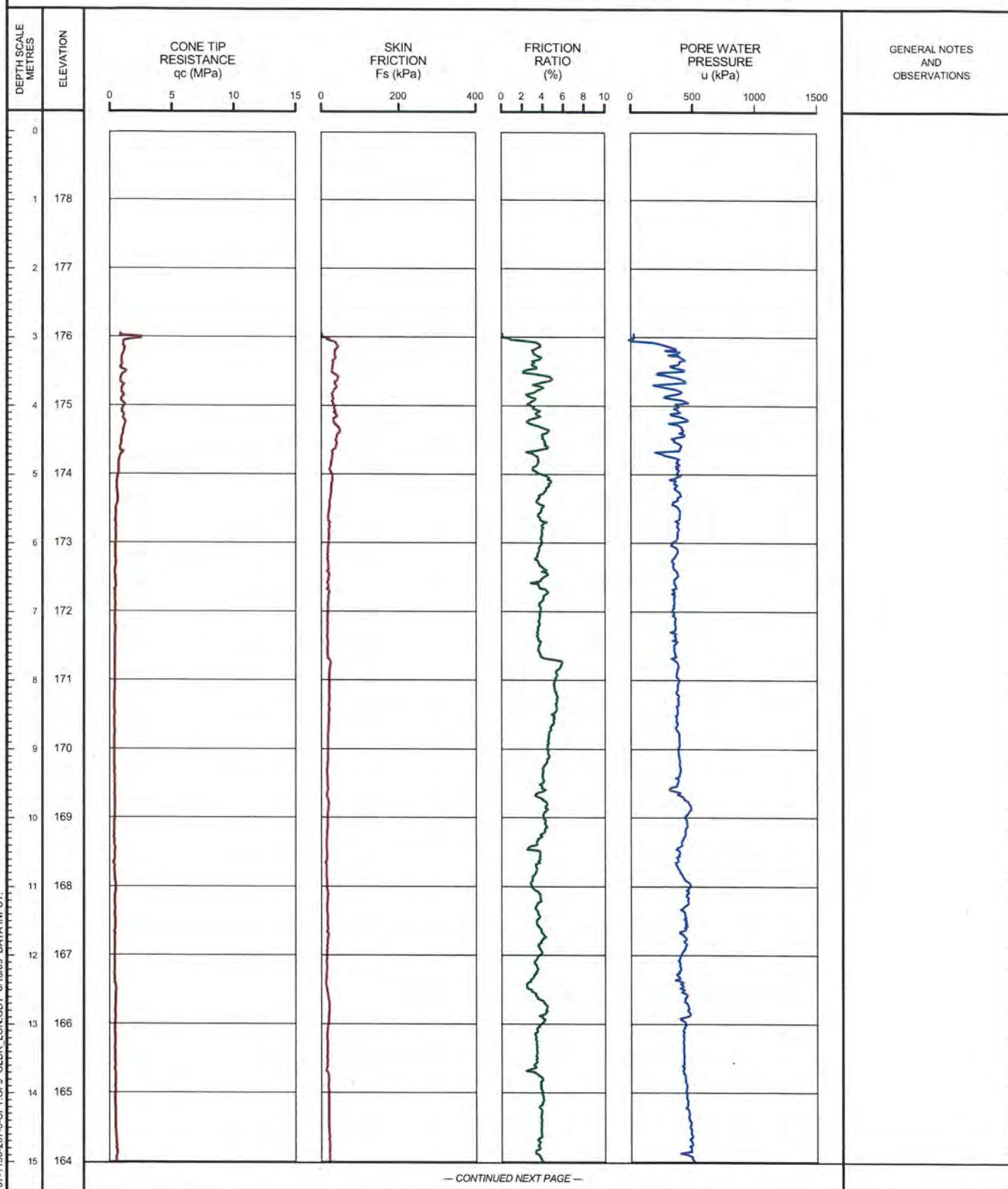
SHEET 1 OF 2

LOCATION: N 4682188.2 ; E 328457.7

TEST DATE: August 13, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION: PREDRILL DEPTH: 2.95m CORRECTION FACTOR A: 0.6 CORRECTION FACTOR B: 0.013



LON CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE  
1 : 75

OPERATOR: CC

CHECKED: *SS*



PROJECT: 07-1130-207-0

**RECORD OF CONE PENETRATION TEST CPT-165**

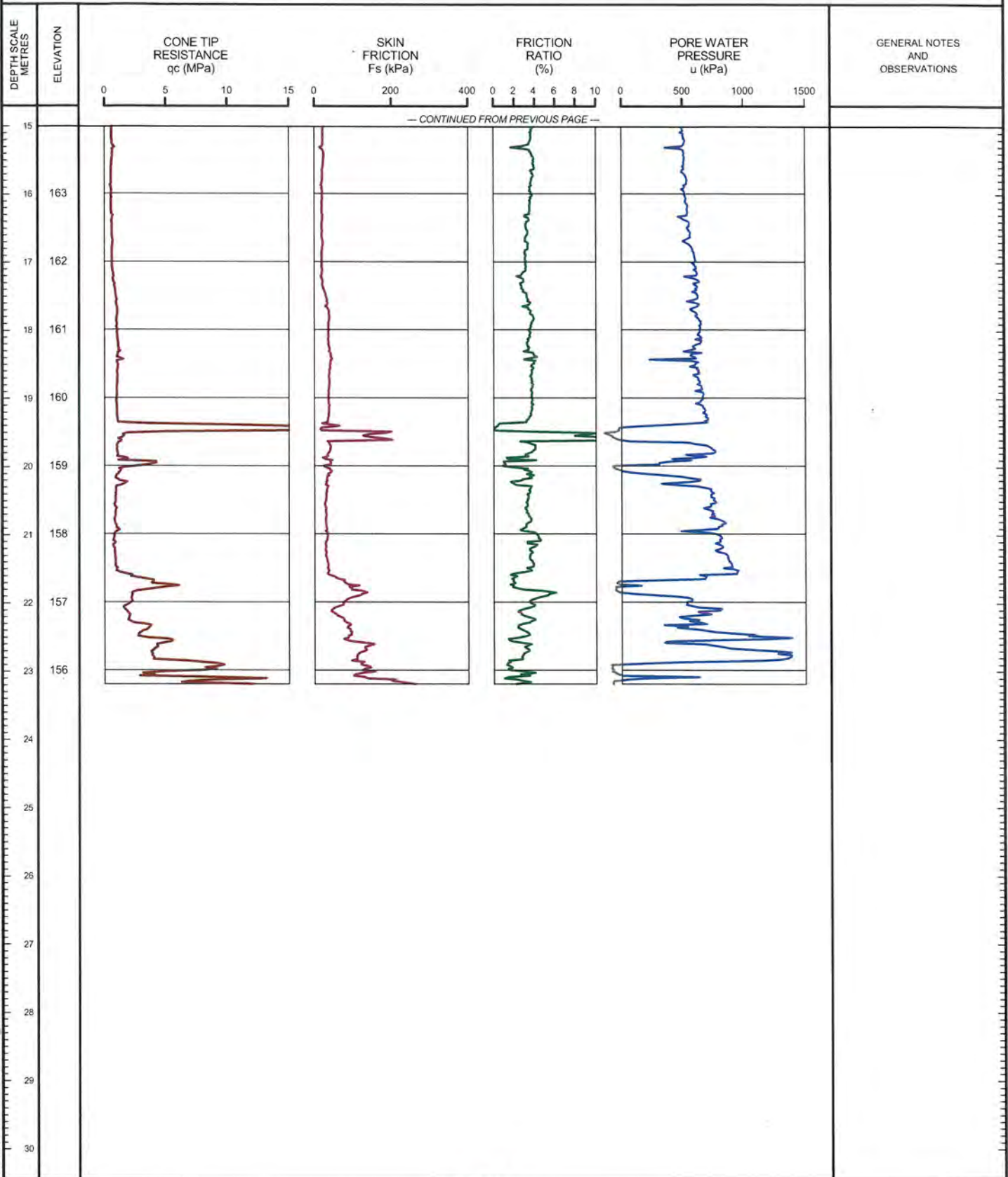
SHEET 2 OF 2

LOCATION: N 4682188.2 ; E 328457.7

TEST DATE: August 13, 2008

DATUM: GEODETIC

GROUND SURFACE ELEVATION:    PREDRILL DEPTH: 2.95m    CORRECTION FACTOR A: 0.6    CORRECTION FACTOR B: 0.013



LDN CPT 01 07-1130-207-0-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: CC

CHECKED: *SVB*

PROJECT: 09-1132-0003

## RECORD OF CONE PENETRATION TEST CPT-201

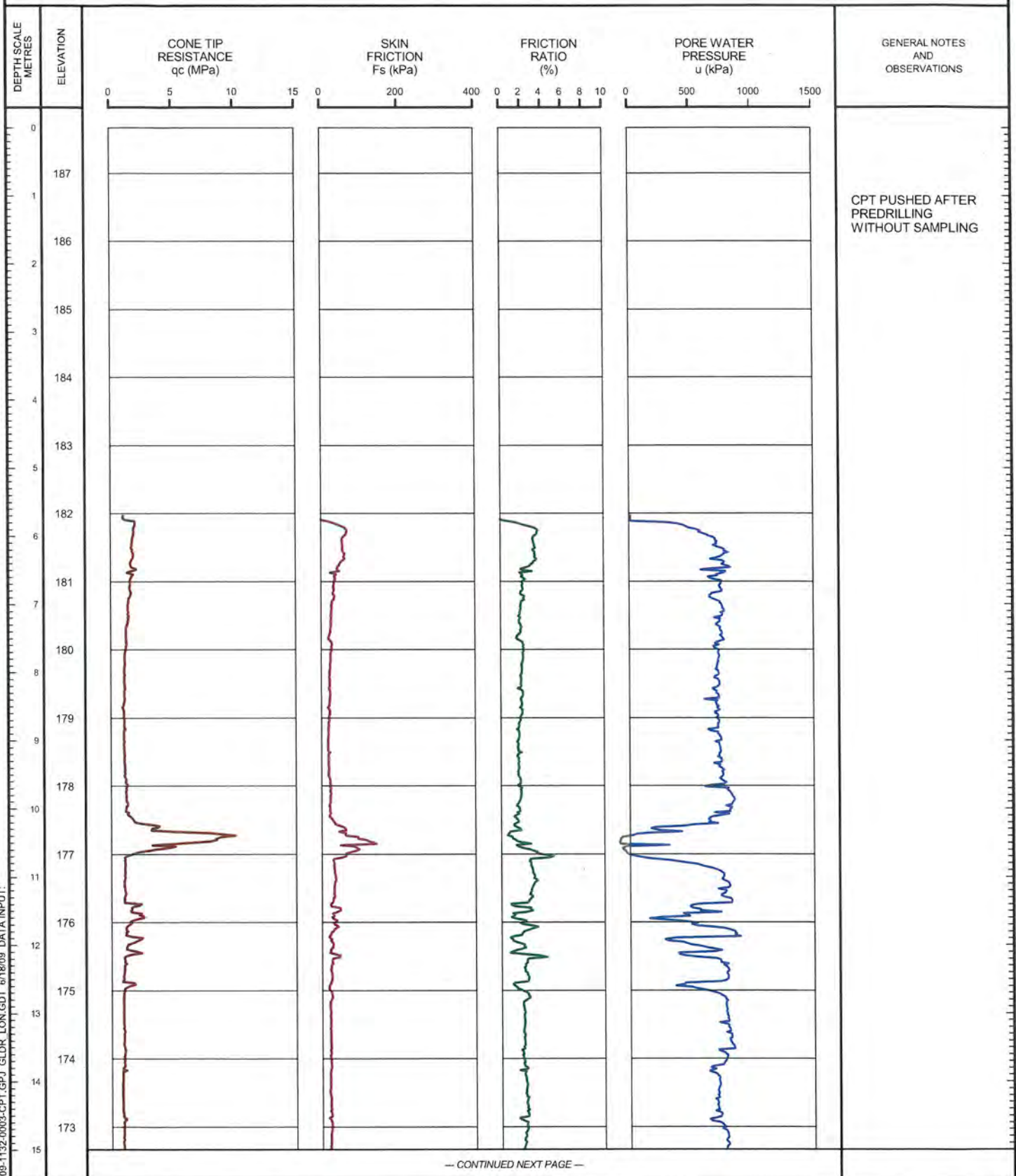
SHEET 1 OF 2

LOCATION: N 4677608.0 :E 335775.0

TEST DATE: February 24, 2009

DATUM: GEODETIC

GROUND SURFACE ELEVATION: 187.67m PREDRILL DEPTH: 5.70m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



DEPTH SCALE

1 : 75



OPERATOR: NG

CHECKED: SSB

PROJECT: 09-1132-0003

## RECORD OF CONE PENETRATION TEST CPT-201

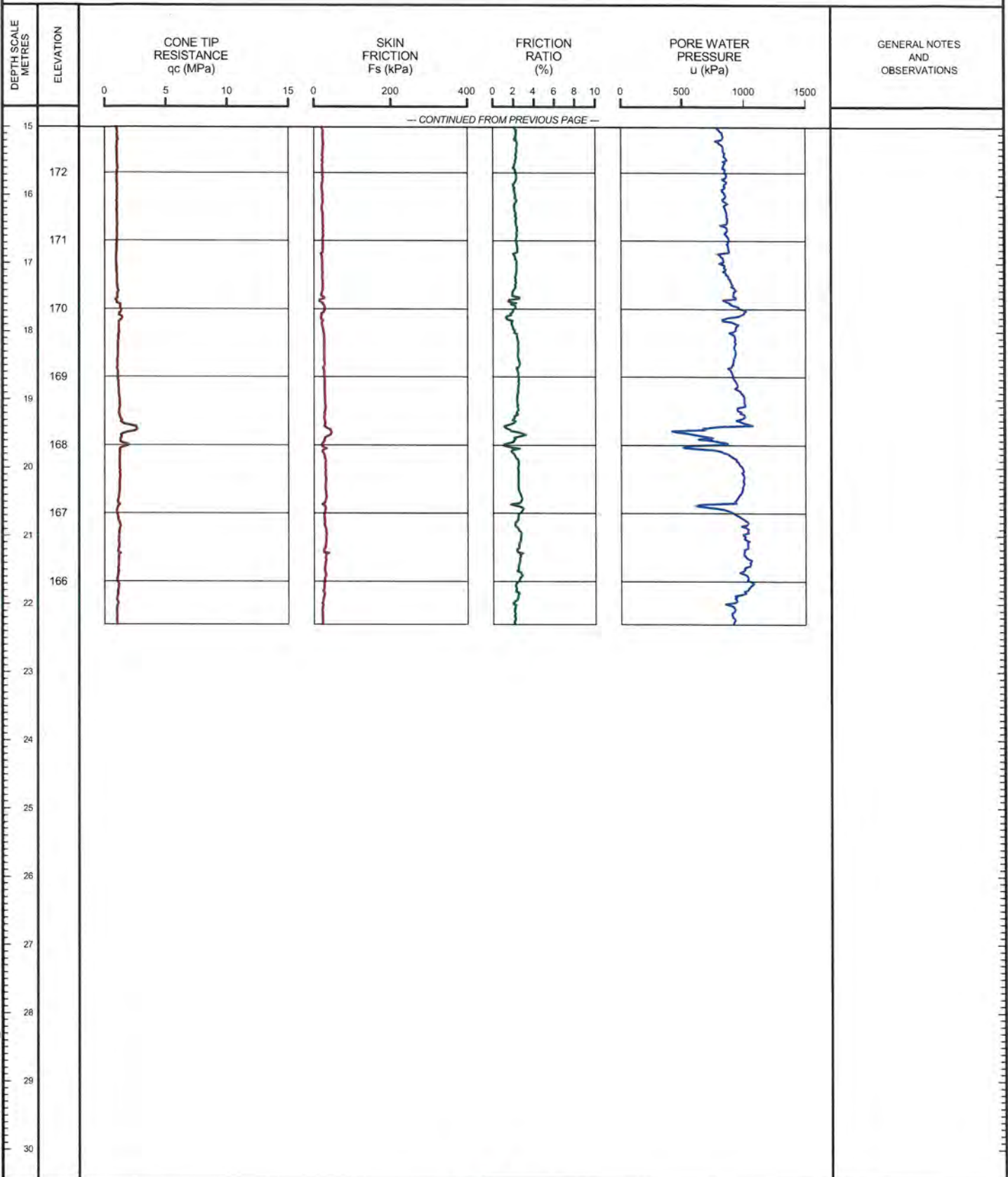
SHEET 2 OF 2

LOCATION: N 4677608.0 :E 335775.0

TEST DATE: February 24, 2009

DATUM: GEODETIC

GROUND SURFACE ELEVATION: 172.67m PREDRILL DEPTH: 5.70m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN CPT 01 09-1132-0003-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE

1 : 75



OPERATOR: NG

CHECKED: *SSB*



PROJECT: 09-1132-0003

## RECORD OF CONE PENETRATION TEST CPT-206

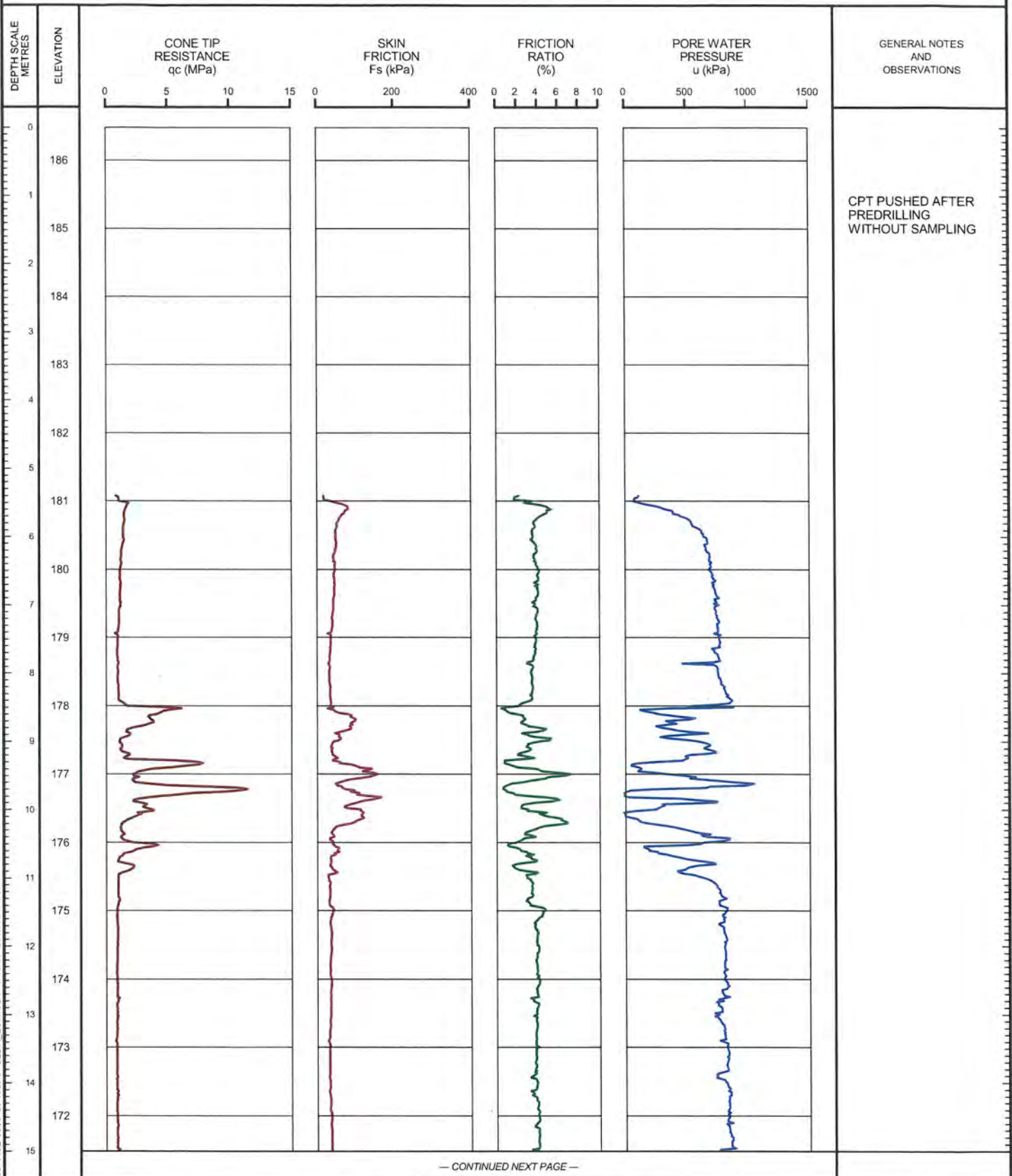
SHEET 1 OF 2

LOCATION: N 4677643.0 ; E 335466.0

TEST DATE: February 24, 2009

DATUM: GEODETIC

GROUND SURFACE ELEVATION: 186.48m PREDRILL DEPTH: 5.40m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012

CPT PUSHED AFTER  
PREDRILLING  
WITHOUT SAMPLING

LON\_CPT\_01 09-1132-0003-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

DEPTH SCALE  
1 : 75OPERATOR: NG  
CHECKED: *NG*



PROJECT: 09-1132-0003

**RECORD OF CONE PENETRATION TEST CPT-206**

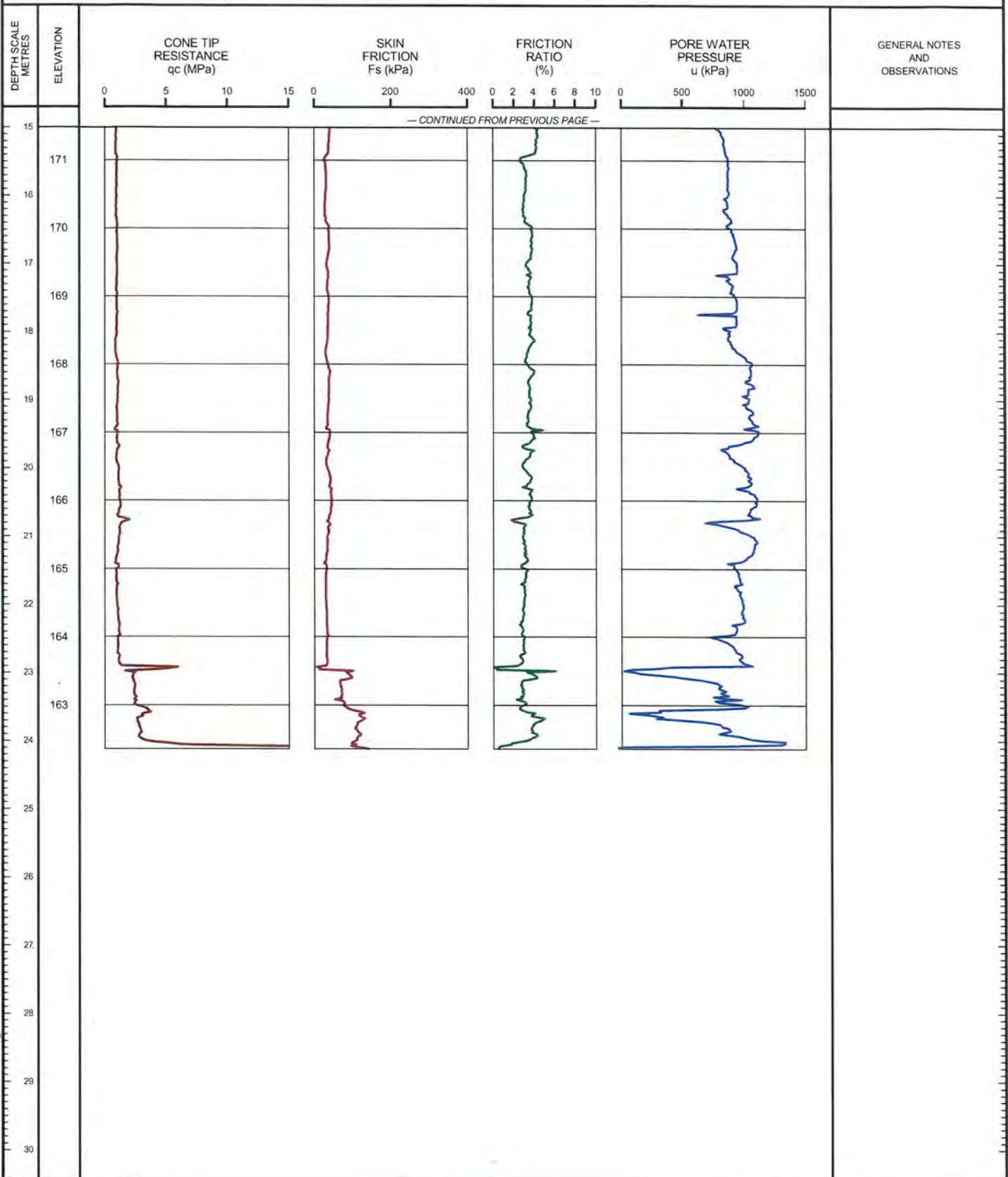
SHEET 2 OF 2

LOCATION: N 4677643.0 ; E 335466.0

TEST DATE: February 24, 2009

DATUM: GEODETIC

GROUND SURFACE ELEVATION: 171.48m PREDRILL DEPTH: 5.40m CORRECTION FACTOR A: 0.584 CORRECTION FACTOR B: 0.012



LDN\_CPT\_01 09-1132-0003-CPT.GPJ GLDR LON.GDT 6/18/09 DATA INPUT:

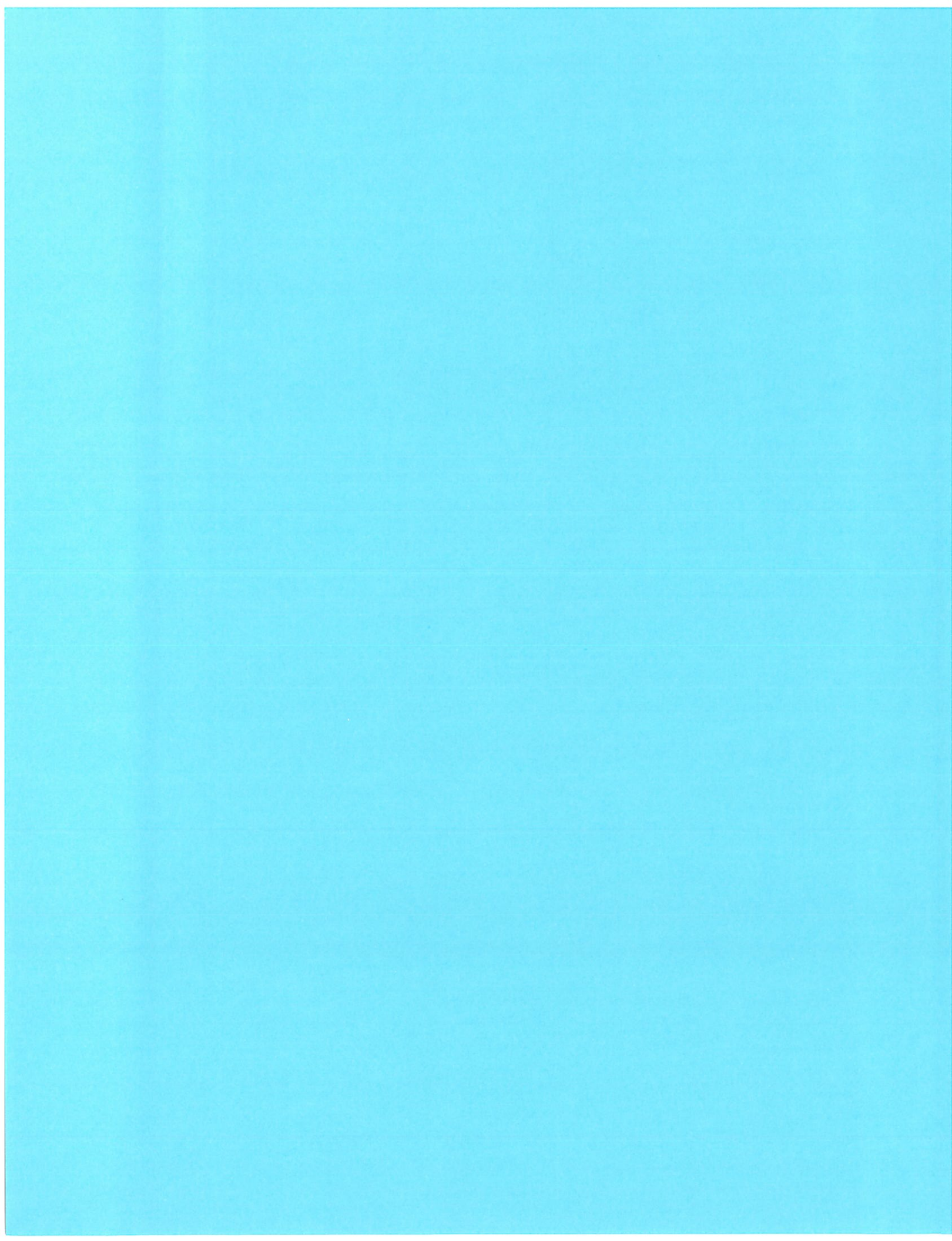
DEPTH SCALE

1 : 75



OPERATOR: NG

CHECKED: *SB*





# APPENDIX F

## Laboratory Tests

LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
1	1A	0.28	19.6											
1	1B	0.34	17.6											
1	2	1.83	14.8											
1	3	4.13	12.1											
1	4	5.72	15.9											
1	5	7.25	15.6	9	30	36	25	61	26.1	13.5	12.6	21.1	2.73	
1	6	8.76	17.8											
1	7	10.29	16.3						22.7	12.3	10.4			
1	8	11.81	16.6											
1	10	13.95	18.4	2	28	41	29	70	27.3	15.1	12.2	20.5	2.73	
1	11	14.86	25.2											
1	12	16.39	20.6						28.8	15.4	13.4			
1	13	17.91	13.6											
1	14	19.44	25.9	3	23	44	30	74	27.2	14.4	12.8	20.0	2.76	
1	15	20.96	27.0											
1	16	22.49	12.6						21.3	13.1	8.2			
1	17	24.01	13.7											
1	18	25.54	13.7						23.7	13.6	10.1			
1	20	27.67	17.6						28.0	15.9	12.1			
1	21	28.58	18.3											
1	23	30.72	24.1						33.5	17.5	16.0			
1	24	31.63	24.8											
1	27	34.30												49.2
7	1A	0.25	20.2											
7	1B	0.43	13.0											
7	2	1.83	13.3											
7	3	2.67	13.3											
7	4	4.19	14.7											
7	5	5.81	14.7						22.9	13.8	9.1			
7	6	7.24	14.2											
7	7	8.70	16.9	1	31	39	30	69	22.9	13.3	9.6	21.4	2.73	
7	8	10.29	18.6											
7	9	11.75	18.3						28.8	15.3	13.5			



LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
7	10	13.34	21.7											
7	11	14.80	21.7	3	19	42	36	78	29.7	15.4	14.3	20.7	2.76	
7	12	16.40	37.3						42.9	21.9	21.0			
7	13	17.91	19.8											
7	15	19.98	15.5						21.1	13.2	7.9			
7	16	20.96	7.4											
7	17	22.42	15.9						26.0	14.7	11.3			
7	18	24.01	17.6											
7	19	25.53	21.7											
7	20	26.22	19.6	2	19	42	37	79	29.1	14.9	14.2	21.0	2.74	
7	21	27.05	20.6											
7	22	28.52	27.5						28.4	16.1	12.3			
7	23	30.10	28.2											
7	24	31.52	13.0						19.0	11.9	7.1			
7	25	33.00	11.1											
7	29	37.20												33.3
14	1	0.30	16.1											
14	2	1.83	22.0											
14	4	4.22	26.1						41.1	20.7	20.4			
14	6	6.36	22.8						32.0	16.4	15.6			
14	6	6.58	22.8											
14	7	7.34	21.7											
14	8	8.79	21.7											
14	9	10.31	20.1	3	26	41	30	71	28.6	15.2	13.4	21.0	2.75	
14	9	10.54	20.6											
14	10	11.91	21.6											
14	11	13.37	21.8	2	23	39	36	75	28.0	15.7	12.3	20.2	2.76	
14	12	14.96	28.8											
14	13	17.02	17.4						56.3	25.2	31.1			
14	15	18.01	26.5											
14	16	18.93	16.4	7	24	45	25	70	24.2	13.6	10.6	21.4	2.75	
14	17	21.06	16.0											
14	18	22.51	18.6						28.5	15.8	12.7			
14	18	22.74	20.0											
14	19	24.26	19.7											
14	20	25.56	24.2						35.4	17.8	17.6			
14	21	27.46	14.5											
14	23	29.22	26.2						29.5	15.7	13.8			
14	24	30.20	18.0											
14	25A	31.58	20.3											
14	25B	31.88	8.1											
14	26	33.48	11.9											
14	30	37.00												36.4

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)		(MPa)
23	23	1A	0.15	10.6										
	23	1B	0.46	14.8										
	23	2A	1.60	21.7										
	23	2B	1.91	17.6										
	23	3	2.74	21.2										
	23	4	4.19	24.2						27.6	17.0	10.6		
	23	5	5.79	36.4										
	23	6	7.32	25.7										
	23	7	8.76	31.6	1	24	37	39	76	31.1	16.6	14.5	19.9	2.75
	23	8	10.36	26.1										
	23	9	11.81	22.9						23.1	13.6	9.5		
	23	10	13.41	25.8										
	23	11	14.86	15.5										
	23	13	16.99	18.4	2	20	44	34	78	29.0	15.5	13.5	21.2	2.74
	23	14	17.99	16.4										
	23	15	19.43	20.5	4	16	40	40	80	33.2	17.9	15.3	21.6	2.75
	23	16A	21.11	19.2										
	23	16B	21.11	14.0										
	23	17	22.41	19.6										
	23	20	24.50											55.4
101	1	0.99	13.0											
101	2	1.75	12.9											
101	3	2.51	12.0	2	30	42	26	68	26.7	13.2	13.5			
101	4	3.28	12.5											
101	5	4.04	12.6											
101	6	4.80	14.4											
101	7	6.32	15.6											
101	8	7.85	9.1											
101	9	9.37	15.1											
101	10	10.90	15.6											
101	11	12.34	11.2											
101	12	13.94	13.9	4	36	35	25	60	25.6	14.6	11.1			
101	13	15.47	10.5					56						
101	14	16.99	19.5	2	27	40	31	71	26.2	13.7	12.5			
101	15	18.52	14.0											
101	16	20.04	27.0											
101	17	21.56	26.3											
101	18	23.09	13.8											
101	19	24.61	15.6											
101	20	26.14	10.1											
101	21	27.66	16.6											
101	22	29.18	16.3											
101	23	30.71	17.2	0	36	58	6	64						
101	24	32.23	11.7											
101	25	33.27	7.1											
101	28	36.14												19.5
102	1	0.99	21.8											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay <75µm	Liquid Limit	Plastic Limit	Plasticity Index				
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)		(MPa)
102	2	1.75	6.8											
102	3	2.51	13.8											
102	4	3.28	14.6											
102	5	4.04	13.8											
102	6	4.80	14.7											
102	7	5.56	16.0											
102	8	6.32	16.5											
102	9	7.85	17.1											
102	10	9.37	15.5	3	32	40	25	65	21.1	12.6	8.5			
102	11	10.13	17.3											
102	12	10.90	15.3											
102	13	12.42	17.7											
102	14	13.94	18.6											
102	15	15.47	20.0	0	24	43	33	76	23.3	13.6	9.8			
102	16	16.99	21.9											
102	17	18.52	22.5						28.2	16.1	12.1			
102	18	20.04	24.1											
102	19	21.56	29.0											
102	20	23.09	13.5	3	28	47	22	69	19.6	12.8	6.8			
102	21	24.61	12.9											
102	22	26.14	19.8											
102	23	27.66	18.2					72						
102	24a	29.11	17.3											
102	24b	29.34	22.3											
102	25	30.71	35.8											
102	26	32.00	16.7											
102	28	34.20												43.1
103	1	0.99	19.2											
103	2	1.75	13.4											
103	3	2.51	12.6											
103	4	3.28	13.1											
103	5	4.04	13.7											
103A	1	3.30	-											
103A	2	3.96	-											
103A	3	4.57	13.3	1	33	37	29	66	25.2	13.1	12.1			
104	1	0.99	15.5											
104	2	1.75	13.2											
104	3	2.51	13.3											
104	4	3.28	12.4											
104	5	4.04	13.3											
104	6	4.80	13.5											
104	7	5.56	14.6											
104	8	6.32	12.1											
104	10	8.61	12.6	4	46	37	13	50	13.4	10.8	2.6			
104	11	9.37	14.9											
104	12	10.90	19.0	2	27	43	28	71	23.4	13.2	10.2			
104	14	13.94	19.1											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway					Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm						
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
104	16	16.99	21.1	1	23	41	35	76	27.3	15.4	11.8			
104	17	18.52	31.5											
104	19	21.56	17.0											
104	20	23.09	12.6											
104	21	24.61	9.3	8	74			18						
104	22a	26.09	18.1					66						
104	22b	26.32	17.4											
104	23a	27.61	22.4											
104	23b	27.84	16.4					92						
104	24	29.18	23.0											
104	25	30.52	7.9											
104	27	32.90												19.0
105	1	0.99	18.4											
105	2	1.75	18.1											
105	3	2.51	12.9											
105	4	3.28	10.6											
105	5	4.04	13.5											
105	6	4.80	14.2											
105	7	5.56	14.7											
105	8	6.25	15.4						26.0	12.7	13.3			
105	9	7.85	15.3						24.0	12.1	11.9			
105	10a	9.30	11.4											
105	10b	9.53	13.8											
105	11	10.97	17.2						25.8	13.0	12.8			
105	12	12.42	18.2											
105	13	13.82	21.1											
105	14	15.47	21.4											
105	15	16.99	21.9						32.2	14.7	17.5			
105	16	18.52	27.8											
105	17	20.04	19.1											
105	18	21.41	31.9											
105	19	23.01	14.5											
105	20	24.60	18.7						37.5	17.4	20.1			
105	21	26.14	28.0											
105	22	27.66	18.4					69						
105	23a	29.11	21.5											
105	23b	29.34	19.8											
105	24a	30.52	7.3											
105	24b	30.59	8.0											
105	26	32.80												19.5
106	1a	0.18	10.6											
106	1b	0.48	13.8											
106	2	0.91	14.6											
106	3	1.52	12.3											
107	1	0.99	18.9											
107	2	1.75	12.9											
107	3	2.51	13.1											



LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
107	4	3.28	11.8											
107	5	4.04	12.5											
107	6	4.80	13.3											
107	7	5.56	14.4											
107	8	6.32	15.1											
107	9	7.85	14.4	2	31	42	25	67	22.6	12.6	10.0			
107	11	10.90	17.1											
107	12	12.42	17.4											
107	13a	13.79	13.6	14	40	36	10	46	15.2	11.2	4.0			
107	13b	14.02	20.8											
107	14	15.47	17.0											
107	15	16.99	20.6											
107	16	18.52	23.9											
107	17	20.04	35.0											
107	18	21.41	18.6	2	20	46	32	78	24.1	14.0	10.1			
107	19	23.09	12.7											
107	20	24.61	17.2											
107	21	26.14	19.9											
107	23	29.18	27.6											
107	24a	30.54	20.2											
107	24b	30.65	10.2											
107	24c	30.82	10.0											
107	30	33.80												44.1
108	1	0.99	20.6											
108	2	1.75	16.3											
108	3	2.51	12.2											
108	4	3.28	13.0											
108	5	4.04	12.3											
109	1	0.99	18.1											
109	2	1.75	20.2											
109	3	2.51	11.9											
109	4	3.28	13.9											
109	5	4.04	13.5											
109	6	4.80	12.2											
109	7	5.87	14.4	10	30	41	19	60	21.7	12.1	9.6			
109	9	8.15	15.8											
109	11	11.05	15.0											
109	12	12.73	20.8											
109	13	14.10	16.5											
109	14	15.77	17.1											
109	17	20.35	13.8	6	26	47	21	68	20.9	11.8	9.1			
109	19	23.39	17.1											
109	21	25.15	21.9	7	12	45	36	81	25.8	14.9	10.9			
109	22a	26.37	18.2					83						
109	22b	26.59	19.0											
109	23a	27.86	27.5											
109	23b	28.09	19.5											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway					Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm						
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
109	24	29.49	19.6					73						
109	25	31.01	10.7					49						
109	26	32.54	9.0	15	71	10	4	14						
109	27	33.89	10.9											
109	28	35.59	12.3											
109	32	40.00												25.4
110	1a	0.15	17.5											
110	1b	0.46	11.1											
110	2	0.91	18.6											
110	3	1.52	6.4											
111	1a	0.11	11.2											
111	1b	0.42	10.0											
111	2	0.91	11.1											
111	3	1.52	13.3											
112	1	0.99	16.3											
112	2	1.75	13.9											
112	3	2.51	12.7											
112	4	2.97	14.0											
112	5	3.73	12.9											
112	6	4.50	12.4											
112	7	5.30	12.9						19.0	11.9	7.1			
112	8	6.78	16.3											
112	10	9.80	16.1						24.2	12.4	11.8			
112	11	9.83	15.9											
112	14	14.55	18.1											
112	15	16.69	30.8											
112	16	19.13	22.3											
112	17	20.65	15.1											
112	18	22.10	15.2						27.9	14.7	13.2			
112	19	23.60	19.3						36.4	15.9	20.5			
112	21	25.68	27.1											
112	23a	28.13	17.6											
112	23b	28.36	20.5					85						
112	24	28.93	10.4					54						
112	25	29.26	7.8											
112	28	33.50												30.1
113	1	0.99	14.2											
113	2	1.75	15.1	1	31	39	29	68	25.9	15.0	10.9			
113	3	2.51	13.1											
113	4	3.28	12.4											
113	5	4.04	12.1	1	31	42	26	68	22.6	13.4	9.2			
113	6	4.80	13.2											
113	7	6.32	14.9											
113	8	7.85	15.5											
113	9	9.37	15.0											
113	11	12.42	12.3											
113	13	15.47	16.7											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
113	14	16.99	33.1											
113	15	18.52	31.4											
113	17	21.56	14.7											
113	18	23.09	18.0											
113	19	24.61	18.0											
113	20	26.14	24.2	1	15	44	40	84	33.2	17.2	16.0			
113	21	27.66	19.7											
113	22a	29.08	9.9											
113	22b	29.31	26.0											
113	28	34.90												16.6
114	1a	0.14	14.0											
114	1b	0.45	10.9											
114	2	0.91	12.6											
114	3	1.52	13.4											
115	1	0.99	13.4											
115	2	1.75	12.5											
115	4	2.97	12.4											
115	5	3.89	17.4											
115	6	4.65	17.2											
115	7	5.41	14.9											
115	8	6.93	14.9											
115	10a	9.94	11.3	3	43	39	14	53	14.4	12.1	2.3			
115	10b	10.17	12.3											
115	11	11.51	15.2					9						
115	12	12.27	17.2	2	30	40	28	68	24.5	13.4	11.1			
115	14	14.55	18.9											
115	15	16.08	22.2											
115	17	19.13	24.0											
115	18	20.65	14.3	4	25	47	24	71	23.2	14.0	9.2			
115	20	22.94	17.9											
115	21	23.70	18.5											
115	22	25.22	21.3											
115	24	28.27	20.0	1	86	8	5	13						
115	25	29.79	14.1											
115	26	31.32	7.1	25	66	6	3	9						
115	30	37.50												26.5
116	1	0.99	22.2											
116	2	1.75	14.1											
116	3	2.51	12.9											
116	4	3.28	11.4	6	30	39	25	64	25.7	15.0	10.7			
116	5	4.04	13.1											
116	6	4.80	13.2											
116	7	5.56	14.4											
116	8	6.32	14.1											
116	9	7.92	16.0											
116	10	9.37	16.4											
116	11	10.90	17.0											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)		(MPa)
116	12	12.42	17.4											
116	13	14.02	16.3											
116	14	15.47	37.5	1	4	36	59	95	36.6	19.4	17.2			
116	15	16.99	27.3											
116	17	20.03	15.2											
116	18	21.56	17.0											
116	20	24.61	18.5	3	21	44	32	76	27.4	15.4	12.0			
116	21	26.14	17.3											
116	22	27.66	25.4											
116	23	29.18	35.3											
116	24	30.71	11.2					49						
116	26	33.00												24.8
117	1	0.99	19.2											
117	2a	1.68	16.8											
117	2b	1.91	12.9											
117	3	2.51	11.7											
117	4	3.28	13.7											
117	5	4.04	12.6											
118	1	0.99	18.7											
118	2	1.75	20.6											
118	3	2.51	13.1											
118	4	3.28	13.1											
118	5	4.04	15.9											
118	6	4.80	15.8											
118	7	5.56	16.4											
118	8	6.32	14.8											
118	10	9.37	26.7	2	15	47	36	83	32.2	16.4	15.8			
118	12	12.42	19.9											
118	13	14.02	20.8											
118	15	16.99	37.5	4	11	32	53	85	38.2	19.0	19.2			
118	16	18.52	15.7											
118	18	21.56	15.0											
118	19	23.09	15.4											
118	21	26.14	19.7											
118	22	27.66	22.0											
118	23a	29.11	17.7											
118	23b	29.34	19.0											
118	24	30.71	9.6	4	48	39	9	48	15.1	10.9	4.2			
118	25	32.17	10.3											
118	26	32.60												100.6
119	1	0.99	24.0											
119	2	1.75	16.9											
119	3	2.51	14.0											
119	4	3.28	14.5											
119	5	4.04	15.9											
119	6	4.80	17.1											
119	8	6.40	18.7											



LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway					Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm						
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
119	9	7.92	18.5						27.7	13.5	14.2			
119	10	9.37	18.9											
119	11	11.58	20.1											
119	12	12.42	21.1											
119	13	13.99	20.2						30.6	14.1	16.5			
119	14	15.47	26.1											
119	15	17.04	37.7											
119	16	18.52	15.9											
119	17	20.12	15.8											
119	18	21.64	16.7											
119	20	24.61	18.9											
119	21	26.21	20.9						33.8	16.1	17.7			
119	22	27.74	22.0											
119	23	29.26	22.5											
119	24	30.78	26.7											
119	26	33.00												38.8
120	1a	0.27	10.8											
120	1b	0.72	12.7											
120	2	0.91	10.9											
121	1a	0.04	24.9											
121	1b	0.34	19.7											
121	2	0.91	17.1											
121	3	1.52	14.6											
122	1	1.00	23.4											
122	2	1.75	15.0											
122	3	2.50	18.3											
122	4	3.26	22.3											
122	5	4.02	26.6											
122	6	4.85	17.9	1	21	41	37	78	32.1	14.2	17.9			
122	7	6.33	22.1											
122	8	7.82	22.9											
122	9	9.35	25.5											
122	10	10.95	21.5	1	19	45	35	80	34.6	15.9	18.7			
122	12	14.05	39.7											
122	13	15.45	46.7											
122	14	17.05	22.5	4	24	39	33	72	31.1	13.9	17.2			
122	15	18.52	14.9											
122	17	21.55	18.3											
122	18	23.15	17.9											
122	19	24.67	16.9	5	26	44	25	69	27.6	13.5	14.1			
122	20	26.20	22.7											
122	21	27.70	21.2											
122	22	29.25	16.6	0	22	69	9	78	19.5	16.1	3.4			
122	23	30.71	17.0					29						
122	24	32.23	13.9											
122	30	39.50												14.2
123	1	0.46	17.6											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
123	2	1.22	22.2											
123	3	1.83	21.1											
124	1	0.30	11.5											
124	2a	0.76	14.5											
124	2b	1.07	20.6											
124	3	1.52	19.8											
126	1	0.99	5.9											
126	2	1.75	26.1											
126	3	2.51	20.7											
126	4	3.28	18.7											
126	5	4.04	15.1											
126	6	4.80	18.9											
126	7	5.56	20.4											
126	8	6.32	19.3											
126	9	7.09	22.3											
126	10	7.85	17.1											
127	1a	0.84	16.5											
127	1b	1.07	15.8											
127	2	1.75	19.8											
127	3	2.51	20.0											
127	4	3.28	15.2											
127	5	4.04	14.9											
127	6	4.80	17.5	3	21	42	35	77	30.8	16.2	14.6			
127	7	5.56	18.0											
127	8	6.40	18.2											
127	9	7.85	21.8											
127	10	9.37	20.6											
127	11	10.90	21.6											
127	12	12.42	28.2											
127	13	13.94	19.5											
127	14	15.47	14.8											
127	15	16.99	15.0											
127	17	20.04	16.9	1	22	45	32	77	27.1	15.4	11.7			
127	18	21.56	19.2											
127	19	23.09	21.7											
127	20	24.61	23.8											
127	21a	25.98	19.8					19						
127	21b	26.14	16.9											
127	21c	26.29	13.4											
127	22	27.66	33.4	0	2	45	53	98	41.1	21.0	20.1			
127	23	29.18	13.1											
127	24a	30.60	12.6											
127	24b	30.83	8.7					39						
127	25	32.19	15.4											
127	28	36.00												83.7
128	1	0.30	12.1											
128	2	0.91	21.3											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
128	3	1.52	28.4											
129	1	0.99	21.3											
129	2	1.75	24.2											
129	3	2.51	18.8											
129	4	3.28	19.8											
129	5	4.04	26.7											
129	6	4.80	18.5											
129	7	5.56	21.2											
129	8	6.35	23.8	1	16	38	45	83	36.2	16.0	20.2			
129	9	7.85	21.5											
129	11	10.90	26.6											
129	12	12.40	21.9	1	18	40	41	81	34.9	16.3	18.6			
129	15	16.99	25.4						34.9	18.6	16.4			
129	16	18.50	19.0	3	29	46	22	68	25.0	13.6	11.4			
129	18	21.56	21.2											
129	19	23.09	18.7						29.5	17.6	12.0			
129	20	24.61	21.7											
129	21	26.15	21.8	2	16	45	37	82	31.2	16.2	15.0			
129	22	27.66	35.1											
129	24	30.71	14.4											
129	25	32.23	12.1											
129	26	33.59	13.8											
129	28	35.07												79.6
130	1a	0.27	1.0											
130	1b	0.57	5.9											
130	2	0.91	22.2											
130	3	1.52	26.3											
131	1	0.99	28.5											
131	2	1.75	19.4											
131	3	2.51	14.0											
131	4	3.28	24.6											
131	5	4.04	21.7											
131	6	4.80	26.8											
131	7	5.56	24.4											
131	8	6.32	19.2											
131	9	7.85	26.0	1	11	40	48	88	40.0	18.7	21.4			
131	11	10.90	22.5											
131	13	13.94	40.5	0	10	36	54	90	39.0	18.9	20.1			
131	15	16.99	16.8											
131	17	20.04	18.3											
131	18	21.56	19.3											
131	20	24.61	20.8											
131	21	26.14	18.5											
131	22	27.66	19.4											
131	23	29.18	40.2											
131	24	30.71	7.2	50	25	20	5	25						
131	25	32.23	12.3											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
131	29	35.02												79.4
132	1	0.99	21.3											
132	2	1.75	22.5											
132	4	3.28	19.8											
132	6	4.80	20.0											
132	7	6.40	23.3	3	19	41	37	78	36.0	16.7	19.3			
132	8	7.85	34.5											
132	11	11.60	31.6	0	15	40	45	85	41.6	18.6	23.0		2.79	
132	12	12.19	23.0	0	16	42	42	84	36.8	18.0	18.8			
132	13	12.80	24.7	0	16	41	43	84	37.3	16.6	20.7			
132	14	14.10	32.7											
132	16	16.99	25.6											
132	17	18.60	15.9	4	26	47	23	70	23.7	12.9	10.8			
132	18	20.04	17.3											
132	20	23.09	19.4											
132	22	26.14	23.6											
132	24	29.18	15.6											
132	26	32.75	10.1					47						
132	28	35.65												39.2
133	1	0.61	18.6											
133	2a	0.99	21.9											
133	2b	1.10	24.3											
133	2c	1.33												
133	3	1.83	21.1											
134	1	0.30	6.3											
134	2	0.91	3.3											
134	3	1.52	22.1											
135	1	0.99	25.2											
135	2	1.75	21.1											
135	3	2.51	19.3											
135	4	3.28	17.0											
135	5	4.04	16.5											
135	6	4.80	19.1											
135	7	5.56	20.9	3	29	39	29	68	25.9	12.8	13.1			
135	9	7.85	23.3											
135	11	10.90	22.4											
135	12	12.40	24.3	0	20	38	42	80	33.3	16.3	17.0			
135	13	13.94	21.9											
135	14	15.45	31.4	1	10	32	57	89	41.6	18.7	22.9			
135	15	16.99	17.4											
135	17	20.05	18.6	5	23	45	27	72	27.7	14.7	13.0			
135	18	21.56	18.6											
135	20	24.61	24.6											
135	21	26.14	20.5											
135	22	27.66	23.2											
135	23	29.18	19.6											
135	24	30.71	20.2											



LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
135	25	32.23	13.9											
135	31	39.60												22.9
136	1	0.99	9.9											
136	2a	1.62	22.9											
136	2b	1.85	23.4											
136	3	2.51	20.9											
136	4	3.28	16.8											
136	5	4.04	19.7											
136	6	4.80	21.8											
136	7	5.56	31.5											
136	9	7.85	28.3											
136	10	9.37	30.3											
136	11	10.90	23.8											
136	13	13.94	25.0											
136	15	16.99	27.9						30.5	17.0	13.5			
136	17	20.04	17.5											
136	19	23.09	20.4						28.8	16.0	12.8			
136	20	24.61	24.2											
136	21a	25.98	27.5											
136	21b	26.21	24.2											
136	22	27.66	25.9											
136	23	29.18	22.2	0	15	77	8	85						
136	24	30.71	25.4											
136	25	32.23	12.4											
136	27	35.97												95.1
137	1	0.30	7.4											
137	2	0.91	9.6											
137	3a	1.47	3.6											
137	3b	1.93	11.4											
139	1	0.99	6.2											
139	2	1.75	25.8											
139	3	2.51	24.3											
139	4	3.28	20.5											
139	5	4.04	17.7											
139	6	4.80	21.5											
139	7	5.56	21.3											
139	8	6.32	25.1											
139	10	9.37	21.0											
139	12	12.42	23.7											
139	14	15.47	24.4											
139	16	18.52	20.2						23.7	13.0	10.8			
139	17	20.04	18.1											
139	18	21.56	18.0											
139	19	23.09	18.3											
139	20	61.53	20.5											
139	21	26.14	21.9						28.1	14.7	13.4			
139	23	29.18	24.1											

LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
139	24a	30.53	23.8											
139	24b	30.76	36.0	0	0	40	60	100						
139	29	37.74												78.3
140	1	0.99	16.4											
140	2	1.75	24.1											
140	3	2.51	22.2											
140	4	3.28	17.1											
140	5	4.04	20.3											
140	6	4.80	23.2											
140	7	5.56	20.5											
140	8	6.32	20.4						34.3	15.5	18.8			
140	9	7.85	20.7											
140	10	9.37	18.9											
140	11	10.90	23.8											
140	13	13.94	24.8											
140	15	16.99	37.3						38.5	18.2	20.4			
140	17	20.04	16.1											
140	20	24.61	20.3											
140	21	26.14	20.4											
140	22	27.66	23.8											
140	23	29.18	28.0											
140	24	30.71	34.1											
140	25a	32.13	26.4											
140	25b	32.32	21.8	0	5	86	9	95						
140	25c	32.42	11.3											
141	1	0.99	14.5											
141	2	1.75	22.5											
141	3	2.51	23.6											
141	4	3.28	25.8											
141	5	4.04	19.0											
141	6	4.80	19.6											
141	7	5.56	21.3											
141	8	6.32	22.1											
141	10	9.37	20.0											
141	13a	13.94	26.6											
141	13b	13.94	24.2											
141	14	15.47	25.8						32.2	15.6	16.6			
141	16	18.52	22.4											
141	18	21.56	17.9						25.6	14.2	11.4			
141	19	23.09	18.8											
141	21	26.14	21.1											
141	22	27.66	22.9											
141	23a	28.99	20.5											
141	23b	29.09	29.9											
141	23c	29.29	21.0	0	8	80	12	92						
141	24	30.71	23.9											
141	25	32.08	12.9	39	31	24	6	30						

LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
141	27	33.63												92.3
142	1	0.99	23.0											
142	2	1.75	17.3											
142	3	2.51	15.4											
142	4	3.28	14.5											
142	5	4.04	16.6											
142	6	4.80	15.9											
142	7	5.56	17.1											
142	8	6.32	18.5											
142	9	7.85	19.4											
142	10	9.37	22.4	0	21	42	37	79	28.8	14.7	14.1			
142	12	12.42	24.8											
142	14	15.47	31.8											
142	16	18.52	17.1											
142	18	21.56	19.3											
142	20	24.61	15.1	23	17	34	26	60	29.7	25.8	3.9			
142	21	26.14	22.7											
142	22	27.66	27.1											
142	23	29.18	29.4	2	13	50	35	85	33.9	18.1	15.8			
142	24a	30.63	31.3											
142	24b	30.86	16.5											
142	27	35.91												47.8
143	1a	0.91	9.2											
143	1b	1.14	22.0											
143	2	1.75	22.4	0	1	64	35	99	35.5	21.1	14.4			
143	3	2.51	18.4											
143	4	3.28	18.7											
143	5	4.04	21.7											
143	6	4.81	22.3											
143	7	5.56	19.7											
143	8	6.32	23.0											
143	9	7.85	22.5											
144	1	0.99	22.2											
144	2	1.75	14.3											
144	3	2.51	16.7											
144	4	3.28	21.8											
144	5	4.04	20.2											
144	6	4.80	13.6											
145	1	0.99	15.4											
145	2	1.75	22.9											
145	3	2.59	20.2											
145	4	3.51	17.2											
145	5	4.04	14.3											
145	6	4.80	15.0											
145	7	5.56	14.6											
145	8	7.09	16.4	2	30	41	27	68	25.9	13.1	12.8			
145	9	8.61	16.7											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)		(MPa)
145	13	11.81	17.8	6	30	40	24	64	25.7	13.1	12.6			
145	14	12.42	18.0											
145	15	13.03	17.2	4	27	40	29	69	26.8	13.5	13.3 oed		2.75	
145	15	13.03	18.4	3	30	41	26	67	25.8	13.3	12.5 tri			
145	16	14.71	9.3											
145	18	17.75	23.0											
145	19	19.28	18.4	2	26	46	26	72	25.5	13.5	12.0			
145	20	20.80	17.1											
145	21	22.40	19.1											
145	22	23.85	19.1											
145	23	25.37	21.0											
145	25	28.42	34.0											
145	28	32.88	2.5											
145	30	34.72												66.4
146	1	0.99	15.3											
146	2	1.75	21.6											
146	3	2.51	19.3											
146	4	3.28	14.9											
146	5	4.80	17.3											
147	1	0.99	16.5											
147	2	1.75	20.5	2	17	43	38	81	33.1	17.5	15.6			
147	3	2.51	14.8											
147	4	3.28	17.9	10	15	42	33	75	33.7	16.8	17.0			
147	5a	3.86	16.4											
147	5b	4.09	21.0											
147	6	4.80	15.8											
147	7	6.32	17.5											
147	8	7.85	18.4											
148	2	0.99	23.3											
148	3	1.37	20.8											
149	1	0.99	24.9											
149	2	1.75	16.2											
149	3	2.51	16.6											
149	4	3.28	15.9	1	11	54	34	88	36.3	16.7	19.7			
149	5	4.04	17.1											
149	6	4.80	15.6											
149	7	5.56	13.4											
149	8	6.32	16.9											
149	9	7.85	18.0											
149	10	9.37	18.4											
149	12	12.42	20.0	2	27	37	34	71	25.9	13.8	12.1			
149	14	15.47	35.4											
149	16	18.52	17.8											
149	18	21.56	15.4											
149	20	24.61	23.5											
149	21	26.14	33.6											
149	22	27.66	10.2											



LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway					Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm						
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)		(MPa)
149	23	29.18	9.1	35	37	21	7	28	16.7	11.5	5.3			
149	24	30.71	7.9											
149	25	31.14	10.4											
149	28	34.14												78.3
150	1a	0.46	12.3											
150	1b	0.69	16.9											
150	2	0.99	13.5											
150	3	1.75	17.5											
151	1	0.99	12.9	0	21	48	31	79						
151	2	1.75	14.0						32.0	17.4	14.7			
151	3	2.51	18.8	0	20	42	38	80	28.1	14.9	13.3			
151	4	3.28	24.0											
151	5	4.04	21.3											
151	6	4.80	19.4											
151	7	6.32	25.1											
151	8	7.85	24.1											
152	1	0.46	11.0											
152	2	0.99	13.2											
152	3a	1.57	12.6											
152	3b	1.66	23.3											
152	3c	1.84	23.1											
152	4a	2.31	13.1											
152	4b	2.54	19.0											
152	5	3.28	17.0	0	17	47	36	83	24.1	11.9	12.2			
152	6	4.04	17.6											
152	7	4.80	17.7											
152	8	5.56	22.7											
152	9	6.32	19.1											
152	10	7.09	22.6											
152	12	9.98	21.6											
152	14	13.03	26.2	4	17	39	40	79	33.2	16.4	16.8			
152	16	16.08	18.7											
152	18	19.13	19.5											
152	20	22.17	20.9	1	24	42	33	75	29.7	15.4	14.4			
152	21	23.70	24.4											
152	22	25.22	19.9											
152	24	28.27	19.0											
152	25	29.49	18.9											
152	29	34.89												66.4
153	1a	0.50	28.0											
153	1b	0.72	17.5											
153	2	0.99	18.1											
154	1	0.99	21.6											
154	2	1.75	22.2											
154	4	3.25	23.5	0	22	40	38	78	38.3	16.7	21.6		2.77	
154	4	3.25	27.5	9	16	37	38	75	33.8	16.3	17.5			
154	4	3.25	-						33.8	16.3	17.5			

LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
154	5	4.04	27.6											
154	6	4.80	18.2	1	20	46	33	79	32.0	15.2	16.8		2.73	
154	6	4.80	18.2	5	24	42	29	71	28.4	14.7	13.7		2.73	
154	6A	6.32	20.9						32.6	16.0	16.6			
154	7	7.09	20.9											
154	8	8.70		1	13	45	41	86	36.5	17.2	19.4			
154	9	10.13	24.4											
154	10	11.70	23.1	1	21	46	32	78	30.6	14.2	16.4		2.75	
154	11	13.18	25.1											
154	12	14.78	23.9	0	18	44	38	82	35.3	15.2	20.1		2.74	
154	12	14.78	23.1	0	21	45	34	79	32.7	15.4	17.3		2.74	
154	12	14.78	-	1	20	42	37	79						
154	13	16.23						69	27.8	15.5	12.3			
154	15	19.28	16.7											
154	16	20.88	19.5											
154	17	22.40	20.7						27.9	14.1	13.8			
154	18	23.85	21.2											
154	20	26.90	24.4											
154	21	28.42	14.5						20.3	12.7	7.7			
154	22	29.95	11.5											
154	23	31.21	10.1											
154	27	36.29												51.1
155	1a	0.38	14.2											
155	1b	0.53	15.0											
155	1c	0.76	13.7											
155	2a	1.16	18.6											
155	2b	1.46	24.0											
156	1a	0.83	21.7											
156	1b	1.05	20.9											
156	2	1.75	23.9											
156	3	2.51	21.6	2	14	28	56	84	40.7	17.9	22.9			
156	4	3.28	21.7											
156	5	4.04	22.8											
156	6	4.80	21.6											
156	7	5.56	27.7											
156	8	6.32	28.3											
156	9	7.85	23.1											
158	1a	0.74	23.5											
158	1b	1.04	25.2											
158	2	1.75	23.5											
158	4a	3.30	24.6	0	12	34	54	88	42.7	19.0	23.8		2.75	
158	5	4.04	30.2											
158	6	4.80	26.8											
158	7	5.56	30.0											
158	8	7.09	28.7	0	15	40	45	85	34.1	16.6	17.5		2.74	
158	8	7.09	23.4	0	11	39	50	89	41.7	18.0	23.7			
158	9	8.61	23.9											

LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)		(MPa)
158	10	10.13	26.8	2	15	44	39	83	31.9	15.2	16.7		2.74	
158	11	11.66	22.5											
158	12	13.18	-											
158	13	14.71	49.7											
158	14	16.25	33.1	3	24	38	35	73	29.3	14.5	14.8		2.75	
158	15	17.75	20.0											
158	18	22.17	21.1											
158	22	24.69	10.6											
158	23	26.87	9.1											
158	24	29.06												41.0
159	1a	0.76	15.1											
159	1b	1.07	15.4											
159	2	1.52	26.6											
160	1	0.99	25.2											
160	2	1.75	24.1											
160	3	2.51	26.1											
160	4	3.28	37.6					92	43.1	18.2	24.9			
160	5	4.04	37.8											
160	6	4.80	39.6											
160	7	5.56	27.9						38.7	18.2	20.6			
160	8	6.40	29.1	0	19	36	45	81	35.4	15.8	19.6		2.76	
160	8	6.40	27.6	0	20	38	42	80	30.7	14.9	15.8			
160	8	6.40	31.6	0	21	41	38	79	34.7	15.5	19.2			
160	9	7.09	34.5											
160	11	10.13	32.8						28.7	14.7	14.0			
160	12	11.65	38.5	0	19	56	25	81	26.7	14.3	12.4			
160	13	12.80	19.8	4	22	44	30	74	27.2	14.5	12.7		2.75	
160	14	14.71	30.0						32.2	15.9	16.3			
160	16	17.91	19.0	17	18	38	27	65	29.1	14.8	14.3		2.75	
160	18	20.92	-										2.76	
160	22	25.83												61.3
161	1	0.76	13.5											
161	2a	1.14	15.5											
161	2b	1.45	18.5											
161	3	1.98	23.3											
162	1a	0.46	6.3											
162	1b	0.76	5.3											
162	2a	1.18	5.2											
162	2b	1.49	5.5											
162	3	1.83	23.2											
163	1a	0.79	6.1											
163	1b	1.02	7.3											
163	2a	1.71	20.7											
163	2b	1.94	20.9											
163	3	2.55	22.5											
163	4	3.28	23.6	0	1	72	27	99	28.0	16.5	11.6			
163	6	4.80	37.8											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
163	7	5.56	37.6											
163	8	6.32	27.5											
163	9	7.09	28.7	11	15	34	40	74	32.5	15.4	17.2			
163	11	9.98	37.7											
163	13	13.03	26.6											
163	15	16.08	19.7	4	22	42	32	74	26.2	13.6	12.7			
163	19	22.17	13.5											
163	22	26.18												56.4
164	2b	1.79	18.2											
164	3	2.51	21.5											
164	4	3.28	24.2	0	2	71	27	98	26.0	16.3	9.7			
164	5	4.04	27.3											
164	6	4.80	25.2											
164	7	5.56	33.8											
164	8	6.32	45.1											
164	9	7.09	42.6											
164	10	8.61	39.2	1	9	32	58	90	42.8	17.7	25.1			
164	12	11.66	39.4											
164	13	13.26	38.6											
164	14	14.71	28.9											
164	16	17.75	24.0											
164	18	20.80	37.8	0	1	46	53	99	44.9	23.9	21.1			
165	1	0.76	11.6											
165	2	1.37	17.4											
165	3	1.98	17.5											
166	1	2.67	28.3											
166	2	4.19	28.0						34.7	17.0	17.7			
166	4	7.24	11.4											
166	6	10.59	27.4						30.8	16.6	14.2			
166	7	11.89	22.8											
166	9	14.86	21.7											
166	11	17.91	20.9											
166	13	20.96	24.7											
166	14	22.48	23.5						23.4	13.1	10.4			
166	17	26.55												47.4
166A	1	0.99	13.9											
166A	2	1.75	20.4	0	3	89	8	97						
166A	3	2.51	20.8											
TR-A1	DM-1	0.85	19.9											
TR-A2	DM-2	0.28	5.2	48	39			13						
TR-B1	DM-3	1.37	19.1	1	35	30	34	64	32.4	15.0	17.4			
TR-B3	DM-6	0.83	23.3											
TR-B5	DM-11	0.65	24.2											
TR-B8	DM-15	0.36	4.0	43	40			17						
TR-C1	DM-4	0.46	9.6	15	64			21						
TR-C4	DM-7	0.48	11.7	7	80			13						
TR-C8	DM-9	0.99	21.0	0	31	35	34	69	36.7	17.7	19.0			

LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
3-1	1	0.99	25.9											
	3	2.52	13.6											
	5	4.04	16.0											
3-1	BULK	-	11.5	3	42	29	26	55	26.7	13.5	13.2			
3-2	2	1.75	18.8											
3-2	4	3.28	16.7											
3-2	6	4.80	17.3											
3-2	BULK	-	11.1	23	38	21	18	39	26.4	13.3	13.1			
ECR-1000N	1	0.18	17.5	0	85			15						
ECR-1001N	2	0.79	6.2											
ECR-1002N	3	0.78	19.6	1	17	59	23	82	26.4	15.7	10.7			
ECR-1002S	1	0.18	18.0	0	81			19						
ECR-1003N	1	0.15	16.2	0	89			11						
ECR-1003N	3	1.17	17.9	0	31	52	17	69						
ECR-1004S	1	0.16	25.7											
ECR-1004S	3	1.20	21.8	0	19	59	22	81						
ECR-1006S	1	0.12	11.5	0	85			15						
ECR-1006S	2	0.72	16.7											
ECR-1007N	2	0.74	18.8											
ECR-1007N	3	1.21	19.2	0	25	50	25	75	27.3	15.9	11.4			
ECR-1008S	2	0.77	11.6											
ECR-1008S	3	1.32	22.6											
ECR-1009N	1	0.16	21.6	0	80			20						
ECR-1009N	3	1.18	27.9											
ECR-1010N2	2	0.80	18.8	0	87	6	7	13						
ECR-1010S1	1	0.15	15.2											
ECR-1011N1	2	0.35	8.7											
ECR-1011N1	4	1.28	0.4	0	90	5	5	10						
ECR-1013N	1	0.15	20.6											
ECR-1013S	3	1.24	14.9	0	11	67	22	89						
ECR-1014S	2	0.60	23.1											
ECR-1014S	3	1.13	23.5	0	11	47	42	89						
ECR-1015S	2	1.13	19.0											
ECR-1016N	2	0.79	22.1	0	20	37	43	80						
OUT-1A	2	0.76	23.6	0	28	36	36	72	36.5	16.6	19.9			
OUT-1B	1	0.15	25.5											
OUT-2A	2	0.79	18.3											
OUT-2B	2	0.84	19.6											
OUT-2A & B	composite	-	18.9	1	26	38	35	73	38.8	17.0	21.9			
OUT-4A	2	0.84	18.1	1	30	35	34	69	36.3	18.1	18.2			
OUT-4B	1	0.15	22.7											
OUT-8A	2	0.89	11.9											
OUT-8B	2	0.89	12.5											
OUT-8A & B	composite	-	13.0	1	30	37	32	69	30.4	15.3	15.2			
OUT-10A	2	0.89	10.6	1	29	38	32	70	30.0	14.6	15.5			
OUT-10B	1	0.15	24.9											
OUT-14A	2	0.91	18.6	0	34	35	31	66	34.4	13.5	21.0			



LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
OUT-14B		1	0.17											
OUT-15A		2	0.91											
OUT-15B		2	0.90											
OUT-15A & B	composite	-	13.1	2	32	38	28	66	30.3	16.0	14.4			
OUT-19A		2	0.89	0	33	35	32	67	27.8	13.1	14.7			
PUL-1		3	1.30	0	18	59	23	82						
MAL-1		3	1.14											
MAL-2		2	1.27	9	71	15	5	20						
MAL-3		1	0.57	7	48			45						
HOW-1		3	0.95											
HCR-1A		4	1.45	2	30	39	29	68						
HCR-1B		2	0.66	31	48			21						
HCR-3C		5	1.45	0	5	70	25	95	20.7	17.3	3.5			
HCR-4C		3	1.18											
HCR-4D		3	1.18											
HCR-4	composite	-	26.3	0	23	27	40	67	40.8	18.1	22.8			
TR-5A		3	1.41	0	18	32	50	82	42.4	20.1	22.4			
TR-5C		3	0.58	2	82			16						
TR-6A		2	1.12											
TR-6B		2	1.19											
TR-6D		4	1.30	0	20	36	44	80	45.2	17.4	27.9			
TR-6E		3	0.81											
TR-6	composite	-	21.4	0	20	32	48	80	38.3	17.0	21.4			
TR-7A		3	1.03											
TR-7B		3	1.13											
TR-7D		2	0.76											
TR-7E		2	1.06	39	42			19						
TR-7	composite	-	13.3	1	29	36	34	70	34.6	16.1	18.6			
TR-8B		2	0.41											
TR-8C		1	0.51											
TR-8C		2	1.03											
TR-8D		2	1.01											
TR-8E		1	0.41	31	50			19	32.1	15.7	16.5			
TR-8E		2	1.08	0	33	38	29	67						
TR-8	composite	-	18.1	1	32	35	32	67	31.1	14.9	16.3			
TR-9A		3	0.72											
TR-9B		1	2.01											
TR-9C		2	1.05											
TR-9	composite	-	17.8	0	29	35	36	71	36.7	15.8	20.9			
TR-10A		2	1.04											
TR-10B		2	1.19											
TR-10C		2	1.01											
TR-10D		3	1.16											
TR-10E		3	1.10											
TR-10	composite	-	17.5	1	31	35	33	68	34.0	15.8	18.3			
201	1	0.99												
201	2	1.75	14.0											

LABORATORY TEST DATA SUMMARY																
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway							Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm								
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)			(MPa)	
201	3	2.51	13.0													
201	4	3.28	12.1	2	30	43	25		27.3	14.3	13.0					
201	5	4.04	14.7													
201	6	4.88	13.8													
201	7	5.56	14.6	0	29	45	26		22.9	13.5	9.4					
201	8	6.32	14.8													
201	9	8.46	17.6													
201	10	10.06	17.3													
201	11	11.51	17.3													
201	12	13.03	18.2	2	30	40	28		21.4	12.4	9.0					
201	13	14.63	17.0													
201	14	16.15	18.1													
201	15	17.68	20.3													
201	16	19.13	18.7	1	28	43	28		23.6	14.1	9.5					
201	17	20.65	21.3													
201	18	22.17	26.2													
201	19	23.70	26.6	2	14	45	39		31.5	16.5	15.0					
201	20	25.22														
201	21	26.75														
201	22a	28.09	18.5													
201	22b	28.24	17.6													
201	22c	28.42	18.2													
201	23	29.79	23.9	1	15	46	38		33.1	17.2	15.9					
201	24	31.32	23.4													
201	25a	32.66	19.2													
201	25b	32.78	7.0													
201	25c	32.93	7.0													
202	1a	0.09														
202	1b	0.32														
202	2	0.99	20.1													
202	3	1.75	19.5	3	27	39	31		32.1	16.5	15.6					
202	4	2.51	13.0													
202	5	3.28	10.2	7	28	43	22		23.1	14.0	9.1					
202	6	4.04	12.3													
202	7a	4.72	15.6													
202	7b	5.03	12.8													
202	8	5.56														
202	9	6.32	17.0													
202	10	8.76	13.8	1	31	44	24		17.3	12.1	5.2					
202	11	10.29	17.9													
202	12	11.89	16.6													
202	13	13.34	18.1	7	33	35	25		23.4	12.4	11.0					
202	14	14.86	15.2													
202	15	16.46	20.7													
202	16	17.91	20.9													
202	17	19.43	22.5	1	23	44	32		28.6	16.4	12.2					
202	18	20.96	35.3													

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway					Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm						
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)		(MPa)
202	19	22.48	35.9						42.6	18.8	23.8			
202	20	24.00	24.5											
202	21	25.53	17.3	3	22	45	30		28.7	15.2	13.5			
202	22	27.05	16.0											
202	23	28.58	22.4											
202	24a	30.00	21.5											
202	24b	30.22	17.9											
202	25	31.62	31.2											
202	26	32.98	13.6											
203	1	0.15												
203	2	0.99	17.3											
203	3	1.75	15.1	2	29	39	30		27.8	15.0	12.8			
203	4	2.51	12.5											
203	5	3.28	13.2	3	29	37	31		26.4	13.5	12.9			
203	6	4.04	13.7											
203	7	4.88	13.8											
203	8	5.56												
203	9	6.32	15.8											
203	10	8.46	14.9	4	41	39	16		17.7	11.5	6.2			
203	11	10.06	18.1											
203	12	11.58	17.7											
203	13	13.03	20.7											
203	14	14.55	19.2	2	28	40	30		23.4	13.4	10.0			
203	15	16.15	15.0											
203	16	17.60	20.9											
203	17	19.13	20.8											
203	18	20.65	34.4											
203	19	22.17	31.5											
203	20	23.70	15.1	3	29	45	23		19.8	13.2	6.6			
203	21	25.22	20.5	0	33	60	7							
203	22	26.75	21.1											
203	23a	28.11	22.2											
203	23b	28.33	18.7	12	32	50	6							
203	24	29.79	21.4											
203	25	31.32	30.8											
203	26	32.66	20.1											
203	27	32.77												
206	1a	0.09												
206	1b	0.32												
206	2a	0.90	22.1											
206	2b	1.13	18.9											
206	3	1.75	27.8	2	23	45	30		32.6	17.2	15.4			
206	4	2.51	20.0											
206	5	3.28	12.1	5	43	40	12		16.5	11.8	4.7			
206	6	4.04	11.4											
206	7	4.88	11.8											
206	8	5.56	14.9	2	30	41	27		22.7	13.4	9.3			

LABORATORY TEST DATA SUMMARY																
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway							Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm								
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)	
206	9	6.32	14.7													
206	10	7.19	16.8													
206	11	8.71	17.3													
206	12	10.31	17.0													
206	13	11.76	17.3	6	28	41	25		23.5	13.3	10.2					
206	14	13.28	19.0													
206	15	14.88	17.2													
206	16	16.33	23.7													
206	17	17.86	22.1													
206	18	19.38	25.6	1	13	40	46		32.9	17.5	15.4					
206	19	20.90	32.9													
206	20	22.43	14.5													
206	21	23.95	16.9													
206	22	25.48														
206	23	27.00	22.8	1	14	49	36		32.7	16.4	16.3					
206	24	28.52	21.9													
206	25a	29.92	19.3													
206	25b	30.15	19.7													
206	26	31.57	30.3													
206	27a	32.17	26.4													
206	27b	32.31	7.8													
207	1	0.99	12.8													
207	2	1.75	12.9	2	30	37	31		26.7	14.5	12.2					
207	3	2.51	13.1													
207	4	3.28	12.5	3	31	39	27		22.7	13.8	8.9					
207	5	4.04	17.4													
207	6	4.88	13.9													
207	7	5.56	14.9	3	30	41	26		22.9	13.4	9.5					
207	8	6.32	15.7													
207	9	8.46	18.1													
207	10	10.06	18.2													
207	11	11.51	16.7	3	35	39	23		16.7	11.2	5.5					
207	12	13.03	17.5													
207	13	14.63	17.4													
207	14	16.08	15.9													
207	15	17.60	21.9	2	21	43	34		26.4	15.0	11.4					
207	16	19.13	29.1													
207	17	20.65	17.1													
207	18	22.17	14.2													
207	19	23.70	14.8													
207	20	25.22	18.9	5	22	43	30		27.5	15.0	12.5					
207	21	26.75	13.9													
207	22	28.27														
207	23	29.79	24.5													
207	24	31.24	24.2													
207	25	32.33	14.2													
208	1	0.99	11.7													

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway					Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm						
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
208	2	1.75	12.3	8	28	40	24		25.7	14.7	11.0			
208	3	2.52	12.7											
208	4	3.28												
208	5	4.04	12.9	3	30	42	25		24.4	14.7	9.7			
208	6	4.88	13.0											
208	7	5.56	14.3											
208	8	6.32	15.8	2	32	41	25		22.7	13.2	9.5			
208	9	7.09	17.4											
208	10	7.85	16.1											
208	11	9.45												
208	12	11.51	17.8											
208	13	13.03	19.3	1	29	43	27		23.2	13.6	9.6			
208	14	14.55	19.5											
208	15	16.15	43.3											
208	16	17.60	21.7	1	24	43	32		26.0	14.0	12.0			
208	17	19.13	33.5											
208	18	20.65	24.3											
208	19	22.17	29.8											
208	20	23.70	15.8	2	24	47	27		21.8	12.9	8.9			
208	21	25.22	16.4											
208	22	26.75	16.0											
208	23	28.27	20.0											
208	24a	29.67	21.2											
208	24b	29.86	18.7	0	45	50	5							
208	24c	29.98	22.8											
208	25	31.32												
215N	1a	0.86	20.5											
215N	1b	1.09	37.7											
215N	2	1.75	13.5											
215N	3	2.51	12.5	1	29	45	25		27.6	15.0	12.6			
215N	4	3.28	12.9											
215N	5	4.04	14.4											
215N	6	4.80	15.4											
216N	1	0.99	17.1											
216N	2	1.75	13.6	3	26	43	28		28.7	15.8	12.9			
216N	3	2.51	12.5											
216N	4	3.28	13.6											
216N	5	4.04	14.5											
216N	6	4.80	15.1											
217N	1	0.99	13.3											
217N	2	1.75	12.9											
217N	3	2.51	12.2											
217N	4	3.28	12.6	2	28	42	28		23.8	13.2	10.6			
217N	5	4.04	13.6											
217N	6	4.80												
218N	1	0.99	12.4											
218N	2	1.75	12.7	1	28	42	29		27.5	14.7	12.8			

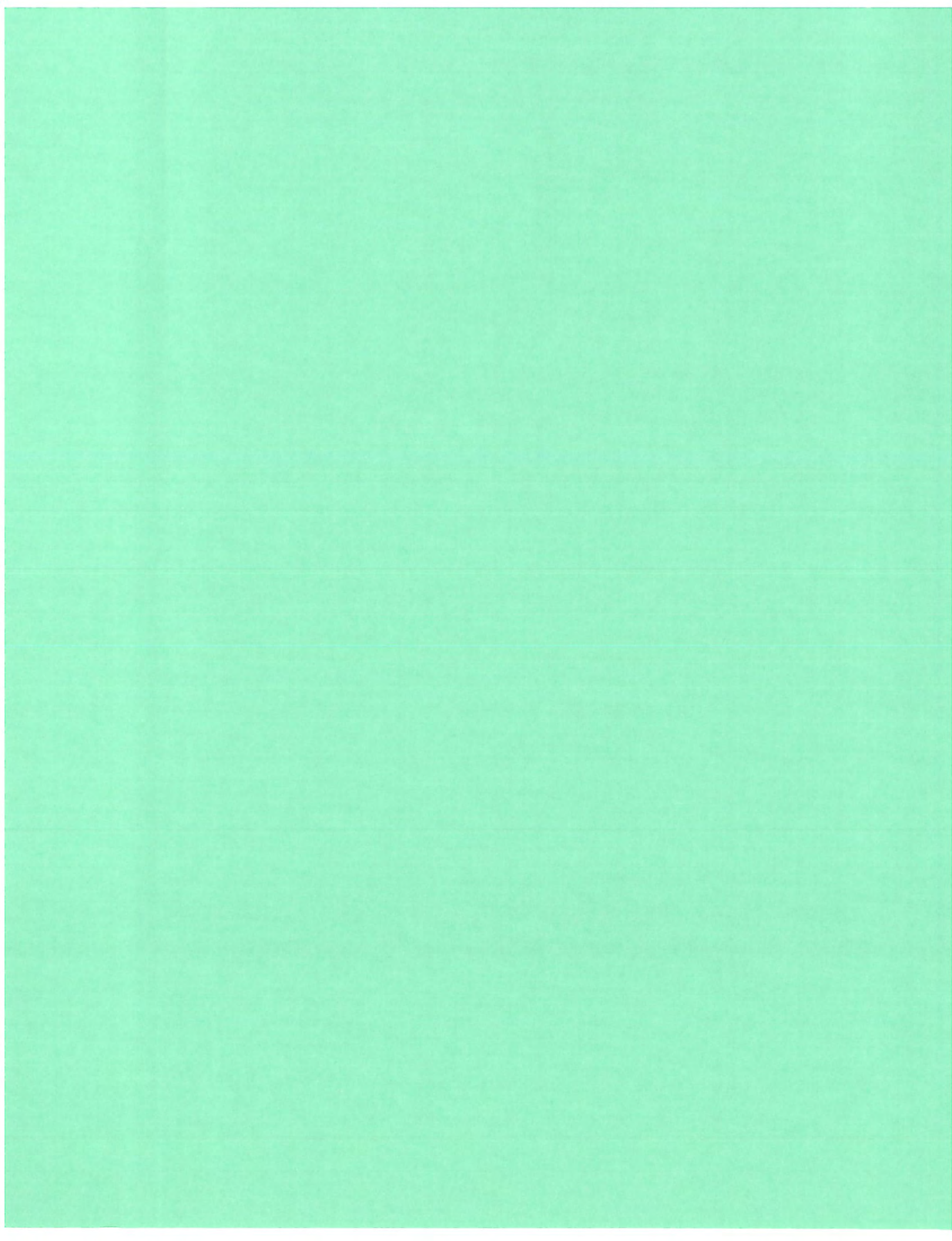


LABORATORY TEST DATA SUMMARY														
Windsor-Essex Parkway														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)		(MPa)
218N	3a	2.41	12.3											
218N	3b	2.64	12.4											
218N	4	3.28	12.6											
218N	5	4.04	14.3											
218N	6	4.80	14.5											
219N	1	0.99	13.9											
219N	2	1.75	12.6											
219N	3	2.51	12.7											
219N	4	3.28	14.0											
219N	5	4.04	14.7	2	29	41	28		24.4	13.3	11.1			
219N	6	4.80	11.0											
220N	1	0.99	13.0											
220N	2	1.75	12.5	4	27	40	29		28.7	14.6	14.1			
220N	3	2.51	12.8											
220N	4	3.28	12.7											
220N	5	4.04	14.6											
220N	6	4.80												
221N	1	0.99	13.4											
221N	2	1.75	12.5											
221N	3	2.51	10.8	2	28	41	29		27.5	13.8	13.7			
221N	4	3.28	13.3											
221N	5	4.04	14.6											
221N	6	4.80												
222N	1	0.99	12.6											
222N	2	1.75	12.3											
222N	3a	2.35	13.2											
222N	3b	2.58	9.4											
222N	4	3.28	10.6	6	28	38	28		25.7	13.4	12.3			
222N	5	4.04	14.1											
222N	6	4.80	14.3											
223N	1	0.99	13.3											
223N	2	1.75	12.7											
223N	3a	2.32	12.8											
223N	3b	2.55	13.0											
223N	4	3.28	14.0											
223N	5	4.04	14.5											
223N	6	4.80	14.1	1	29	40	30		24.2	13.2	11.0			
224N	1	0.99	13.6											
224N	2	1.75	13.1	1	29	40	30		26.4	13.6	12.8			
224N	3	2.51	13.6											
224N	4	3.28	9.8											
224N	5	4.04	15.3											
224N	6	4.80	13.8											
225N	1	0.99	12.6											
225N	2	1.75	13.7											
225N	3	2.51	14.1	4	27	41	28		26.6	13.3	13.3			
225N	4	3.28	10.9											

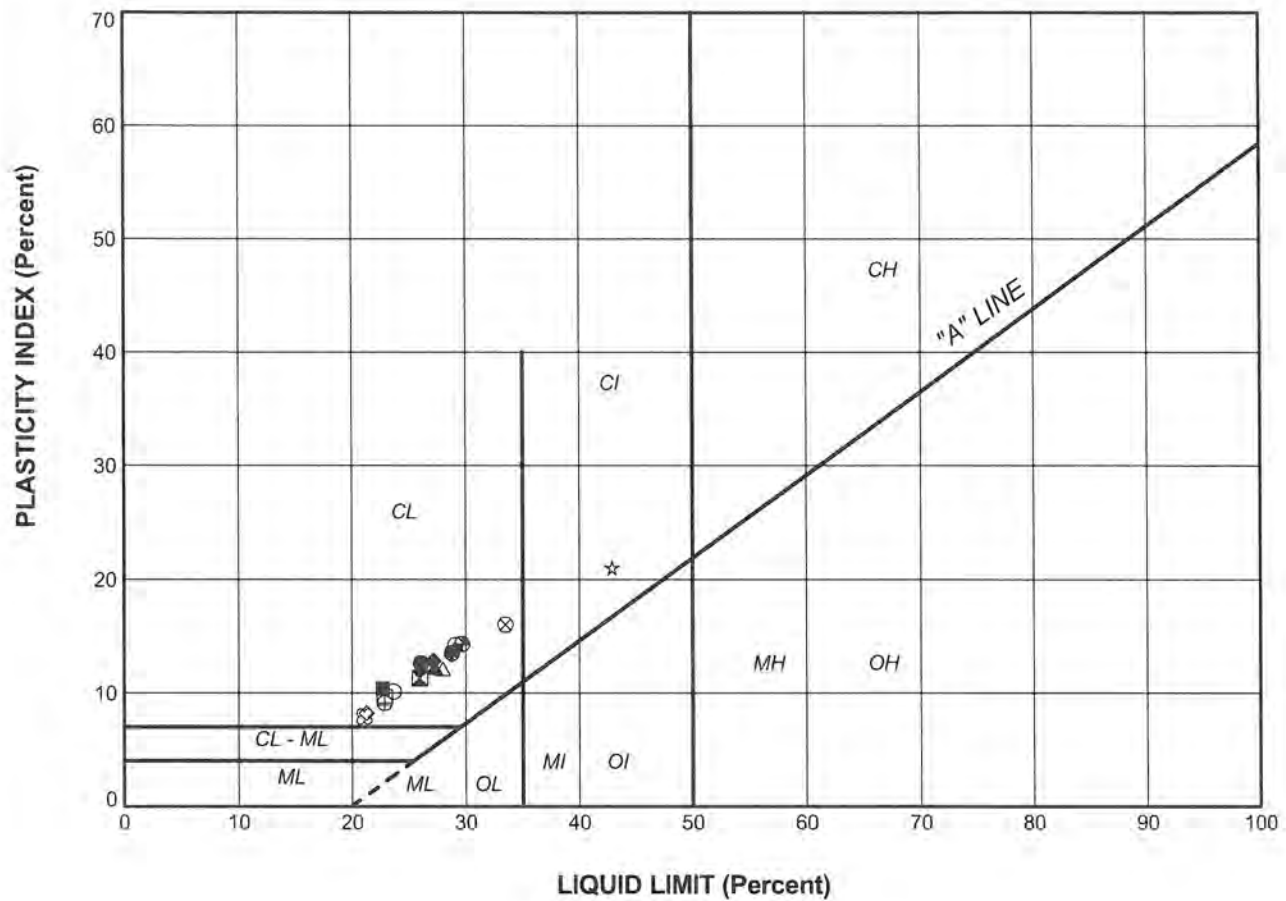
LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway					Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm						
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
225N	5	4.04	15.2											
225N	6	4.80	15.2											
226N	1	0.99	12.6											
226N	2	1.75	13.4											
226N	3	2.51	13.3											
226N	4	3.28	14.2	2	28	41	29		26.3	13.1	13.2			
226N	5	4.04	12.5											
226N	6	4.80	15.2											
227N	1	0.99	13.6											
227N	2	1.75	13.8											
227N	3	2.51	13.3											
227N	4	3.28	14.3											
227N	5	4.04	15.8	9	27	39	25		25.8	14.5	11.3			
227N	6	4.80	15.8											
228N	1	0.99	13.3											
228N	2	1.75	11.8	0	29	41	30		28.2	14.7	13.5			
228N	3a	2.35	12.8											
228N	3b	2.58	13.0											
228N	4	3.28	13.5											
228N	5	4.04	16.0											
228N	6	4.80	15.4											
229N	1	0.99	13.0											
229N	2	1.75	13.3											
229N	3a	2.32	12.8											
229N	3b	2.55	12.2											
229N	4	3.28	12.6	5	27	42	26		19.3	11.8	7.5			
229N	5	4.04	15.4											
229N	6	4.80	14.6											
230N	1	0.99	13.5											
230N	2	1.75	13.1											
230N	3	2.51	13.4	3	27	45	25		24.7	12.9	11.8			
230N	4	3.28	14.9											
230N	5	4.04	14.4											
230N	6a	4.62	13.3											
230N	6b	4.85	10.8	6	50	37	7							
231N	1	0.99	12.8											
231N	2	1.75	14.2	4	29	40	27		28.6	14.4	14.2			
231N	3	2.51	12.9											
231N	4	3.28	13.5											
231N	5	4.04	14.9											
231N	6	4.80	15.3											
232N	1	0.99	12.3											
232N	2	1.75	13.4											
232N	3	2.51	13.3											
232N	4	3.28	14.7	4	27	42	27		22.6	12.3	10.3			
232N	5	4.04	13.5											
232N	6	4.80	15.5											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway					Liquid Limit	Plastic Limit	Plasticity Index	Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm						
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m <sup>3</sup> )		(MPa)
233N	1	0.99	13.7											
233N	2a	1.57	13.2											
233N	2b	1.80	12.8											
233N	3	2.51	13.4											
233N	4	3.28	14.0											
233N	5	4.04	15.2	1	29	42	28		24.9	13.8	11.1			
233N	6	4.80	16.2											
235N	1a	0.80	13.6											
235N	1b	1.03	21.0											
235N	2	1.75	14.5											
235N	3	2.51	15.0	1	29	45	25		26.3	13.9	12.4			
235N	4	3.28	14.0											
235N	5	4.04	13.1											
235N	6	4.80	13.4	2	28	42	28		24.7	13.8	10.9			
236N	1	0.99	18.9											
236N	2	1.75	14.4	6	27	41	26		26.9	14.4	12.5			
236N	3	2.51	13.3											
236N	4	3.28	13.0											
236N	5	4.04	14.1	2	30	43	25		25.5	13.6	11.9			
236N	6	4.80	10.5											
237N	1	0.99	19.0											
237N	2	1.75	17.8											
237N	3	2.51	12.9											
237N	4	3.28	13.5	3	30	43	24		26.2	14.5	11.7			
237N	5	4.04	12.6											
237N	6	4.80	14.1											
238N	1a	0.80	25.0											
238N	1b	1.03	22.4											
238N	2	1.75	20.9	1	29	40	30		35.4	16.5	18.9			
238N	3	2.51	14.4											
238N	4	3.28	12.4											
238N	5	4.04	12.9											
238N	6	4.80	13.7											
239N	1	0.99	33.6											
239N	2	1.75	13.9											
239N	3	2.51	13.3	1	29	42	28		25.8	14.5	11.3			
239N	4	3.28	11.4											
239N	5	4.04	11.6											
239N	6	4.80	13.4											
240N	1	0.99	18.7											
240N	2	1.75	15.8	8	36	34	22		22.6	13.3	9.3			
240N	3	2.51	13.6	3	30	43	24		23.2	13.5	9.7			
240N	4	3.28	12.9											
240N	5	4.04	13.9											
240N	6	4.80	13.0											
241N	1	0.99	18.2											
241N	2	1.75	13.5											

LABORATORY TEST DATA SUMMARY														
BOREHOLE	SAMPLE	Depth	Natural Water Content	Windsor-Essex Parkway								Wet Unit Weight	Specific Gravity	Uniaxial Compressive Strength
				Gravel	Sand	Silt	Clay	<75µm	Liquid Limit	Plastic Limit	Plasticity Index			
				(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)			
No.	No.	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(kN/m³)		(MPa)
241N	3	2.51	13.7											
241N	4	3.28	13.3	2	32	39	27		28.2	14.5	13.7			
241N	5	4.04	13.0											
241N	6	4.80	13.2											
242N	1	0.99	23.1											
242N	2	1.75	24.8											
242N	3	2.51	13.1	1	31	40	28		26.4	12.9	13.5			
242N	4	3.28	12.4											
242N	5	4.04	13.5											
242N	6	4.80	13.6											







### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	1	5	26.1	13.5	12.6
■	1	7	22.7	12.3	10.4
▲	1	10	27.3	15.1	12.2
+	1	12	28.8	15.4	13.4
◆	1	14	27.2	14.4	12.8
◇	1	16	21.3	13.1	8.2
○	1	18	23.7	13.6	10.1
△	1	20	28.0	15.9	12.1
⊗	1	23	33.5	17.5	16.0
⊕	7	5	22.9	13.8	9.1
□	7	7	22.9	13.3	9.6
⊙	7	9	28.8	15.3	13.5
⊗	7	11	29.7	15.4	14.3
☆	7	12	42.9	21.9	21.0
⊗	7	15	21.1	13.2	7.9
⊗	7	17	26.0	14.7	11.3
⊗	7	20	29.1	14.9	14.2

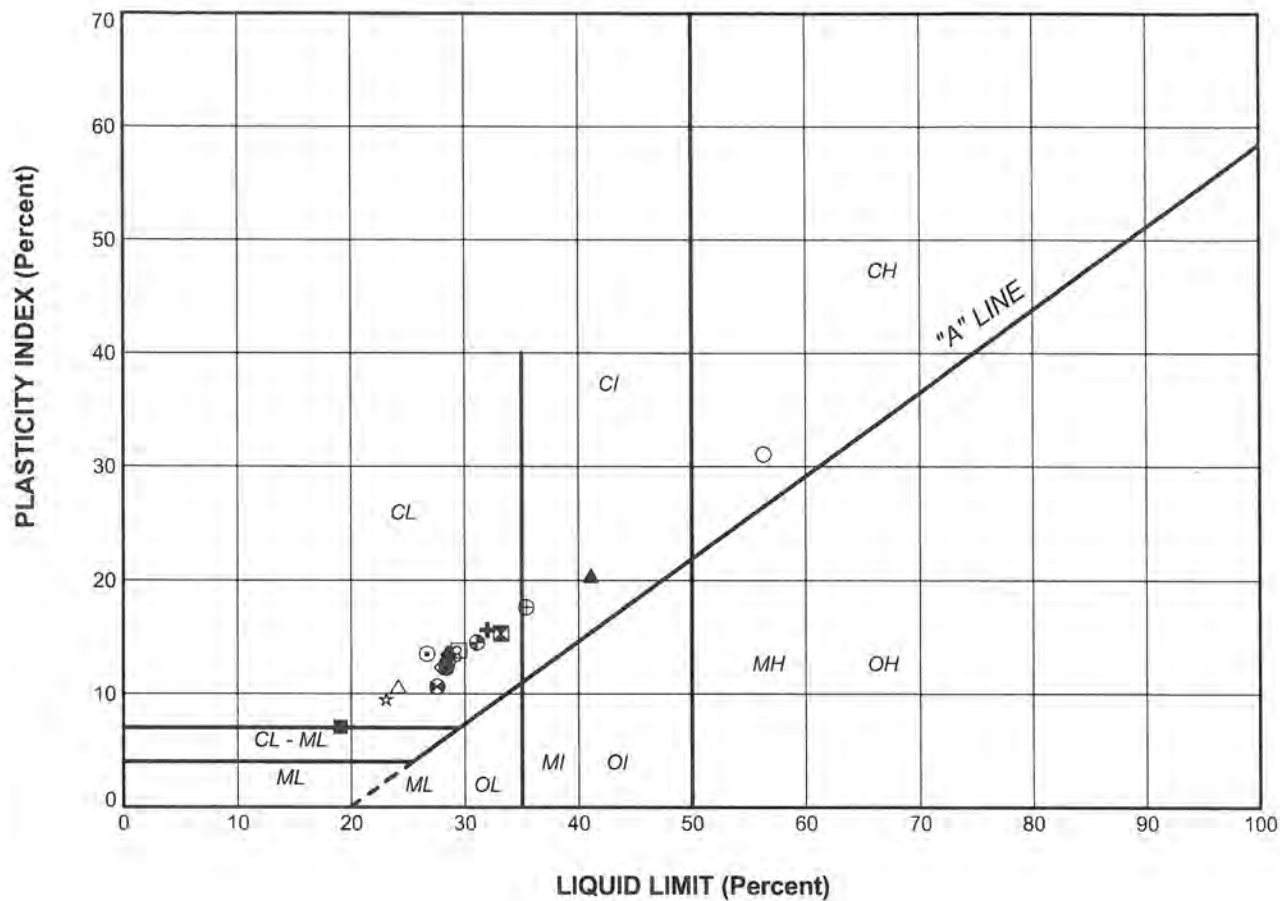
PROJECT  
**GEOTECHNICAL DATA REPORT**  
**WINDSOR-ESSEX PARKWAY**  
**WINDSOR, ONTARIO**

TITLE  
**PLASTICITY CHART**




PROJECT No.	07-1130-207-0	FILE No.	071130(2070-R0100F1
DRAWN	WDF	May 11/09	SCALE N/A
CHECK	SSS	June 07	REV.

**FIGURE F.1A**

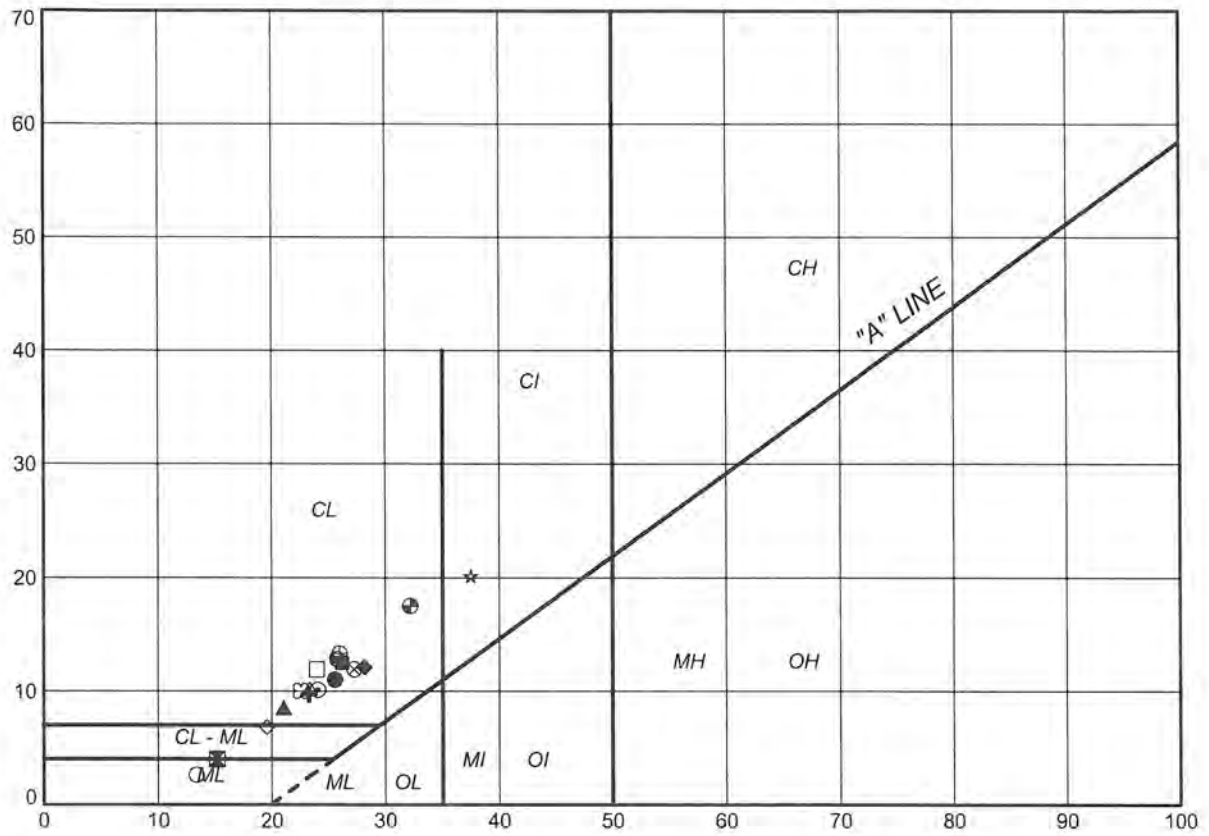


### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	7	22	28.4	16.1	12.3
■	7	24	19.0	11.9	7.1
▲	14	4	41.1	20.7	20.4
+	14	6	32.0	16.4	15.6
◆	14	9	28.6	15.2	13.4
◇	14	11	28.0	15.7	12.3
○	14	13	56.3	25.2	31.1
△	14	16	24.2	13.6	10.6
⊗	14	18	28.5	15.8	12.7
⊕	14	20	35.4	17.8	17.6
□	14	23	29.5	15.7	13.8
⊙	23	4	27.6	17.0	10.6
⊖	23	7	31.1	16.6	14.5
☆	23	9	23.1	13.6	9.5
⊗	23	13	29.0	15.5	13.5
⊕	23	15	33.2	17.9	15.3
⊙	101	3	26.7	13.2	13.5

PROJECT				GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE							
PLASTICITY CHART							
PROJECT No.		07-1130-207-0		FILE No.		0711302070-R0100F1	
DRAWN		WDF		SCALE		N/A	
CHECK		SSB		May 11/09		REV.	
 <b>Golder Associates</b> LONDON, ONTARIO				<b>FIGURE F.1B</b>			

PLASTICITY INDEX (Percent)




LIQUID LIMIT (Percent)

SOIL TYPE  
C = Clay  
M = Silt  
O = Organic

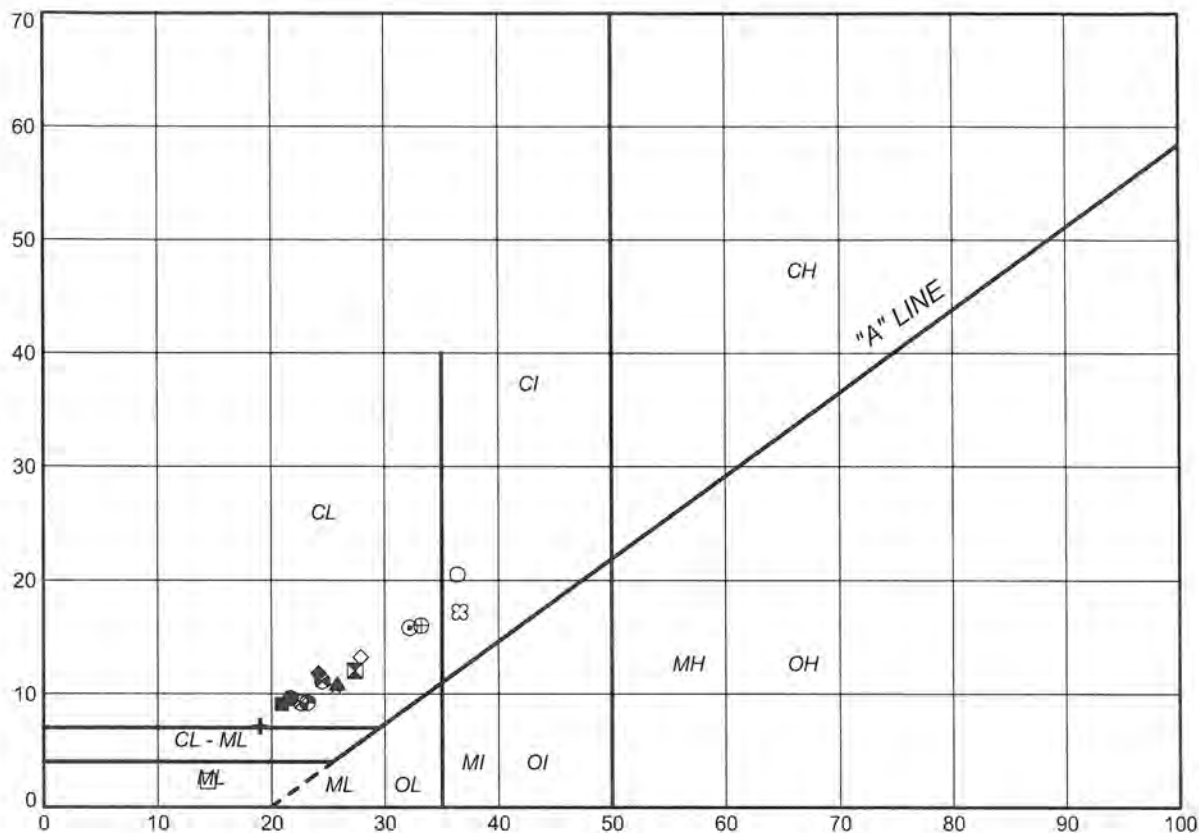
PLASTICITY  
L = Low  
I = Intermediate  
H = High

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	101	12	25.6	14.6	11.0
■	101	14	26.2	13.7	12.5
▲	102	10	21.1	12.6	8.5
+	102	15	23.3	13.6	9.7
◆	102	18	28.2	16.1	12.1
◇	102	20	19.6	12.8	6.8
○	104	10	13.4	10.8	2.6
△	104	12	23.4	13.2	10.2
⊗	104	16	27.3	15.4	11.9
⊕	105	8	26.0	12.7	13.3
□	105	9	24.0	12.1	11.9
⊙	105	11	25.8	13.0	12.8
⊗	105	15	32.2	14.7	17.5
☆	105	20	37.5	17.4	20.1
⊗	107	9	22.6	12.6	10.0
⊗	107	13a	15.2	11.2	4.0
⊗	107	18	24.1	14.0	10.1

PROJECT				GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE				PLASTICITY CHART			
PROJECT No.		07-1130-207-0		FILE No.		0711302070-R0100F1	
DRAWN		WDF		SCALE		N/A	
CHECK		May 11/09		REV.			
 <b>Golder Associates</b> LONDON, ONTARIO				<b>FIGURE F-1C</b>			

PLASTICITY INDEX (Percent)



LIQUID LIMIT (Percent)

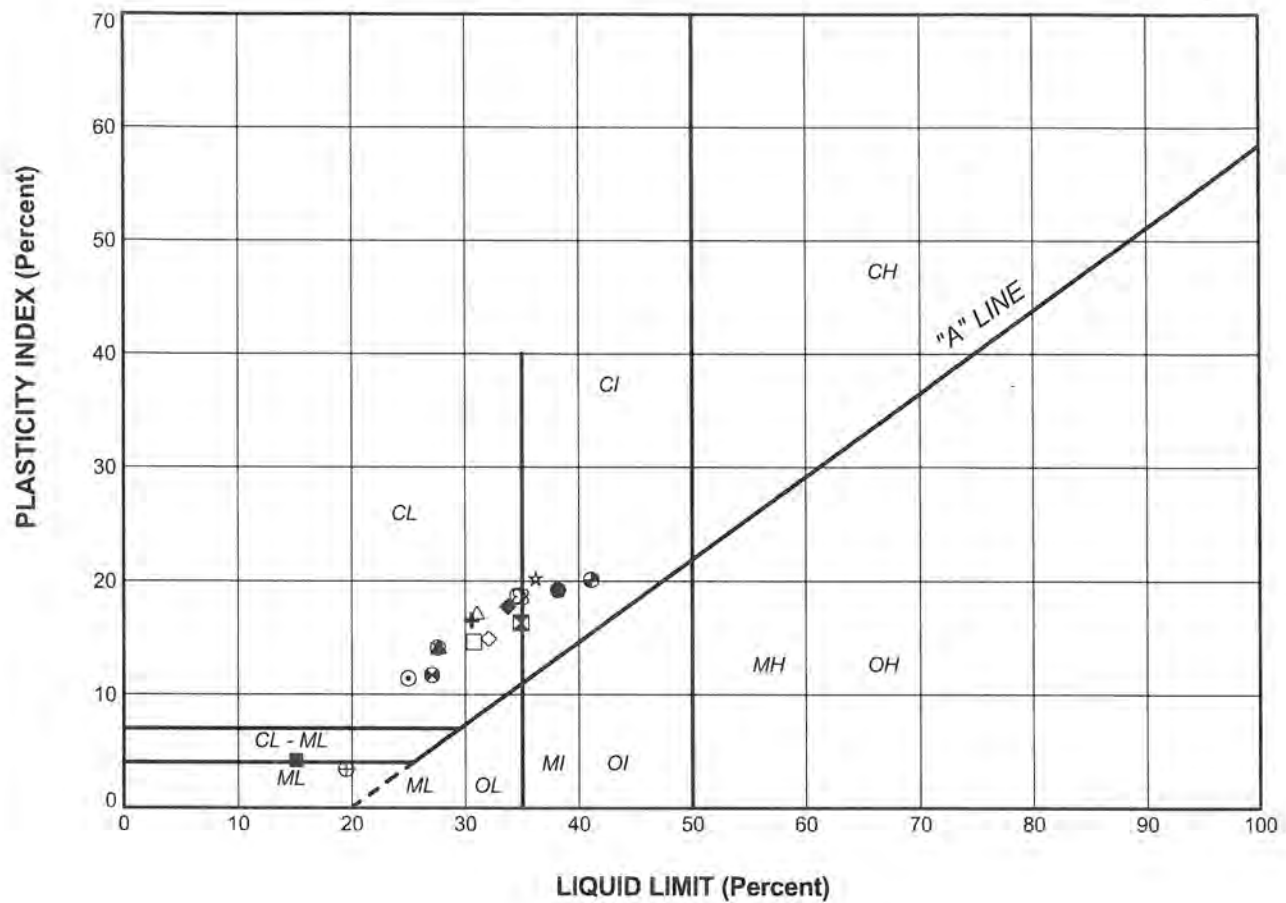
SOIL TYPE  
C = Clay  
M = Silt  
O = Organic

PLASTICITY  
L = Low  
I = Intermediate  
H = High

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	109	7	21.7	12.1	9.6
■	109	17	20.9	11.8	9.1
▲	109	21	25.8	14.9	10.9
+	112	7	19.0	11.9	7.1
◆	112	10	24.2	12.4	11.8
◇	112	18	27.9	14.7	13.2
○	112	19	36.4	15.9	20.5
△	113	2	25.9	15.0	10.9
⊗	113	5	22.6	13.4	9.2
⊕	113	20	33.2	17.2	16.0
□	115	10	14.4	12.1	2.3
⊙	115	12	24.5	13.4	11.1
⊛	115	18	23.2	14.0	9.2
☆	116	4	25.7	15.0	10.7
⊞	116	14	36.6	19.4	17.2
⊠	116	20	27.4	15.4	12.0
⊡	118	10	32.2	16.4	15.8

PROJECT				GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE							
PLASTICITY CHART							
PROJECT No.		07-1130-207-0		FILE No.		0711302070-R0100F1	
DRAWN		WDF		SCALE		N/A	
CHECK		JLB		REV.			
		May 11/09					
Golder Associates LONDON, ONTARIO				FIGURE F-1D			



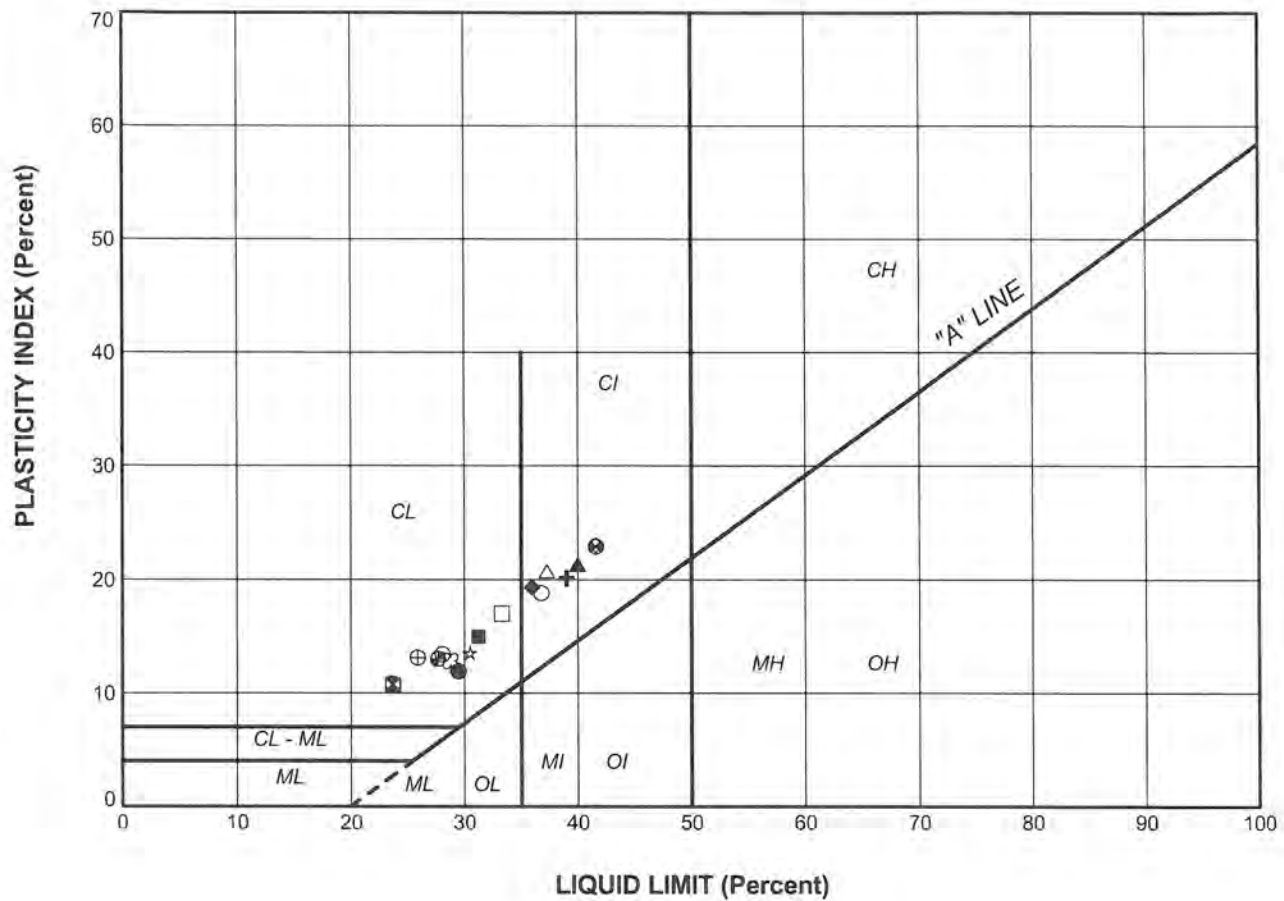
### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	118	15	38.2	19.0	19.2
■	118	24	15.1	10.9	4.2
▲	119	9	27.7	13.5	14.2
+	119	13	30.6	14.1	16.5
◆	119	21	33.8	16.1	17.7
◇	122	6	32.1	17.2	14.9
○	122	10	34.6	15.9	18.7
△	122	14	31.1	13.9	17.2
⊗	122	19	27.6	13.5	14.1
⊕	122	22	19.5	16.1	3.4
□	127	6	30.8	16.2	14.6
⊙	127	17	27.1	15.4	11.7
⊛	127	22	41.1	21.0	20.1
☆	129	8	36.2	16.0	20.2
⊗	129	12	34.9	16.3	18.6
⊕	129	15	34.9	18.6	16.3
⊙	129	16	25.0	13.6	11.4

PROJECT				GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE				PLASTICITY CHART			
PROJECT No.		07-1130-207-0		FILE No.		0711302070-R0100F1	
DRAWN		WDF		SCALE		N/A	
CHECK		SSB		REV.			
		May 11/09					
		J. 20/09					
						FIGURE F-1E	







### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	129	19	29.5	17.6	11.9
■	129	21	31.2	16.2	15.0
▲	131	9	40.0	18.7	21.3
+	131	13	39.0	18.9	20.1
◆	132	7	36.0	16.7	19.3
◇	132	11	41.6	18.6	23.0
○	132	12	36.8	18.0	18.8
△	132	13	37.3	16.6	20.7
⊗	132	17	23.7	12.9	10.8
⊕	135	7	25.9	12.8	13.1
□	135	12	33.3	16.3	17.0
⊙	135	14	41.6	18.7	22.9
⊗	135	17	27.7	14.7	13.0
☆	136	15	30.5	17.0	13.5
⊗	136	19	28.8	16.0	12.8
⊗	139	16	23.7	13.0	10.7
⊗	139	21	28.1	14.7	13.4

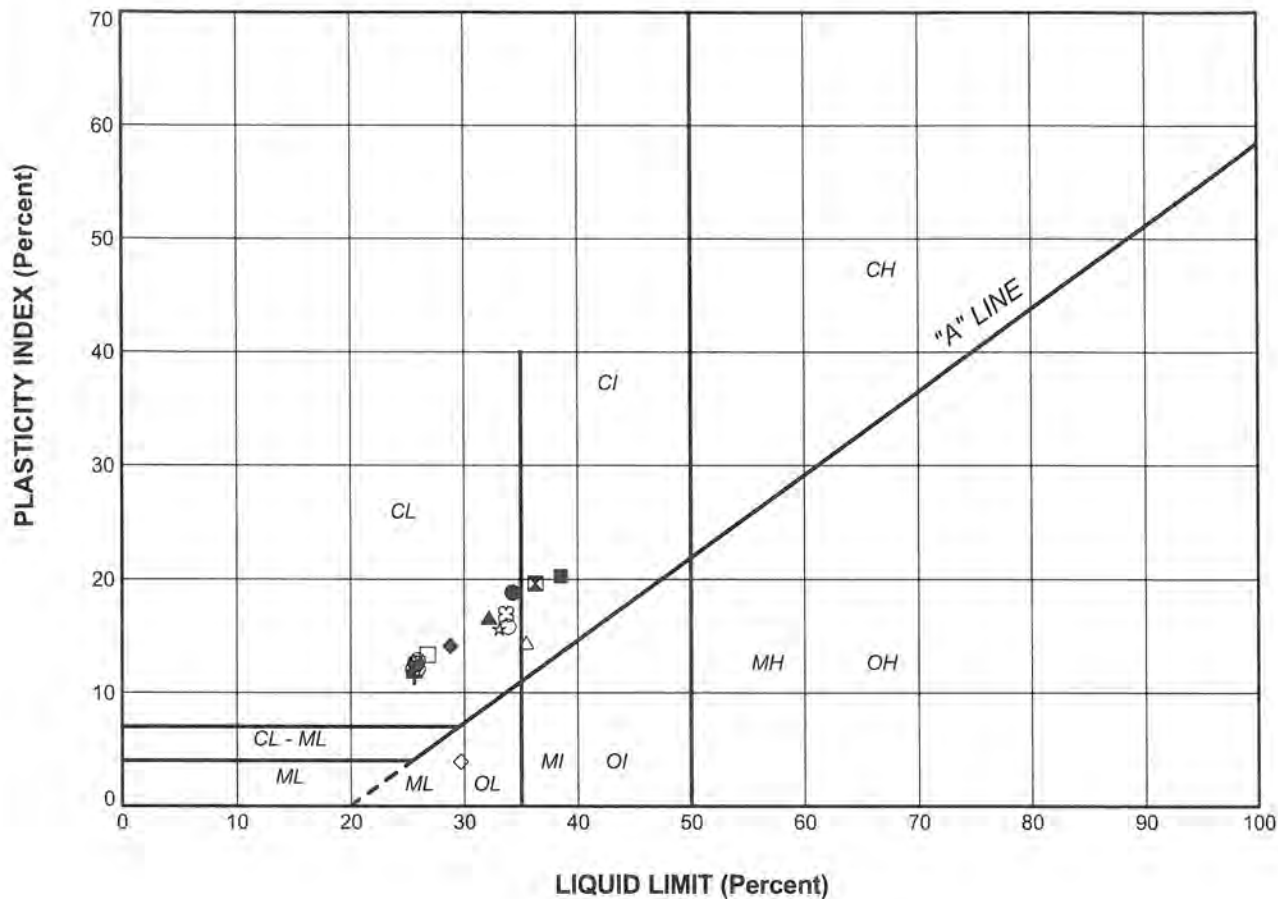
PROJECT  
 GEOTECHNICAL DATA REPORT  
 WINDSOR-ESSEX PARKWAY  
 WINDSOR, ONTARIO

TITLE  
 PLASTICITY CHART



PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F1
DRAWN	WDF	SCALE	N/A
CHECK	SSS	REV.	
	May 11/09		

FIGURE F.1F



### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	140	8	34.3	15.5	18.8
■	140	15	38.5	18.2	20.3
▲	141	14	32.2	15.6	16.6
+	141	18	25.6	14.2	11.4
◆	142	10	28.8	14.7	14.1
◇	142	20	29.7	25.8	3.9
○	142	23	33.9	18.1	15.8
△	143	2	35.5	21.1	14.4
⊗	145	8	25.9	13.1	12.8
⊕	145	13	25.7	13.1	12.6
□	145	15	26.8	13.5	13.3
⊙	145	15	25.8	13.3	12.5
⊗	145	19	25.5	13.5	12.0
☆	147	2	33.1	17.5	15.6
⊗	147	4	33.7	16.8	16.9
⊗	149	4	36.3	16.7	19.6
⊙	149	12	25.9	13.8	12.1

PROJECT  
 GEOTECHNICAL DATA REPORT  
 WINDSOR-ESSEX PARKWAY  
 WINDSOR, ONTARIO

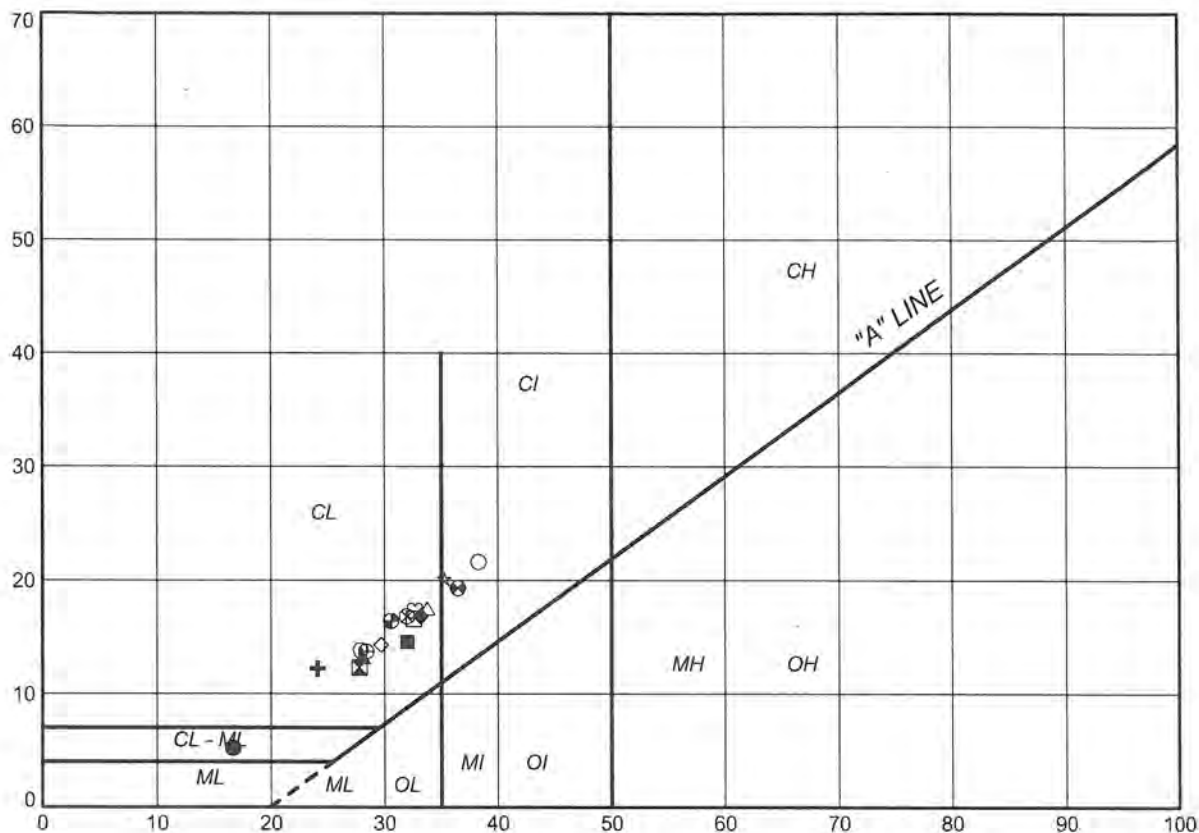
TITLE  
 PLASTICITY CHART



PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F1
DRAWN	WDF	May 11/09	SCALE N/A
CHECK	DB	Jun 24/09	REV.

FIGURE F.1G

PLASTICITY INDEX (Percent)



LIQUID LIMIT (Percent)

SOIL TYPE  
C = Clay  
M = Silt  
O = Organic

PLASTICITY  
L = Low  
I = Intermediate  
H = High

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	149	23	16.7	11.5	5.2
■	151	2	32.0	17.4	14.6
▲	151	3	28.1	14.9	13.2
+	152	5	24.1	11.9	12.2
◆	152	14	33.2	16.4	16.8
◇	152	20	29.7	15.4	14.3
○	154	4	38.3	16.7	21.6
△	154	4	33.8	16.3	17.5
⊗	154	6	32.0	15.2	16.8
⊕	154	6	28.4	14.7	13.7
□	154	6A	32.6	16.0	16.6
⊗	154	8	36.5	17.2	19.3
⊕	154	10	30.6	14.2	16.4
☆	154	12	35.3	15.2	20.1
⊗	154	12	32.7	15.4	17.3
⊕	154	13	27.8	15.5	12.3
⊗	154	17	27.9	14.1	13.8

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

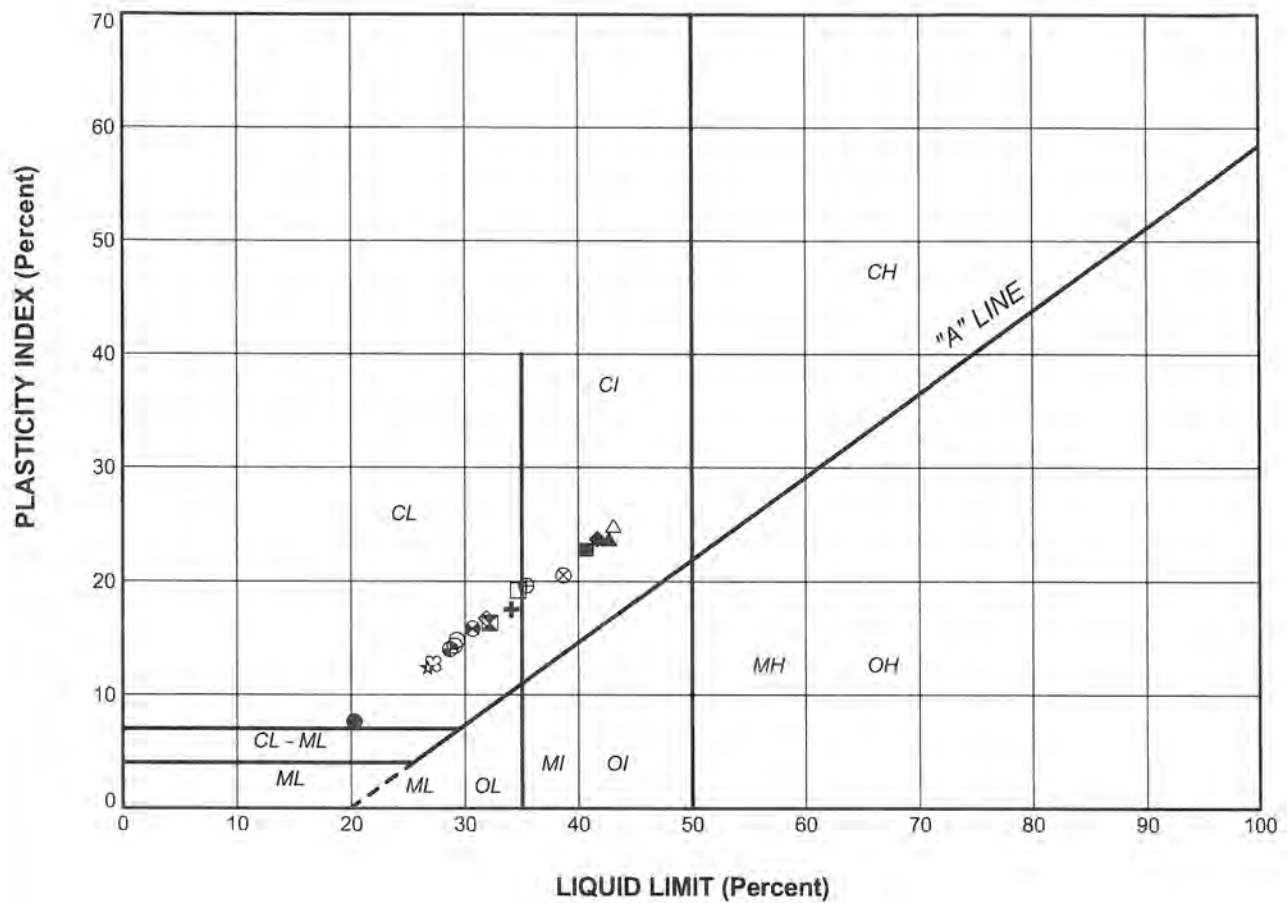
TITLE

PLASTICITY CHART




PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F1
DRAWN	WDF	May 11/09	SCALE N/A
CHECK	SDS	Jun 3/09	REV.

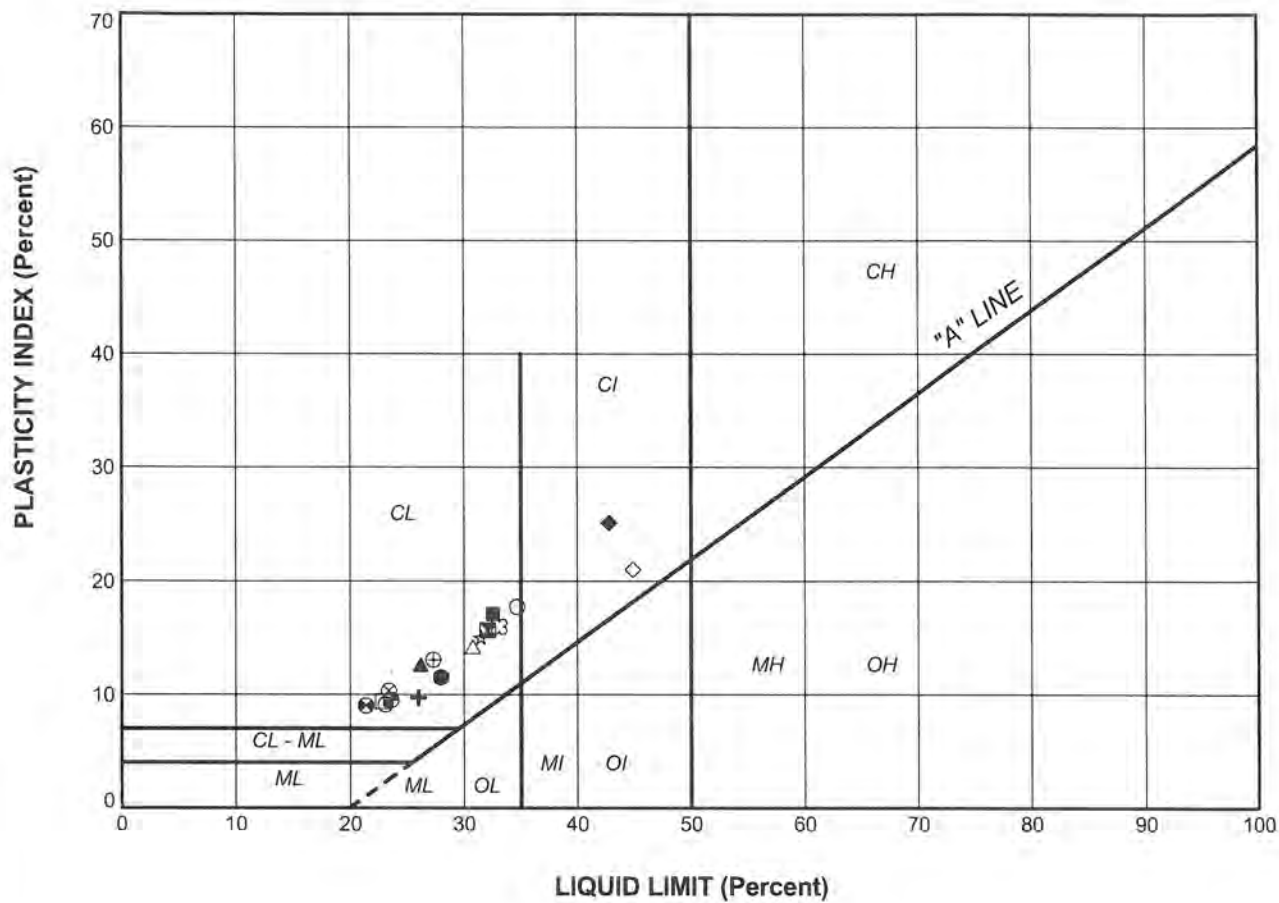
FIGURE F.1H



### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	154	21	20.3	12.7	7.6
■	156	3	40.7	17.9	22.8
▲	158	4A	42.7	19.0	23.7
+	158	8	34.1	16.6	17.5
◆	158	8	41.7	18.0	23.7
◇	158	10	31.9	15.2	16.7
○	158	14	29.3	14.5	14.8
△	160	4	43.1	18.2	24.9
⊗	160	7	38.7	18.2	20.5
⊕	160	8	35.4	15.8	19.6
□	160	8	34.7	15.5	19.2
⊙	160	8	30.7	14.9	15.8
⊖	160	11	28.7	14.7	14.0
☆	160	12	26.7	14.3	12.4
⊗	160	13	27.2	14.5	12.7
⊕	160	14	32.2	15.9	16.3
⊖	160	16	29.1	14.8	14.3

PROJECT		GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO	
TITLE		PLASTICITY CHART	
PROJECT No. 07-1130-207-0		FILE No. 0711302070-R0100F1	
DRAWN WDF		SCALE N/A	
CHECK <i>[Signature]</i>		REV.	
 <b>Golder Associates</b> LONDON, ONTARIO		May 11/09 <b>FIGURE F.11</b>	



### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	163	4	28.0	16.5	11.5
■	163	9	32.5	15.4	17.1
▲	163	15	26.2	13.6	12.6
+	164	4	26.0	16.3	9.7
◆	164	10	42.8	17.7	25.1
◇	164	18	44.9	23.9	21.0
○	166	2	34.7	17.0	17.7
△	166	6	30.8	16.6	14.2
⊗	166	14	23.4	13.1	10.3
⊕	201	4	27.3	14.3	13.1
□	201	7	22.9	13.5	9.4
⊙	201	12	21.4	12.4	9.0
⊗	201	16	23.6	14.1	9.5
☆	201	19	31.5	16.5	15.0
⊗	201	23	33.1	17.2	16.0
⊗	202	3	32.1	16.5	15.7
⊙	202	5	23.1	14.0	9.1

PROJECT  
**GEOTECHNICAL DATA REPORT**  
**WINDSOR-ESSEX PARKWAY**  
**WINDSOR, ONTARIO**

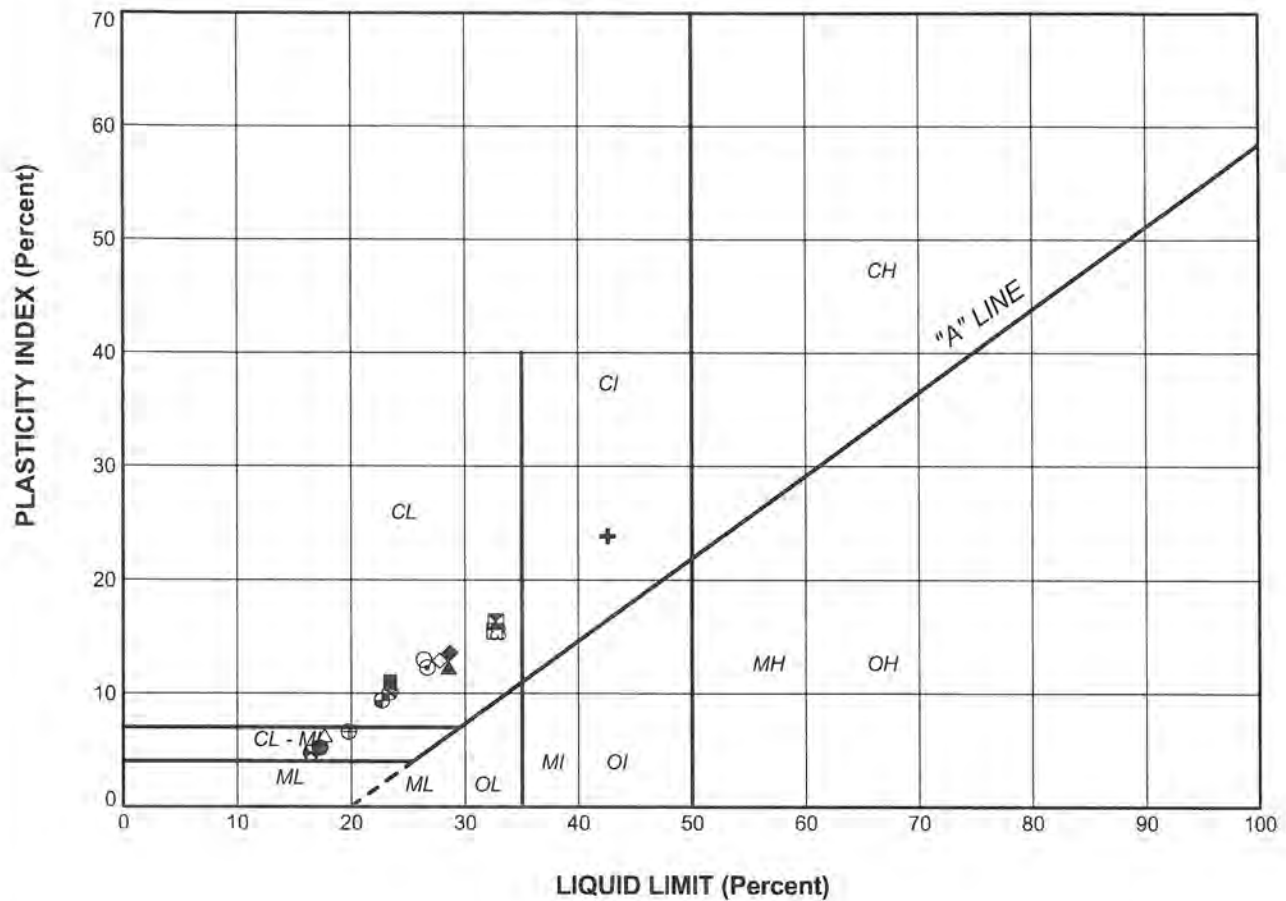
TITLE  
**PLASTICITY CHART**



PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F1
DRAWN	WDF	May 11/09	SCALE N/A
CHECK	SSB	May 11/09	REV


**FIGURE F.1J**

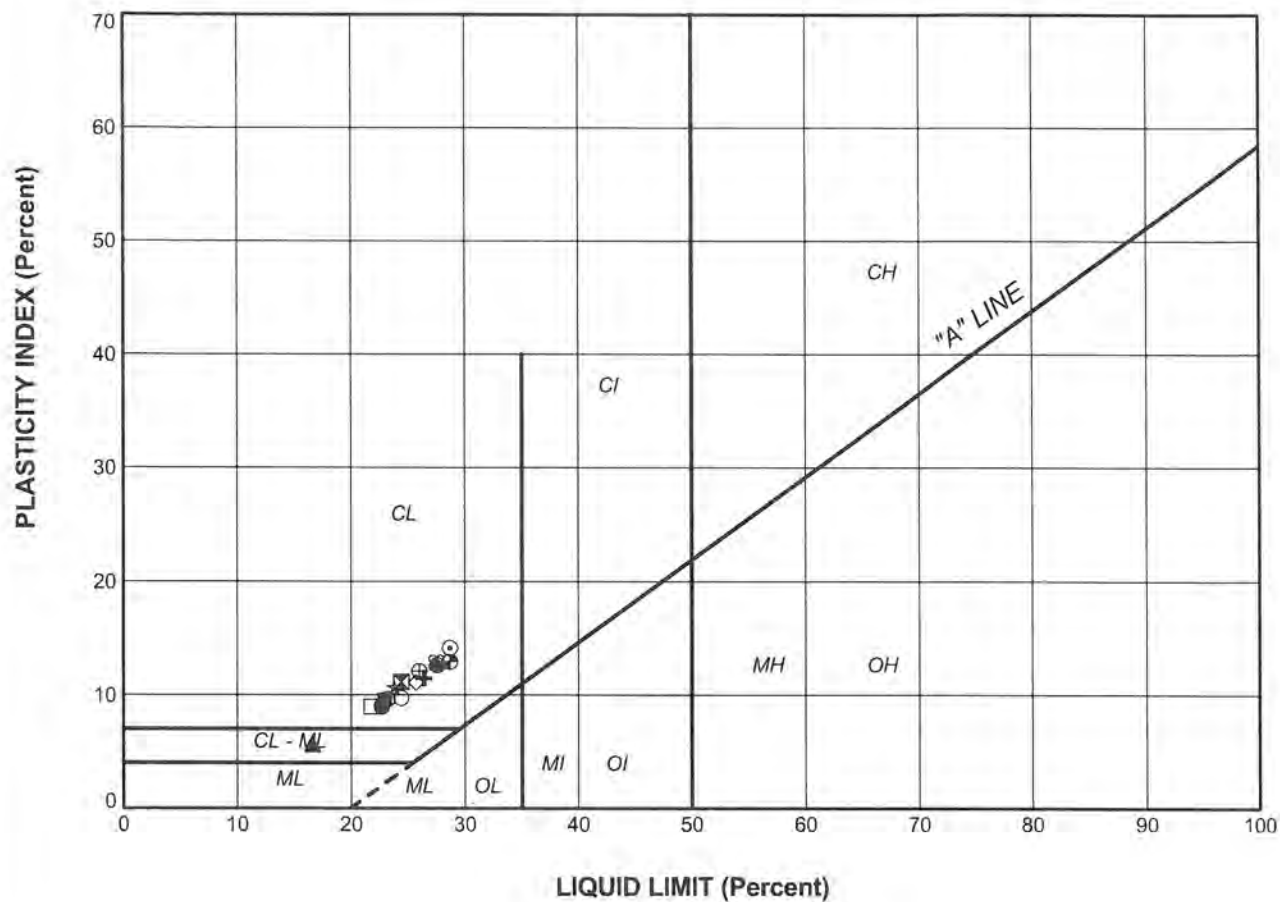




### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	202	10	17.3	12.1	5.2
■	202	13	23.4	12.4	11.1
▲	202	17	28.6	16.4	12.3
+	202	19	42.6	18.8	23.9
◆	202	21	28.7	15.2	13.6
◇	203	3	27.8	15.0	12.9
○	203	5	26.4	13.5	13.0
△	203	10	17.7	11.5	6.3
⊗	203	14	23.4	13.4	10.1
⊕	203	20	19.8	13.2	6.6
□	206	3	32.6	17.2	15.5
⊙	206	5	16.5	11.8	4.8
⊗	206	8	22.7	13.4	9.4
☆	206	13	23.5	13.3	10.2
⊗	206	18	32.9	17.5	15.4
⊗	206	23	32.7	16.4	16.3
⊙	207	2	26.7	14.5	12.3

PROJECT				GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE				PLASTICITY CHART			
PROJECT No.		07-1130-207-0		FILE No.		0711302070-RD100F1	
DRAWN		WDF		SCALE		N/A	
CHECK		JSS		REV.			
		May 11/09					
		2007/05/15					
 <b>Golder Associates</b> LONDON, ONTARIO				<b>FIGURE F.1K</b>			



### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	207	4	22.7	13.8	9.0
■	207	7	22.9	13.4	9.6
▲	207	11	16.7	11.2	5.6
✦	207	15	26.4	15.0	11.5
◆	207	20	27.5	15.0	12.6
◇	208	2	25.7	14.7	11.1
○	208	5	24.4	14.7	9.7
△	208	8	22.7	13.2	9.6
⊗	208	13	23.2	13.6	9.6
⊕	208	16	26.0	14.0	12.1
□	208	20	21.8	12.9	9.0
⊙	215N	3	27.6	15.0	12.6
⊗	216N	2	28.7	15.8	12.9
★	217N	4	23.8	13.2	10.7
⊗	218N	2	27.5	14.7	12.8
⊗	219N	5	24.4	13.3	11.1
⊙	220N	2	28.7	14.6	14.1


PROJECT		GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO	
TITLE		PLASTICITY CHART	
PROJECT No. 07-1130-207-0		FILE No. 0711302070-R0100F1	
SCALE N/A		REV.	
DRAWN WDF	May 11/09	FIGURE F.1L	
CHECK <i>[Signature]</i>	<i>[Signature]</i>		

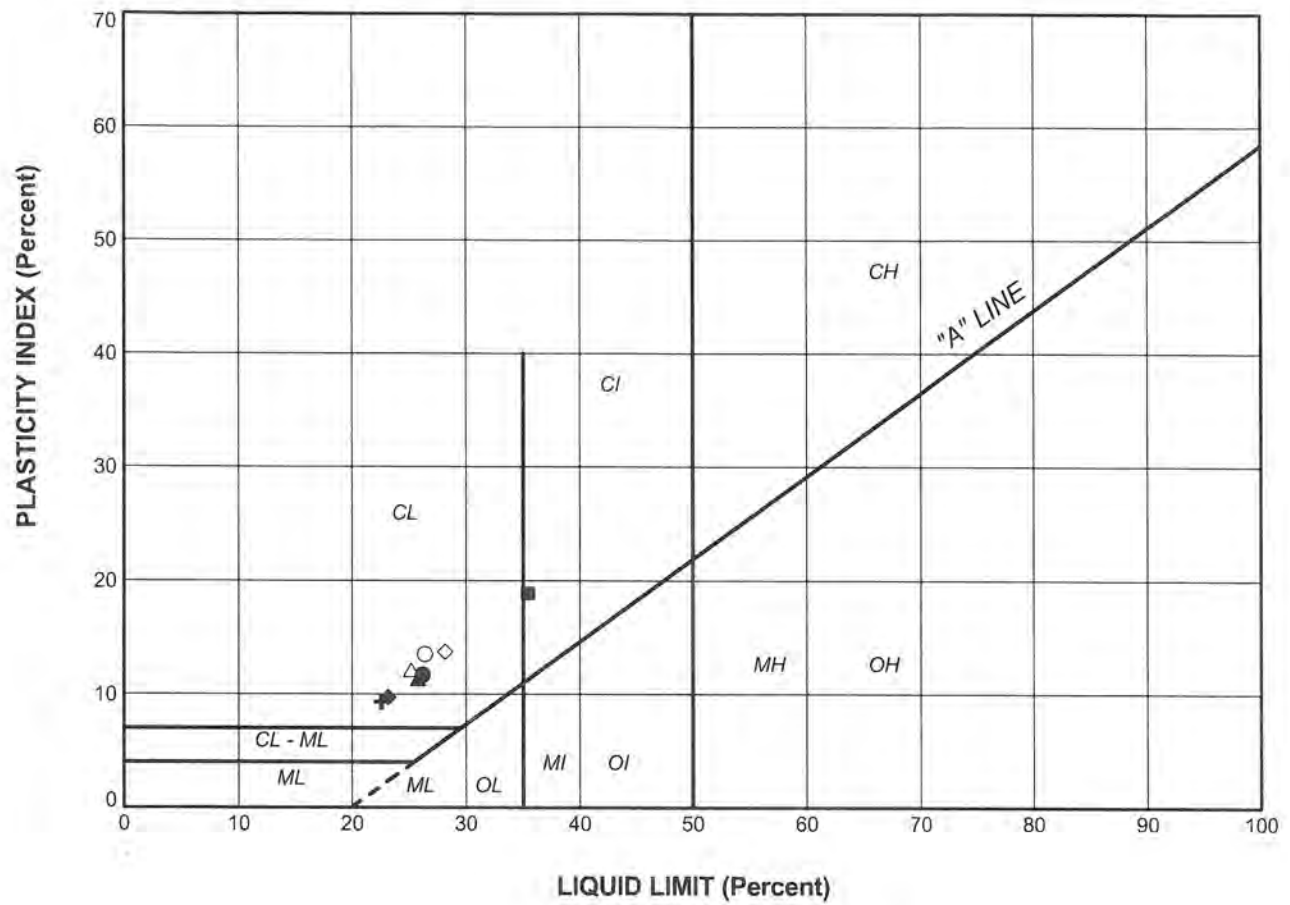




SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	221N	3	27.5	13.8	13.7
■	222N	4	25.7	13.4	12.3
▲	223N	6	24.2	13.2	11.0
✦	224N	2	26.4	13.6	12.8
◆	225N	3	26.6	13.3	13.3
◇	226N	4	26.3	13.1	13.2
○	227N	5	25.8	14.5	11.3
△	228N	2	28.2	14.7	13.5
⊗	229N	4	19.3	11.8	7.5
⊕	230N	3	24.7	12.9	11.8
□	231N	2	28.6	14.4	14.2
⊙	232N	4	22.6	12.3	10.3
⊛	233N	5	24.9	13.8	11.1
☆	235N	3	26.3	13.9	12.4
⊠	235N	6	24.7	13.8	10.9
⊞	236N	2	26.9	14.4	12.5
⊚	236N	5	25.5	13.6	11.9

PROJECT	<b>GEOTECHNICAL DATA REPORT</b> <b>WINDSOR-ESSEX PARKWAY</b> <b>WINDSOR, ONTARIO</b>		
TITLE	<b>PLASTICITY CHART</b>		

 <b>Golder Associates</b> LONDON ONTARIO	PROJECT No. 07-1130-207-0		FILE No. 0711302070-R0100F1	
	DRAWN WDF	May 11/06	SCALE N/A	REV.
	CHECK <i>SSB</i>	<i>Jun 3/06</i>	FIGURE F.1M	



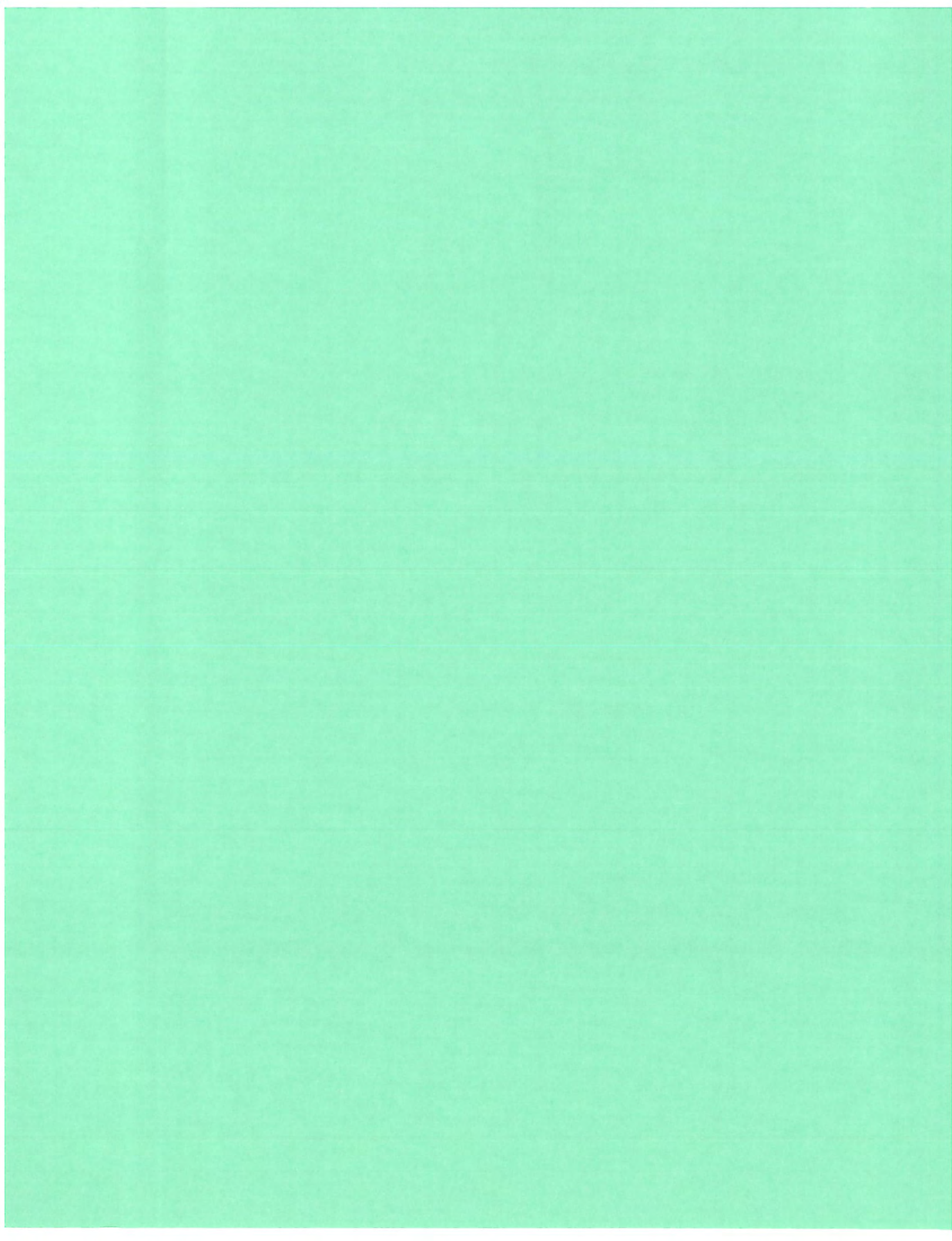
### LEGEND

SYMBOL	BOREHOLE	SAMPLE	LL(%)	PL(%)	PI
●	237N	4	26.2	14.5	11.7
■	238N	2	35.4	16.5	18.9
▲	239N	3	25.8	14.5	11.3
+	240N	2	22.6	13.3	9.3
◆	240N	3	23.2	13.5	9.7
◇	241N	4	28.2	14.5	13.7
○	242N	3	26.4	12.9	13.5
△	CPT-103A	3	25.2	13.1	12.1

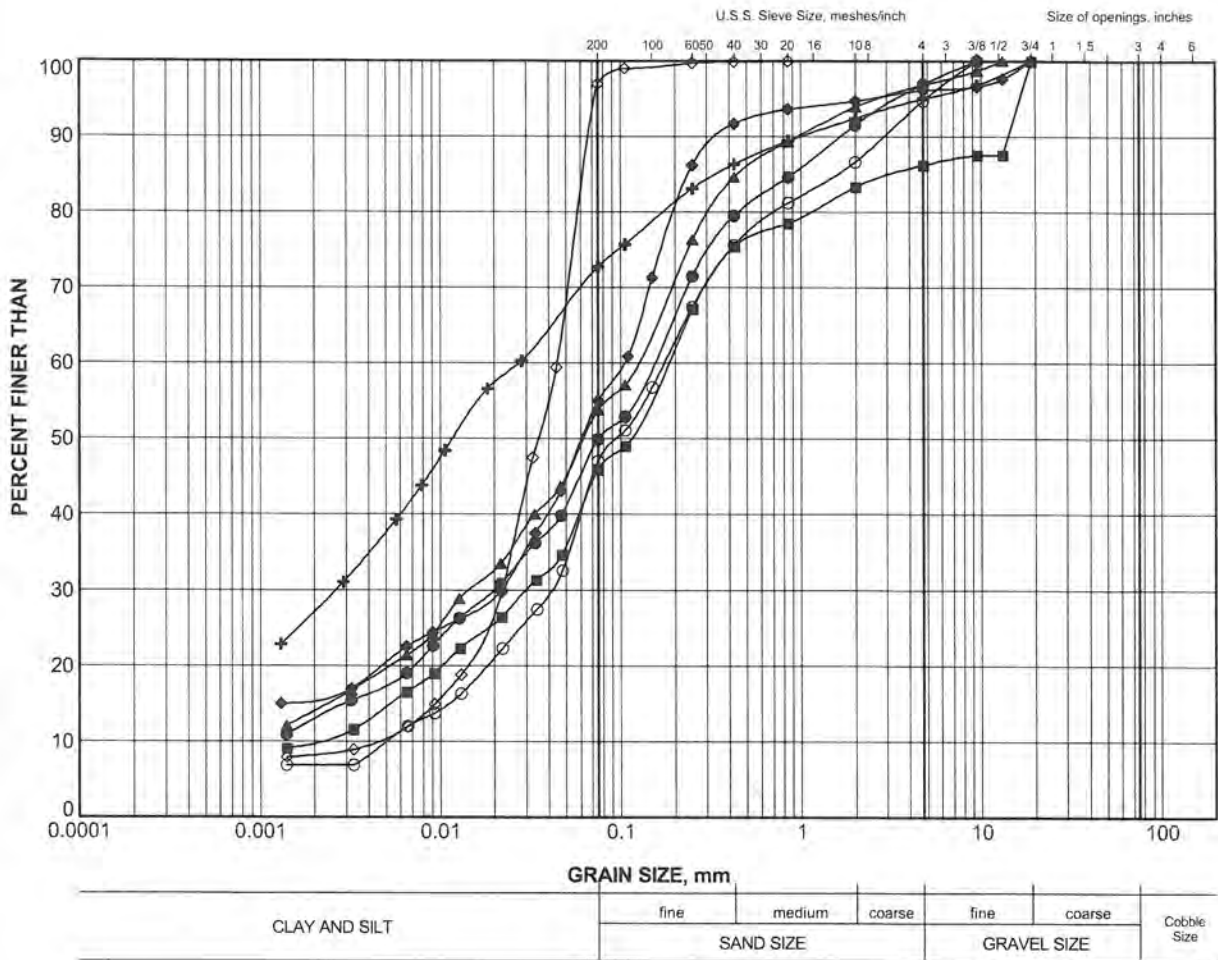
PROJECT				GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE							
PLASTICITY CHART							
PROJECT No.		07-1130-207-0		FILE No.		0711302070-RD100F1	
DRAWN		WDF		SCALE		N/A	
CHECK		SJB		REV.			
DATE		May 11/09		FIGURE F.1N			







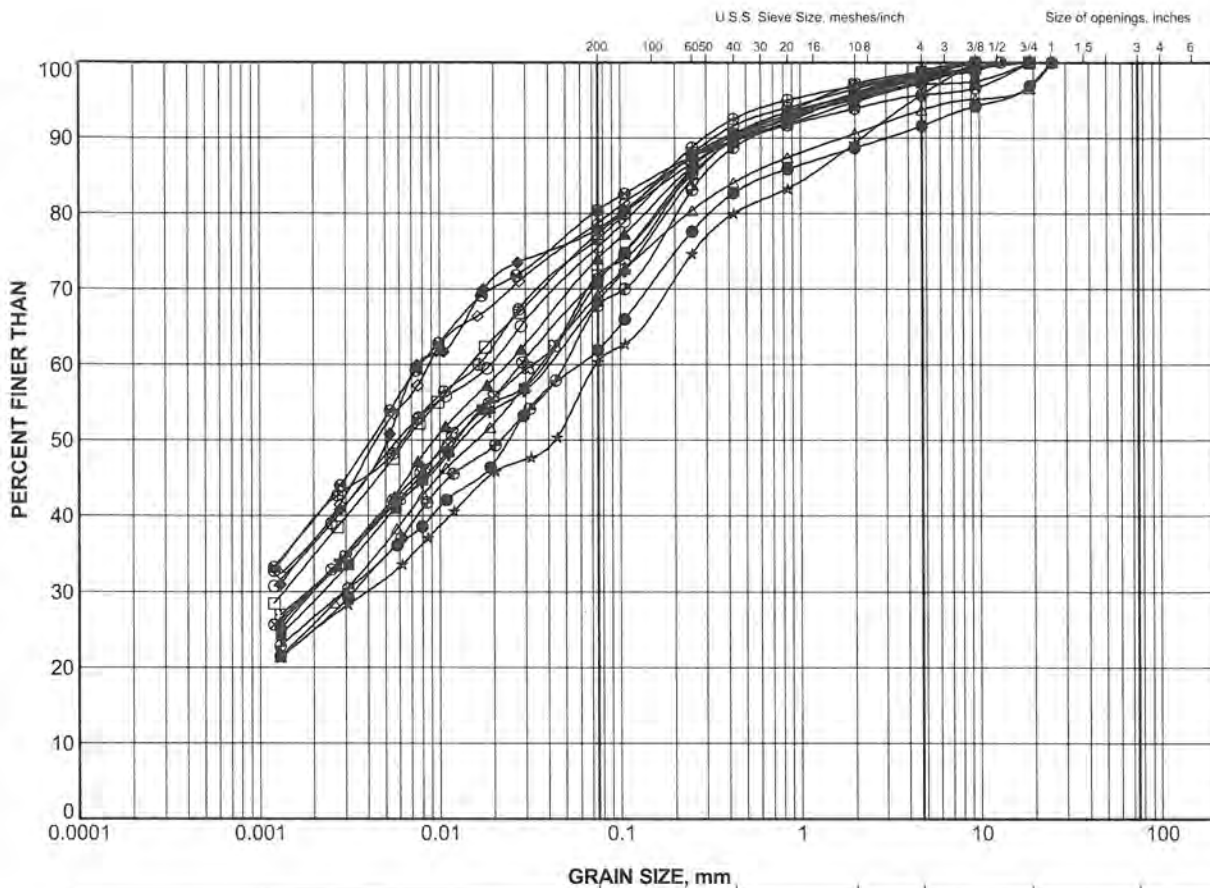




LEGEND			
SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	104	10	177.5
■	107	13a	172.1
▲	115	10	173.8
+	135	17	162.0
◆	203	10	178.8
◇	166A	2	177.3
○	230N	6	182.5

PROJECT		GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO	
TITLE		GRAIN SIZE DISTRIBUTION UPPER GRANULAR DEPOSITS	
PROJECT No. 07-1130-207-0		FILE No. 0711302070-R0100F2	
DRAWN WDF		SCALE N/A	
CHECK JDB		REV.	
May 11/09		FIGURE F.2	





CLAY AND SILT						Cobble Size
	fine	medium	coarse	fine	coarse	
	SAND SIZE			GRAVEL SIZE		

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	1	5	179.5
■	1	10	172.8
▲	1	14	167.3
✦	7	7	174.5
◆	7	11	168.3
◇	7	20	157.0
○	14	9	171.8
△	14	11	168.7
⊗	14	16	162.6
⊕	23	7	170.2
□	23	13	161.9
⊙	23	15	159.5
⊗	101	3	184.9
☆	101	12	173.4
⊠	101	14	170.4

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

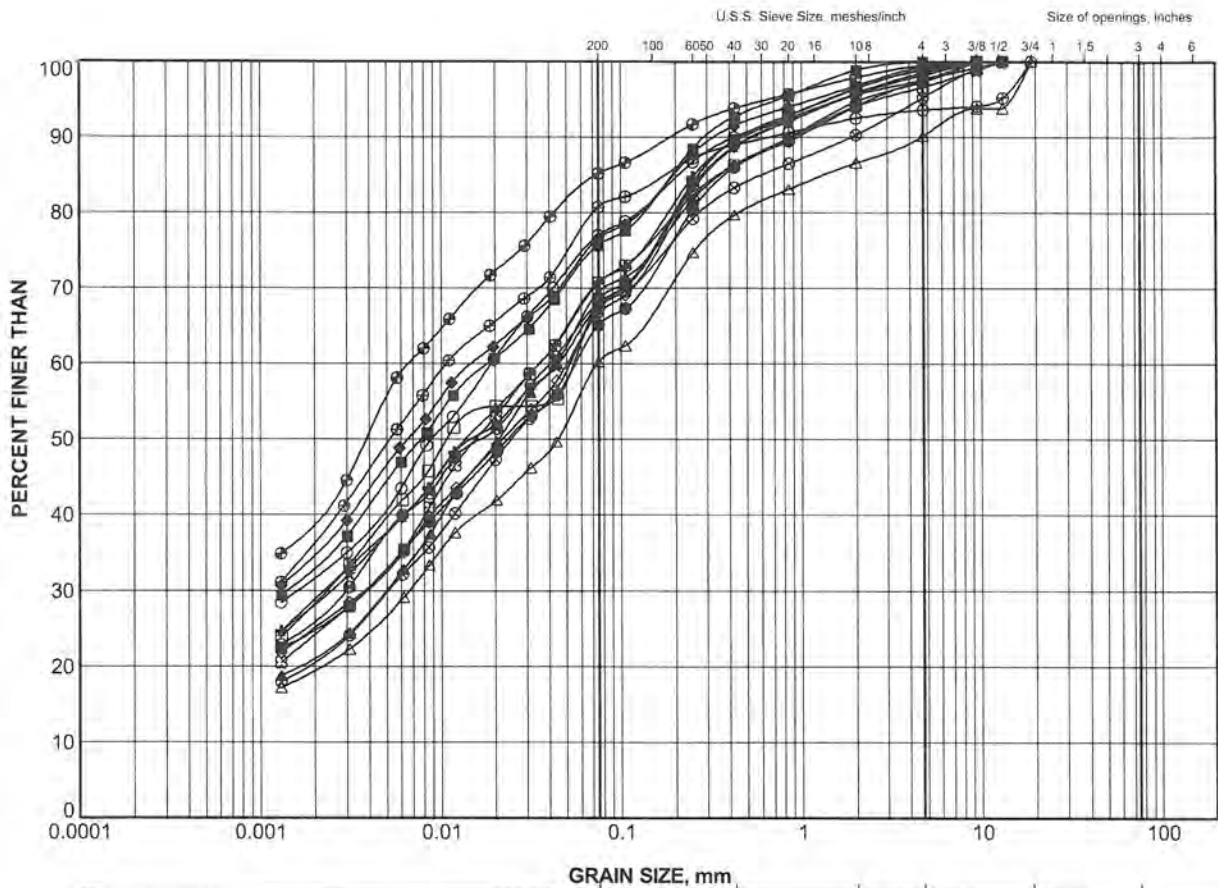
TITLE

**GRAIN SIZE DISTRIBUTION**  
**CLAYEY SILT TO SILTY CLAY DEPOSIT**



PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F3
DRAWN	WDF	May 11/09	SCALE N/A
CHECK	JB	In 3/6/09	REV.

**FIGURE F.3A**



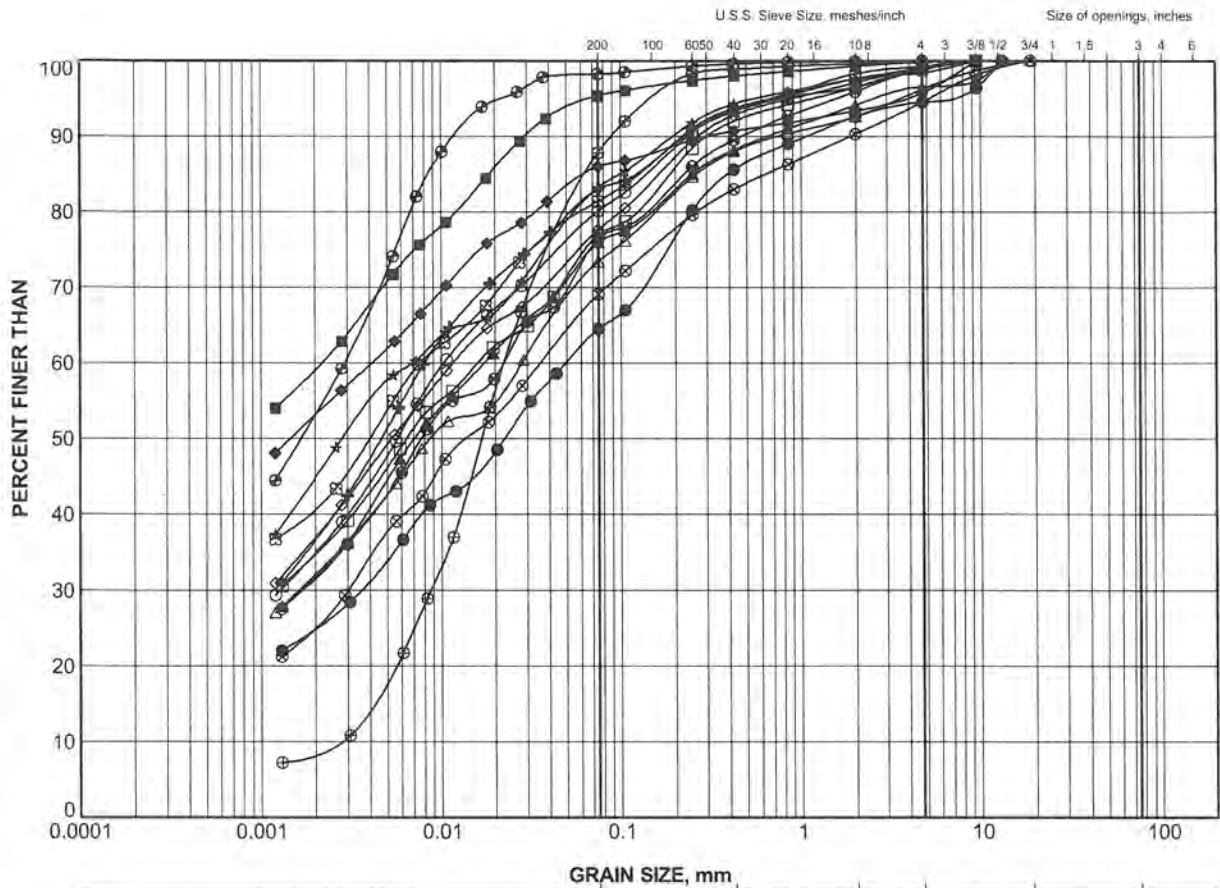
CLAY AND SILT	fine	medium	coarse	fine	coarse	Cobble Size
	SAND SIZE			GRAVEL SIZE		

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	102	10	177.2
■	102	15	171.1
▲	102	20	163.5
+	104	12	175.2
◆	104	16	169.2
◇	107	9	178.0
○	107	18	164.3
△	109	7	179.4
⊗	109	17	164.9
⊕	109	21	160.2
□	113	2	182.7
⊙	113	5	180.4
⊗	113	20	158.3
☆	115	12	171.5
⊗	115	18	163.1

PROJECT		GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE		GRAIN SIZE DISTRIBUTION CLAYEY SILT TO SILTY CLAY DEPOSIT			
PROJECT No.		07-1130-207-0		FILE No. 0711302070-R0100F3	
SCALE		N/A		REV.	
DRAWN		WDF		May 11/09	
CHECK		SIS		JUN 24/09	
		FIGURE F.3B			





CLAY AND SILT						Cobble Size
	fine	medium	coarse	fine	coarse	
	SAND SIZE			GRAVEL SIZE		

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	116	4	180.4
■	116	14	168.2
▲	116	20	159.0
◆	118	10	173.3
◇	118	15	165.7
○	122	6	176.9
△	122	10	170.8
⊗	122	14	164.6
⊕	122	19	157.0
⊖	122	22	152.4
□	127	6	176.5
⊗	127	17	161.2
⊕	127	22	153.6
☆	129	8	174.5
⊗	129	12	168.4

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

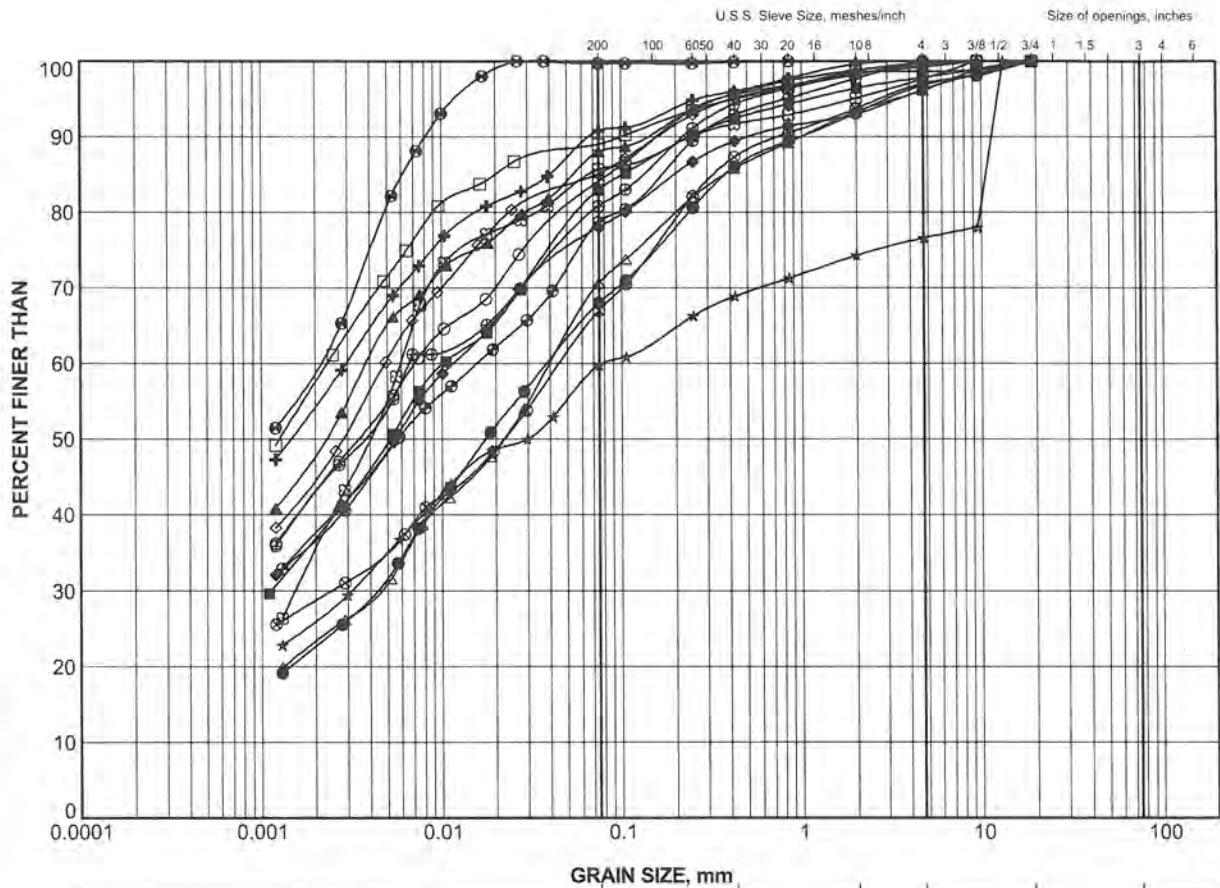
TITLE

**GRAIN SIZE DISTRIBUTION**  
**CLAYEY SILT TO SILTY CLAY DEPOSIT**



PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F3
DRAWN	WDF	May 11/09	SCALE N/A
CHECK	SDB	Dr. [Signature]	REV.

**FIGURE F.3C**



CLAY AND SILT	fine	medium	coarse	fine	coarse	Cobble Size
	SAND SIZE			GRAVEL SIZE		

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	129	16	162.3
■	129	21	154.6
▲	131	9	173.0
+	131	13	166.9
◆	132	7	175.1
◇	132	11	169.9
○	132	13	168.7
△	132	17	162.9
⊗	135	7	176.5
⊕	135	12	169.6
□	135	14	166.5
⊙	139	24b	151.5
⊗	142	10	171.7
☆	142	20	156.5
⊗	142	23	151.9

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

TITLE

**GRAIN SIZE DISTRIBUTION**  
**CLAYEY SILT TO SILTY CLAY DEPOSIT**

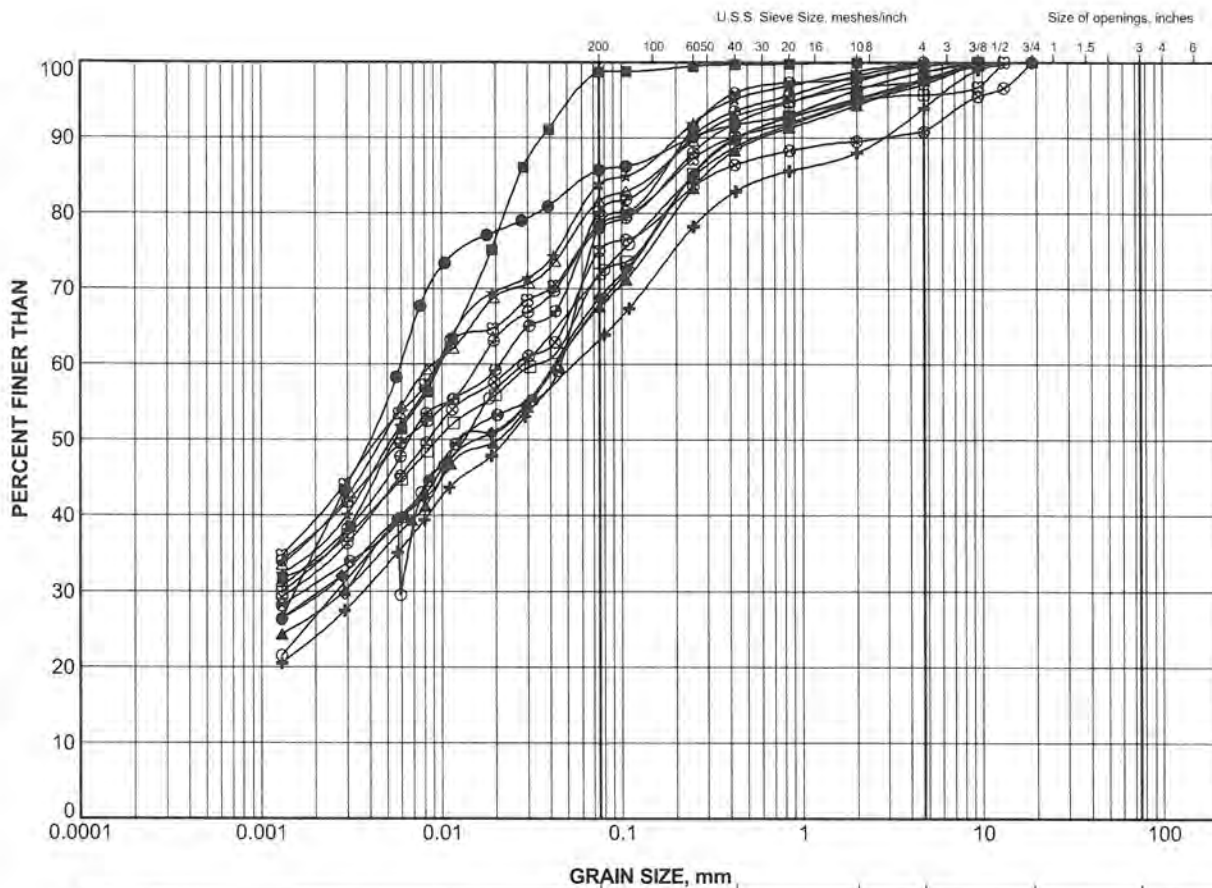


PROJECT No. 07-1130-207-0 FILE No. 0711302070-R0100F3

DRAWN WDF May 11/09 SCALE N/A REV.

CHECK *SB* *20/5/09* **FIGURE F.3D**





CLAY AND SILT	GRAVEL SIZE, mm					Cobble Size
	fine	medium	coarse	fine	coarse	
	SAND SIZE			GRAVEL SIZE		

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	142	24a	150.4
■	143	2	179.5
▲	145	8	175.2
+	145	13	170.5
◆	145	15	169.2
◇	145	15	168.6
○	145	19	163.0
△	147	2	179.1
⊗	147	4	177.6
⊕	149	4	177.7
□	149	12	168.6
⊙	151	1	179.4
⊗	151	3	177.8
☆	152	5	176.9
⊠	152	14	167.1

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

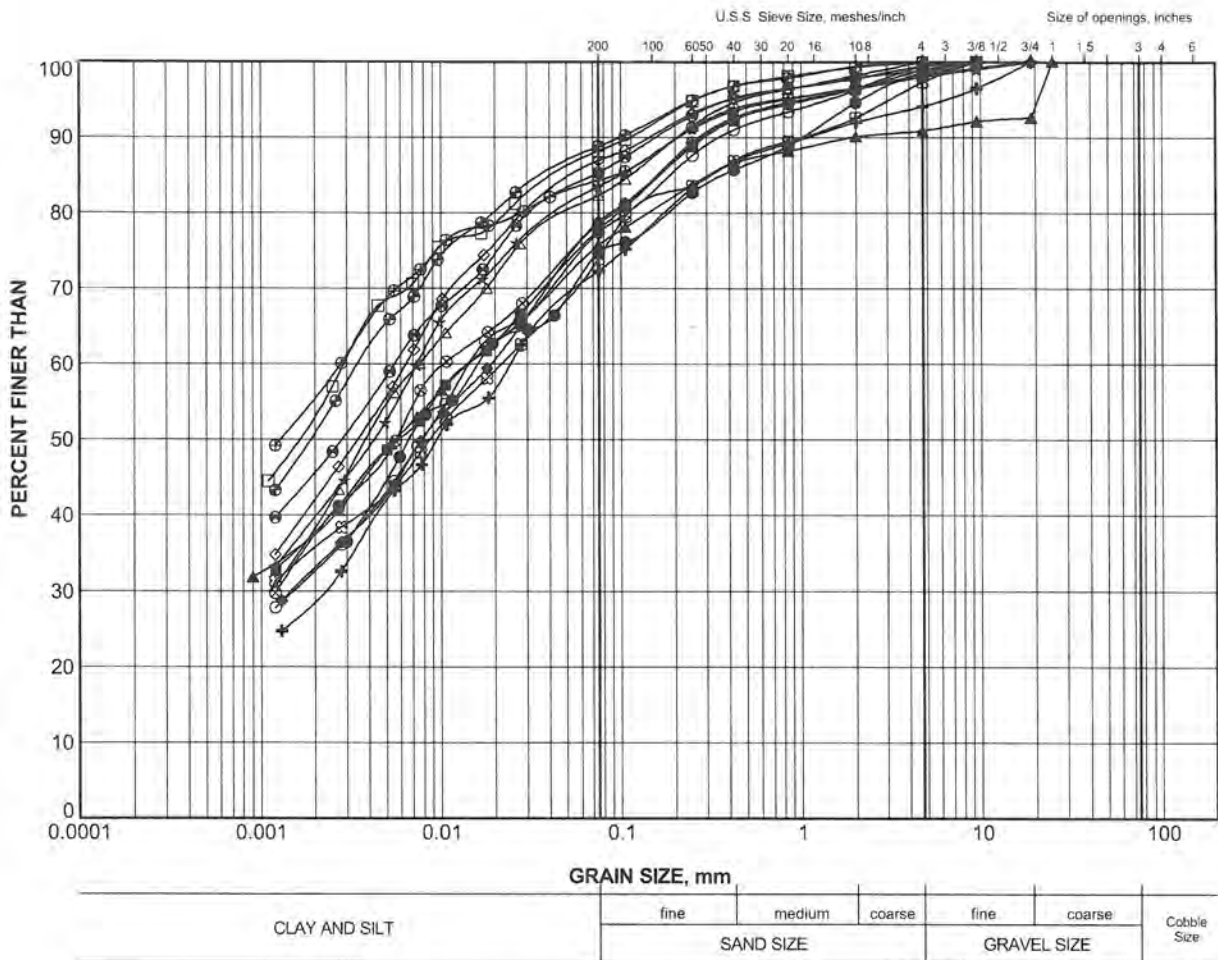
TITLE

**GRAIN SIZE DISTRIBUTION**  
**CLAYEY SILT TO SILTY CLAY DEPOSIT**




PROJECT No.	07-1130-207-B	FILE No.	0711302070-R0100F3
DRAWN	WDF	May 11/09	SCALE N/A
CHECK	SSB	Am 3/29	REV.

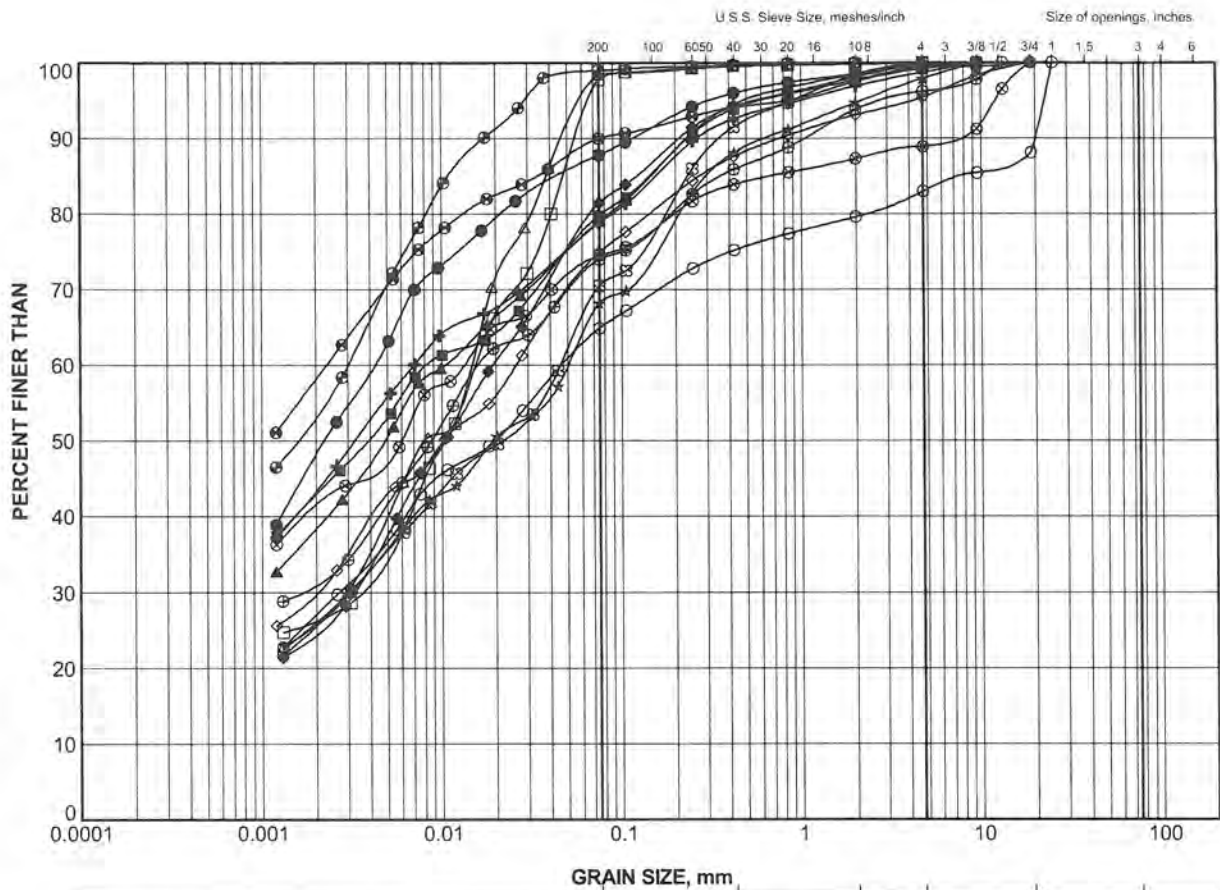
**FIGURE F.3E**



### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	152	20	158.0
■	154	4	177.8
▲	154	4	177.7
+	154	6	176.3
◆	154	6	175.2
◇	154	8	172.2
○	154	10	169.1
△	154	12	166.4
⊗	154	12	165.3
⊕	156	3	177.0
□	158	4a	175.9
⊙	158	8	172.4
⊗	158	8	172.3
☆	158	10	169.2
⊠	158	14	163.1

PROJECT				GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE				GRAIN SIZE DISTRIBUTION CLAYEY SILT TO SILTY CLAY DEPOSIT			
PROJECT No.		07-1130-207-0		FILE No.		0711302070-R0100F3	
SCALE		N/A		REV.			
DRAWN		WDF May 11/09		CHECK		SJB <i>in 3/09</i>	
 <b>Golder Associates</b> LONDON, ONTARIO				<b>FIGURE F.3F</b>			



CLAY AND SILT	SAND SIZE			GRAVEL SIZE		Cobble Size
	fine	medium	coarse	fine	coarse	

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	158	18	157.1
■	160	8	172.4
▲	160	8	172.4
+	160	8	171.8
◆	160	12	166.8
◇	160	13	165.3
○	160	16	160.6
△	163	4	175.5
⊗	163	9	171.7
⊕	163	15	162.7
□	164	4	175.8
⊙	164	10	170.4
⊗	164	18	158.3
☆	201	4	184.4
⊗	201	7	182.1

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

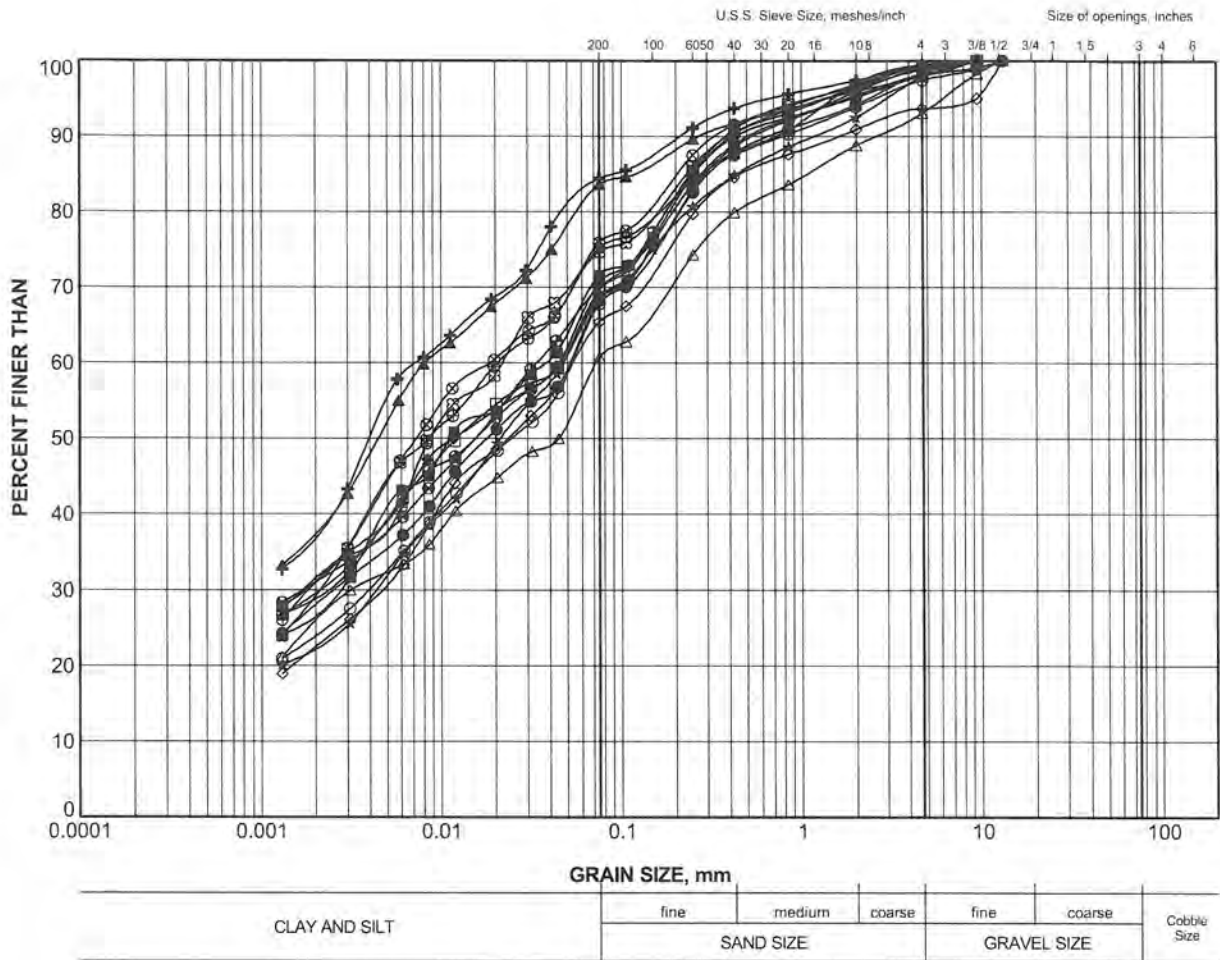
TITLE

**GRAIN SIZE DISTRIBUTION**  
**CLAYEY SILT TO SILTY CLAY DEPOSIT**




PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F3
DRAWN	WDF	May 11/08	SCALE N/A REV.
CHECK	SB	Jan 9/09	

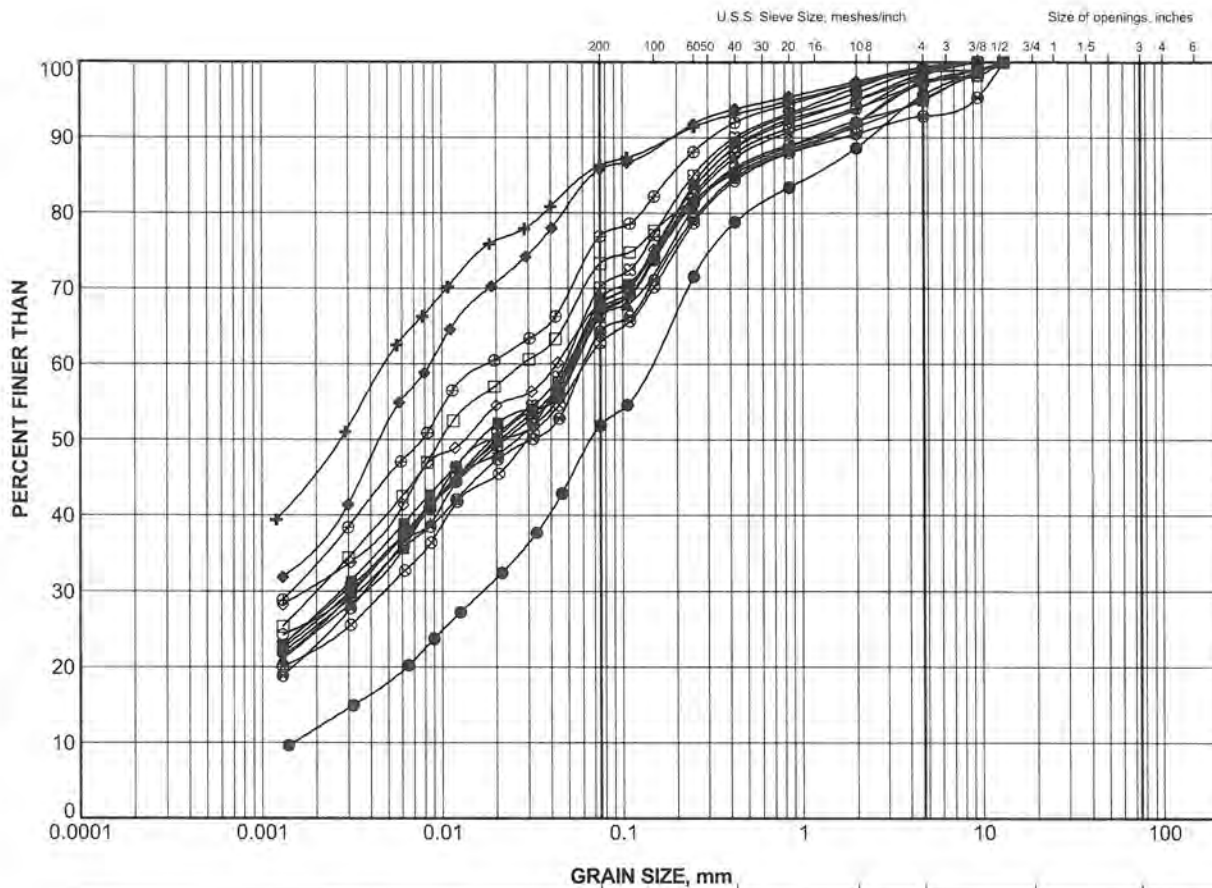
**FIGURE F.3G**



### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	201	12	174.6
■	201	16	168.5
▲	201	19	164.0
+	201	23	157.9
◆	202	3	185.6
◇	202	5	184.0
○	202	10	178.5
△	202	13	174.0
⊗	202	17	167.9
⊕	202	21	161.8
□	203	3	185.5
⊗	203	5	184.0
⊕	203	14	172.7
☆	203	20	163.5
⊗	206	3	184.7

PROJECT				GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE				GRAIN SIZE DISTRIBUTION CLAYEY SILT TO SILTY CLAY DEPOSIT			
PROJECT No.		07-1130-207-0		FILE No.		0711302070-R0100F3	
SCALE		N/A		REV.			
DRAWN		WDF		May 11/09			
CHECK		SB		Jm 3/2/09		FIGURE F.3H	
 <b>Golder Associates</b> LONDON, ONTARIO							



GRAIN SIZE, mm						
CLAY AND SILT	fine	medium	coarse	fine	coarse	Cobble Size
	SAND SIZE			GRAVEL SIZE		

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	206	5	183.2
■	206	8	180.9
▲	206	13	174.7
✦	206	18	167.1
◆	206	23	159.5
◇	207	2	185.1
○	207	4	183.6
△	207	7	181.3
⊗	207	11	175.4
⊕	207	15	169.3
□	207	20	161.7
⊙	208	2	185.1
⊗	208	5	182.8
☆	208	8	180.5
⊠	208	13	173.8

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

TITLE

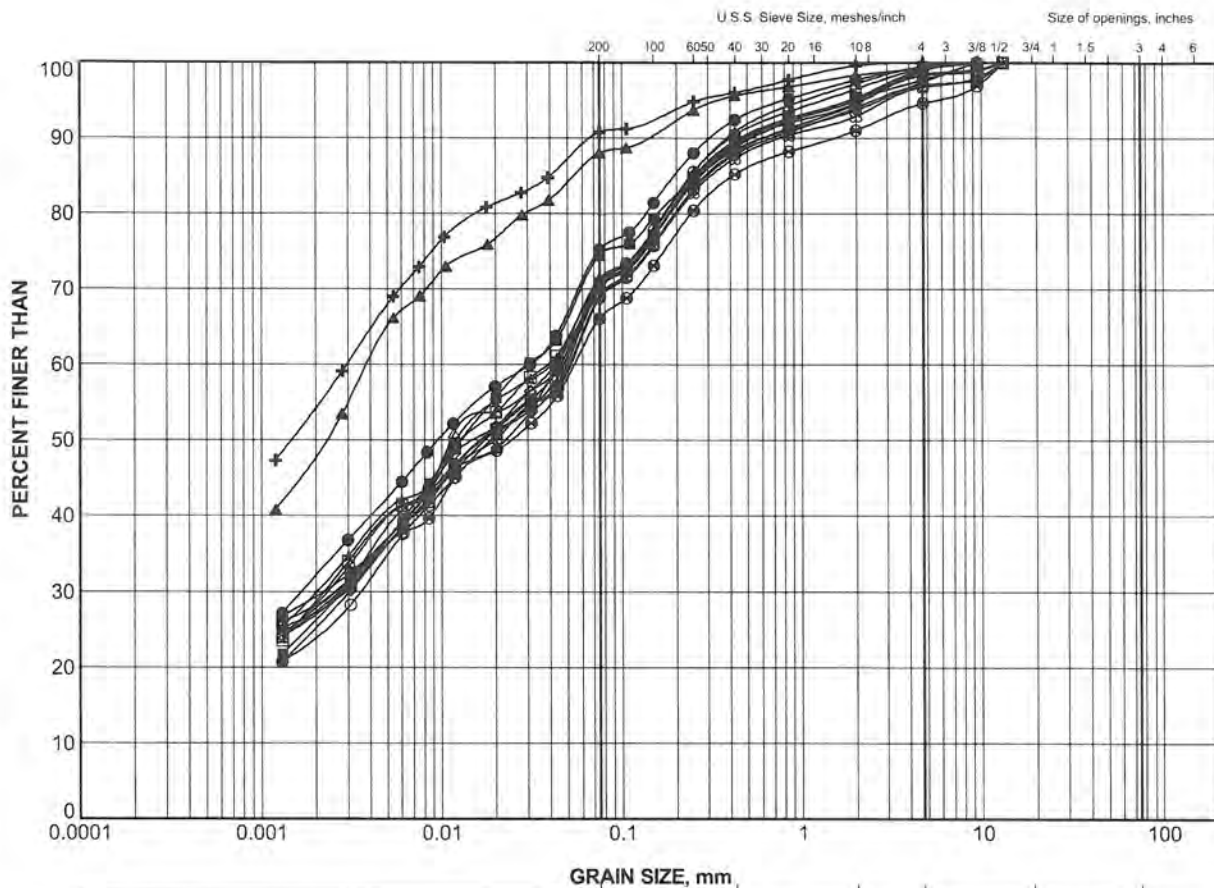
**GRAIN SIZE DISTRIBUTION**  
**CLAYEY SILT TO SILTY CLAY DEPOSIT**



PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F3
DRAWN	WDF	May 11/09	SCALE N/A
CHECK	5/13	24/3/09	REV.

**FIGURE F.31**





CLAY AND SILT	GRAIN SIZE, mm						Cobble Size
	fine	medium	coarse	fine	coarse		
	SAND SIZE			GRAVEL SIZE			

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	208	16	169.3
■	208	20	163.2
▲	131A	9	173.0
+	131A	13	166.9
◆	215N	3	187.2
◇	216N	2	187.5
○	217N	4	186.0
△	218N	2	187.4
⊗	219N	5	185.0
⊕	220N	2	187.1
□	221N	3	186.3
⊙	222N	4	185.2
⊗	223N	6	183.4
☆	224N	2	186.6
⊠	225N	3	185.6

PROJECT

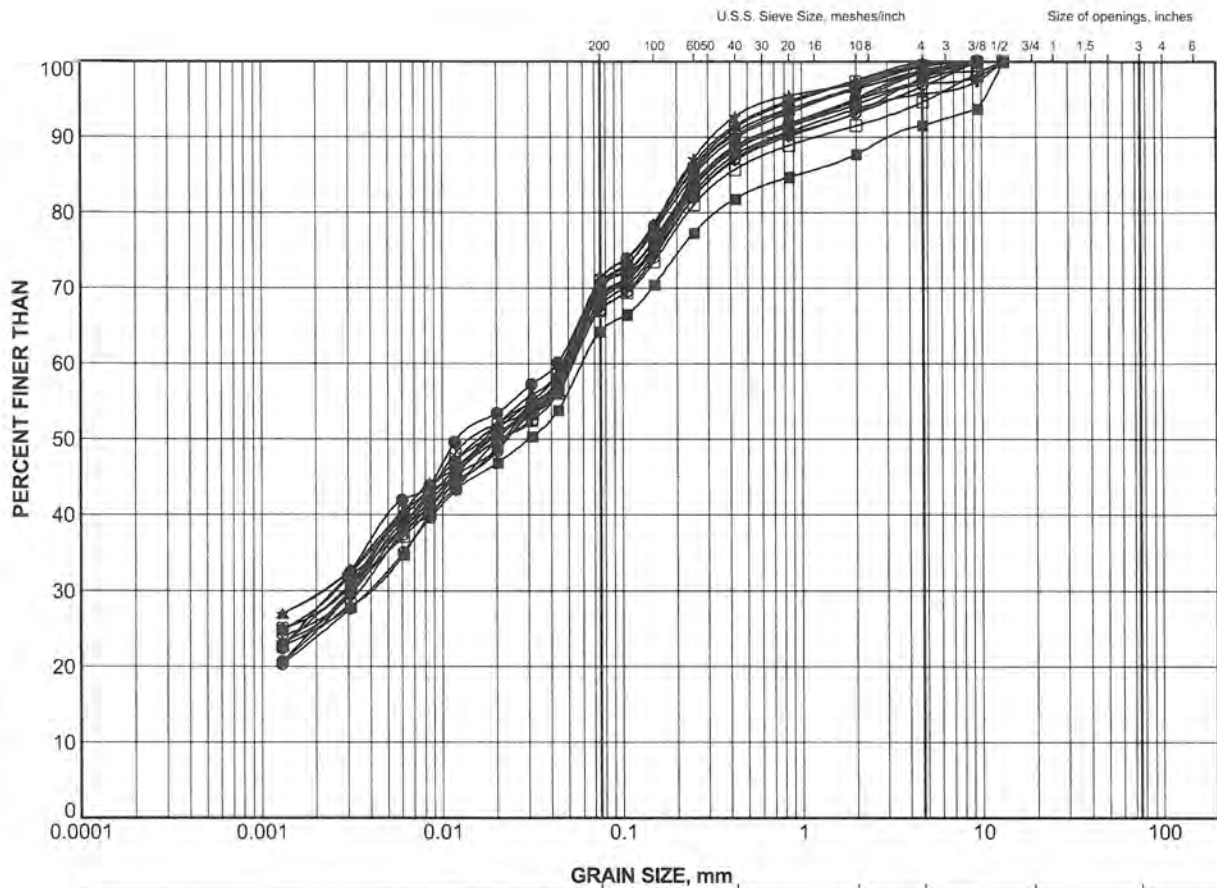
GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

TITLE

**GRAIN SIZE DISTRIBUTION**  
**CLAYEY SILT TO SILTY CLAY DEPOSIT**



PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F3
DRAWN	WDF	May 11/09	SCALE N/A REV.
CHECK	SSB	Jun 29/09	FIGURE F.3J



CLAY AND SILT	SAND SIZE, mm					Cobble Size
	fine	medium	coarse	fine	coarse	
	SAND SIZE			GRAVEL SIZE		

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	226N	4	184.4
■	227N	5	183.6
▲	228N	2	185.7
+	229N	4	184.1
◆	230N	3	184.8
◇	231N	2	185.3
○	232N	4	183.5
△	233N	5	179.1
⊗	235N	3	186.0
⊕	235N	6	183.7
□	236N	2	185.8
⊙	236N	5	183.5
⊗	237N	4	184.5
☆	238N	2	186.1
⊗	239N	3	185.0

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

TITLE

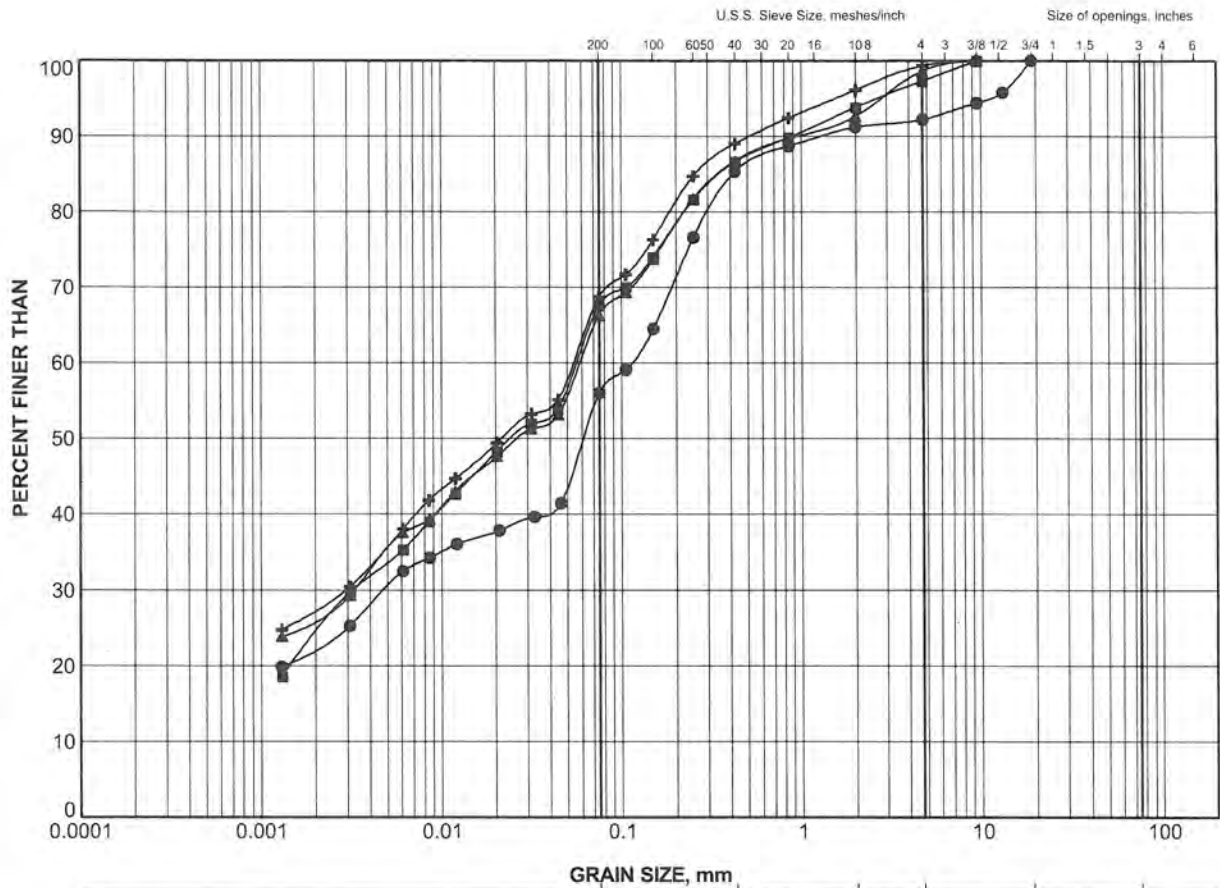
**GRAIN SIZE DISTRIBUTION**  
**CLAYEY SILT TO SILTY CLAY DEPOSIT**



**Golder Associates**  
LONDON, ONTARIO

PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F3
SCALE	N/A	REV.	
DRAWN	WDF	May 11/09	
CHECK	SB	Jun 30/09	


**FIGURE F.3K**

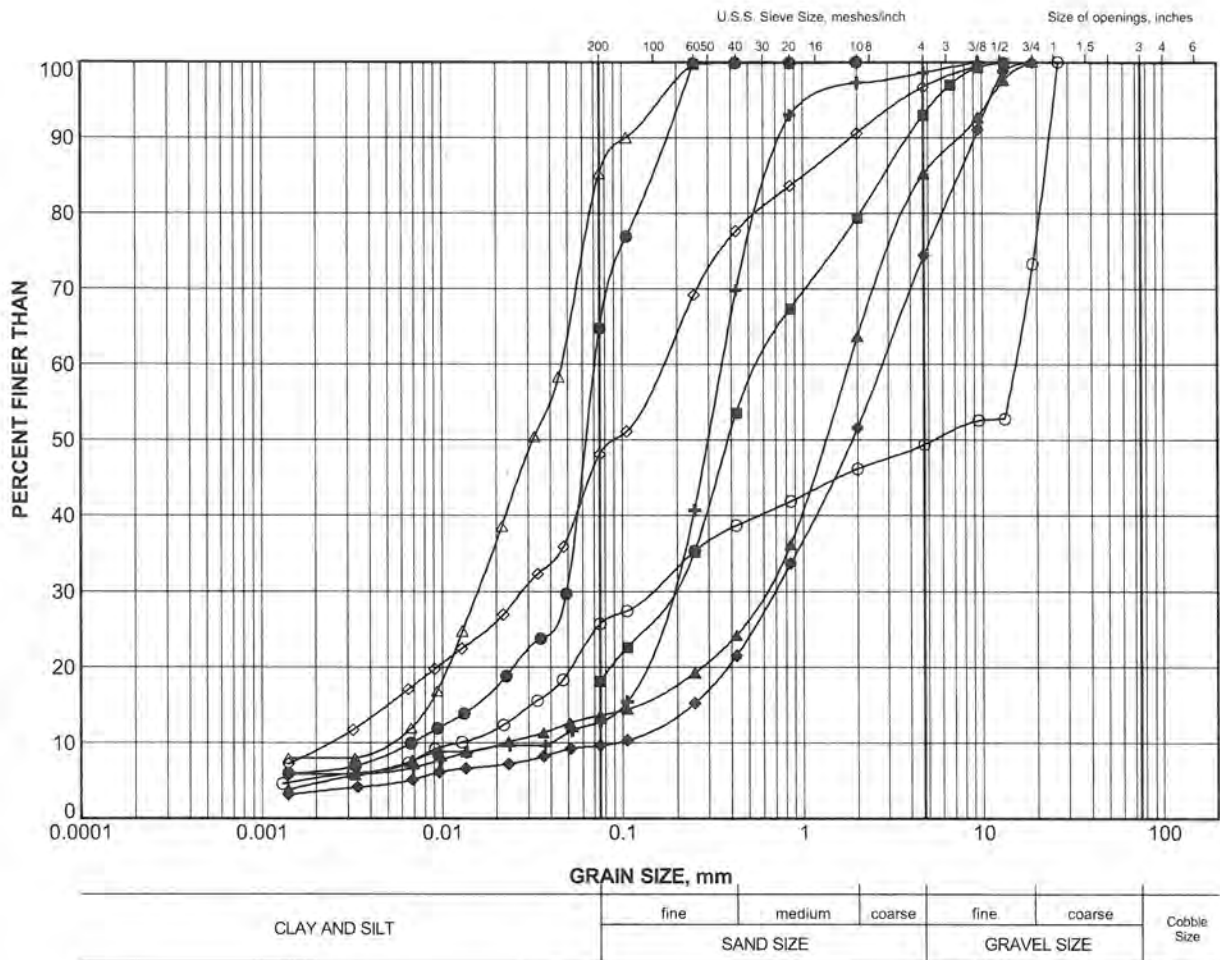


CLAY AND SILT	fine	medium	coarse	fine	coarse	Cobble Size
	SAND SIZE			GRAVEL SIZE		

#### LEGEND


SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	240N	2	185.7
■	240N	3	184.9
▲	241N	4	184.0
+	242N	3	184.5

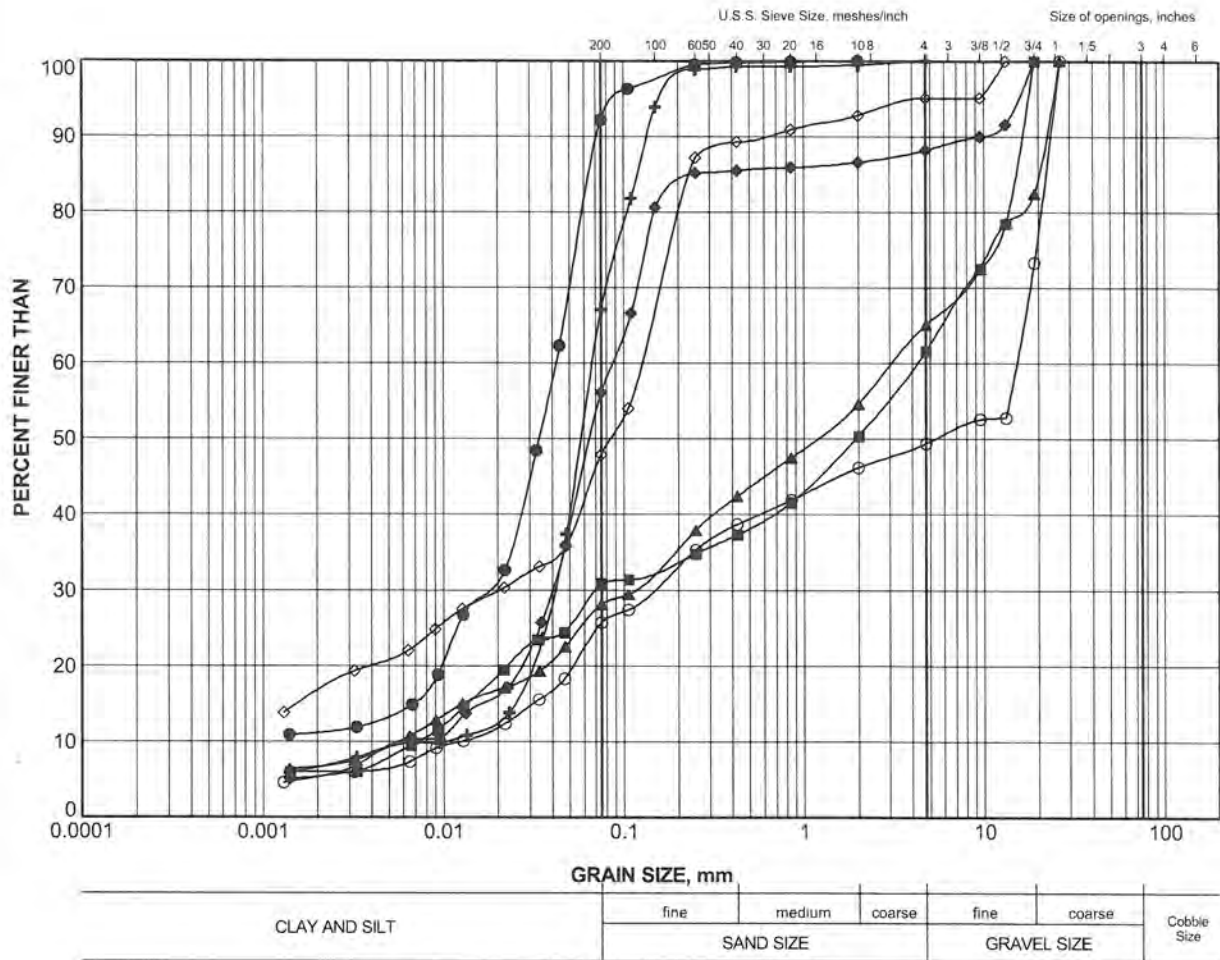
PROJECT				GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO			
TITLE				GRAIN SIZE DISTRIBUTION CLAYEY SILT TO SILTY CLAY DEPOSIT			
PROJECT No.		07-1130-207-0		FILE No.		0711302070-R0100F3	
DRAWN		WDF		SCALE		N/A	
CHECK		JSS		REV.			
		May 11/08					
		2009					
 <b>Golder Associates</b> LONDON, ONTARIO				<b>FIGURE F.3L</b>			



### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	101	23	155.1
■	104	21	161.5
▲	109	26	152.8
+	115	24	155.5
◆	115	26	152.5
◇	118	24	152.4
○	131	24	150.1
△	136	23	152.6

PROJECT		GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO	
TITLE		GRAIN SIZE DISTRIBUTION LOWER GRANULAR DEPOSITS	
PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F4
DRAWN	WDF	SCALE	N/A
CHECK	SJB	REV.	
May 12/09		FIGURE F.4A	
 <b>Golder Associates</b> LONDON, ONTARIO			



### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	141	23c	152.4
■	141	25	149.6
▲	149	23	151.8
+	203	21	162.0
◆	203	23	159.0
◇	206	25	156.4
○	131A	24	150.1

PROJECT

GEOTECHNICAL DATA REPORT  
WINDSOR-ESSEX PARKWAY  
WINDSOR, ONTARIO

TITLE

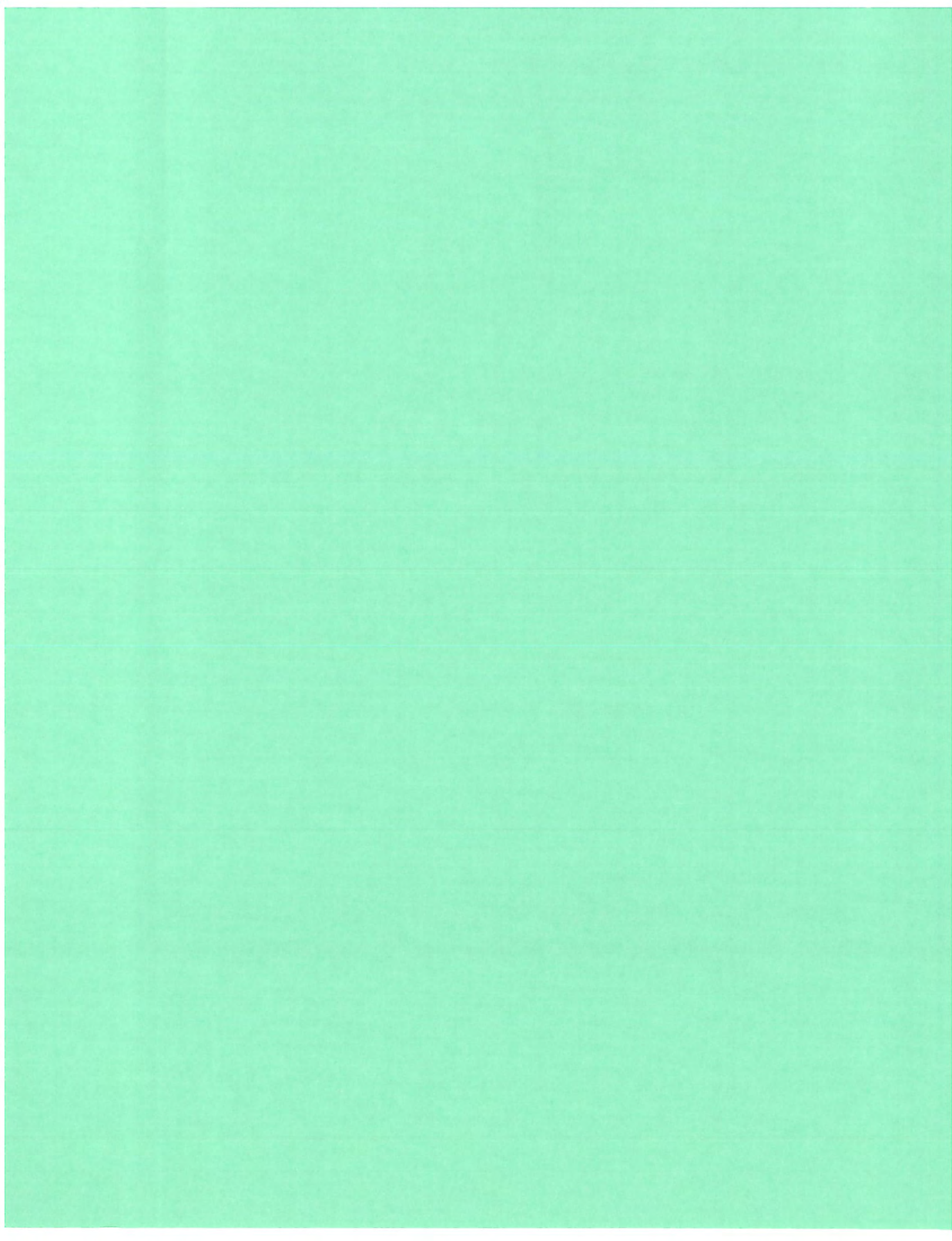
**GRAIN SIZE DISTRIBUTION**  
**LOWER GRANULAR DEPOSITS**

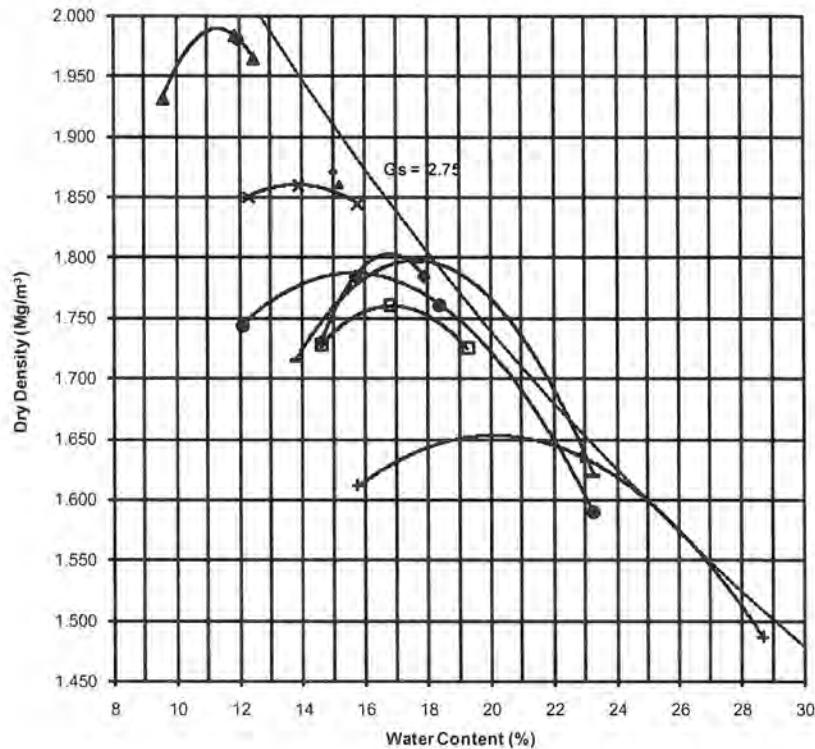


PROJECT No.	07-1130-207-0	FILE No.	0711302070-R0100F4
DRAWN	WDF	May 12/09	SCALE N/A
CHECK	SSB	Jun 24/09	REV.

**FIGURE F.4B**







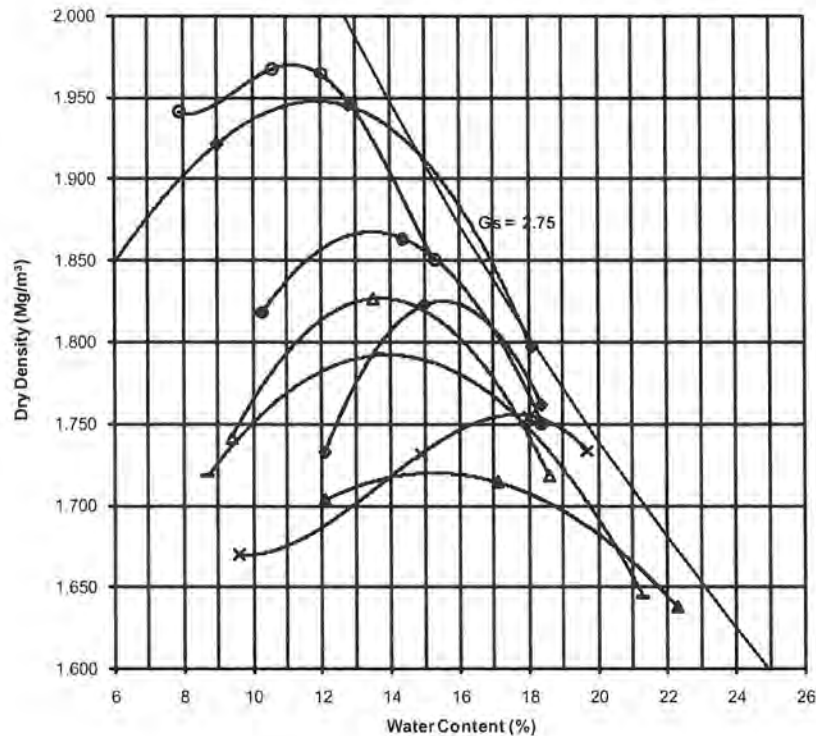
#### LEGEND

SYMBOL	BOREHOLE	SAMPLE	MAXIMUM	OPTIMUM
			DRY DENSITY (Mg/m <sup>3</sup> )	WATER CONTENT (%)
♦	113	8	1.798	16.6
o	115	9	1.980	12.0
▲	116	9	1.987	11.5
x	118	9	1.860	13.9
—	132	3	1.796	17.4
•	132	5	1.780	16.2
◊	132	7	1.870	15.0
△	135	7	1.860	15.2
+	136	8	1.648	20.7
□	160	10	1.760	16.9

#### Notes:

1. This figure is to be read in conjunction with the report "Subsurface Conditions Baseline Report, Windsor-Essex Parkway."
2. The water content and maximum dry density curves illustrated in this figure are based on a series of three-point and one-point tests carried out in accordance with ASTM D698. The fitted curves for those tests with three-points exhibit some deviation from the behaviour of the materials on account of the curve fitting techniques. Therefore, there may be overlap of the fitted curve and the zero air voids curve in which case the zero air voids curve shall be considered representative of the water content and maximum dry density relationship.
3. Construction equipment and procedures must be selected to accommodate variation in the optimum water content for compaction and maximum dry density as described in the report text. Where precise determination of optimum water content and maximum dry density are critical for the work they should be verified by investigation and routine testing during construction.

PROJECT		GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO	
TITLE		SUMMARY OF DATA OPTIMUM WATER CONTENT AND MAXIMUM DRY DENSITY	
PROJECT No. 07-1130-207-0		FILE No. 0711302070-R0100F5	
CADD	WDF	June 18/09	SCALE AS SHOWN
CHECK	SD	20/09	REV. 0
 <b>Golder Associates</b> LONDON, ONTARIO		FIGURE F.5A	




#### LEGEND

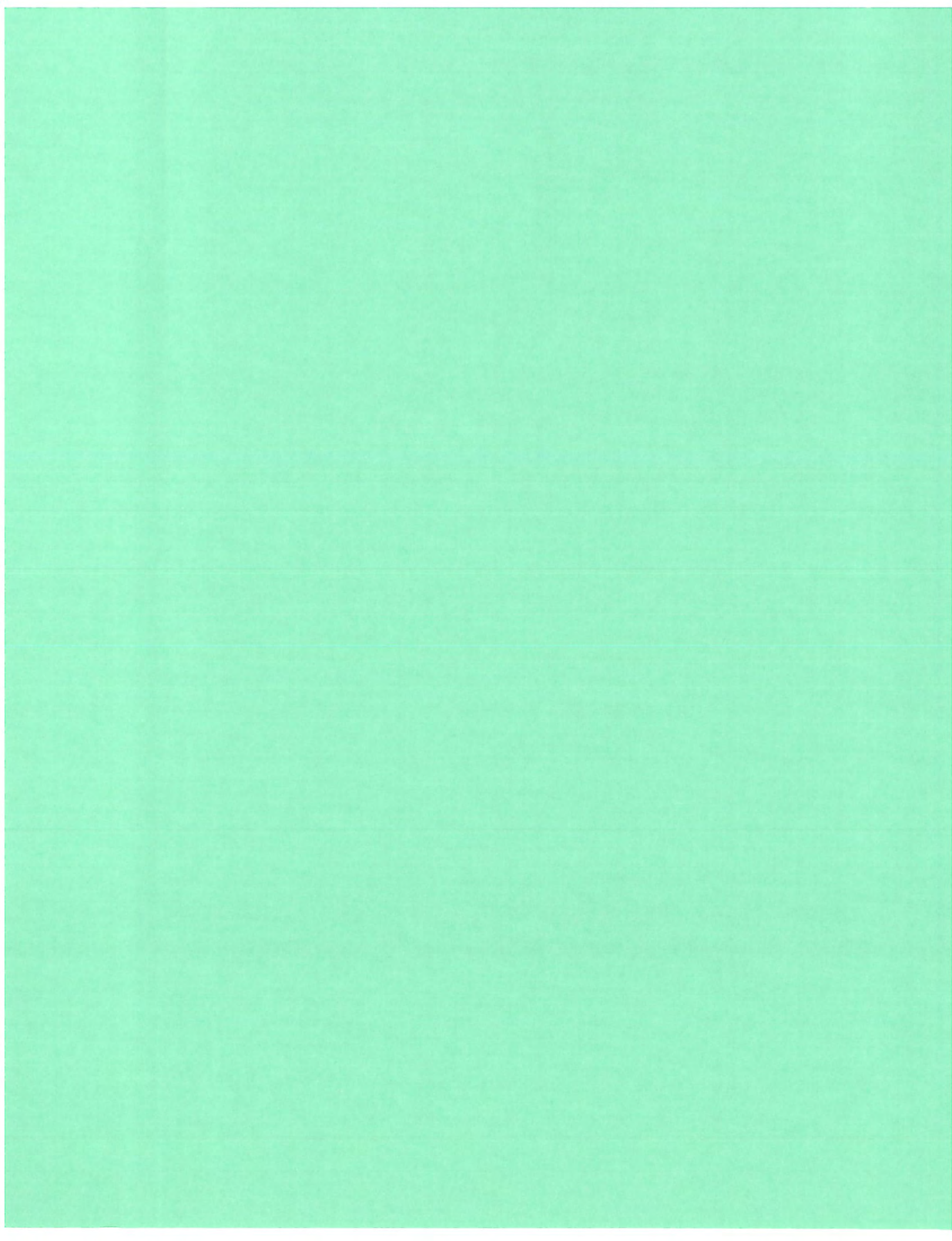
SYMBOL	BOREHOLE	SAMPLE	MAXIMUM DRY DENSITY (Mg/m³)	OPTIMUM WATER CONTENT (%)
♦	3-1	BULK	1.950	11.6
○	3-2	BULK	1.969	11.1
▲	TR-4	COMP	1.718	15.7
x	TR-6	COMP	1.757	17.3
—	TR-7	COMP	1.791	14.0
•	TR-8	COMP	1.866	13.7
◊	TR-9	COMP	1.824	15.4
Δ	TR-10	COMP	1.826	13.7

#### Notes:

1. This figure is to be read in conjunction with the report "Subsurface Conditions Baseline Report, Windsor-Essex Parkway."
2. The water content and maximum dry density curves illustrated in this figure are based on a series of three-point and one-point tests carried out in accordance with ASTM D698. The fitted curves for those tests with three-points exhibit some deviation from the behaviour of the materials on account of the curve fitting techniques. Therefore, there may be overlap of the fitted curve and the zero air voids curve in which case the zero air voids curve shall be considered representative of the water content and maximum dry density relationship.
3. Construction equipment and procedures must be selected to accommodate variation in the optimum water content for compaction and maximum dry density as described in the report text. Where precise determination of optimum water content and maximum dry density are critical for the work they should be verified by investigation and routine testing during construction.

PROJECT		GEOTECHNICAL DATA REPORT WINDSOR-ESSEX PARKWAY WINDSOR, ONTARIO	
TITLE		SUMMARY OF DATA OPTIMUM WATER CONTENT AND MAXIMUM DRY DENSITY	
PROJECT No. 07-1130-207-0		FILE No. 0711302070-R0100F5	
CADD	WDF	June 18/09	SCALE AS SHOWN
CHECK	SJB	Jun 24/09	REV. 0
 <b>Golder Associates</b> LONDON, ONTARIO		FIGURE F.5B	





## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	5
Borehole Number	1	Sample Depth, m	6.94-7.55

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	7		
Date Started	10/17/2006		
Date Completed	11/01/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	21.09
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	17.94
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	60.13	Solids Height, cm	1.273
Water Content, %	17.55	Volume of Solids, cm <sup>3</sup>	40.29
Wet Mass, g	129.31	Volume of Voids, cm <sup>3</sup>	19.84
Dry Mass, g	110.00	Degree of Saturation, %	97.3

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.900	0.492	1.900				
4.83	1.896	0.489	1.898	9	8.49E-02	4.36E-04	3.62E-06
9.46	1.893	0.487	1.895	15	5.07E-02	3.41E-04	1.70E-06
19.29	1.883	0.479	1.888	46	1.64E-02	5.35E-04	8.62E-07
38.58	1.869	0.468	1.876	46	1.62E-02	3.82E-04	6.07E-07
77.57	1.849	0.452	1.859	60	1.22E-02	2.70E-04	3.23E-07
154.88	1.815	0.426	1.832	14	5.08E-02	2.31E-04	1.15E-06
309.77	1.781	0.399	1.798	23	2.98E-02	1.16E-04	3.37E-07
619.14	1.739	0.366	1.760	19	3.46E-02	7.15E-05	2.42E-07
1237.66	1.692	0.329	1.716	98	6.37E-03	4.00E-05	2.50E-08
2475.57	1.639	0.287	1.666	89	6.61E-03	2.25E-05	1.46E-08
1237.66	1.648	0.294	1.644				
309.38	1.672	0.313	1.660				
77.57	1.695	0.331	1.684				
19.29	1.729	0.358	1.712				
4.83	1.755	0.379	1.742				

Note:  
k calculated using cv based on t<sub>90</sub> values.

### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

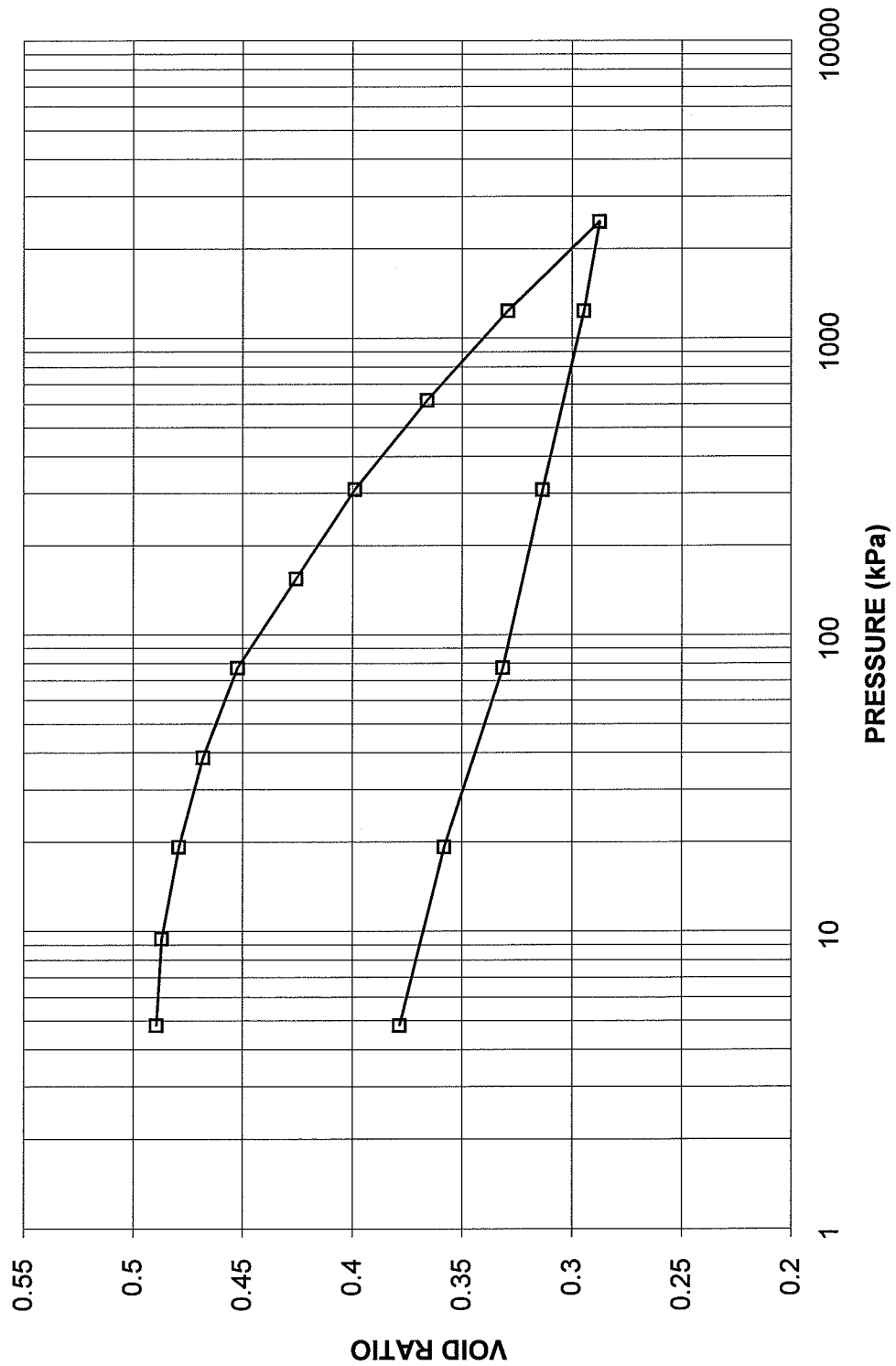
Sample Height, cm	1.76	Unit Weight, kN/m <sup>3</sup>	22.29
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	19.42
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	55.54	Solids Height, cm	1.273
Water Content, %	14.78	Volume of Solids, cm <sup>3</sup>	40.29
Wet Mass, g	126.26	Volume of Voids, cm <sup>3</sup>	15.25
Dry Mass, g	110		



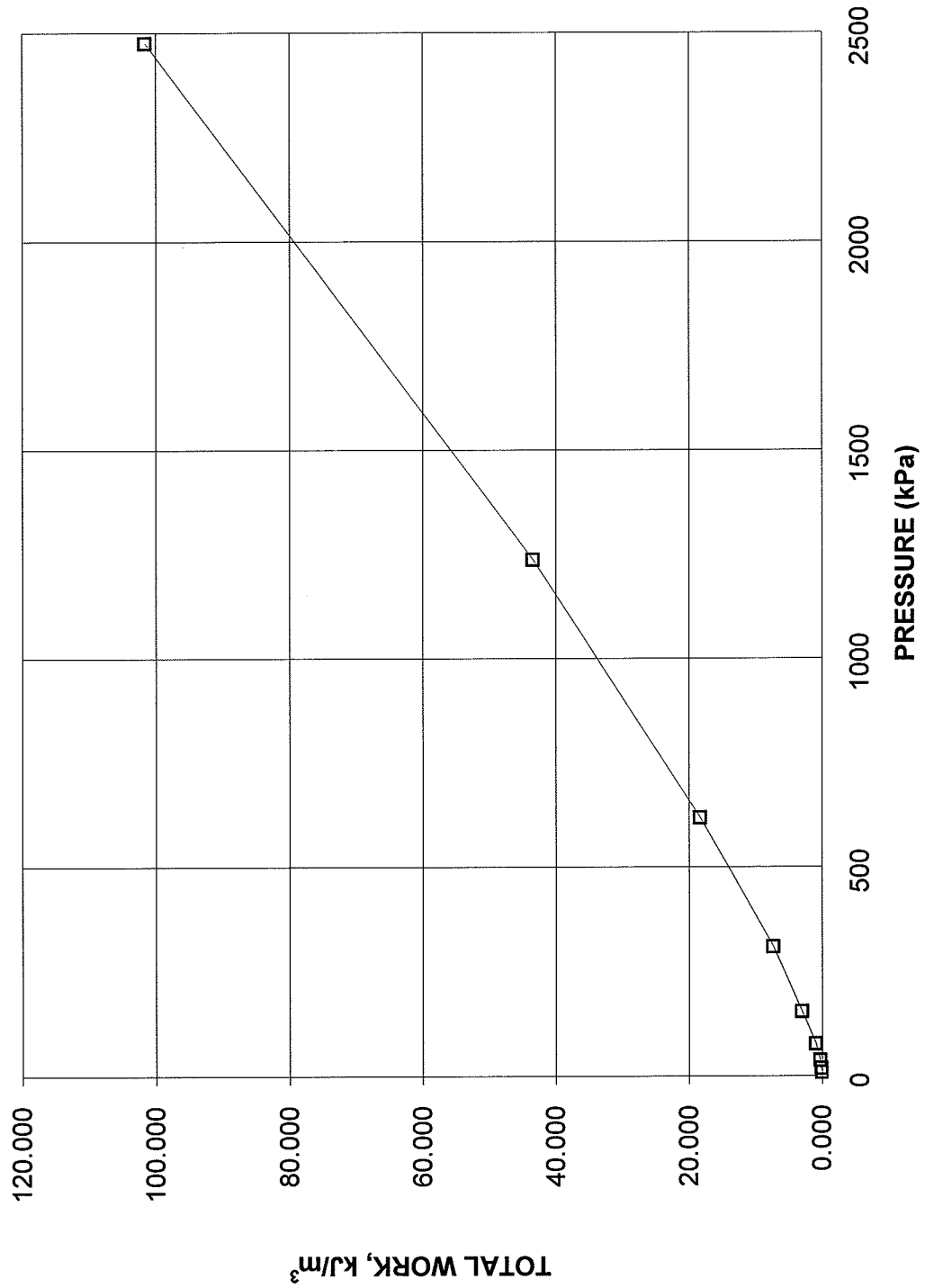
**CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE**

**FIGURE BH 1 SA 5 OED A**

**CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH 1 SA 5**



**CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH 1 SA 5**



## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	10
Borehole Number	1	Sample Depth, m	13.64-14.25

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	8		
Date Started	10/17/2006		
Date Completed	11/01/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.92	Unit Weight, kN/m <sup>3</sup>	20.54
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	17.11
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	60.65	Solids Height, cm	1.224
Water Content, %	20.02	Volume of Solids, cm <sup>3</sup>	38.76
Wet Mass, g	127.00	Volume of Voids, cm <sup>3</sup>	21.88
Dry Mass, g	105.82	Degree of Saturation, %	96.8

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.915	0.565	1.915				
4.84	1.911	0.561	1.913	17	4.56E-02	4.32E-04	1.93E-06
9.53	1.906	0.557	1.909	28	2.76E-02	5.57E-04	1.50E-06
18.98	1.897	0.550	1.902	60	1.28E-02	4.97E-04	6.23E-07
38.26	1.880	0.536	1.889	28	2.70E-02	4.60E-04	1.22E-06
77.43	1.857	0.517	1.869	19	3.90E-02	3.07E-04	1.17E-06
154.66	1.824	0.490	1.841	15	4.79E-02	2.23E-04	1.05E-06
309.11	1.783	0.457	1.804	46	1.50E-02	1.39E-04	2.04E-07
618.35	1.732	0.415	1.758	28	2.34E-02	8.61E-05	1.97E-07
1235.86	1.677	0.370	1.705	23	2.68E-02	4.65E-05	1.22E-07
2473.04	1.619	0.323	1.648	113	5.10E-03	2.45E-05	1.22E-08
1235.86	1.627	0.329	1.623				
309.11	1.651	0.349	1.639				
77.43	1.680	0.373	1.666				
18.98	1.720	0.405	1.700				
4.84	1.749	0.429	1.735				

Note:

k calculated using cv based on t<sub>90</sub> values.

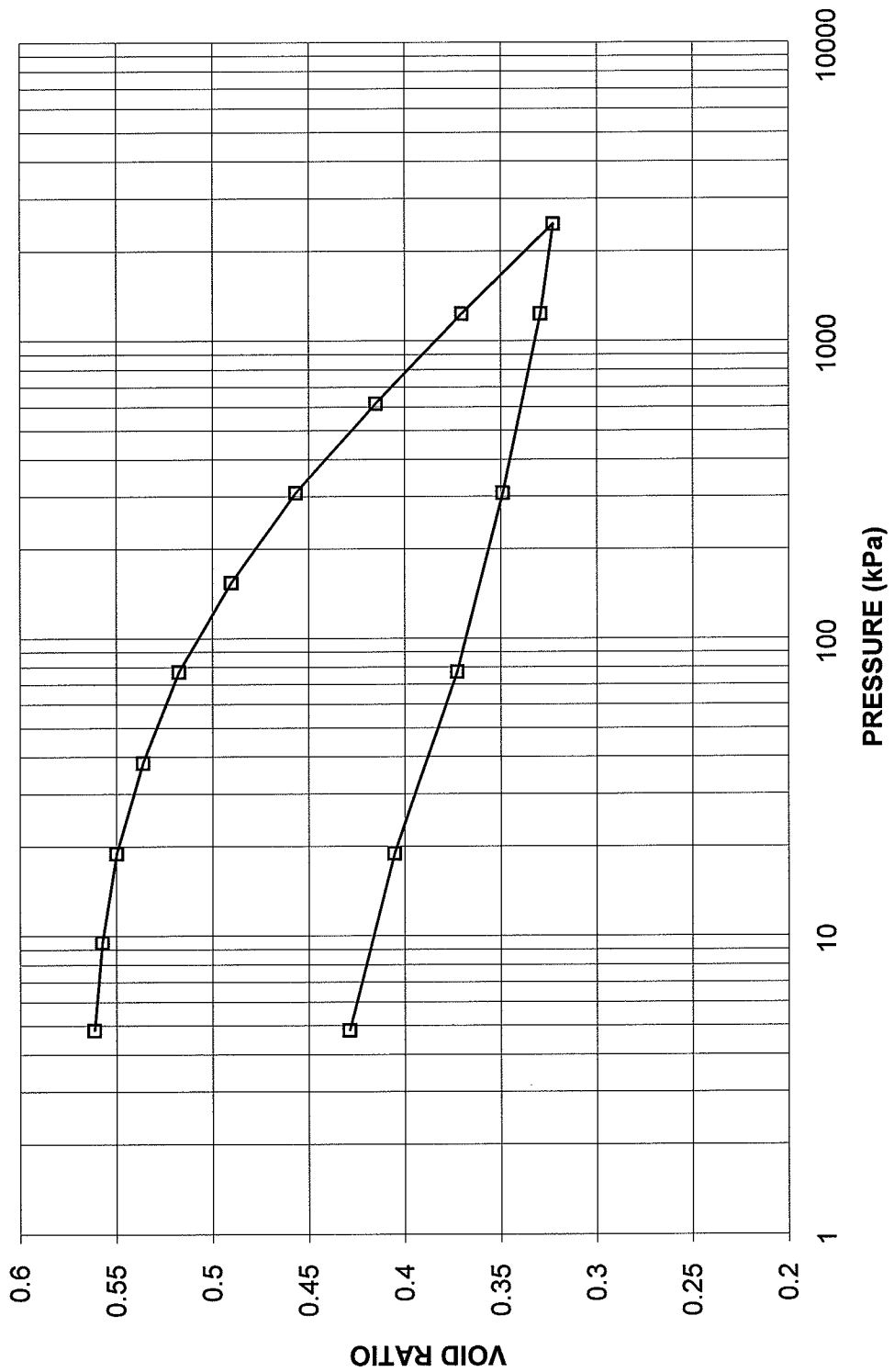
### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.75	Unit Weight, kN/m <sup>3</sup>	21.80
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	18.74
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	55.39	Solids Height, cm	1.224
Water Content, %	16.37	Volume of Solids, cm <sup>3</sup>	38.76
Wet Mass, g	123.14	Volume of Voids, cm <sup>3</sup>	16.63
Dry Mass, g	105.82		

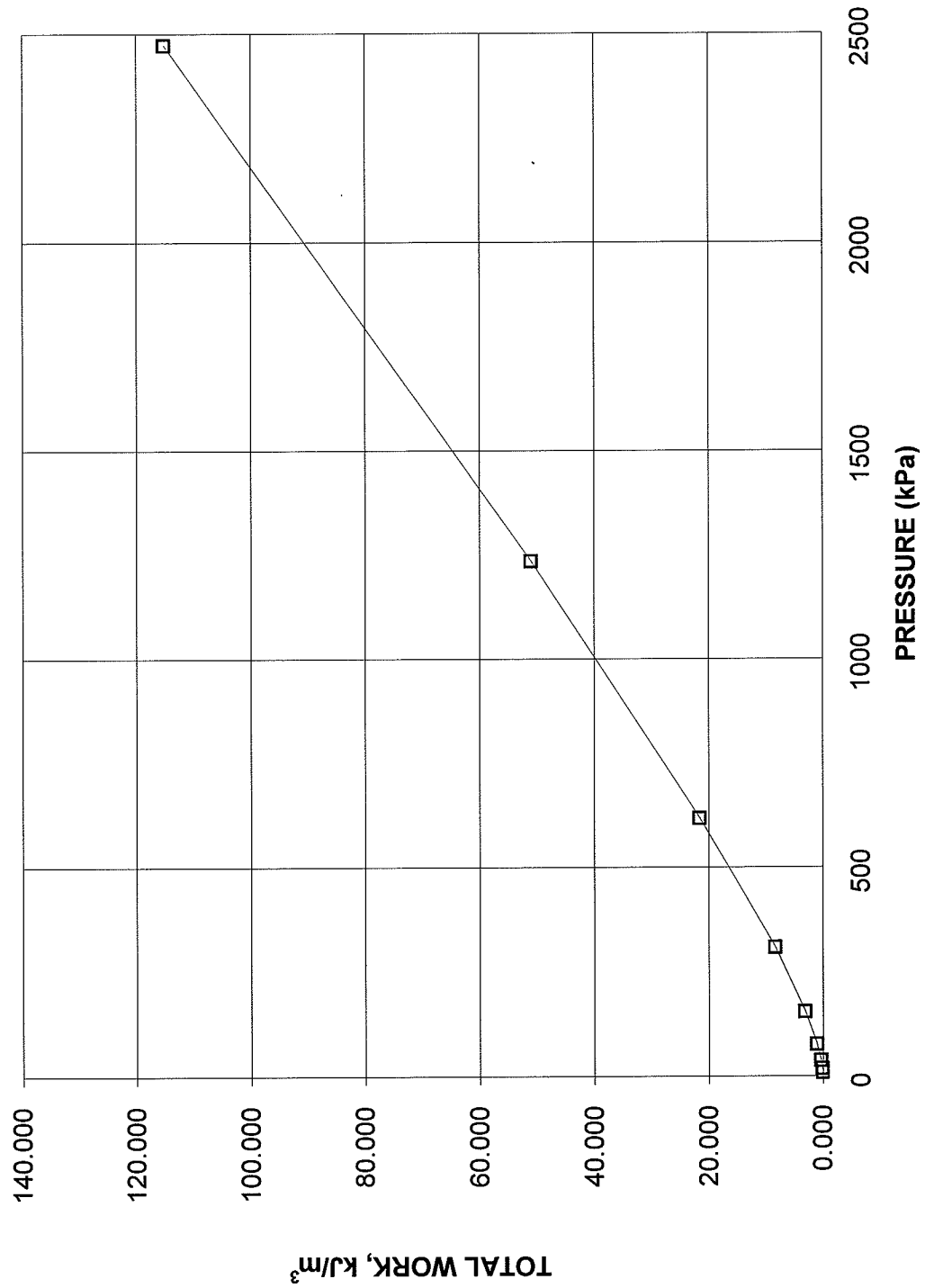
**CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE**

**FIGURE BH 1 SA 10 OED A**

**CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH 1 SA 10**



**CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH 1 SA 10**





## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	14
Borehole Number	1	Sample Depth, m	19.13-19.74

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	6		
Date Started	10/17/2006		
Date Completed	11/11/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	20.02
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	16.30
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	60.17	Solids Height, cm	1.144
Water Content, %	22.81	Volume of Solids, cm <sup>3</sup>	36.23
Wet Mass, g	122.81	Volume of Voids, cm <sup>3</sup>	23.94
Dry Mass, g	100.00	Degree of Saturation, %	95.3

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.900	0.661	1.900				
4.75	1.887	0.649	1.894	12	6.33E-02	1.44E-03	8.94E-06
9.54	1.878	0.642	1.883	56	1.34E-02	9.89E-04	1.30E-06
19.40	1.860	0.626	1.869	28	2.64E-02	9.61E-04	2.49E-06
38.88	1.834	0.603	1.847	40	1.81E-02	7.02E-04	1.24E-06
77.38	1.803	0.576	1.819	23	3.05E-02	4.24E-04	1.27E-06
154.70	1.765	0.543	1.784	17	3.97E-02	2.59E-04	1.01E-06
308.46	1.724	0.507	1.745	46	1.40E-02	1.40E-04	1.93E-07
617.46	1.680	0.468	1.702	60	1.02E-02	7.49E-05	7.52E-08
1233.50	1.631	0.426	1.656	56	1.04E-02	4.19E-05	4.26E-08
2470.61	1.576	0.378	1.604	76	7.17E-03	2.34E-05	1.64E-08
1233.50	1.589	0.389	1.583				
308.46	1.612	0.409	1.601				
77.38	1.638	0.432	1.625				
19.40	1.673	0.462	1.656				
4.75	1.711	0.496	1.692				

Note:

k calculated using cv based on t<sub>90</sub> values.

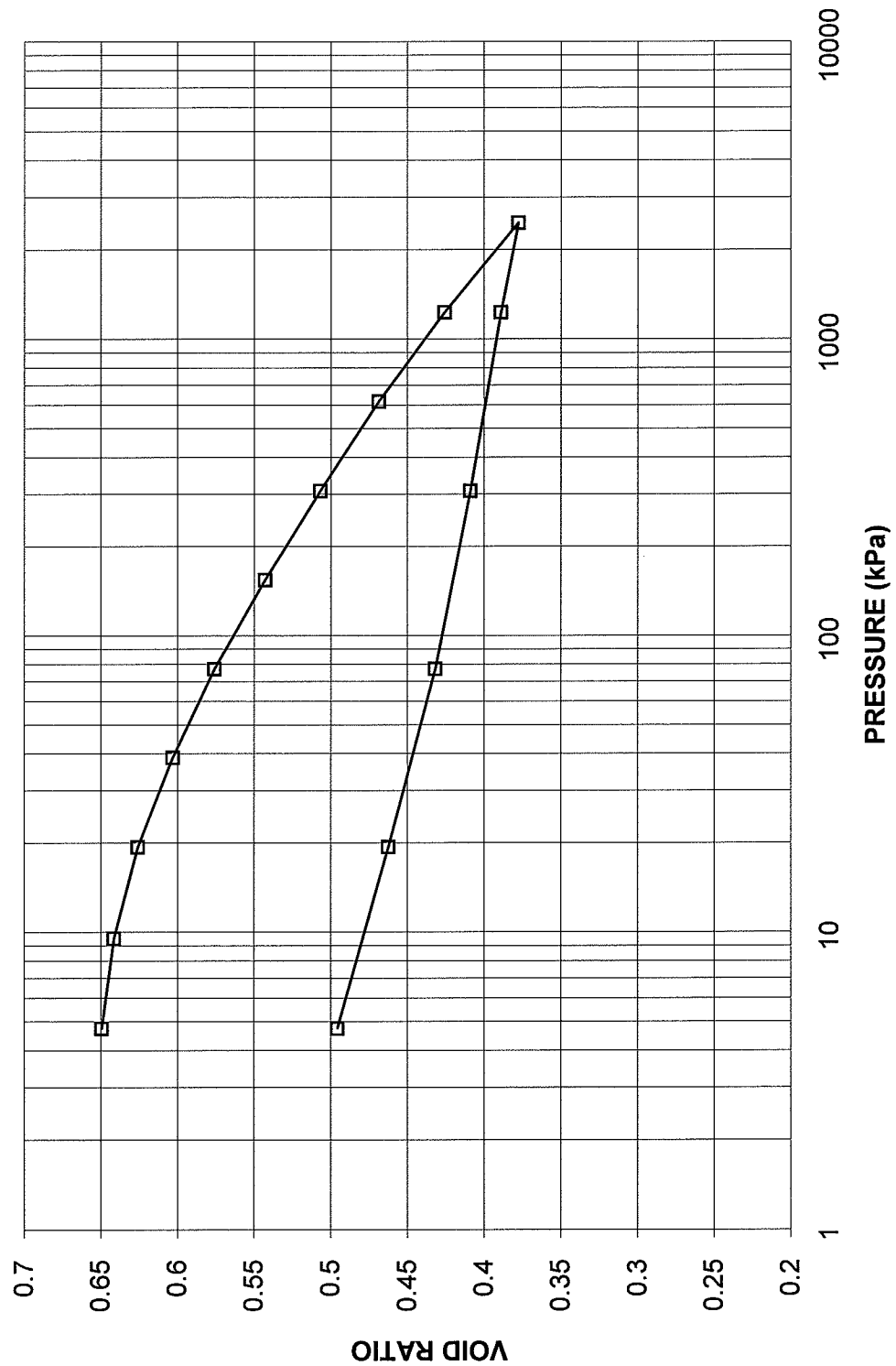
### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.71	Unit Weight, kN/m <sup>3</sup>	21.44
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	18.10
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	54.19	Solids Height, cm	1.144
Water Content, %	18.48	Volume of Solids, cm <sup>3</sup>	36.23
Wet Mass, g	118.48	Volume of Voids, cm <sup>3</sup>	17.95
Dry Mass, g	100.00		

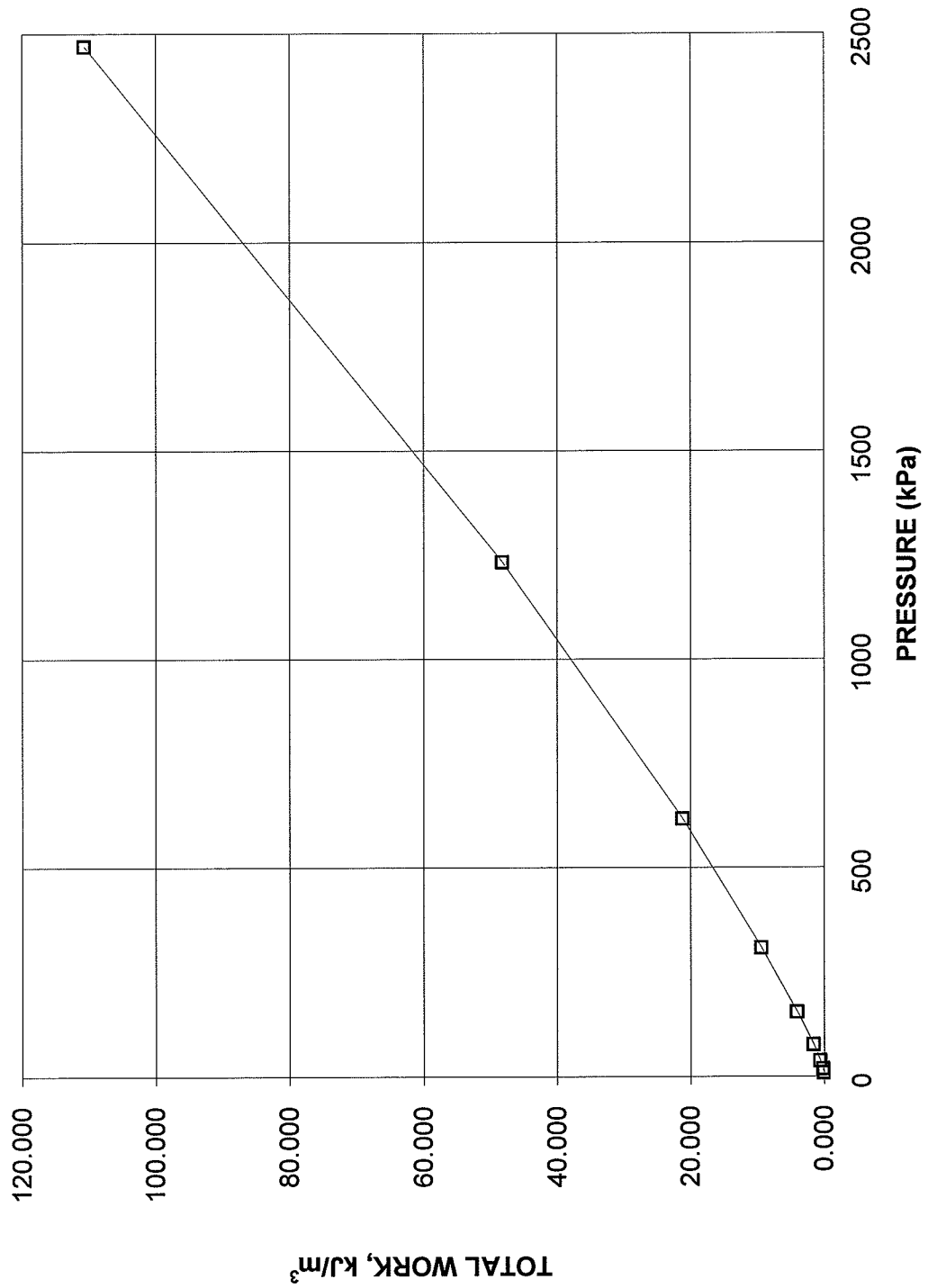
**CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE**

**FIGURE BH 1 SA 14 OED A**

**CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH 1 SA 14**



**CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH 1 SA 14**



## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	7
Borehole Number	7	Sample Depth, m	8.5-8.9

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	5		
Date Started	11/13/2006		
Date Completed	11/25/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.91	Unit Weight, kN/m <sup>3</sup>	21.44
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	18.35
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	60.45	Solids Height, cm	1.309
Water Content, %	16.88	Volume of Solids, cm <sup>3</sup>	41.43
Wet Mass, g	132.19	Volume of Voids, cm <sup>3</sup>	19.02
Dry Mass, g	113.10	Degree of Saturation, %	100.4

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.910	0.459	1.910				
4.70	1.875	0.432	1.893	8	9.49E-02	3.90E-03	3.63E-05
9.54	1.865	0.425	1.870	7	1.06E-01	1.08E-03	1.12E-05
19.26	1.853	0.416	1.859	43	1.70E-02	6.46E-04	1.08E-06
38.70	1.837	0.403	1.845	46	1.57E-02	4.31E-04	6.63E-07
77.44	1.819	0.390	1.828	53	1.34E-02	2.43E-04	3.19E-07
154.87	1.794	0.371	1.807	76	9.10E-03	1.69E-04	1.51E-07
309.20	1.757	0.342	1.776	94	7.11E-03	1.26E-04	8.75E-08
618.55	1.711	0.307	1.734	124	5.14E-03	7.79E-05	3.92E-08
1241.52	1.660	0.268	1.686	68	8.86E-03	4.29E-05	3.72E-08
2478.24	1.608	0.228	1.634	146	3.88E-03	2.20E-05	8.36E-09
1241.52	1.614	0.233	1.611				
309.20	1.633	0.248	1.624				
77.44	1.659	0.267	1.646				
19.29	1.691	0.292	1.675				
4.85	1.717	0.312	1.704				

Note:

k calculated using cv based on t<sub>90</sub> values.

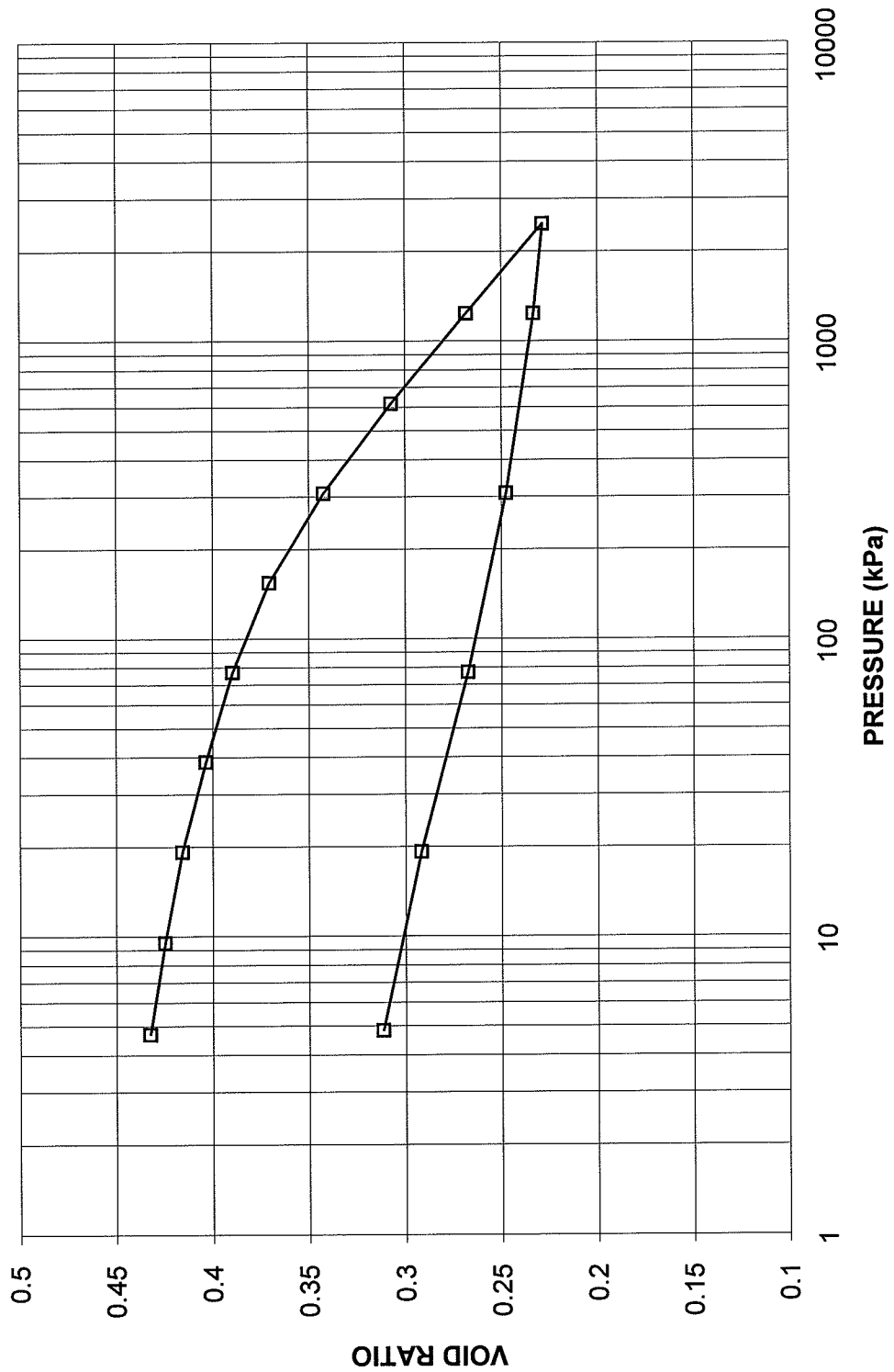
### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.72	Unit Weight, kN/m <sup>3</sup>	23.31
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	20.41
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	54.34	Solids Height, cm	1.309
Water Content, %	14.20	Volume of Solids, cm <sup>3</sup>	41.43
Wet Mass, g	129.16	Volume of Voids, cm <sup>3</sup>	12.91
Dry Mass, g	113.1		

CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE

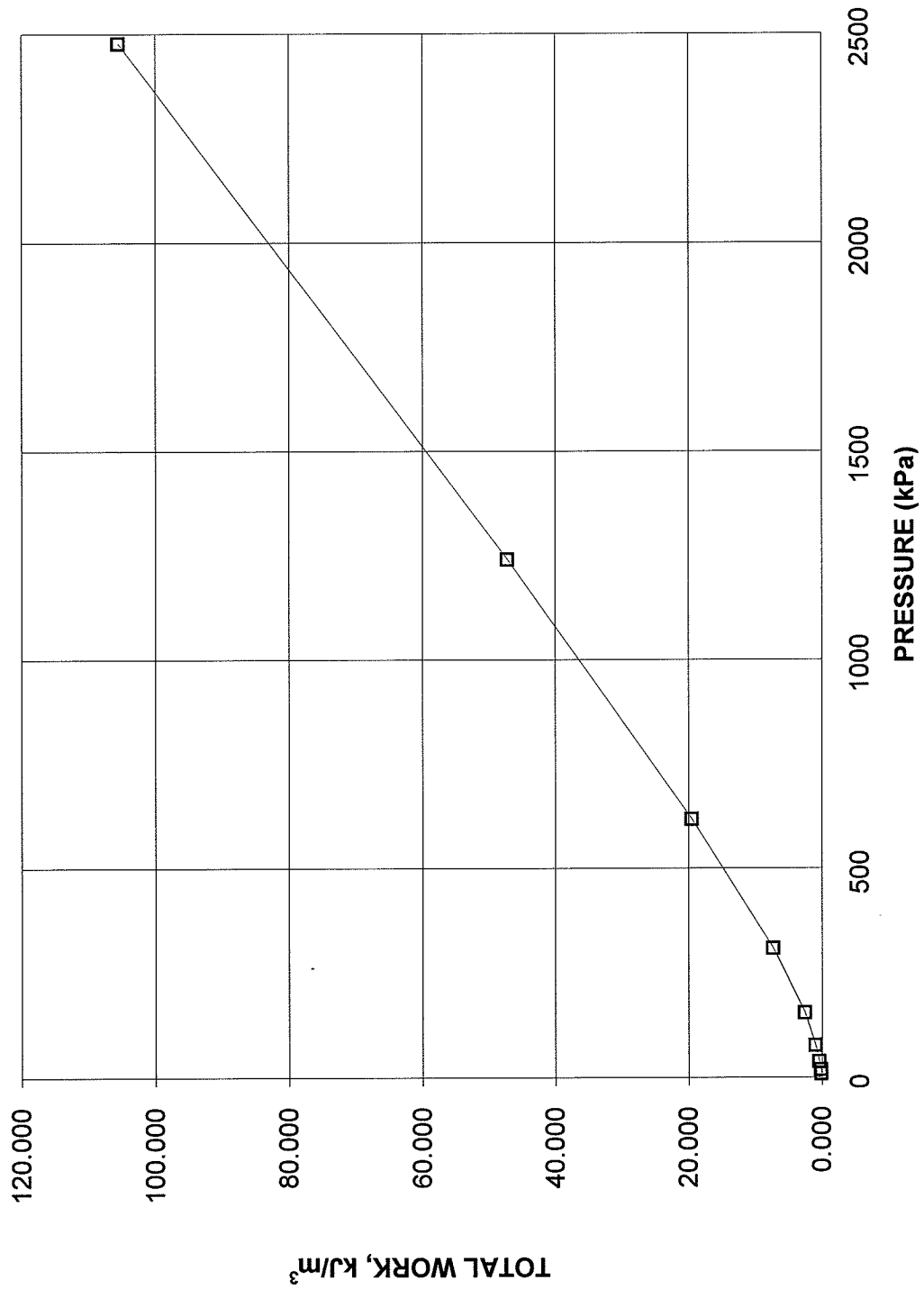
FIGURE BH 7 SA 7 OED A

CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH 7 SA 7





**CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH 7 SA 7**



## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	11
Borehole Number	7	Sample Depth, m	14.6-15.0

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	7		
Date Started	11/13/2006		
Date Completed	11/24/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	20.68
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	16.99
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	60.13	Solids Height, cm	1.193
Water Content, %	21.71	Volume of Solids, cm <sup>3</sup>	37.75
Wet Mass, g	126.80	Volume of Voids, cm <sup>3</sup>	22.39
Dry Mass, g	104.18	Degree of Saturation, %	101.0

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.900	0.593	1.900				
4.83	1.897	0.591	1.899	8	9.55E-02	3.27E-04	3.06E-06
9.55	1.890	0.585	1.894	13	5.85E-02	7.81E-04	4.47E-06
19.51	1.876	0.573	1.883	23	3.27E-02	7.40E-04	2.37E-06
38.91	1.855	0.555	1.866	23	3.21E-02	5.70E-04	1.79E-06
77.57	1.826	0.531	1.841	28	2.56E-02	3.95E-04	9.92E-07
154.67	1.791	0.502	1.809	124	5.59E-03	2.39E-04	1.31E-07
309.92	1.732	0.452	1.762	271	2.43E-03	2.00E-04	4.76E-08
619.27	1.670	0.400	1.701	40	1.53E-02	1.05E-04	1.59E-07
1237.90	1.593	0.336	1.632	15	3.76E-02	6.55E-05	2.42E-07
2475.99	1.508	0.264	1.551	34	1.50E-02	3.61E-05	5.31E-08
1237.90	1.522	0.276	1.515				
309.92	1.549	0.299	1.536				
77.57	1.588	0.331	1.569				
19.51	1.634	0.370	1.611				
4.83	1.663	0.394	1.649				

Note:

k calculated using cv based on t<sub>90</sub> values.

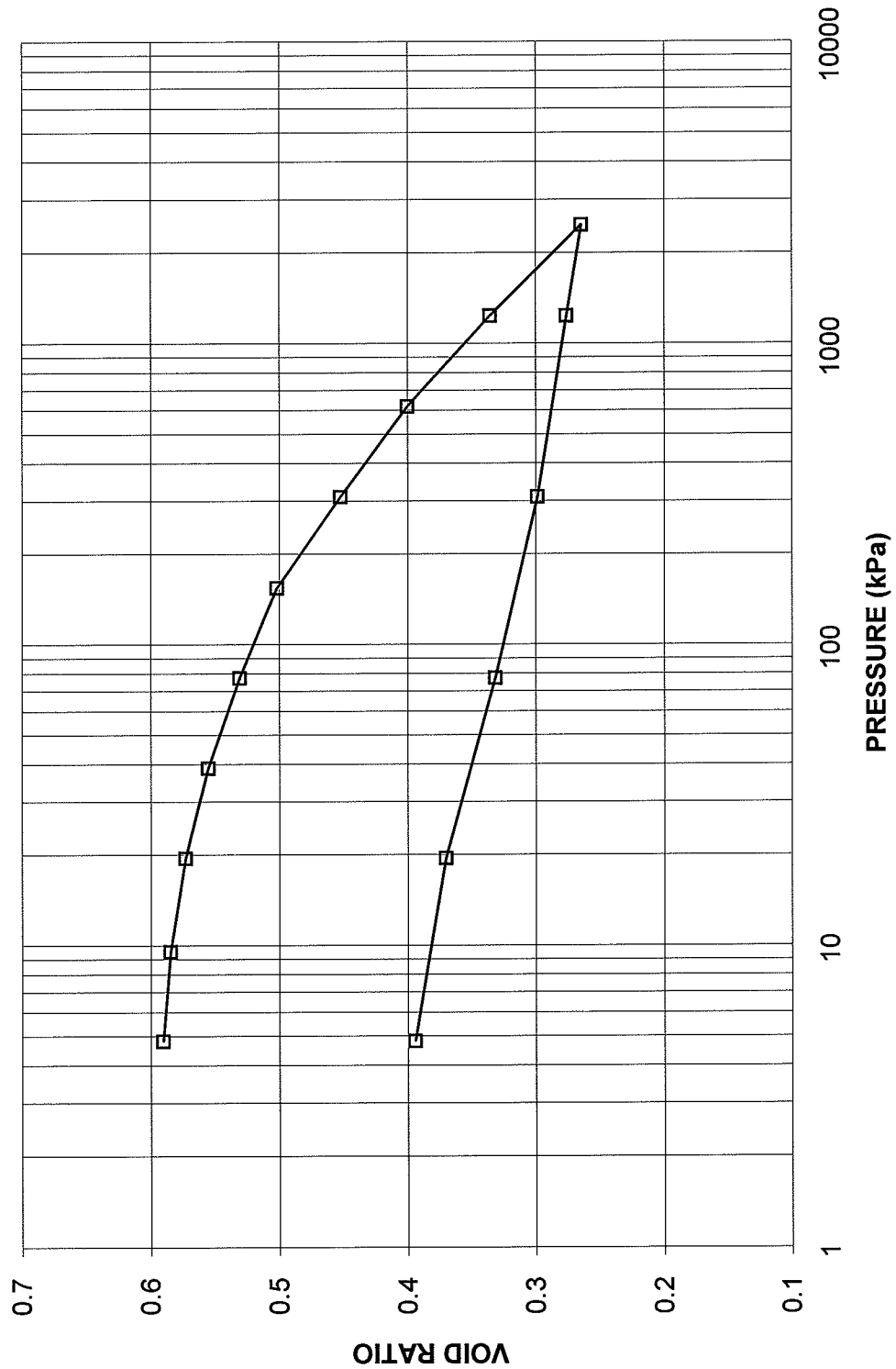
### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.66	Unit Weight, kN/m <sup>3</sup>	22.90
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	19.41
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	52.63	Solids Height, cm	1.193
Water Content, %	18.00	Volume of Solids, cm <sup>3</sup>	37.75
Wet Mass, g	122.93	Volume of Voids, cm <sup>3</sup>	14.89
Dry Mass, g	104.18		

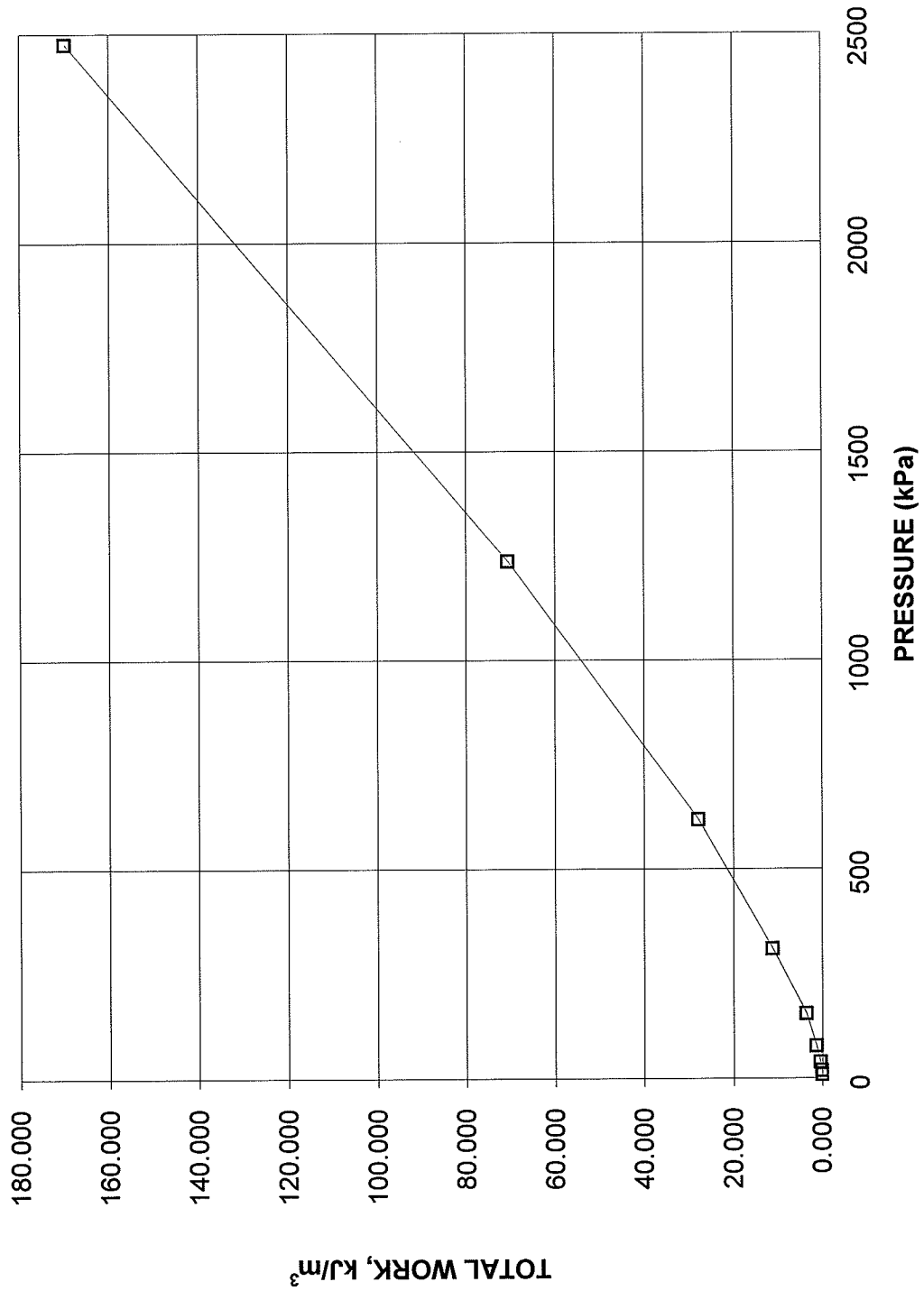
# CONSOLIDATION TEST VOID RATIO VS. LOG PRESSURE

FIGURE BH 7 SA 11 OED A

CONSOLIDATION TEST  
VOID RATIO vs. PRESSURE  
BH 7 SA 11



**CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH 7 SA 11**



## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	20
Borehole Number	7	Sample Depth, m	25.9-26.5

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	8		
Date Started	11/14/2006		
Date Completed	11/29/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.92	Unit Weight, kN/m <sup>3</sup>	20.98
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	17.54
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	60.65	Solids Height, cm	1.250
Water Content, %	19.57	Volume of Solids, cm <sup>3</sup>	39.60
Wet Mass, g	129.73	Volume of Voids, cm <sup>3</sup>	21.05
Dry Mass, g	108.50	Degree of Saturation, %	100.9

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.915	0.532	1.915				
4.85	1.912	0.529	1.914	7	1.11E-01	3.23E-04	3.51E-06
9.50	1.907	0.525	1.910	19	4.07E-02	5.61E-04	2.24E-06
19.40	1.894	0.515	1.901	15	5.10E-02	6.86E-04	3.43E-06
38.64	1.876	0.500	1.885	20	3.77E-02	4.89E-04	1.80E-06
77.43	1.849	0.479	1.863	11	6.69E-02	3.63E-04	2.38E-06
154.57	1.801	0.440	1.825	12	5.88E-02	3.25E-04	1.87E-06
309.12	1.746	0.396	1.774	17	3.92E-02	1.86E-04	7.14E-07
618.28	1.678	0.342	1.712	68	9.14E-03	1.15E-04	1.03E-07
1236.63	1.609	0.287	1.644	158	3.62E-03	5.83E-05	2.07E-08
2474.00	1.533	0.226	1.571	84	6.23E-03	3.21E-05	1.96E-08
1236.63	1.543	0.234	1.538				
309.12	1.570	0.256	1.557				
77.43	1.611	0.288	1.591				
19.40	1.656	0.324	1.634				
4.85	1.692	0.353	1.674				

Note:

k calculated using cv based on t<sub>90</sub> values.

### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

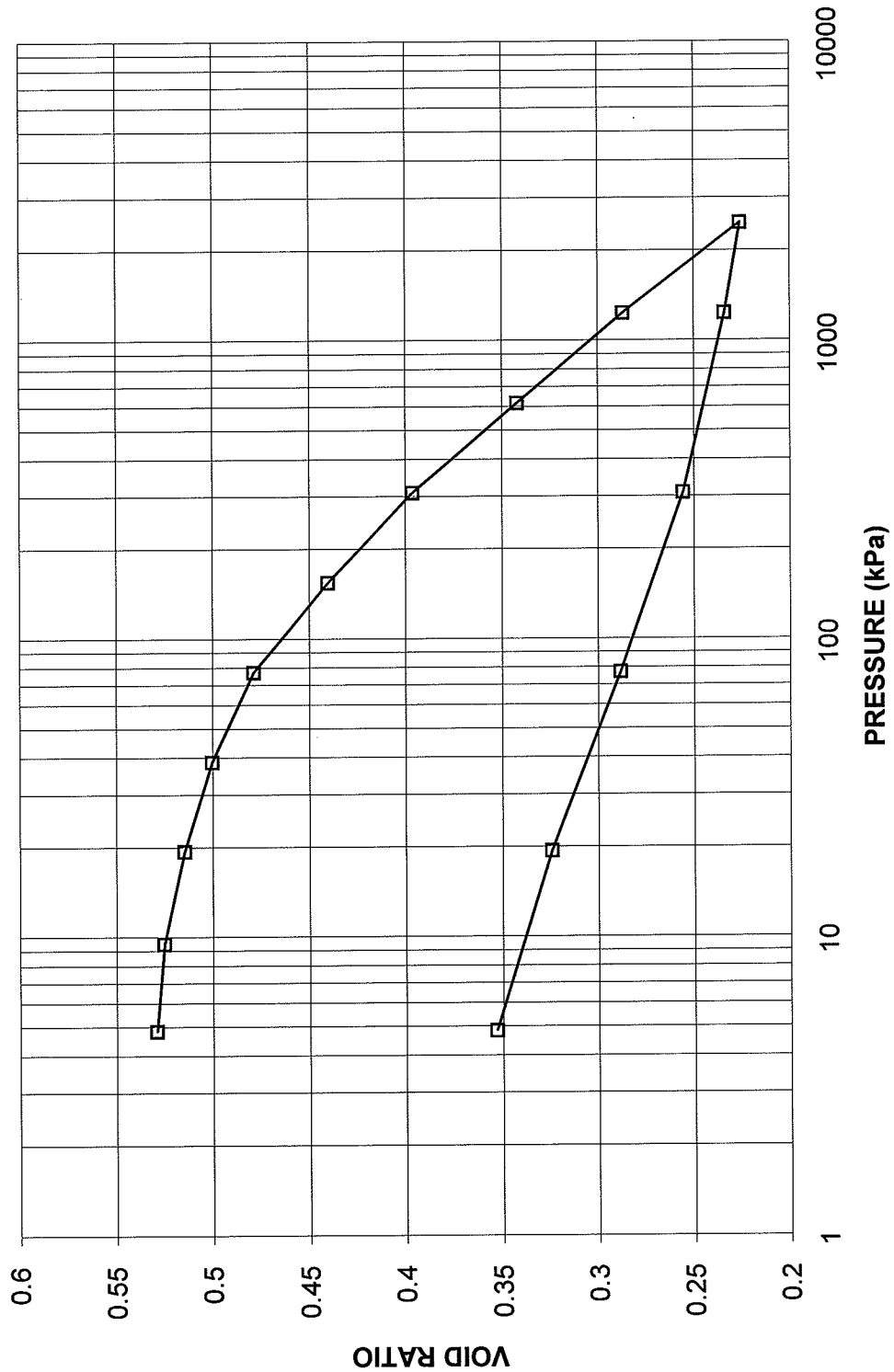
Sample Height, cm	1.69	Unit Weight, kN/m <sup>3</sup>	23.20
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	19.86
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	53.58	Solids Height, cm	1.250
Water Content, %	16.81	Volume of Solids, cm <sup>3</sup>	39.60
Wet Mass, g	126.74	Volume of Voids, cm <sup>3</sup>	13.99
Dry Mass, g	108.5		



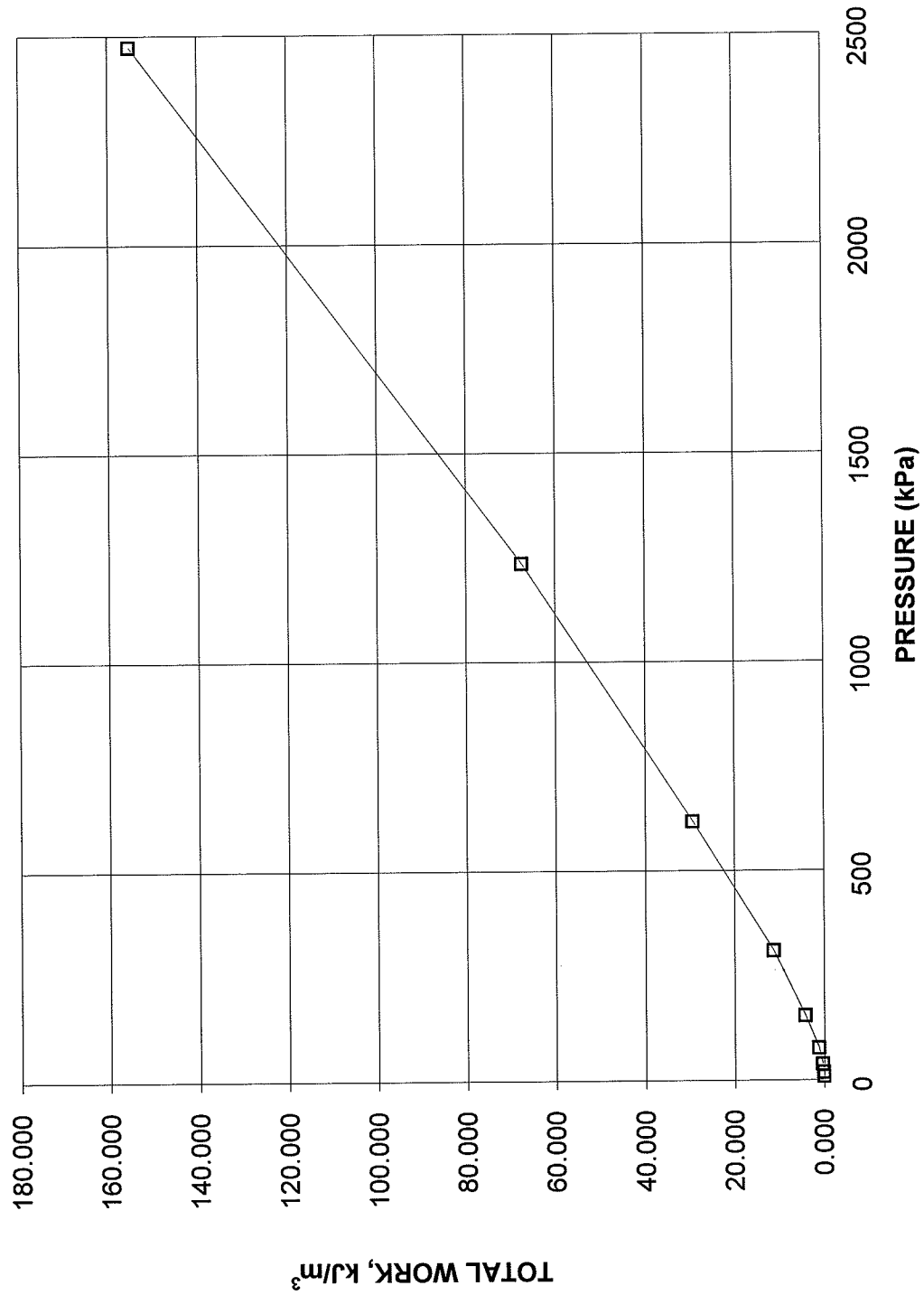
# CONSOLIDATION TEST VOID RATIO VS. LOG PRESSURE

FIGURE BH 7 SA 20 OED A

CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH 7 SA 20



**CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH 7 SA 20**



## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	9
Borehole Number	14	Sample Depth, m	10.1-10.5

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	6		
Date Started	11/16/2006		
Date Completed	11/29/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	20.99
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	17.47
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	60.17	Solids Height, cm	1.231
Water Content, %	20.15	Volume of Solids, cm <sup>3</sup>	38.98
Wet Mass, g	128.80	Volume of Voids, cm <sup>3</sup>	21.19
Dry Mass, g	107.20	Degree of Saturation, %	101.9

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.900	0.544	1.900				
4.75	1.894	0.539	1.897	10	7.63E-02	6.65E-04	4.97E-06
9.54	1.888	0.534	1.891	53	1.43E-02	6.59E-04	9.24E-07
19.25	1.876	0.524	1.882	76	9.88E-03	6.50E-04	6.30E-07
38.68	1.857	0.509	1.867	94	7.86E-03	5.15E-04	3.96E-07
77.38	1.835	0.491	1.846	184	3.93E-03	2.99E-04	1.15E-07
154.68	1.808	0.469	1.822	108	6.51E-03	1.84E-04	1.17E-07
309.02	1.768	0.436	1.788	124	5.47E-03	1.36E-04	7.31E-08
618.89	1.717	0.395	1.743	53	1.21E-02	8.66E-05	1.03E-07
1238.01	1.657	0.346	1.687	103	5.86E-03	5.10E-05	2.93E-08
2475.42	1.592	0.293	1.625	158	3.54E-03	2.76E-05	9.59E-09
1238.01	1.605	0.304	1.599				
309.02	1.629	0.323	1.617				
77.38	1.664	0.352	1.647				
19.25	1.710	0.389	1.687				
4.75	1.747	0.419	1.729				

Note:

k calculated using cv based on t<sub>90</sub> values.

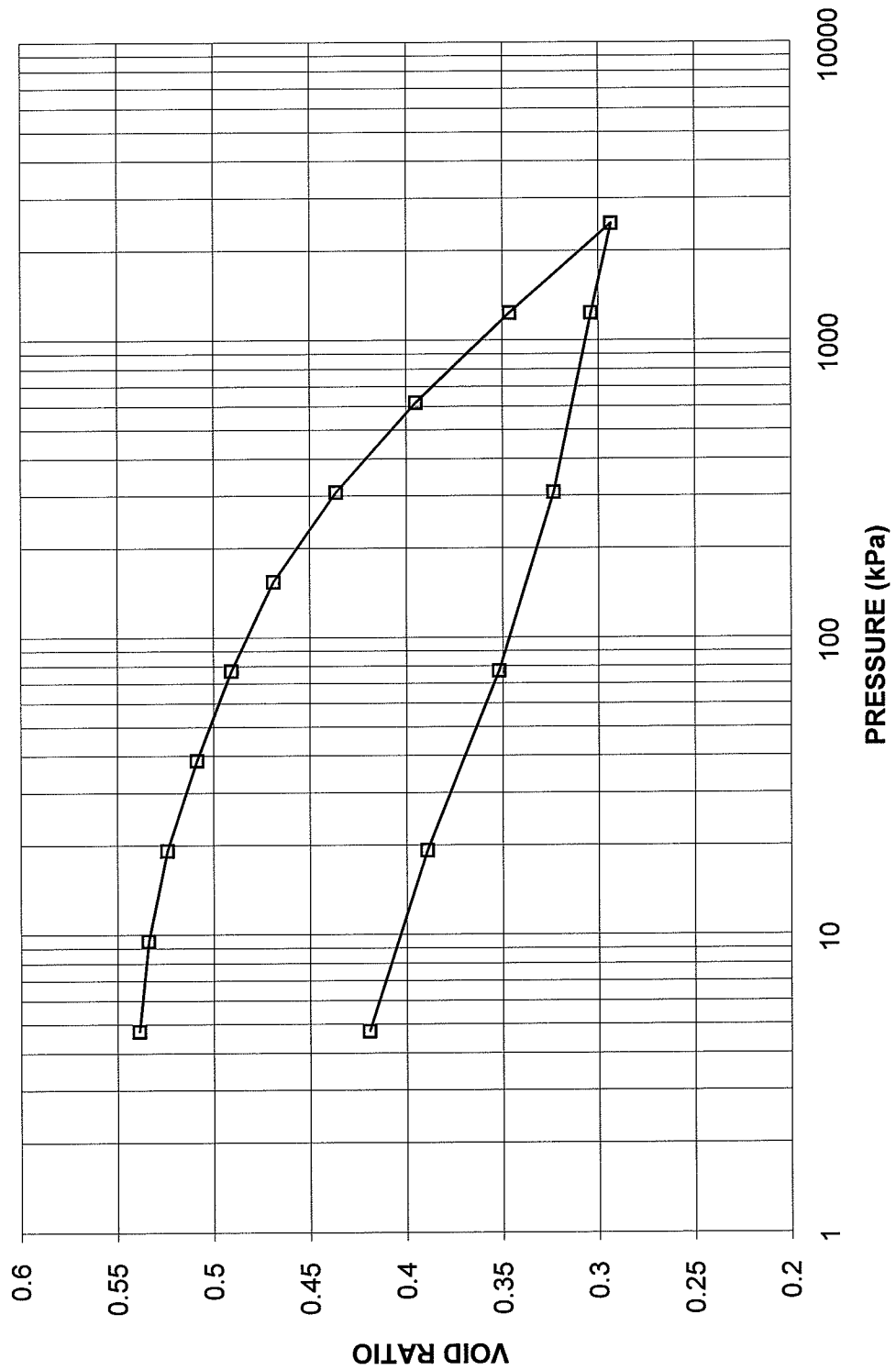
### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.75	Unit Weight, kN/m <sup>3</sup>	22.40
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	19.00
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	55.33	Solids Height, cm	1.231
Water Content, %	17.90	Volume of Solids, cm <sup>3</sup>	38.98
Wet Mass, g	126.39	Volume of Voids, cm <sup>3</sup>	16.34
Dry Mass, g	107.2		

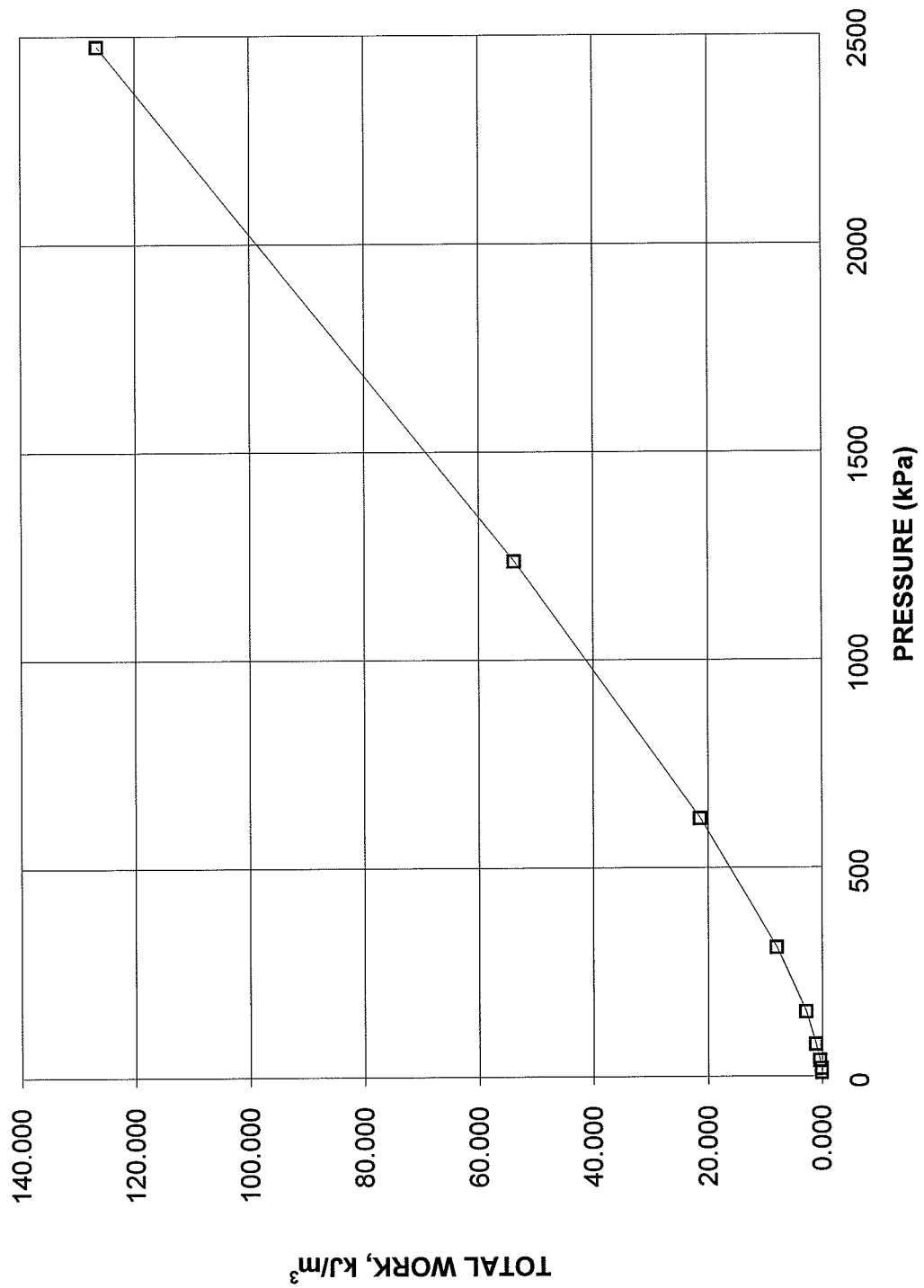
CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE

FIGURE BH 14 SA 9 OED A

CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH 14 SA 9



**CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH 14 SA 9**





## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	11
Borehole Number	14	Sample Depth, m	13.1-13.6

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	9		
Date Started	11/20/2006		
Date Completed	12/03/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.92	Unit Weight, kN/m <sup>3</sup>	20.18
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	16.38
Area, cm <sup>2</sup>	31.52	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	60.36	Solids Height, cm	1.159
Water Content, %	23.17	Volume of Solids, cm <sup>3</sup>	36.53
Wet Mass, g	124.18	Volume of Voids, cm <sup>3</sup>	23.83
Dry Mass, g	100.82	Degree of Saturation, %	98.0

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.915	0.652	1.915				
4.87	1.911	0.649	1.913	2	3.88E-01	4.29E-04	1.63E-05
9.55	1.906	0.645	1.909	4	1.93E-01	5.58E-04	1.06E-05
19.50	1.895	0.635	1.901	26	2.95E-02	5.77E-04	1.67E-06
38.82	1.878	0.620	1.887	60	1.26E-02	4.59E-04	5.66E-07
77.80	1.854	0.600	1.866	60	1.23E-02	3.22E-04	3.88E-07
155.52	1.821	0.571	1.838	60	1.19E-02	2.22E-04	2.59E-07
310.67	1.777	0.533	1.799	197	3.48E-03	1.48E-04	5.05E-08
621.30	1.721	0.485	1.749	76	8.53E-03	9.41E-05	7.87E-08
1243.24	1.660	0.432	1.691	197	3.08E-03	5.12E-05	1.54E-08
2486.79	1.594	0.375	1.627	68	8.25E-03	2.77E-05	2.24E-08
1243.24	1.605	0.385	1.600				
1243.24	1.605	0.385	1.605				
310.67	1.631	0.407	1.618				
77.80	1.670	0.441	1.651				
19.50	1.712	0.477	1.691				
4.87	1.741	0.502	1.727				

Note:

k calculated using cv based on t<sub>90</sub> values.

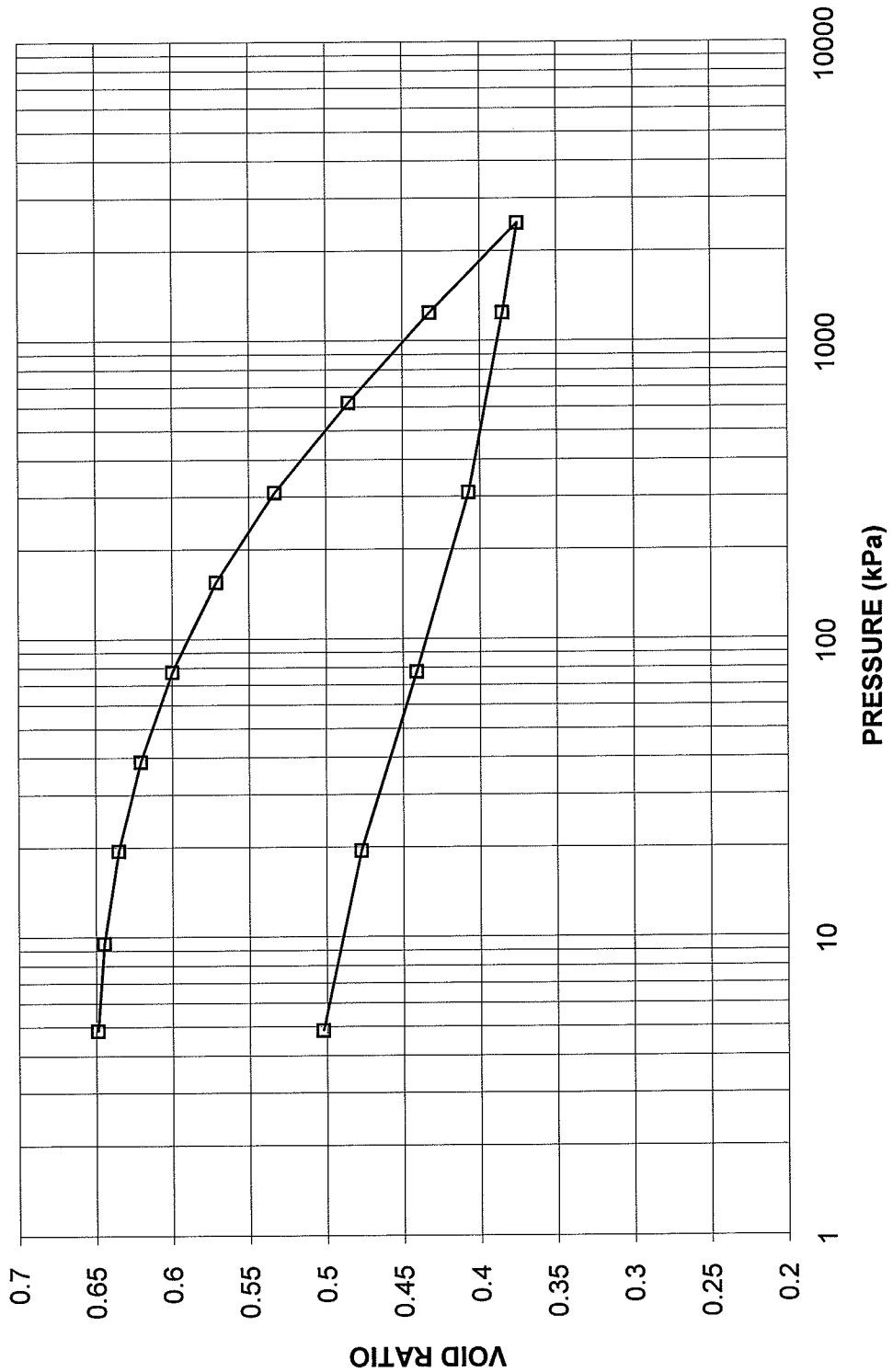
### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.71	Unit Weight, kN/m <sup>3</sup>	21.65
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	18.32
Area, cm <sup>2</sup>	31.52	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	53.96	Solids Height, cm	1.159
Water Content, %	18.14	Volume of Solids, cm <sup>3</sup>	36.53
Wet Mass, g	119.11	Volume of Voids, cm <sup>3</sup>	17.43
Dry Mass, g	100.82		

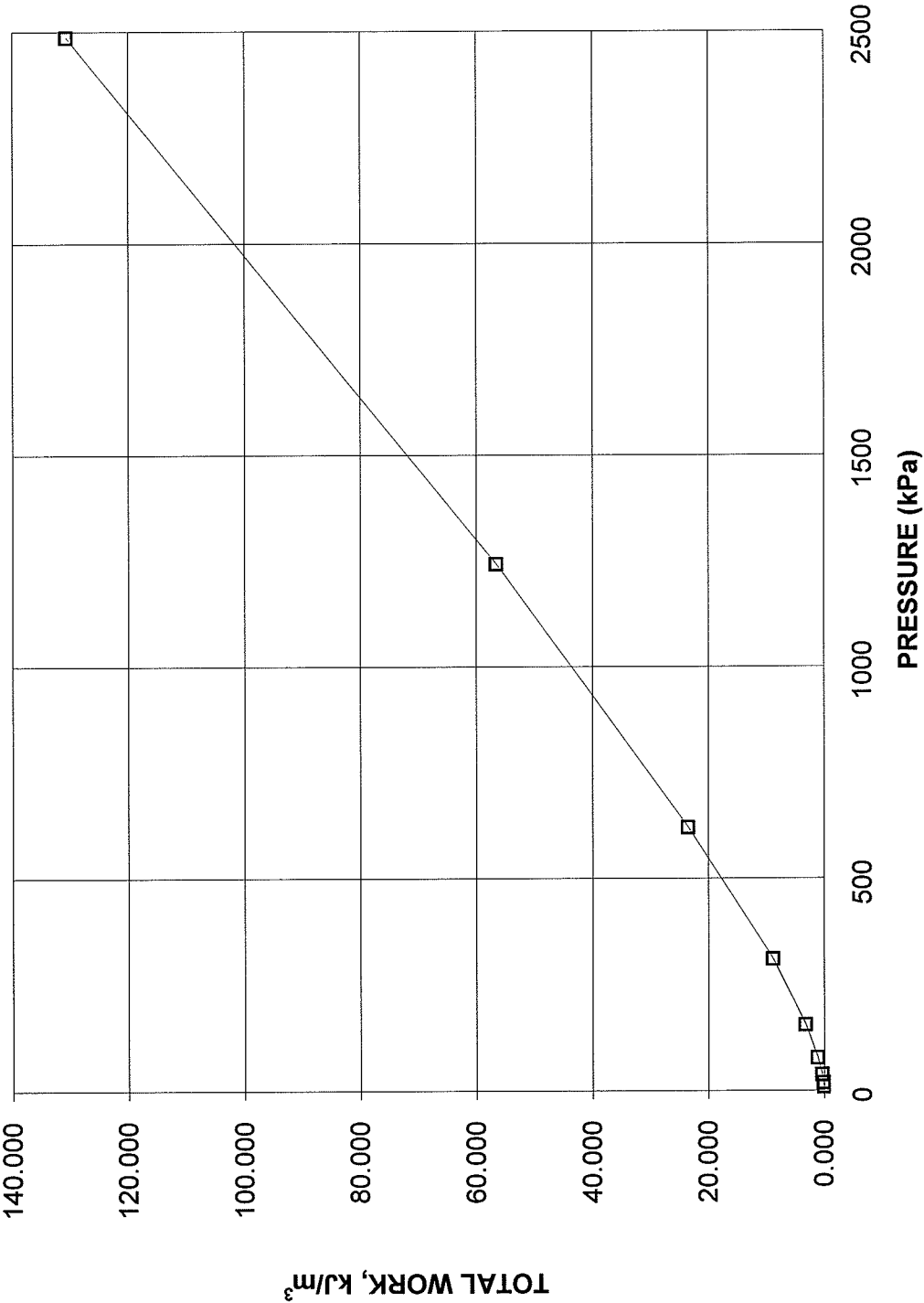
**CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE**

**FIGURE BH 14 SA 11 OED A**

**CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH-14 SA-11**



CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH-14 SA-11



## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	16
Borehole Number	14	Sample Depth, m	18.6-19.2

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	7		
Date Started	11/24/2006		
Date Completed	12/07/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	21.36
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	18.26
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	60.13	Solids Height, cm	1.296
Water Content, %	17.00	Volume of Solids, cm <sup>3</sup>	41.00
Wet Mass, g	130.97	Volume of Voids, cm <sup>3</sup>	19.13
Dry Mass, g	111.94	Degree of Saturation, %	99.5

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.900	0.467	1.900				
4.83	1.888	0.457	1.894	540	1.41E-03	1.31E-03	1.80E-07
9.46	1.885	0.455	1.887	124	6.08E-03	3.41E-04	2.03E-07
19.51	1.868	0.442	1.877	184	4.06E-03	8.90E-04	3.54E-07
38.91	1.851	0.429	1.860	475	1.54E-03	4.61E-04	6.98E-08
77.57	1.829	0.412	1.840	709	1.01E-03	3.00E-04	2.97E-08
154.88	1.801	0.390	1.815	475	1.47E-03	1.91E-04	2.75E-08
309.33	1.768	0.365	1.785	304	2.22E-03	1.12E-04	2.45E-08
619.10	1.732	0.337	1.750	184	3.53E-03	6.12E-05	2.12E-08
1239.01	1.686	0.301	1.709	85	7.28E-03	3.91E-05	2.79E-08
2477.23	1.638	0.264	1.662	85	6.89E-03	2.04E-05	1.38E-08
1239.01	1.646	0.270	1.642				
309.33	1.665	0.285	1.656				
77.57	1.688	0.303	1.677				
19.51	1.710	0.320	1.699				
4.83	1.733	0.338	1.722				

Note:  
k calculated using cv based on t<sub>90</sub> values.

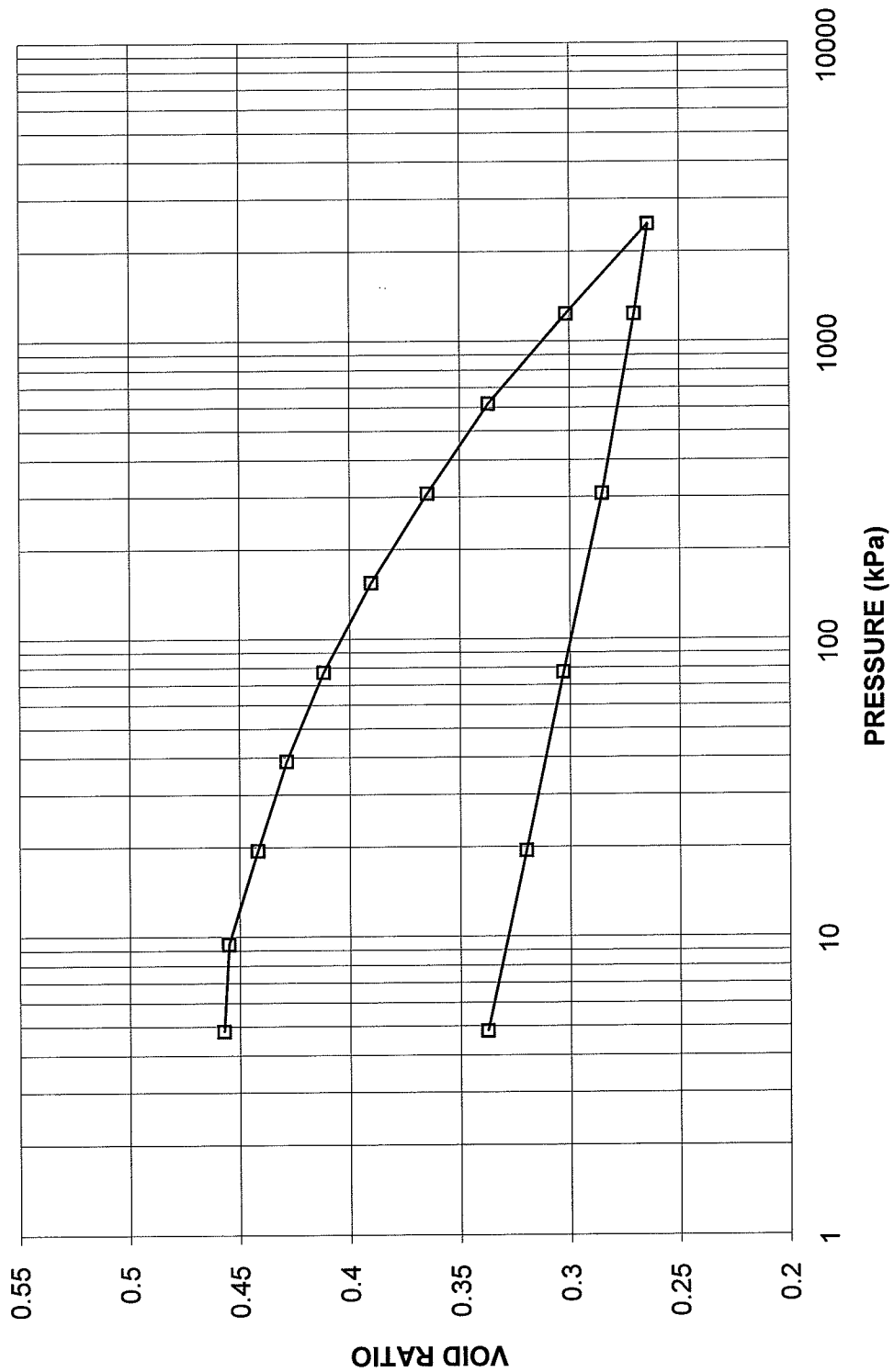
### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.73	Unit Weight, kN/m <sup>3</sup>	22.70
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	20.01
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	54.85	Solids Height, cm	1.296
Water Content, %	13.40	Volume of Solids, cm <sup>3</sup>	41.00
Wet Mass, g	126.94	Volume of Voids, cm <sup>3</sup>	13.84
Dry Mass, g	111.94		

**CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE**

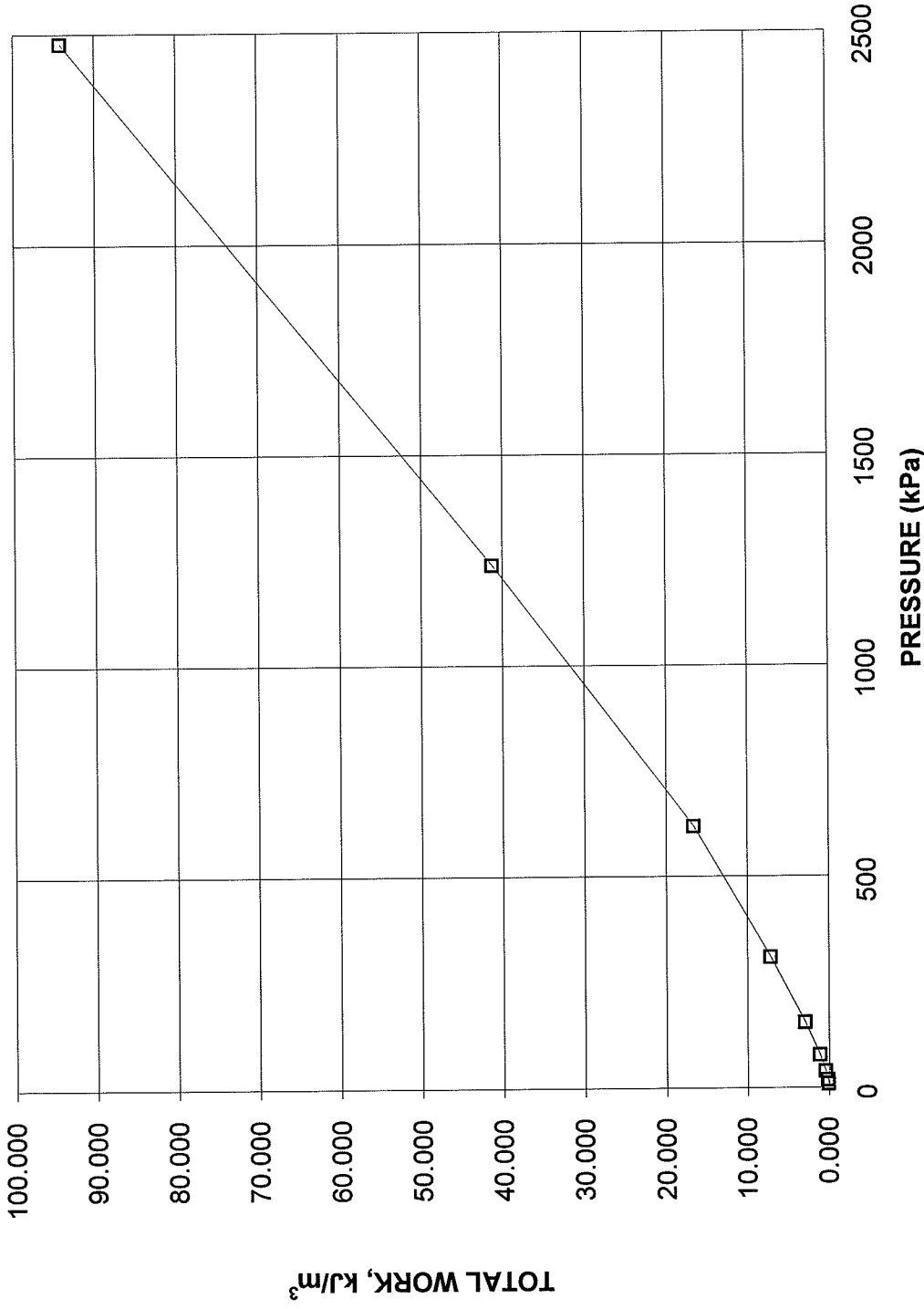
**FIGURE BH 14 SA 16 OED A**

**CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH 14 SA 16**





CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH 14 SA 16



## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	7
Borehole Number	23	Sample Depth, m	8.5-9.0

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	5		
Date Started	11/27/2006		
Date Completed	12/10/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.91	Unit Weight, kN/m <sup>3</sup>	19.86
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	15.80
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	60.45	Solids Height, cm	1.119
Water Content, %	25.72	Volume of Solids, cm <sup>3</sup>	35.42
Wet Mass, g	122.45	Volume of Voids, cm <sup>3</sup>	25.03
Dry Mass, g	97.4	Degree of Saturation, %	100.1

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.910	0.707	1.910				
4.85	1.868	0.669	1.889	8	9.46E-02	4.53E-03	4.20E-05
9.54	1.863	0.665	1.866	34	2.17E-02	5.58E-04	1.19E-06
19.29	1.853	0.656	1.858	68	1.08E-02	5.37E-04	5.66E-07
38.71	1.838	0.642	1.846	80	9.03E-03	4.04E-04	3.58E-07
77.44	1.813	0.620	1.826	240	2.94E-03	3.38E-04	9.75E-08
154.88	1.767	0.579	1.790	240	2.83E-03	3.11E-04	8.63E-08
309.17	1.694	0.514	1.731	158	4.02E-03	2.48E-04	9.75E-08
618.53	1.624	0.451	1.659	540	1.08E-03	1.18E-04	1.25E-08
1237.69	1.556	0.390	1.590	394	1.36E-03	5.75E-05	7.67E-09
2479.12	1.493	0.334	1.525	184	2.68E-03	2.66E-05	6.97E-09
1237.29	1.499	0.339	1.496				
309.36	1.525	0.363	1.512				
77.44	1.563	0.397	1.544				
19.29	1.602	0.432	1.583				
4.82	1.634	0.460	1.618				

Note:  
k calculated using cv based on t<sub>90</sub> values.

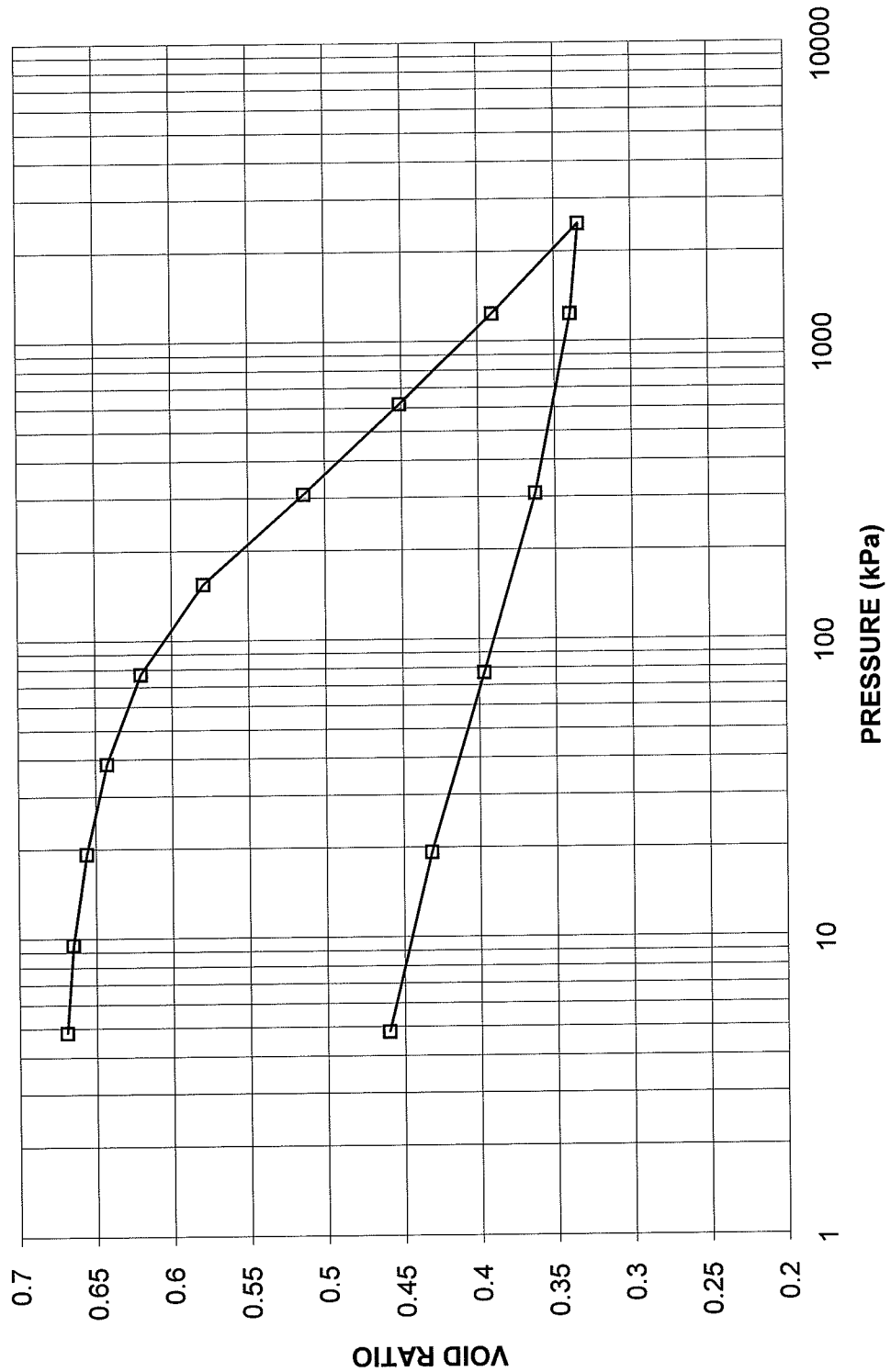
### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.63	Unit Weight, kN/m <sup>3</sup>	21.99
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	18.47
Area, cm <sup>2</sup>	31.65	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	51.71	Solids Height, cm	1.119
Water Content, %	19.03	Volume of Solids, cm <sup>3</sup>	35.42
Wet Mass, g	115.94	Volume of Voids, cm <sup>3</sup>	16.30
Dry Mass, g	97.4		

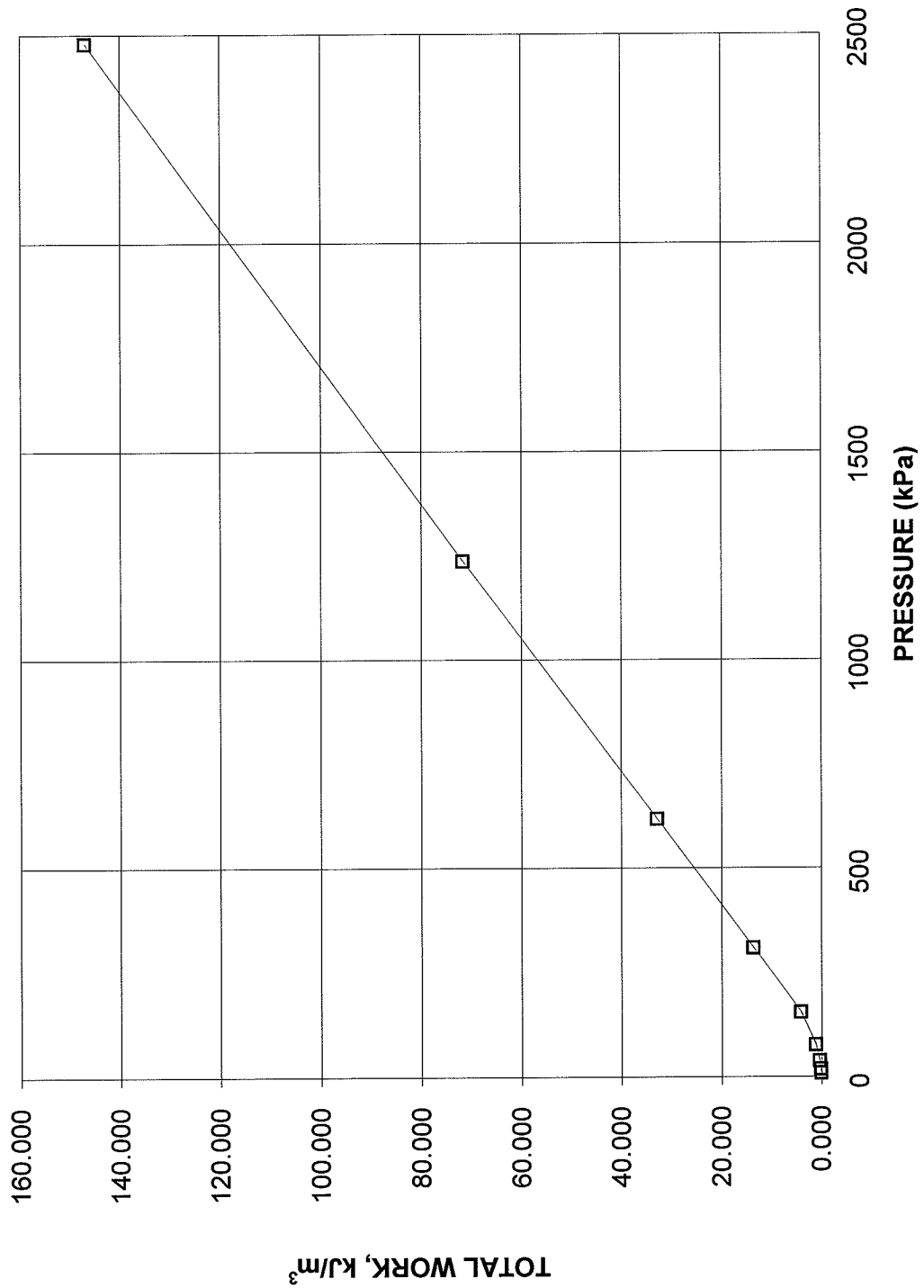
CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE

FIGURE BH 23 SA 7 OED A

CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH-23 SA-7



CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH-23 SA-7



# OEDOMETER CONSOLIDATION SUMMARY

## SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	13
Borehole Number	23	Sample Depth, m	16.8-17.2

## TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	11		
Date Started	11/27/2006		
Date Completed	12/09/2006		

## SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	2.54	Unit Weight, kN/m <sup>3</sup>	21.20
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	17.78
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	80.44	Solids Height, cm	1.668
Water Content, %	19.24	Volume of Solids, cm <sup>3</sup>	52.83
Wet Mass, g	173.87	Volume of Voids, cm <sup>3</sup>	27.61
Dry Mass, g	145.82	Degree of Saturation, %	101.6

## TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.540	0.523	2.540				
4.82	2.523	0.512	2.532	60	2.26E-02	1.39E-03	3.08E-06
9.54	2.514	0.507	2.519	103	1.31E-02	7.51E-04	9.60E-07
19.25	2.497	0.497	2.506	103	1.29E-02	6.89E-04	8.73E-07
38.68	2.477	0.485	2.487	124	1.06E-02	4.05E-04	4.20E-07
77.38	2.450	0.469	2.464	85	1.51E-02	2.75E-04	4.07E-07
154.90	2.413	0.446	2.432	324	3.87E-03	1.88E-04	7.12E-08
309.64	2.361	0.415	2.387	454	2.66E-03	1.32E-04	3.45E-08
618.65	2.303	0.380	2.332	540	2.14E-03	7.39E-05	1.55E-08
1236.69	2.238	0.341	2.271	338	3.23E-03	4.14E-05	1.31E-08
2473.91	2.171	0.301	2.205	304	3.39E-03	2.13E-05	7.08E-09
1236.69	2.178	0.306	2.175				
309.64	2.205	0.322	2.192				
77.52	2.246	0.346	2.226				
18.97	2.286	0.370	2.266				
4.82	2.317	0.389	2.302				

Note:

k calculated using cv based on t<sub>90</sub> values.

## SAMPLE DIMENSIONS AND PROPERTIES - FINAL

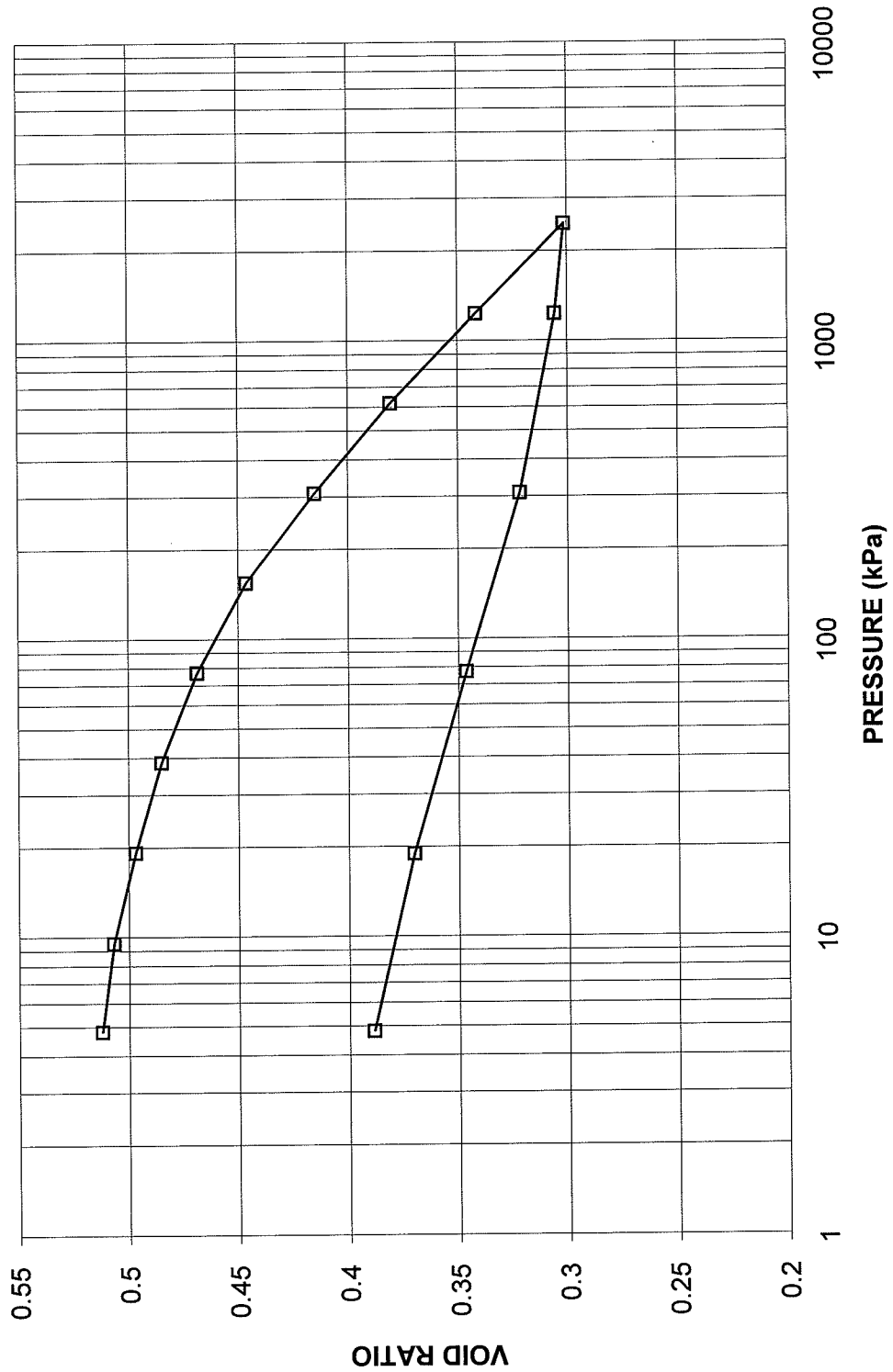
Sample Height, cm	2.32	Unit Weight, kN/m <sup>3</sup>	22.59
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	19.49
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	73.38	Solids Height, cm	1.668
Water Content, %	15.90	Volume of Solids, cm <sup>3</sup>	52.83
Wet Mass, g	169.00	Volume of Voids, cm <sup>3</sup>	20.54
Dry Mass, g	145.82		



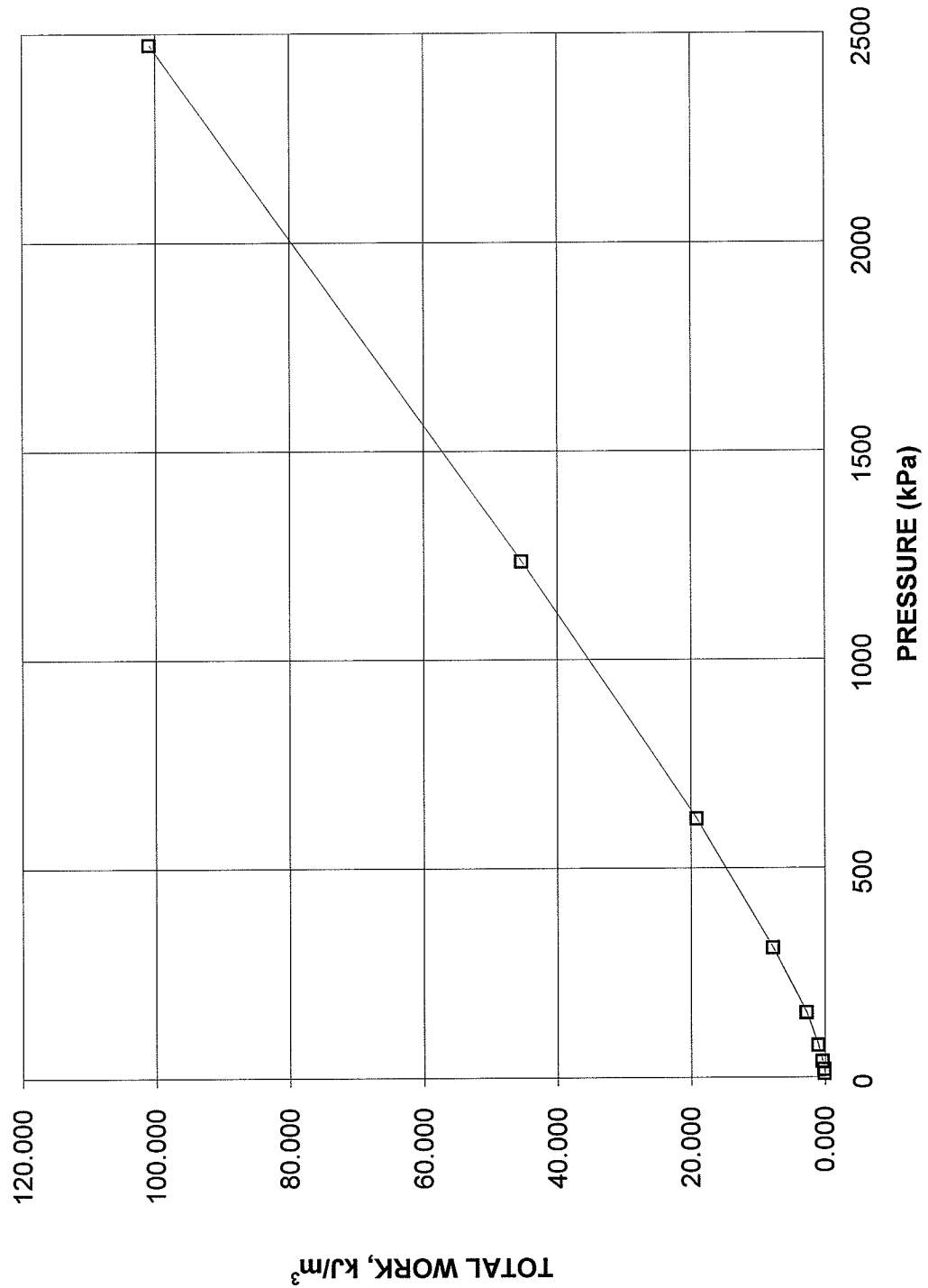
**CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE**

**FIGURE BH 23 SA 13 OED A**

**CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH-23 SA-13**



CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH-23 SA-13



## OEDOMETER CONSOLIDATION SUMMARY

### SAMPLE IDENTIFICATION

Project Number	04-1111-060	Sample Number	15
Borehole Number	23	Sample Depth, m	19.2-19.7

### TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	6		
Date Started	11/28/2006		
Date Completed	12/11/2006		

### SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	21.61
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	18.26
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	60.17	Solids Height, cm	1.286
Water Content, %	18.36	Volume of Solids, cm <sup>3</sup>	40.73
Wet Mass, g	132.58	Volume of Voids, cm <sup>3</sup>	19.44
Dry Mass, g	112.01	Degree of Saturation, %	105.8

### TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.900	0.477	1.900				
4.69	1.889	0.469	1.895	11	6.92E-02	1.23E-03	8.37E-06
9.53	1.879	0.461	1.884	23	3.27E-02	1.09E-03	3.49E-06
19.28	1.863	0.449	1.871	60	1.24E-02	8.64E-04	1.05E-06
38.69	1.843	0.433	1.853	53	1.37E-02	5.42E-04	7.30E-07
77.39	1.822	0.417	1.833	68	1.05E-02	2.86E-04	2.93E-07
154.78	1.796	0.396	1.809	34	2.04E-02	1.77E-04	3.54E-07
309.73	1.759	0.368	1.778	60	1.12E-02	1.26E-04	1.37E-07
619.39	1.714	0.333	1.737	40	1.60E-02	7.65E-05	1.20E-07
1238.36	1.662	0.292	1.688	60	1.01E-02	4.42E-05	4.36E-08
2479.37	1.601	0.245	1.632	124	4.55E-03	2.59E-05	1.15E-08
1238.36	1.614	0.255	1.608				
309.73	1.643	0.277	1.629				
77.39	1.681	0.307	1.662				
19.28	1.721	0.338	1.701				
4.69	1.756	0.365	1.739				

Note:

k calculated using cv based on t<sub>90</sub> values.

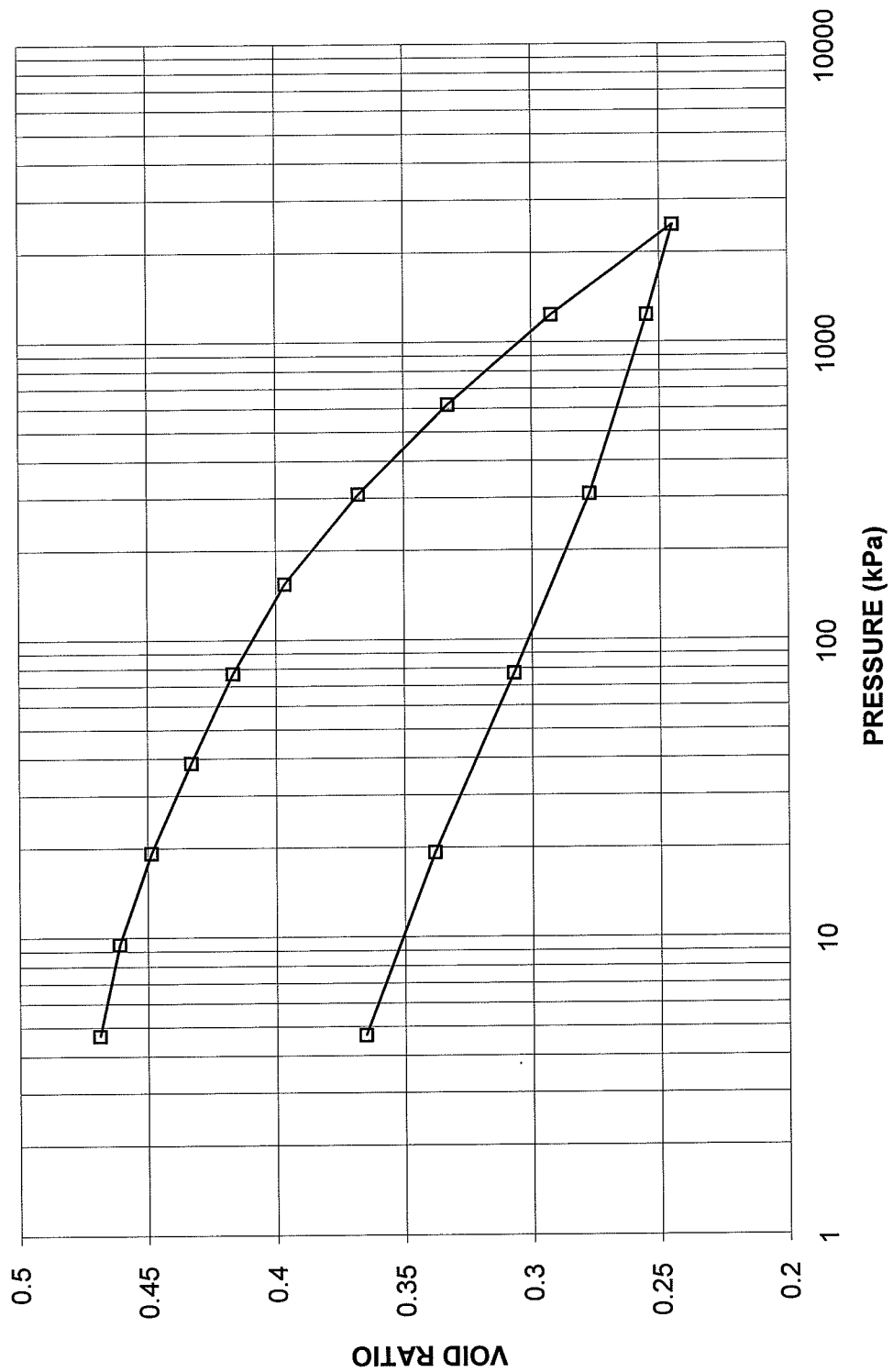
### SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.76	Unit Weight, kN/m <sup>3</sup>	23.32
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	19.75
Area, cm <sup>2</sup>	31.67	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	55.61	Solids Height, cm	1.286
Water Content, %	18.07	Volume of Solids, cm <sup>3</sup>	40.73
Wet Mass, g	132.25	Volume of Voids, cm <sup>3</sup>	14.88
Dry Mass, g	112.01		

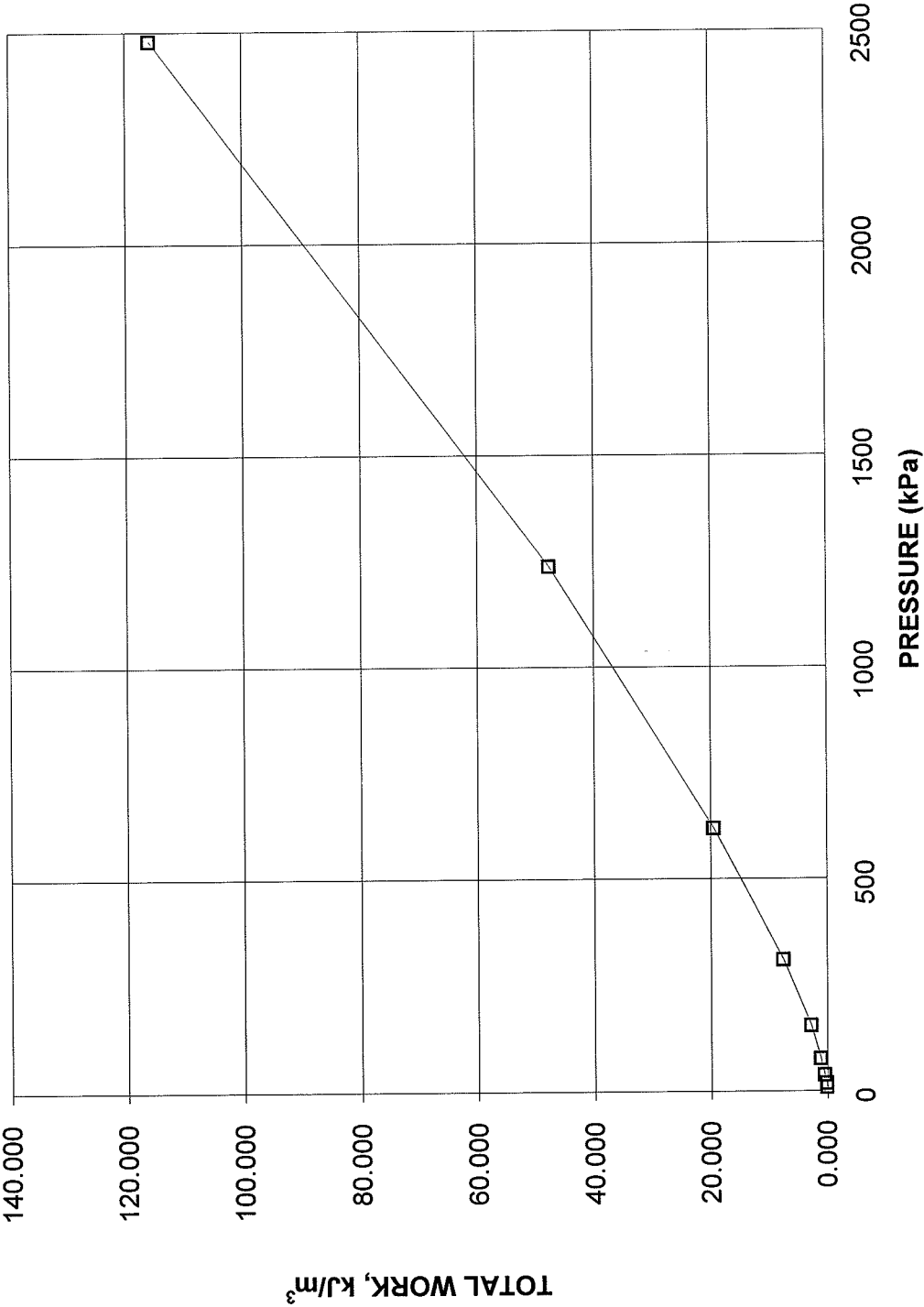
CONSOLIDATION TEST  
VOID RATIO VS. LOG PRESSURE

FIGURE BH 23 SA 15 OED A

CONSOLIDATION TEST  
VOID RATIO vs PRESSURE  
BH-23 SA-15



CONSOLIDATION TEST  
TOTAL WORK,  $\text{kJ/m}^3$  vs PRESSURE  
BH-23 SA-15





**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 132 SA 11 OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	11
Borehole Number	132	Sample Depth, m	11.3-11.9

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	10		
Date Started	08/27/2008		
Date Completed	09/28/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	2.54	Unit Weight, kN/m <sup>3</sup>	19.27
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	14.64
Area, cm <sup>2</sup>	31.62	Specific Gravity, measured	2.79
Volume, cm <sup>3</sup>	80.34	Solids Height, cm	1.360
Water Content, %	31.60	Volume of Solids, cm <sup>3</sup>	42.99
Wet Mass, g	157.84	Volume of Voids, cm <sup>3</sup>	37.36
Dry Mass, g	119.94	Degree of Saturation, %	101.5

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.541	0.869	2.541				
4.70	2.544	0.871	2.543	8	1.71E-01	-2.51E-04	-4.22E-06
9.56	2.542	0.870	2.543	69	1.99E-02	1.62E-04	3.15E-07
19.28	2.534	0.864	2.538	79	1.73E-02	3.24E-04	5.49E-07
38.75	2.520	0.854	2.527	76	1.78E-02	2.83E-04	4.94E-07
83.10	2.494	0.834	2.507	97	1.37E-02	2.31E-04	3.11E-07
152.00	2.443	0.797	2.469	60	2.15E-02	2.91E-04	6.15E-07
38.75	2.483	0.826	2.463				
9.56	2.511	0.847	2.497				
38.75	2.495	0.835	2.503	540	2.46E-03	2.16E-04	5.20E-08
152.00	2.454	0.805	2.475	240	5.41E-03	1.42E-04	7.55E-08
309.50	2.410	0.773	2.432	276	4.54E-03	1.10E-04	4.89E-08
619.01	2.274	0.673	2.342	371	3.13E-03	1.73E-04	5.31E-08
1238.58	2.134	0.570	2.204	464	2.22E-03	8.89E-05	1.93E-08
2474.80	2.007	0.476	2.071	112	8.11E-03	4.04E-05	3.22E-08
619.01	2.050	0.508	2.029				
152.00	2.122	0.561					
38.95	2.201	0.619					
4.70	2.303	0.694					

Note:

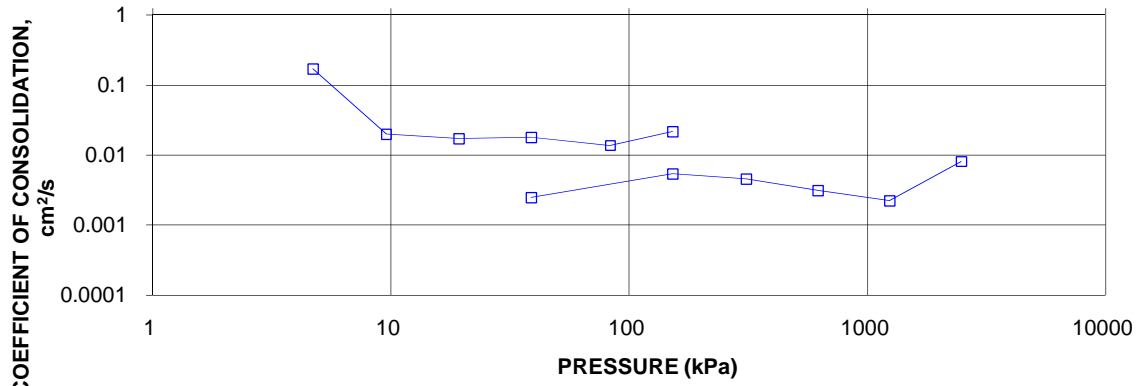
k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	2.05	Unit Weight, kN/m <sup>3</sup>	23.14
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	18.15
Area, cm <sup>2</sup>	31.62	Specific Gravity, measured	2.79
Volume, cm <sup>3</sup>	64.82	Solids Height, cm	1.360
Water Content, %	27.50	Volume of Solids, cm <sup>3</sup>	42.99
Wet Mass, g	152.92	Volume of Voids, cm <sup>3</sup>	21.83
Dry Mass, g	119.94		

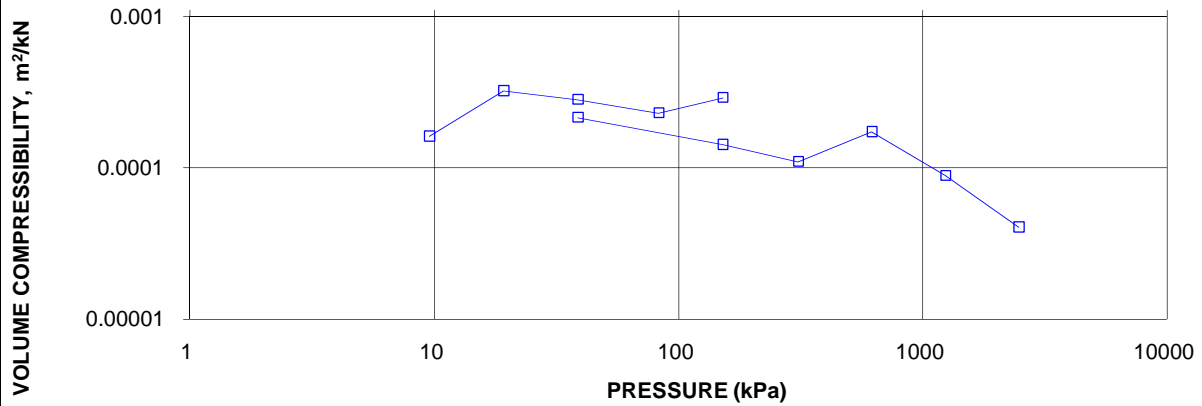
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 132 SA 11 OED B

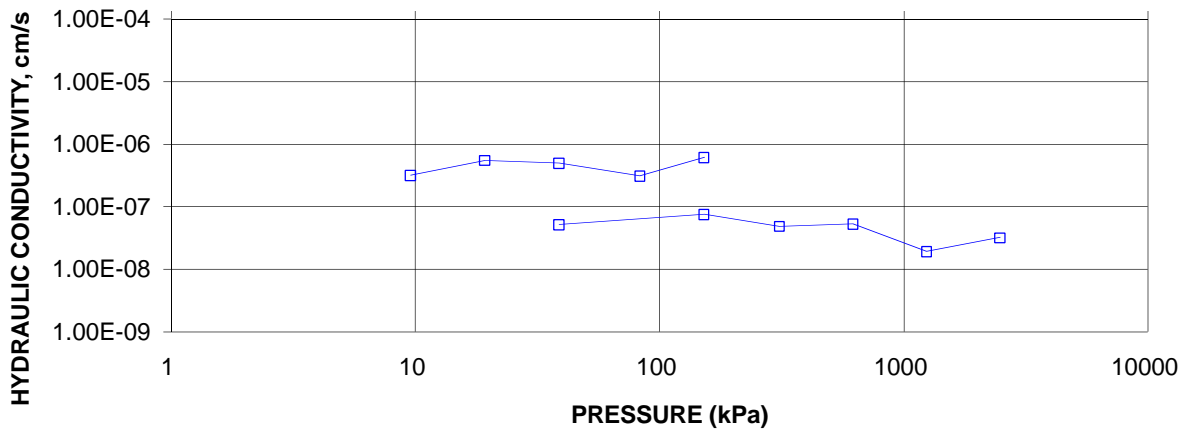
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 132 SA 11

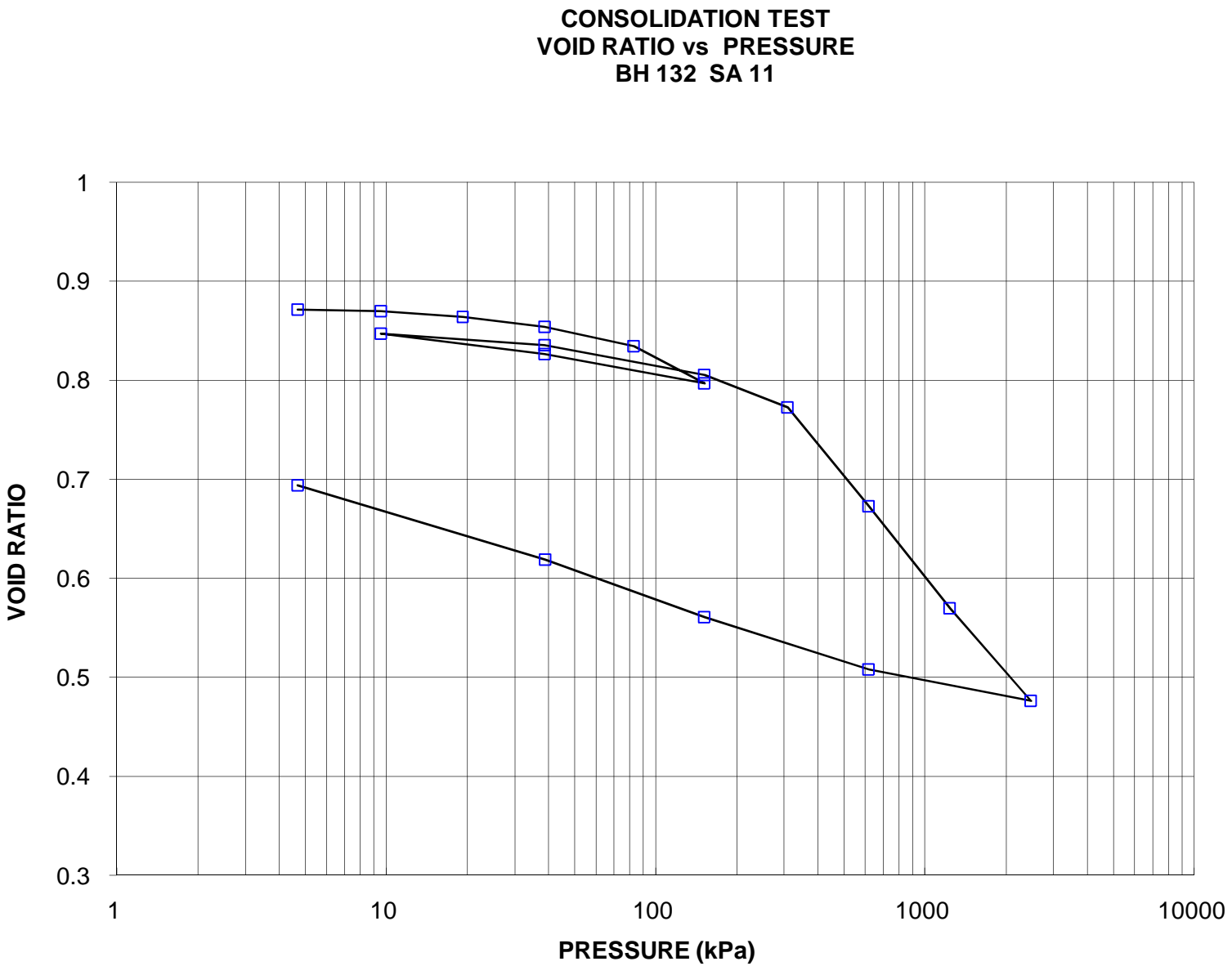


**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 132 SA 11



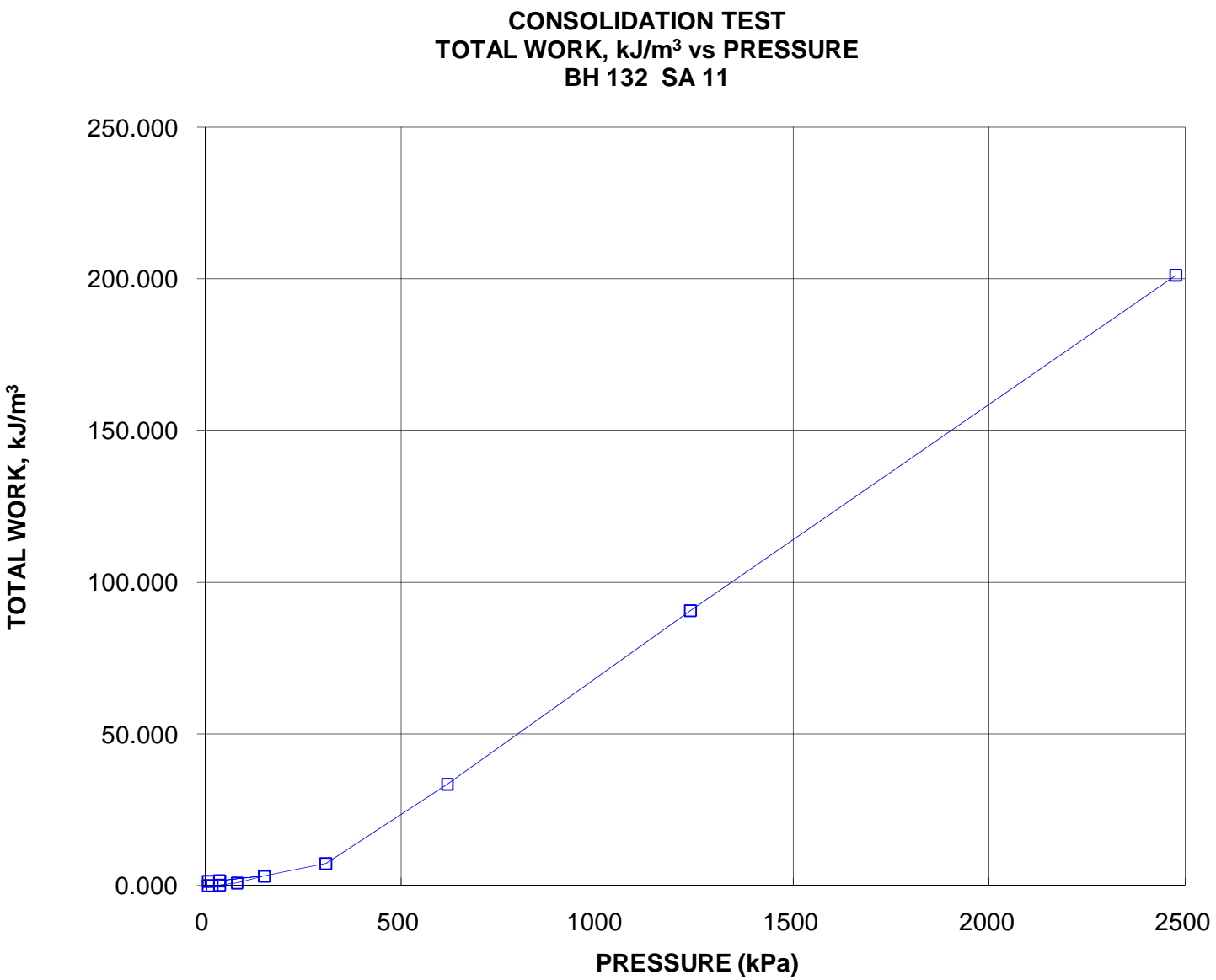
**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 132 SA 11





**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 132 SA 11 OED D**



**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 145 SA 15 OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	15
Borehole Number	145	Sample Depth, m	12.8-13.3

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	11		
Date Started	09/04/2008		
Date Completed	09/27/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	2.54	Unit Weight, kN/m <sup>3</sup>	20.88
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	17.63
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	80.16	Solids Height, cm	1.660
Water Content, %	18.41	Volume of Solids, cm <sup>3</sup>	52.41
Wet Mass, g	170.65	Volume of Voids, cm <sup>3</sup>	27.75
Dry Mass, g	144.12	Degree of Saturation, %	95.6

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.539	0.529	2.539				
4.84	2.526	0.522	2.533	22	6.18E-02	1.06E-03	6.41E-06
9.55	2.515	0.515	2.521	32	4.21E-02	9.20E-04	3.79E-06
19.31	2.495	0.503	2.505	104	1.28E-02	8.07E-04	1.01E-06
38.81	2.466	0.485	2.481	22	5.93E-02	5.86E-04	3.40E-06
77.76	2.426	0.461	2.446	32	3.96E-02	4.04E-04	1.57E-06
155.14	2.376	0.431	2.401	16	7.64E-02	2.54E-04	1.91E-06
176.00	2.371	0.428	2.374	305	3.92E-03	9.44E-05	3.62E-08
155.14	2.371	0.428	2.371				
38.80	2.382	0.435	2.377				
9.55	2.398	0.445	2.390				
19.31	2.396	0.443	2.397	22	5.54E-02	8.07E-05	4.38E-07
38.81	2.390	0.440	2.393	60	2.02E-02	1.21E-04	2.40E-07
77.68	2.381	0.434	2.386	32	3.77E-02	9.12E-05	3.37E-07
176.00	2.362	0.423	2.372	60	1.99E-02	7.61E-05	1.48E-07
310.33	2.323	0.399	2.343	146	7.97E-03	1.14E-04	8.93E-08
620.30	2.264	0.364	2.294	155	7.19E-03	7.50E-05	5.29E-08
1240.72	2.203	0.327	2.234	175	6.04E-03	3.87E-05	2.29E-08
2481.42	2.142	0.290	2.173	92	1.09E-02	1.94E-05	2.06E-08
1240.72	2.147	0.293					
310.33	2.170	0.307					
176.00	2.181	0.314					
77.76	2.202	0.326					
19.34	2.236	0.347					
4.84	2.265	0.364					

Note:  
k calculated using cv based on t<sub>90</sub> values.

**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

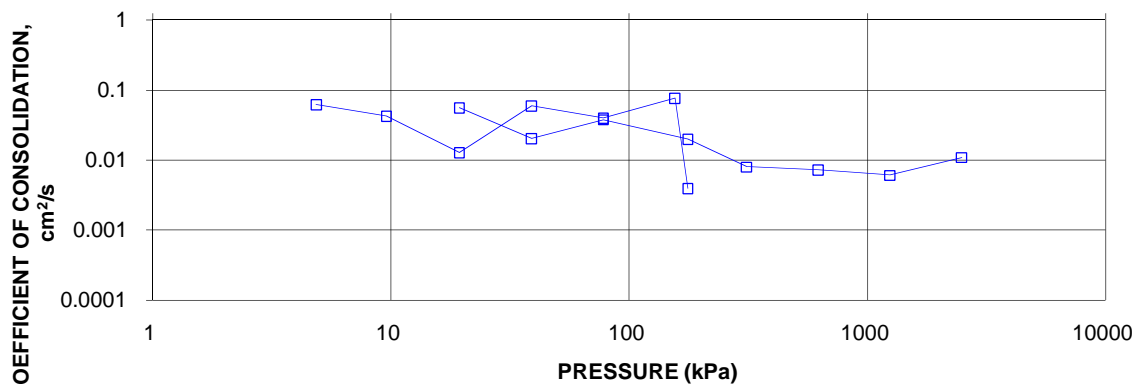
Sample Height, cm	2.32	Unit Weight, kN/m <sup>3</sup>	21.95
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	19.27
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	73.34	Solids Height, cm	1.660
Water Content, %	13.90	Volume of Solids, cm <sup>3</sup>	52.41
Wet Mass, g	164.15	Volume of Voids, cm <sup>3</sup>	20.93
Dry Mass, g	144.12		



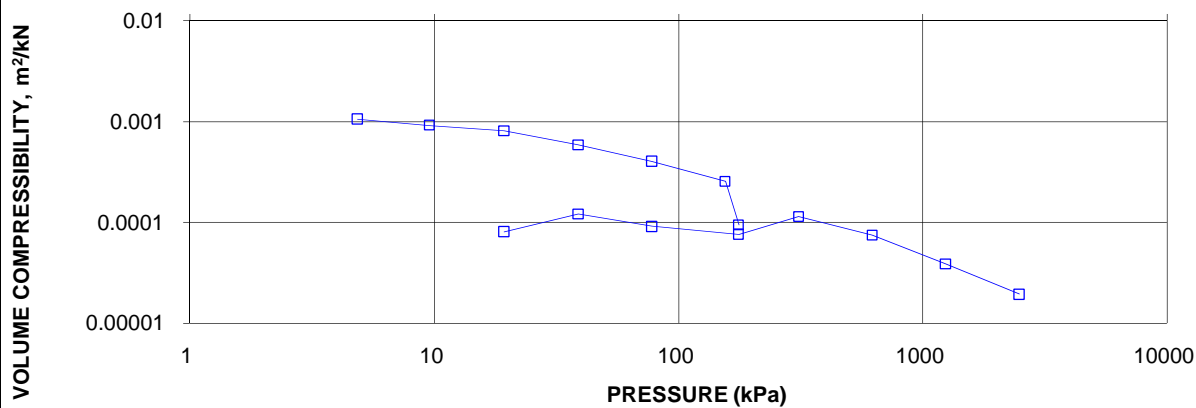
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 145 SA 15 OED B

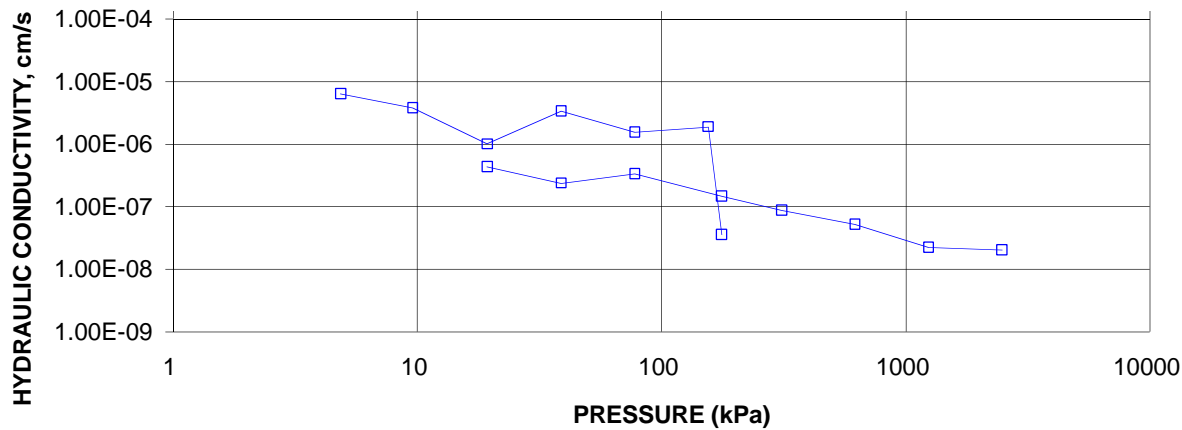
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 145 SA 15

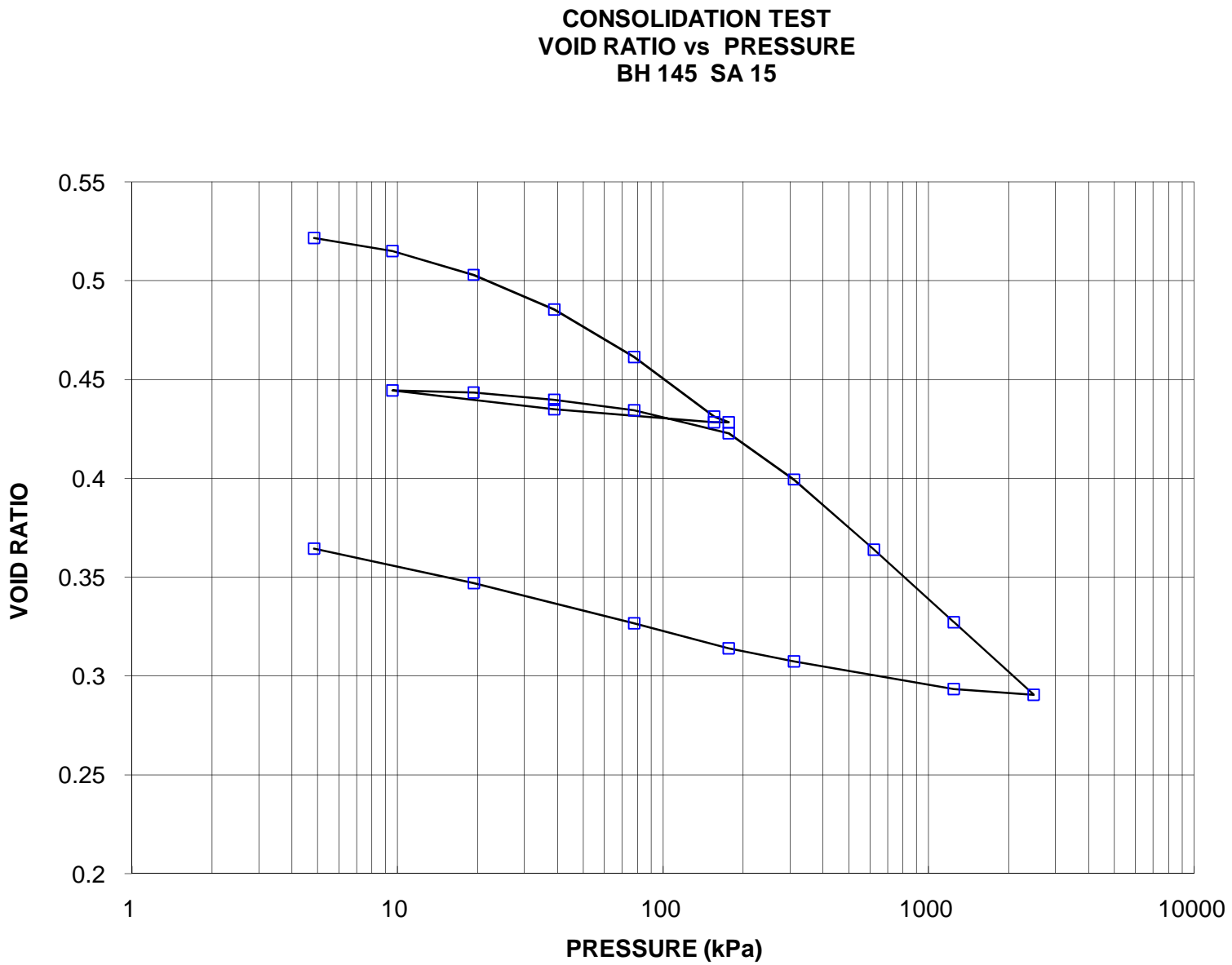


**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 145 SA 15



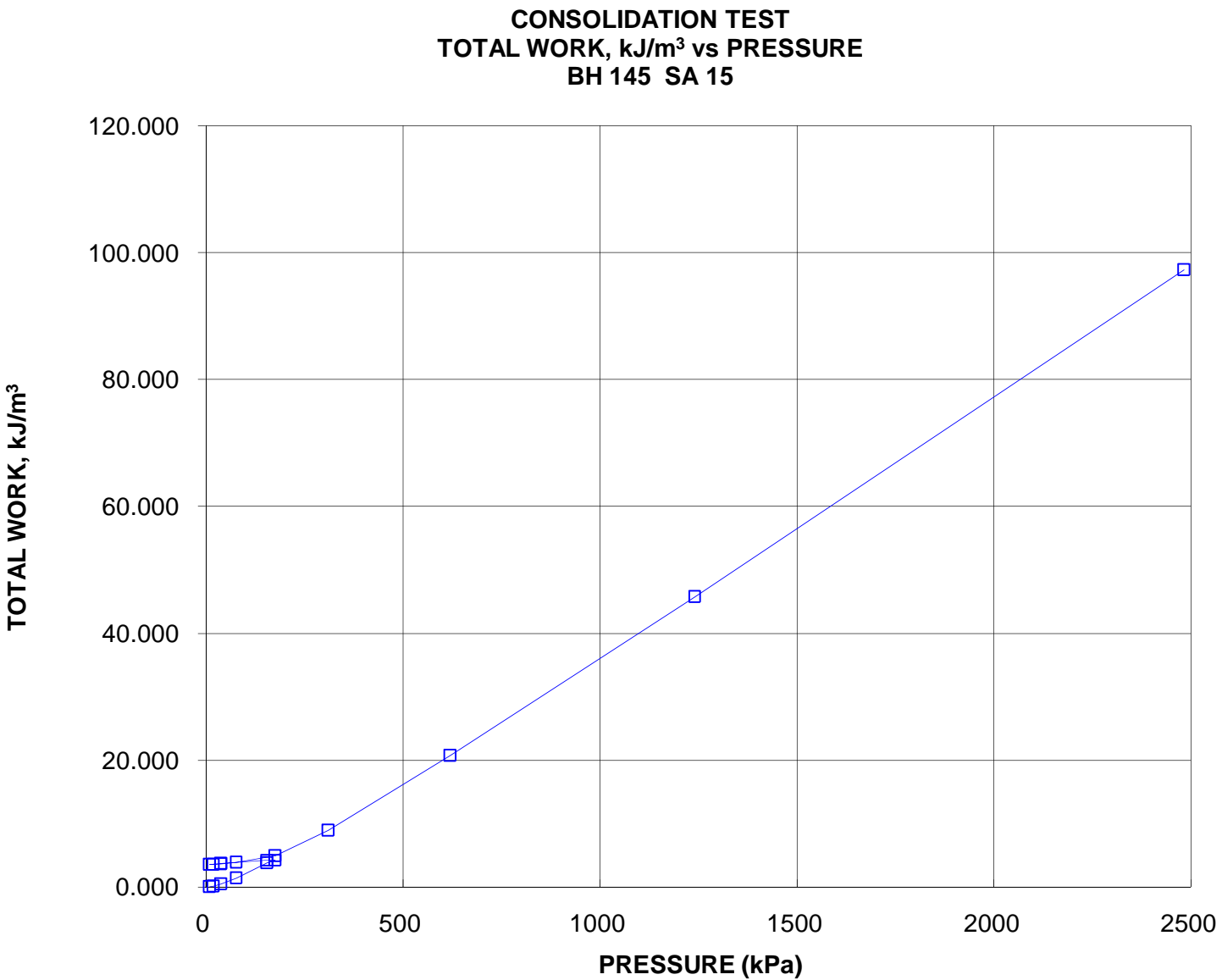
**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 145 SA 15





**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 145 SA 15 OED D**



**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 154 SA 4 OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	4
Borehole Number	154	Sample Depth, m	

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	4		
Date Started	10/30/2008		
Date Completed	11/15/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	2.54	Unit Weight, kN/m <sup>3</sup>	19.48
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	15.28
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.77
Volume, cm <sup>3</sup>	80.19	Solids Height, cm	1.429
Water Content, %	27.47	Volume of Solids, cm <sup>3</sup>	45.12
Wet Mass, g	159.31	Volume of Voids, cm <sup>3</sup>	35.07
Dry Mass, g	124.98	Degree of Saturation, %	97.9

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.540	0.777	2.540				
4.77	2.539	0.777	2.540	1	1.37E+00	8.25E-05	1.11E-05
9.53	2.547	0.782	2.543	3	4.57E-01	-6.45E-04	-2.89E-05
19.34	2.549	0.784	2.548	25	5.51E-02	-9.23E-05	-4.98E-07
38.80	2.547	0.782	2.548	23	5.99E-02	3.44E-05	2.02E-07
53.15	2.543	0.779	2.545	22	6.24E-02	1.32E-04	8.06E-07
38.80	2.545	0.781	2.544				
9.58	2.584	0.808	2.564				
4.77	2.591	0.813	2.587				
9.56	2.591	0.813	2.591	23	6.19E-02	1.64E-05	9.97E-08
19.55	2.583	0.807	2.587	265	5.35E-03	3.03E-04	1.59E-07
38.81	2.569	0.798	2.576	135	1.04E-02	2.80E-04	2.86E-07
53.00	2.560	0.791	2.564	20	6.97E-02	2.75E-04	1.88E-06
77.76	2.544	0.780	2.552	43	3.21E-02	2.48E-04	7.80E-07
155.06	2.504	0.752	2.524	135	1.00E-02	2.03E-04	1.99E-07
310.23	2.460	0.721	2.482	1188	1.10E-03	1.11E-04	1.20E-08
620.60	2.407	0.684	2.434	49	2.56E-02	6.75E-05	1.69E-07
1240.57	2.340	0.637	2.374	98	1.22E-02	4.25E-05	5.08E-08
2481.51	2.259	0.580	2.299	34	3.30E-02	2.58E-05	8.32E-08
1240.57	2.277	0.593	2.268				
310.23	2.348	0.643	2.313				
77.76	2.427	0.698	2.388				
53.00	2.445	0.711	2.436				
9.53	2.494	0.745	2.469				
4.77	2.546	0.781	2.520				

Note:

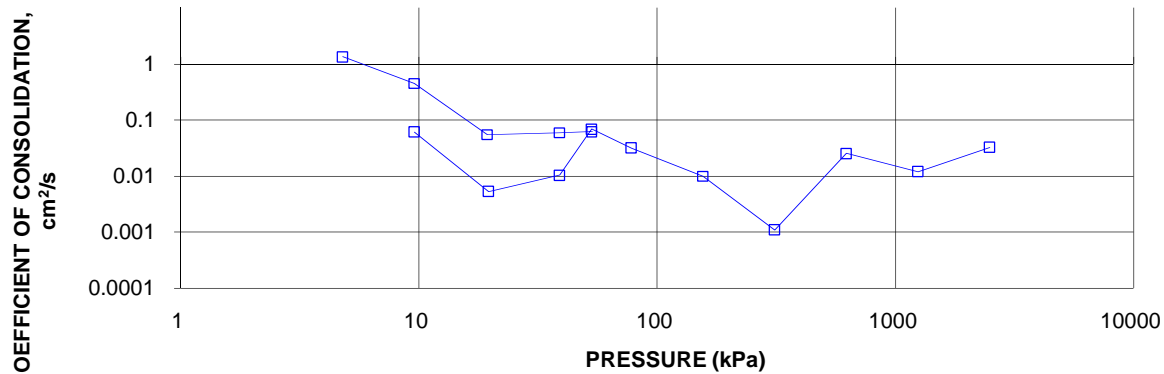
k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	2.55	Unit Weight, kN/m <sup>3</sup>	19.71
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	15.25
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.77
Volume, cm <sup>3</sup>	80.36	Solids Height, cm	1.429
Water Content, %	29.20	Volume of Solids, cm <sup>3</sup>	45.12
Wet Mass, g	161.48	Volume of Voids, cm <sup>3</sup>	35.24
Dry Mass, g	124.98		

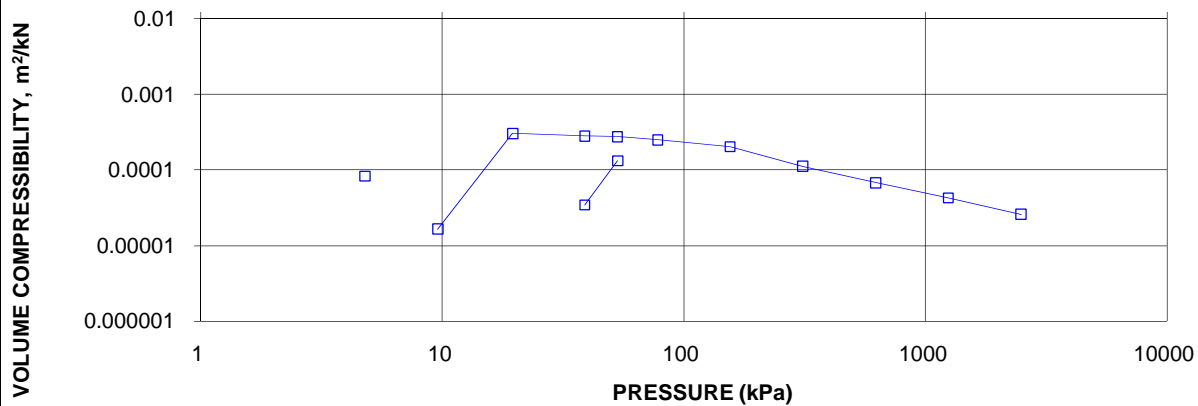
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 154 SA 4 OED B

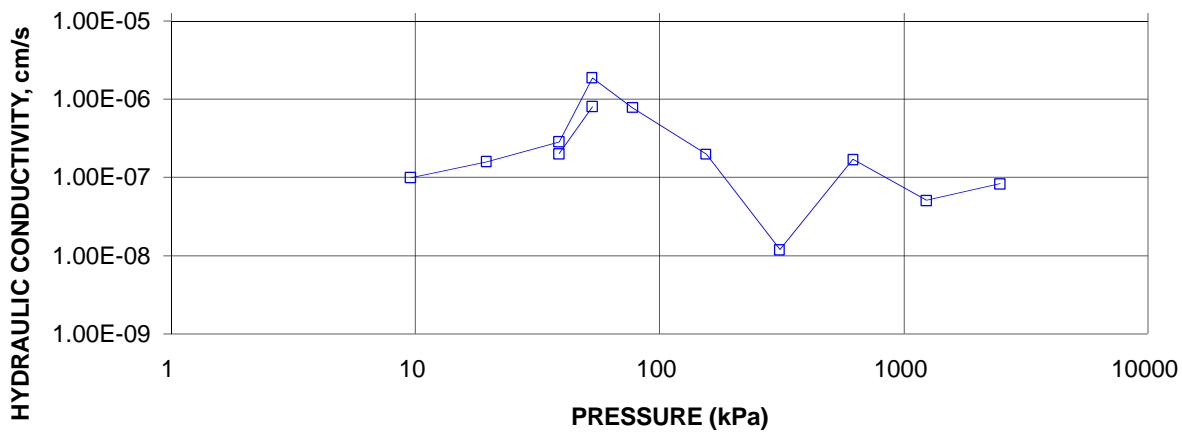
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 154 SA 4



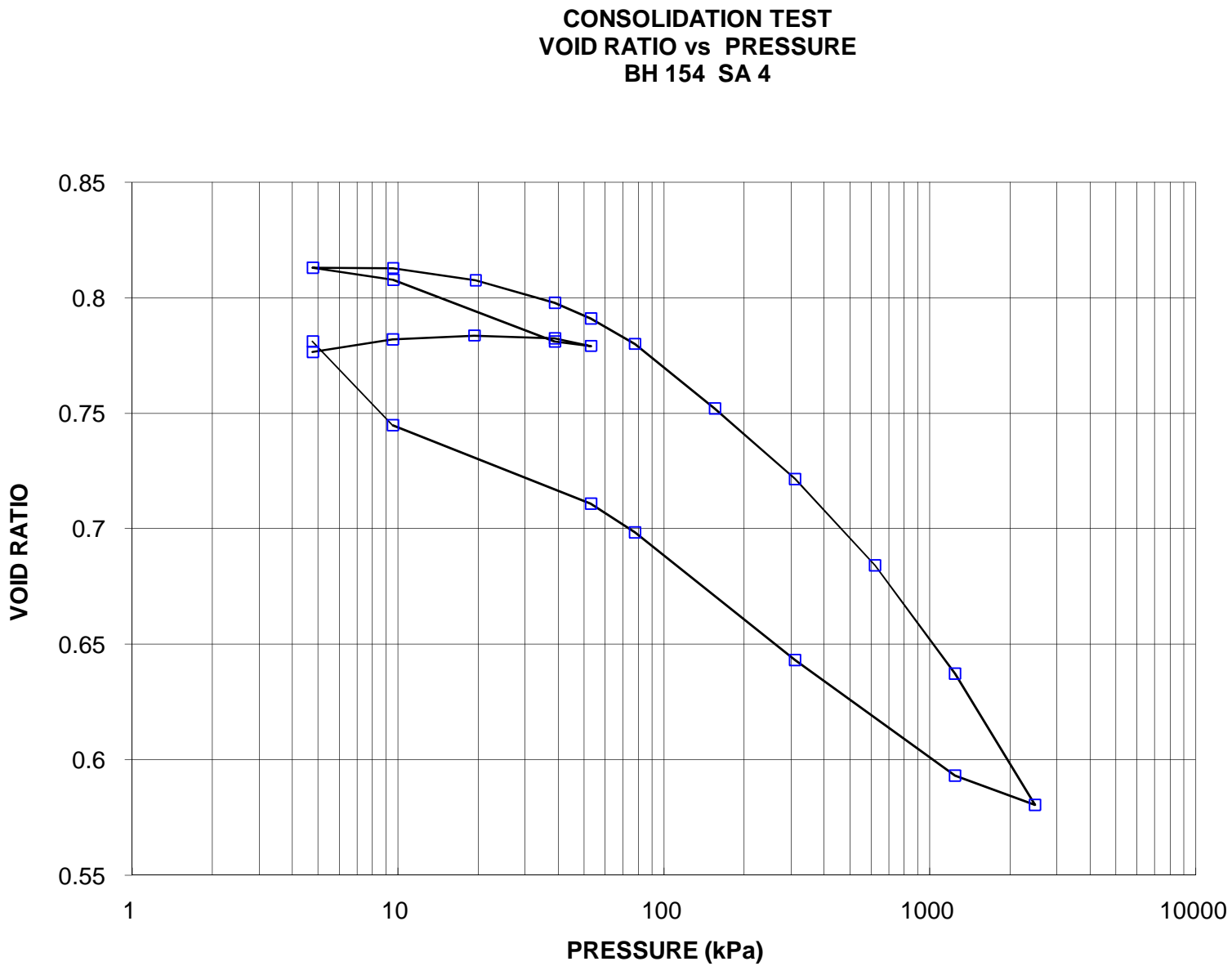
**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 154 SA 4



**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 154 SA 4

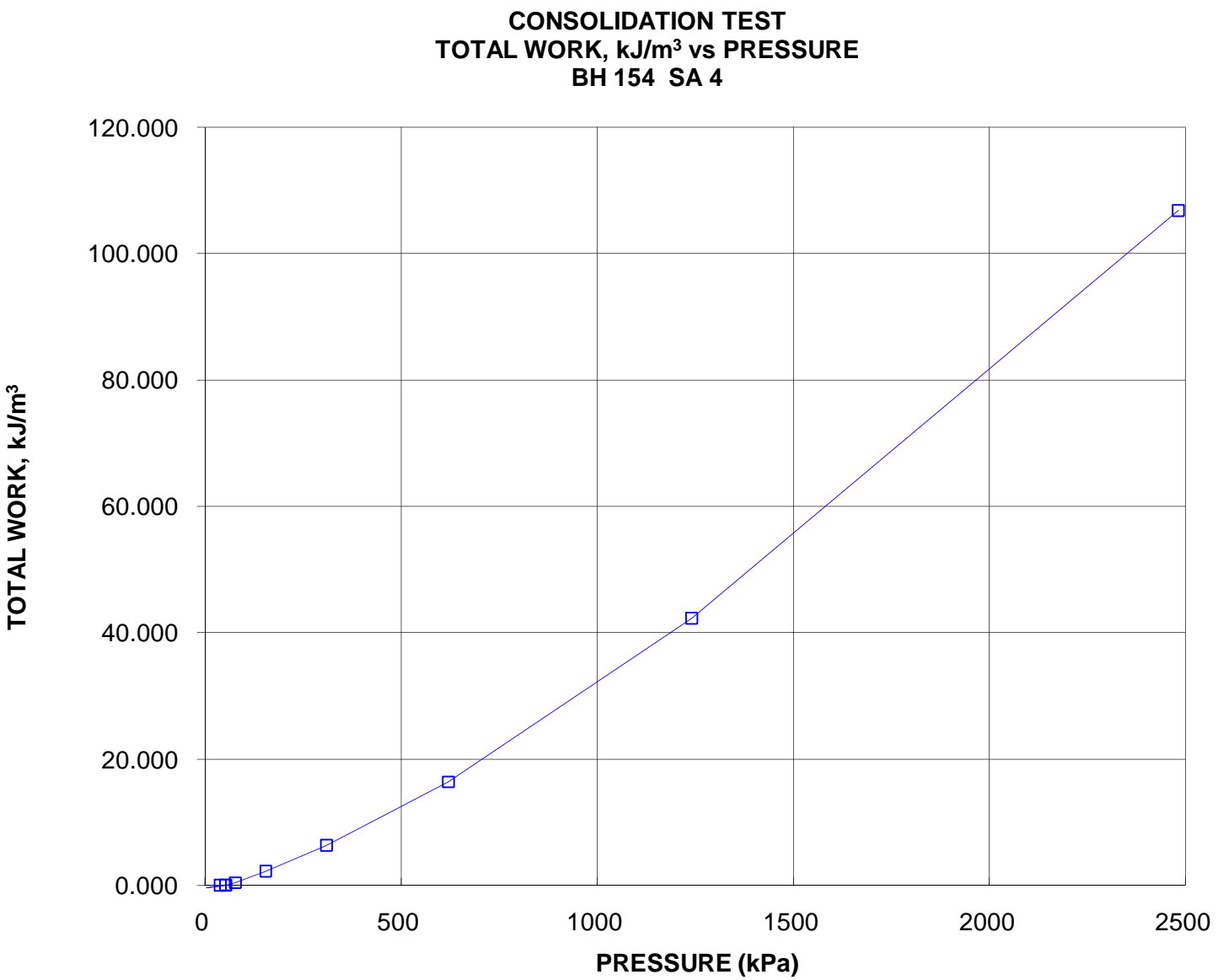






**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 154 SA 4 OED D**



# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 154 SA 6 OED A

## SAMPLE IDENTIFICATION

Project Number	07-1130-2070	Sample Number	6
Borehole Number	154	Sample Depth, m	4.6-5.0

## TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	8		
Date Started	10/17/2008		
Date Completed	11/03/2008		

## SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	20.72
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	17.54
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	59.92	Solids Height, cm	1.243
Water Content, %	18.15	Volume of Solids, cm <sup>3</sup>	39.25
Wet Mass, g	126.60	Volume of Voids, cm <sup>3</sup>	20.67
Dry Mass, g	107.15	Degree of Saturation, %	94.1

## TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.898	0.527	1.898				
4.77	1.902	0.530	1.900	5	1.53E-01	-4.64E-04	-6.96E-06
9.56	1.901	0.529	1.901	42	1.82E-02	1.87E-04	3.34E-07
19.34	1.894	0.523	1.897	41	1.86E-02	3.45E-04	6.29E-07
39.01	1.883	0.514	1.888	60	1.26E-02	3.05E-04	3.77E-07
67.81	1.875	0.508	1.879	82	9.12E-03	1.48E-04	1.33E-07
19.34	1.883	0.515	1.879				
4.87	1.892	0.522	1.888				
9.53	1.890	0.520	1.891	9	8.42E-02	2.15E-04	1.77E-06
19.55	1.885	0.516	1.888	104	7.26E-03	2.42E-04	1.72E-07
39.01	1.877	0.510	1.881	76	9.87E-03	2.22E-04	2.15E-07
67.81	1.871	0.505	1.874	89	8.37E-03	1.06E-04	8.70E-08
155.06	1.840	0.480	1.855	28	2.61E-02	1.93E-04	4.92E-07
310.12	1.815	0.459	1.827	44	1.61E-02	8.49E-05	1.34E-07
620.27	1.770	0.423	1.792	26	2.62E-02	7.64E-05	1.96E-07
1240.50	1.725	0.388	1.747	51	1.27E-02	3.75E-05	4.66E-08
2481.47	1.672	0.345	1.699	54	1.13E-02	2.28E-05	2.53E-08
1240.50	1.679	0.350	1.675				
310.12	1.704	0.370	1.691				
67.81	1.748	0.406	1.726				
19.34	1.774	0.427	1.761				
4.87	1.795	0.444	1.784				

Note:  
k calculated using cv based on t<sub>90</sub> values.

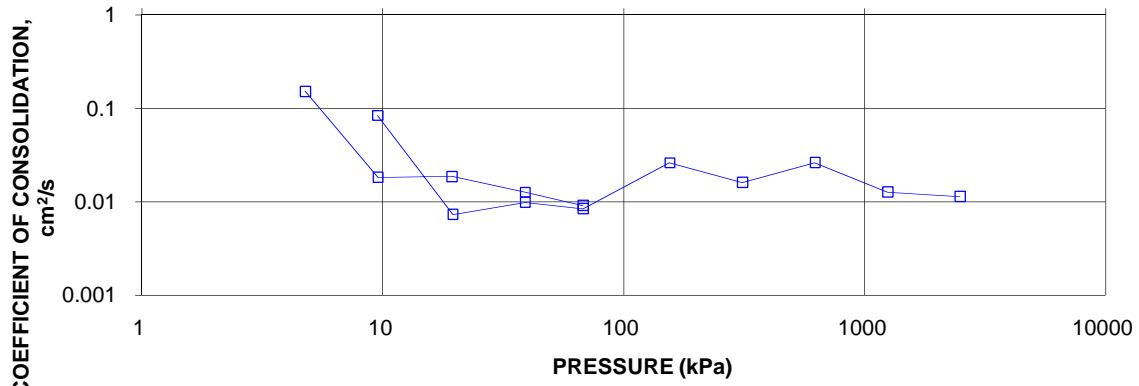
## SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	1.80	Unit Weight, kN/m <sup>3</sup>	21.73
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	18.54
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.73
Volume, cm <sup>3</sup>	56.67	Solids Height, cm	1.243
Water Content, %	17.21	Volume of Solids, cm <sup>3</sup>	39.25
Wet Mass, g	125.59	Volume of Voids, cm <sup>3</sup>	17.42
Dry Mass, g	107.15		

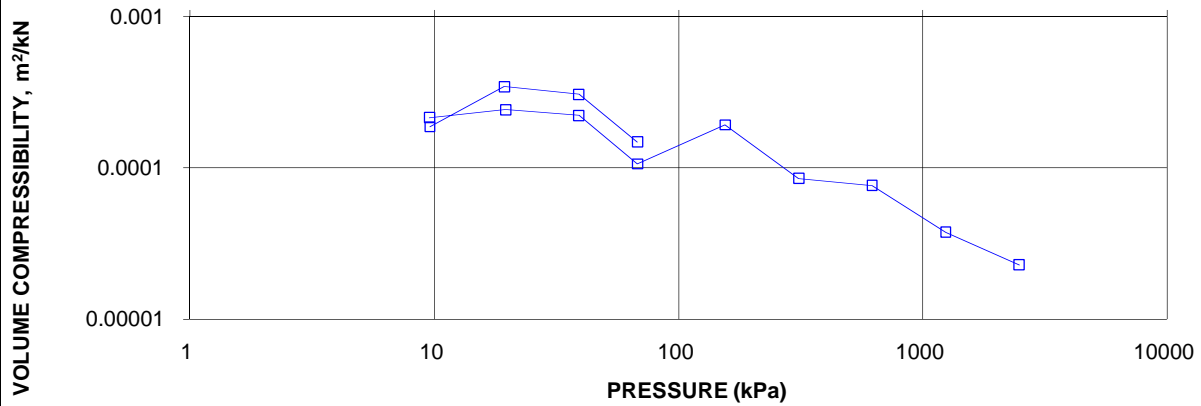
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 154 SA 6 OED B

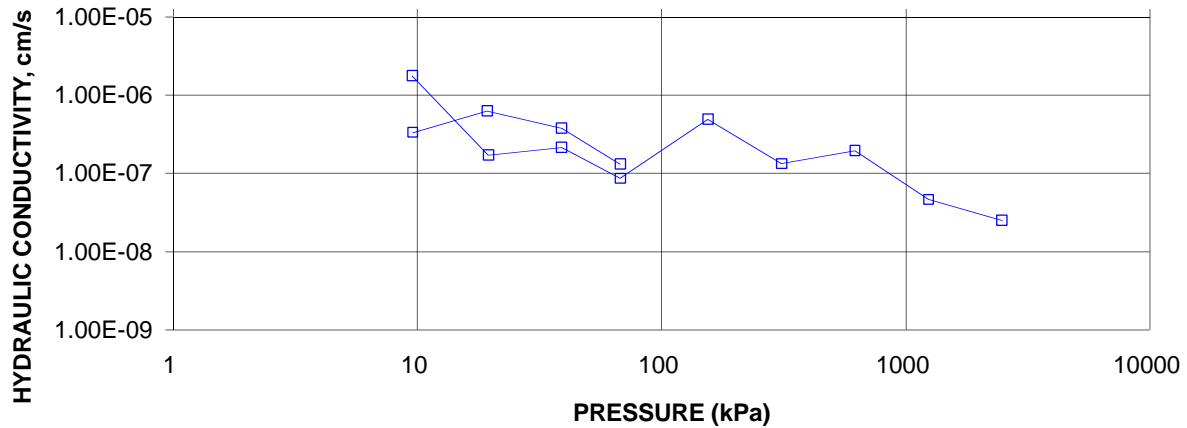
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 154 SA 6

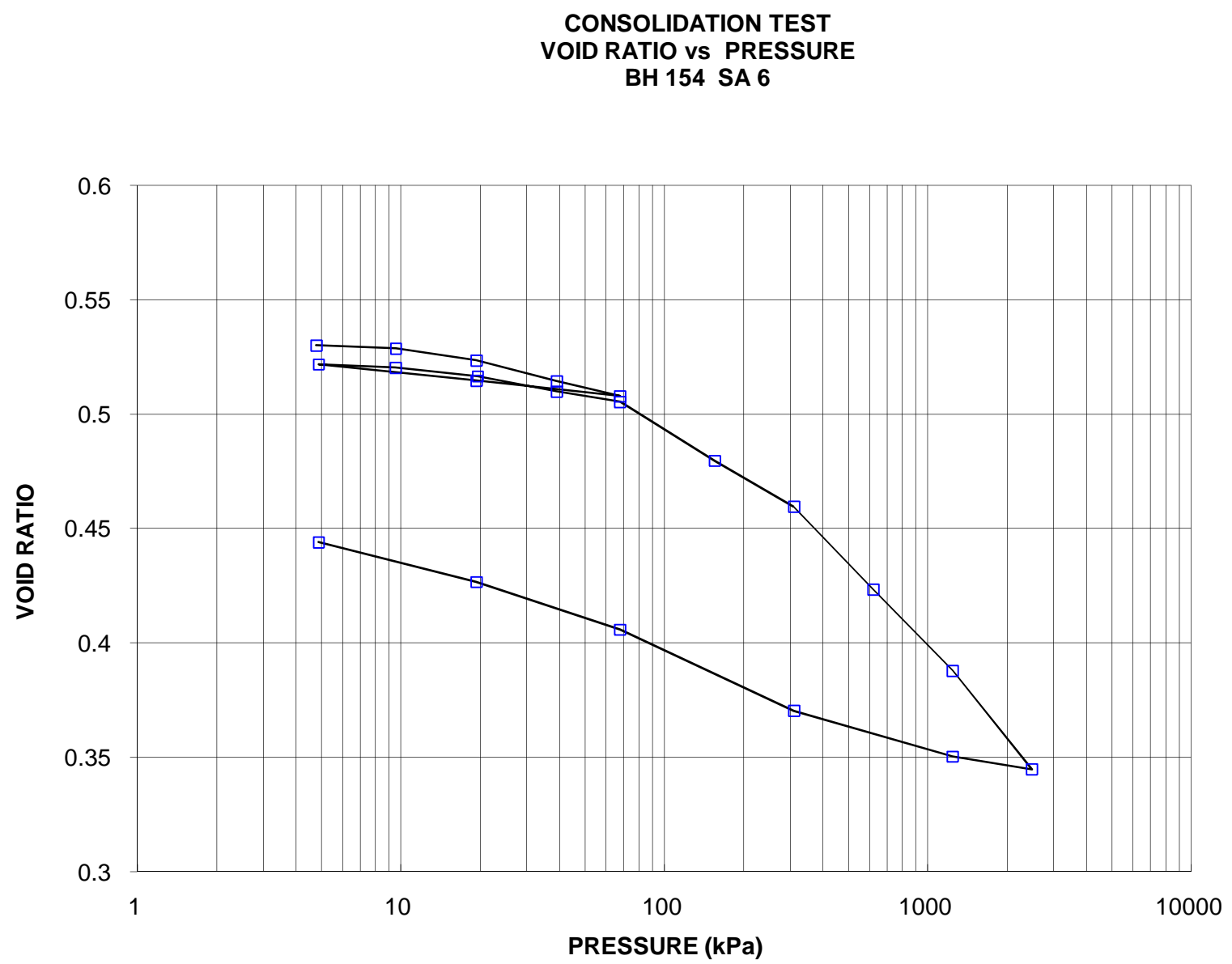


**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 154 SA 6



**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 154 SA 6

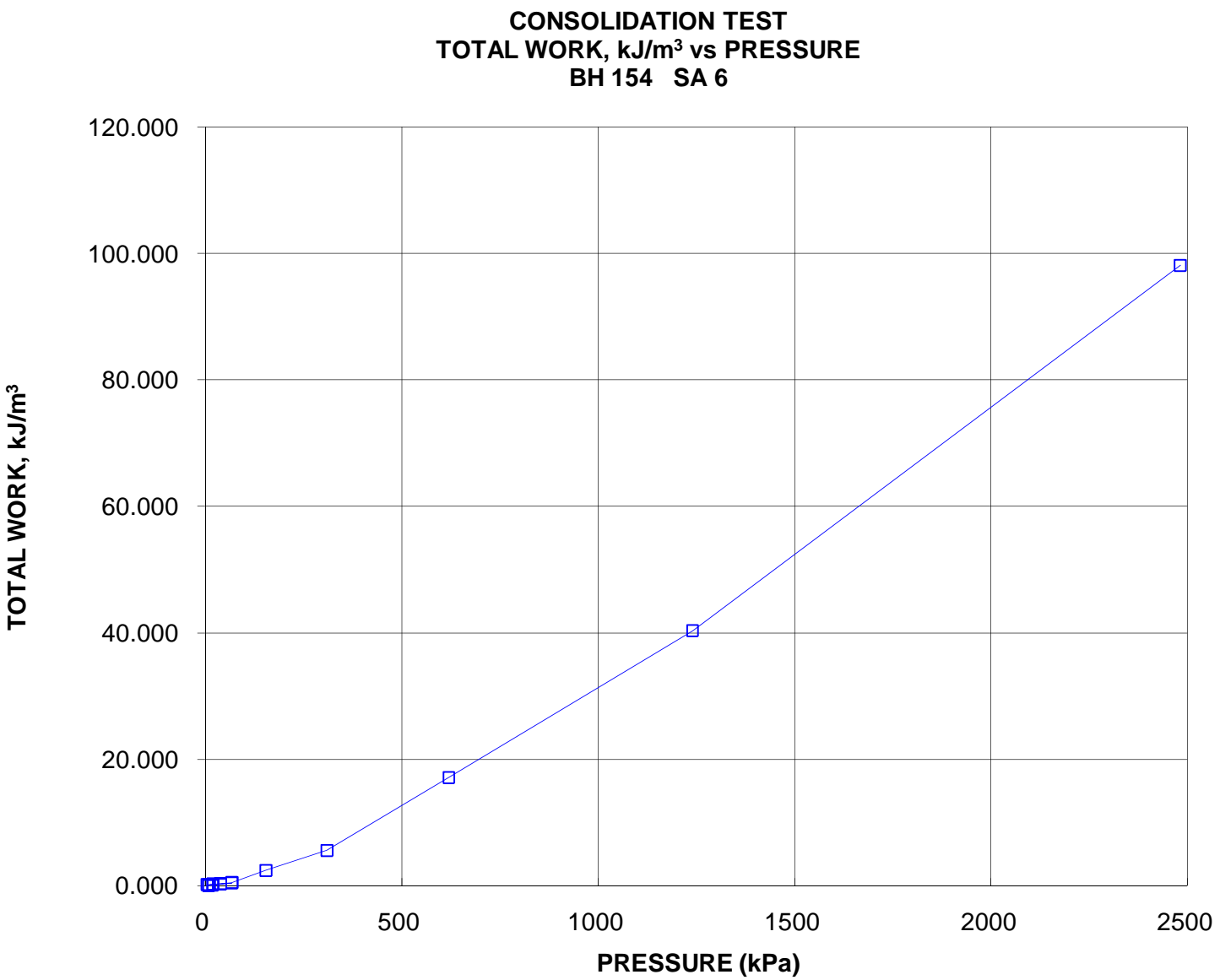






CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE

FIGURE BH 154 SA 6 OED D



Project No. 07-1130-2070

Prepared By: LFG

**Golder Associates**

Checked By: MM

**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 154 SA 10 OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	10
Borehole Number	154	Sample Depth, m	11.4-12.0

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	12		
Date Started	10/08/2008		
Date Completed	10/18/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	2.55	Unit Weight, kN/m <sup>3</sup>	20.08
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	16.31
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	80.25	Solids Height, cm	1.542
Water Content, %	23.08	Volume of Solids, cm <sup>3</sup>	48.54
Wet Mass, g	164.29	Volume of Voids, cm <sup>3</sup>	31.71
Dry Mass, g	133.48	Degree of Saturation, %	97.2

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.550	0.653	2.550				
4.72	2.547	0.651	2.548	19	7.25E-02	2.58E-04	1.83E-06
9.51	2.541	0.647	2.544	49	2.80E-02	5.16E-04	1.42E-06
19.37	2.529	0.640	2.535	65	2.10E-02	4.45E-04	9.15E-07
38.88	2.505	0.624	2.517	32	4.20E-02	4.94E-04	2.03E-06
77.87	2.476	0.606	2.491	93	1.41E-02	2.87E-04	3.97E-07
155.63	2.437	0.580	2.456	60	2.13E-02	2.01E-04	4.19E-07
310.96	2.369	0.536	2.403	151	8.10E-03	1.71E-04	1.36E-07
621.91	2.298	0.490	2.334	185	6.24E-03	8.90E-05	5.44E-08
1243.64	2.215	0.436	2.256	128	8.43E-03	5.27E-05	4.36E-08
2485.82	2.132	0.382	2.173	108	9.27E-03	2.61E-05	2.37E-08
1243.64	2.136	0.385	2.134				
310.96	2.179	0.413	2.157				
77.87	2.226	0.443	2.202				
19.37	2.275	0.475	2.250				

Note:

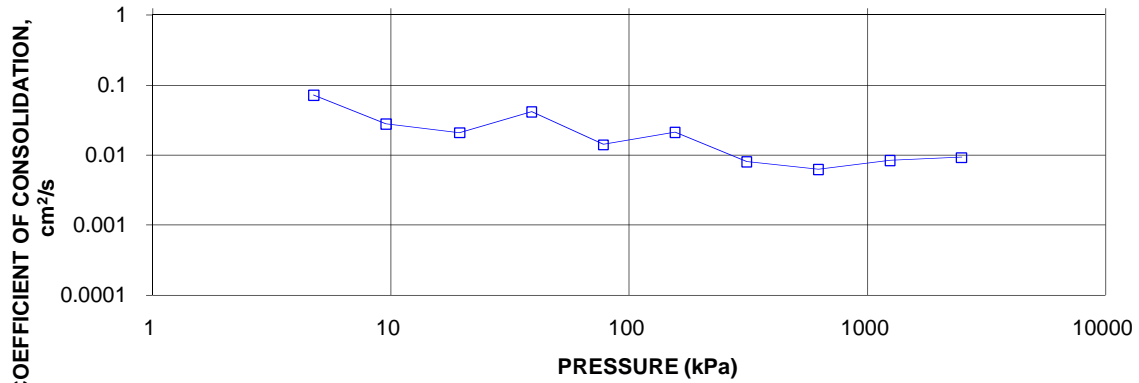
k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	2.28	Unit Weight, kN/m <sup>3</sup>	21.59
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	18.28
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	71.60	Solids Height, cm	1.542
Water Content, %	18.10	Volume of Solids, cm <sup>3</sup>	48.54
Wet Mass, g	157.64	Volume of Voids, cm <sup>3</sup>	23.06
Dry Mass, g	133.48		

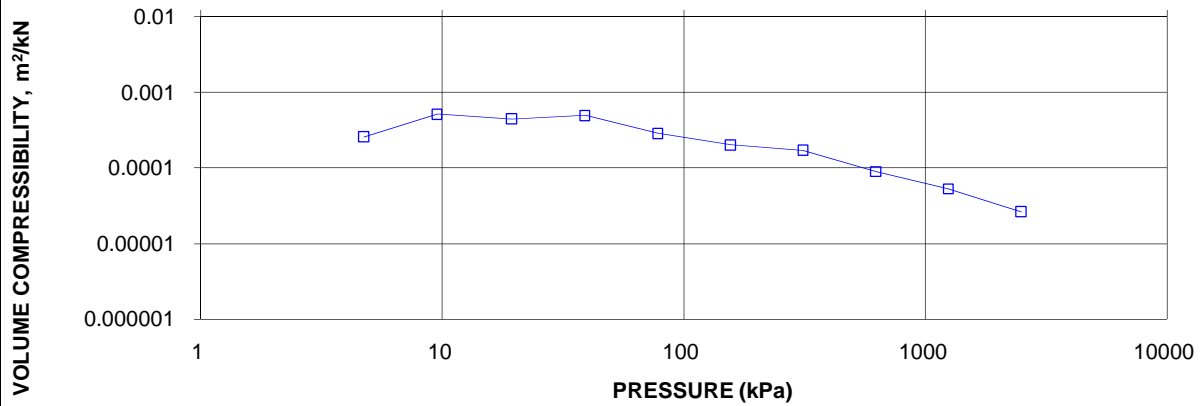
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 154 SA 10 OED B

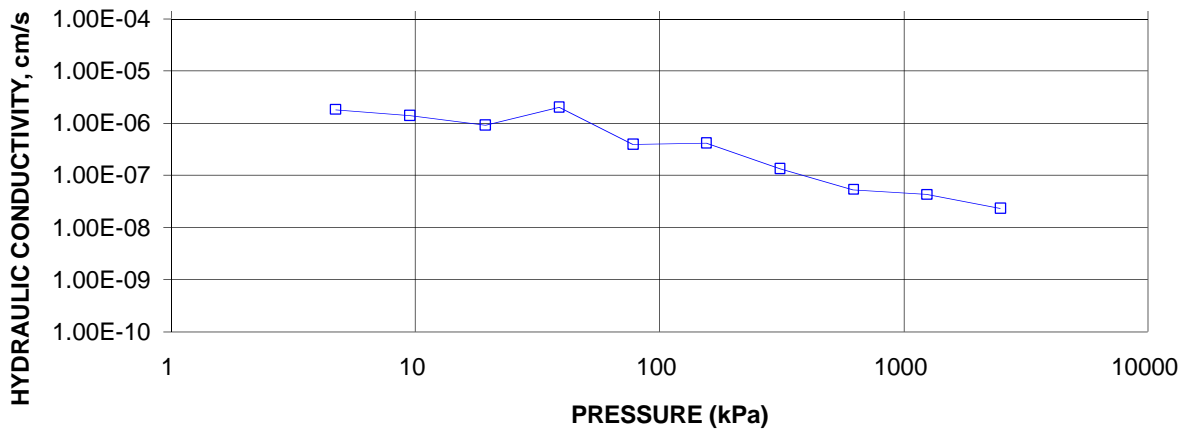
CONSOLIDATION TEST  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 154 SA 10

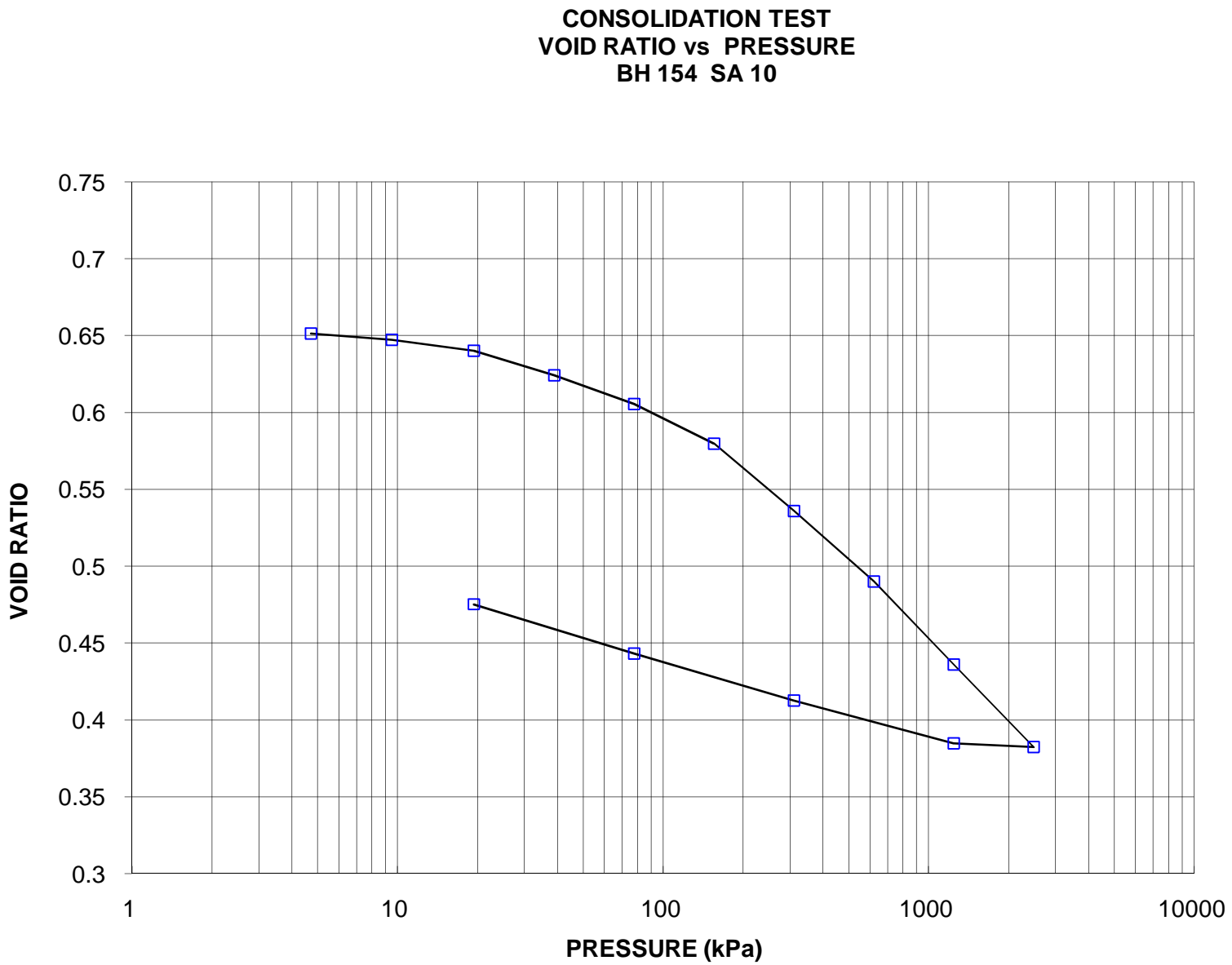


CONSOLIDATION TEST  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 154 SA 10



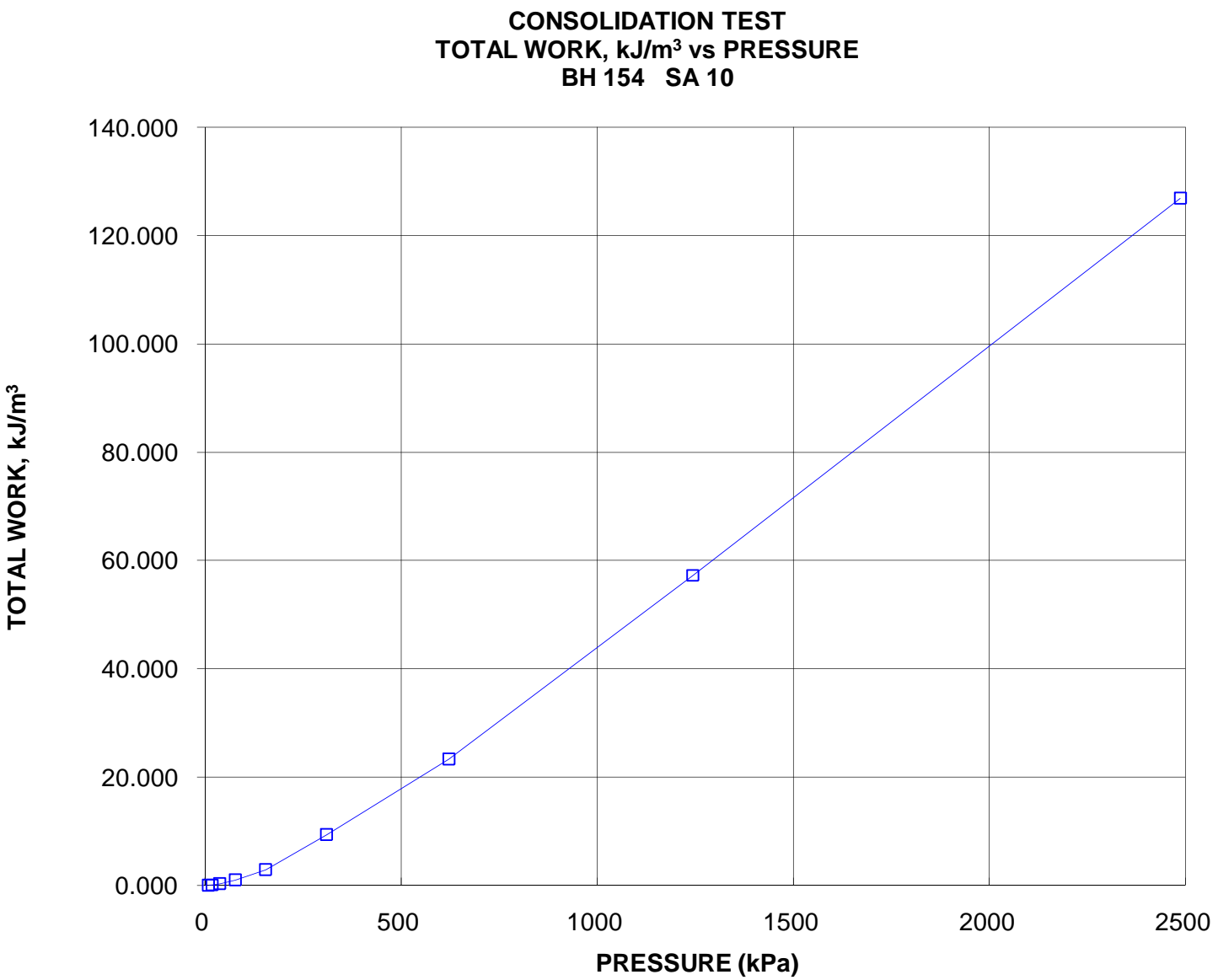
CONSOLIDATION TEST  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 154 SA 10





**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 154 SA 10 OED D**



**TOTAL WORK, kJ/m<sup>3</sup>**

**PRESSURE (kPa)**

**Golder Associates**

Project No. 07-1130-2070

Prepared By: LFG

Checked By: MM



**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 154 SA 12 OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	12
Borehole Number	154	Sample Depth, m	14.5-14.9

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	8		
Date Started	11/02/2008		
Date Completed	11/27/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	20.13
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	16.25
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	59.92	Solids Height, cm	1.148
Water Content, %	23.92	Volume of Solids, cm <sup>3</sup>	36.23
Wet Mass, g	123.00	Volume of Voids, cm <sup>3</sup>	23.69
Dry Mass, g	99.26	Degree of Saturation, %	100.2

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.898	0.654	1.898				
4.86	1.898	0.654	1.898	6	1.27E-01	1.08E-05	1.35E-07
9.53	1.891	0.647	1.894	24	3.17E-02	8.35E-04	2.59E-06
19.31	1.886	0.644	1.888	26	2.91E-02	2.37E-04	6.75E-07
39.01	1.868	0.628	1.877	60	1.24E-02	4.92E-04	6.00E-07
77.64	1.838	0.602	1.853	26	2.80E-02	4.00E-04	1.10E-06
176.27	1.787	0.557	1.813	37	1.88E-02	2.75E-04	5.07E-07
39.01	1.803	0.571	1.795				
9.56	1.824	0.590	1.813				
4.84	1.824	0.589	1.824				
9.56	1.825	0.590	1.824	10	7.05E-02	-1.12E-04	-7.72E-07
19.14	1.821	0.587	1.823	5	1.41E-01	1.87E-04	2.58E-06
38.80	1.813	0.580	1.817	11	6.36E-02	2.25E-04	1.40E-06
77.76	1.801	0.570	1.807	15	4.62E-02	1.53E-04	6.91E-07
176.28	1.776	0.548	1.789	6	1.13E-01	1.36E-04	1.50E-06
309.90	1.743	0.519	1.759	118	5.56E-03	1.32E-04	7.20E-08
619.07	1.687	0.470	1.715	189	3.30E-03	9.49E-05	3.07E-08
1239.27	1.624	0.415	1.655	46	1.26E-02	5.35E-05	6.62E-08
2479.58	1.561	0.360	1.592	41	1.31E-02	2.68E-05	3.44E-08
1239.27	1.570	0.368	1.565				
309.90	1.599	0.393	1.584				
176.27	1.614	0.407	1.606				
77.64	1.637	0.427	1.626				
19.31	1.681	0.465	1.659				
4.86	1.714	0.493	1.697				

Note:

k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	1.71	Unit Weight, kN/m <sup>3</sup>	21.50
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	17.99
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	54.09	Solids Height, cm	1.148
Water Content, %	19.49	Volume of Solids, cm <sup>3</sup>	36.23
Wet Mass, g	118.61	Volume of Voids, cm <sup>3</sup>	17.87
Dry Mass, g	99.26		

Prepared By: LFG

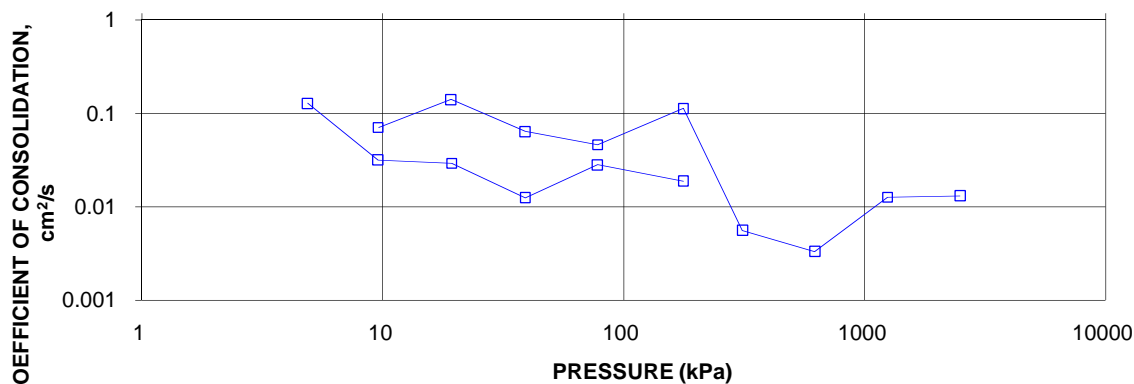
**Golder Associates**

Checked By: MM

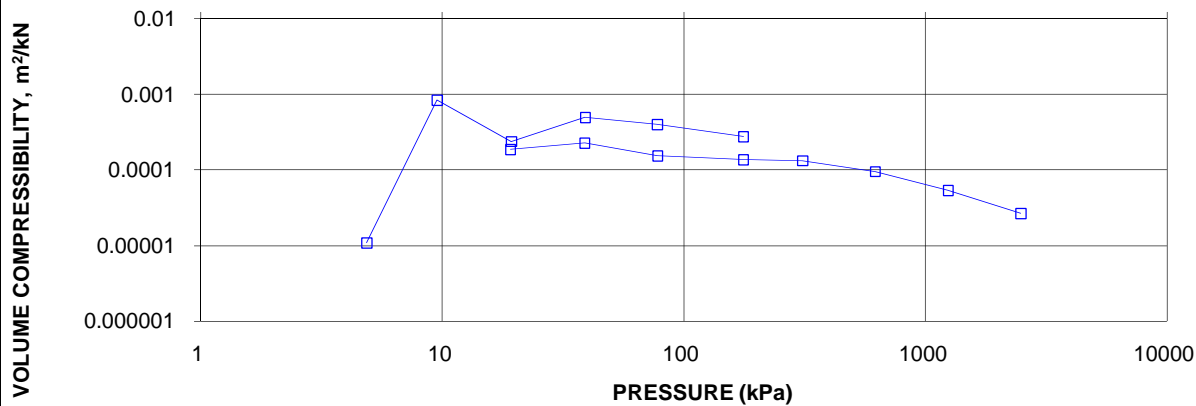
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 154 SA 12 OED B

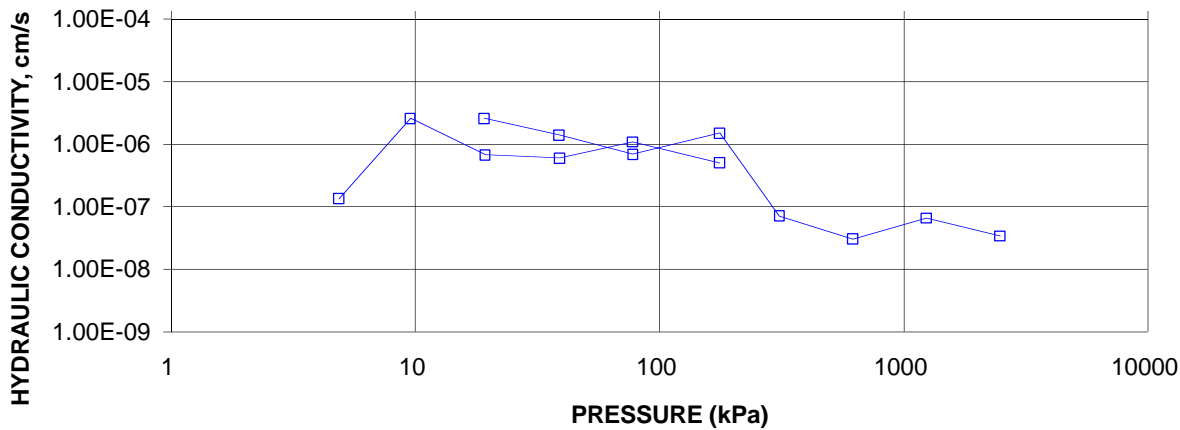
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 154 SA 12

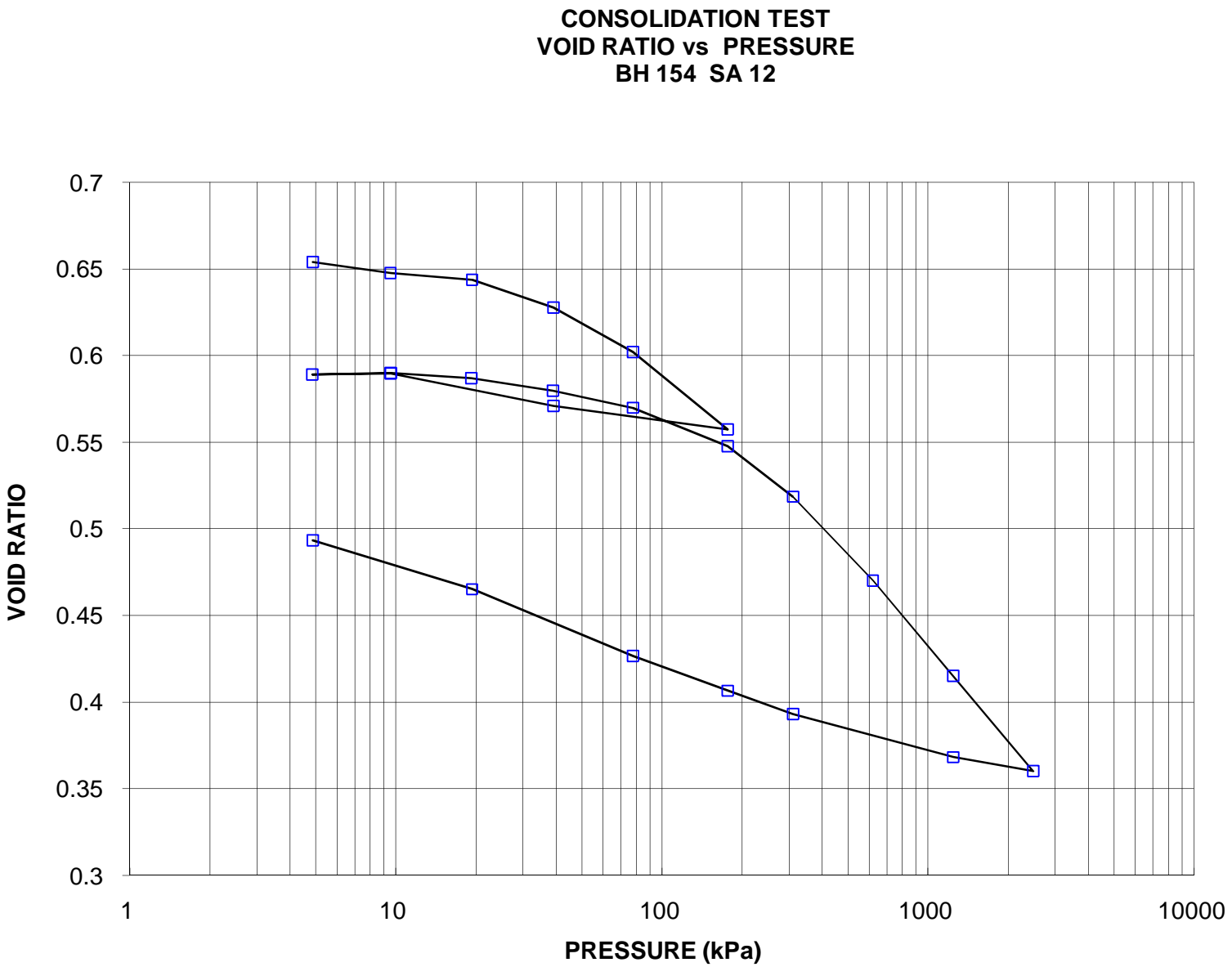


**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 154 SA 12



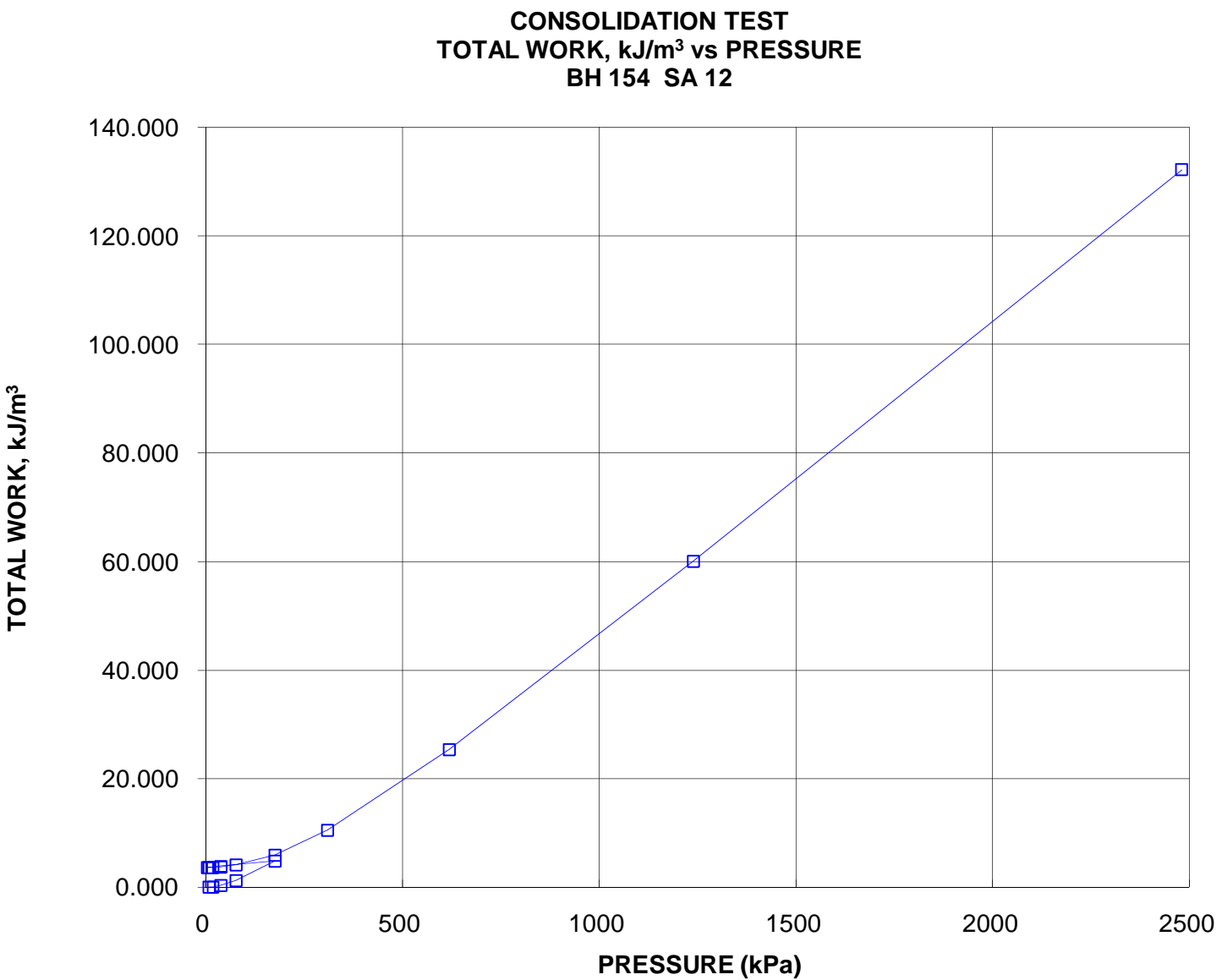
**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 154 SA 12





CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE

FIGURE BH 154 SA 12 OED D



# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 154 SA 12 OED A

## SAMPLE IDENTIFICATION

Project Number	07-1130-2070	Sample Number	12
Borehole Number	154	Sample Depth, m	14.5-14.9

## TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	9		
Date Started	02/11/2008		
Date Completed	22/11/2008		

## SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	20.21
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	16.41
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	59.89	Solids Height, cm	1.162
Water Content, %	23.14	Volume of Solids, cm <sup>3</sup>	36.57
Wet Mass, g	123.40	Volume of Voids, cm <sup>3</sup>	23.31
Dry Mass, g	100.21	Degree of Saturation, %	99.5

## TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.903	0.637	1.903				
4.72	1.906	0.640	1.905	6	1.28E-01	-3.34E-04	-4.19E-06
9.60	1.902	0.637	1.904	5	1.54E-01	4.31E-04	6.49E-06
19.40	1.895	0.631	1.899	26	2.94E-02	3.75E-04	1.08E-06
38.92	1.881	0.619	1.888	15	5.04E-02	3.77E-04	1.86E-06
77.87	1.856	0.597	1.869	30	2.47E-02	3.37E-04	8.15E-07
176.83	1.813	0.560	1.834	13	5.49E-02	2.31E-04	1.24E-06
38.92	1.830	0.575	1.821				
9.56	1.850	0.592	1.840				
4.78	1.856	0.597	1.853				
9.51	1.854	0.595	1.855	5	1.46E-01	2.33E-04	3.34E-06
19.37	1.848	0.590	1.851	36	2.02E-02	3.14E-04	6.22E-07
38.88	1.839	0.582	1.844	39	1.85E-02	2.42E-04	4.39E-07
77.92	1.827	0.572	1.833	142	5.02E-03	1.62E-04	7.94E-08
177.86	1.806	0.554	1.816	13	5.38E-02	1.13E-04	5.96E-07
311.83	1.772	0.525	1.789	19	3.57E-02	1.32E-04	4.61E-07
622.95	1.711	0.472	1.741	32	2.01E-02	1.03E-04	2.03E-07
1244.98	1.646	0.416	1.679	60	9.95E-03	5.49E-05	5.36E-08
2489.57	1.580	0.359	1.613	39	1.41E-02	2.79E-05	3.87E-08
1244.98	1.590	0.368	1.585				
311.83	1.624	0.397	1.607				
177.86	1.639	0.410	1.631				
77.88	1.662	0.430	1.651				
19.40	1.701	0.464	1.682				
4.72	1.732	0.490	1.717				

Note:

**Specimen loaded horizontally**

k calculated using cv based on t<sub>90</sub> values.

## SAMPLE DIMENSIONS AND PROPERTIES - FINAL

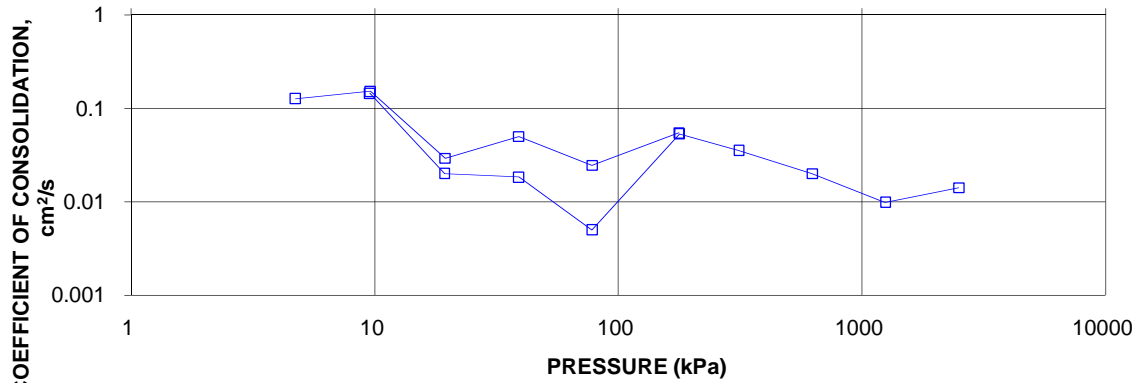
Sample Height, cm	1.73	Unit Weight, kN/m <sup>3</sup>	21.46
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	18.03
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	54.51	Solids Height, cm	1.162
Water Content, %	19.00	Volume of Solids, cm <sup>3</sup>	36.57
Wet Mass, g	119.25	Volume of Voids, cm <sup>3</sup>	17.93
Dry Mass, g	100.21		



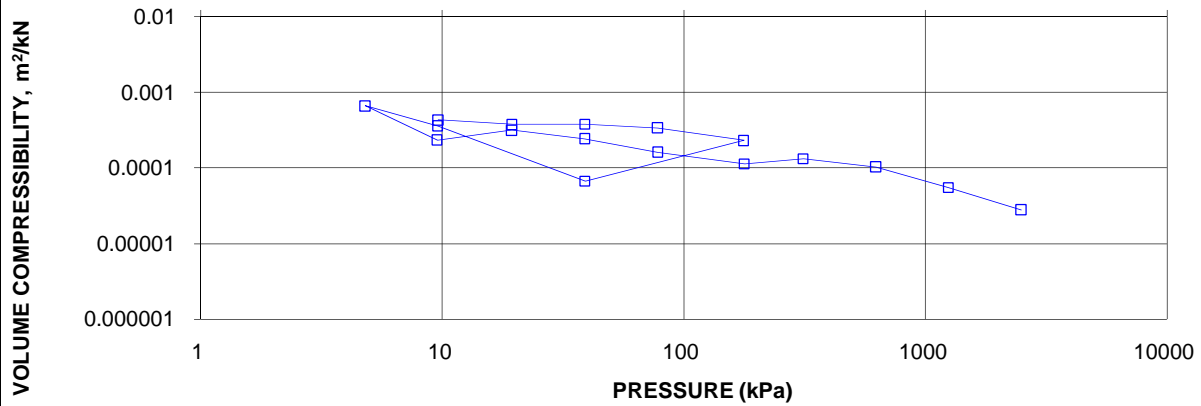
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 154 SA 12 OED B

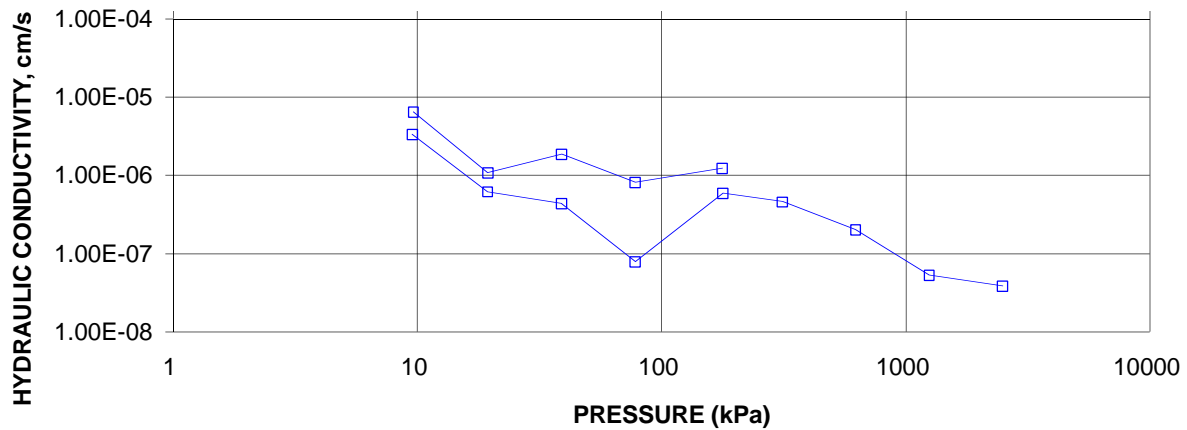
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 154 SA 12 (Horizontally Loaded)

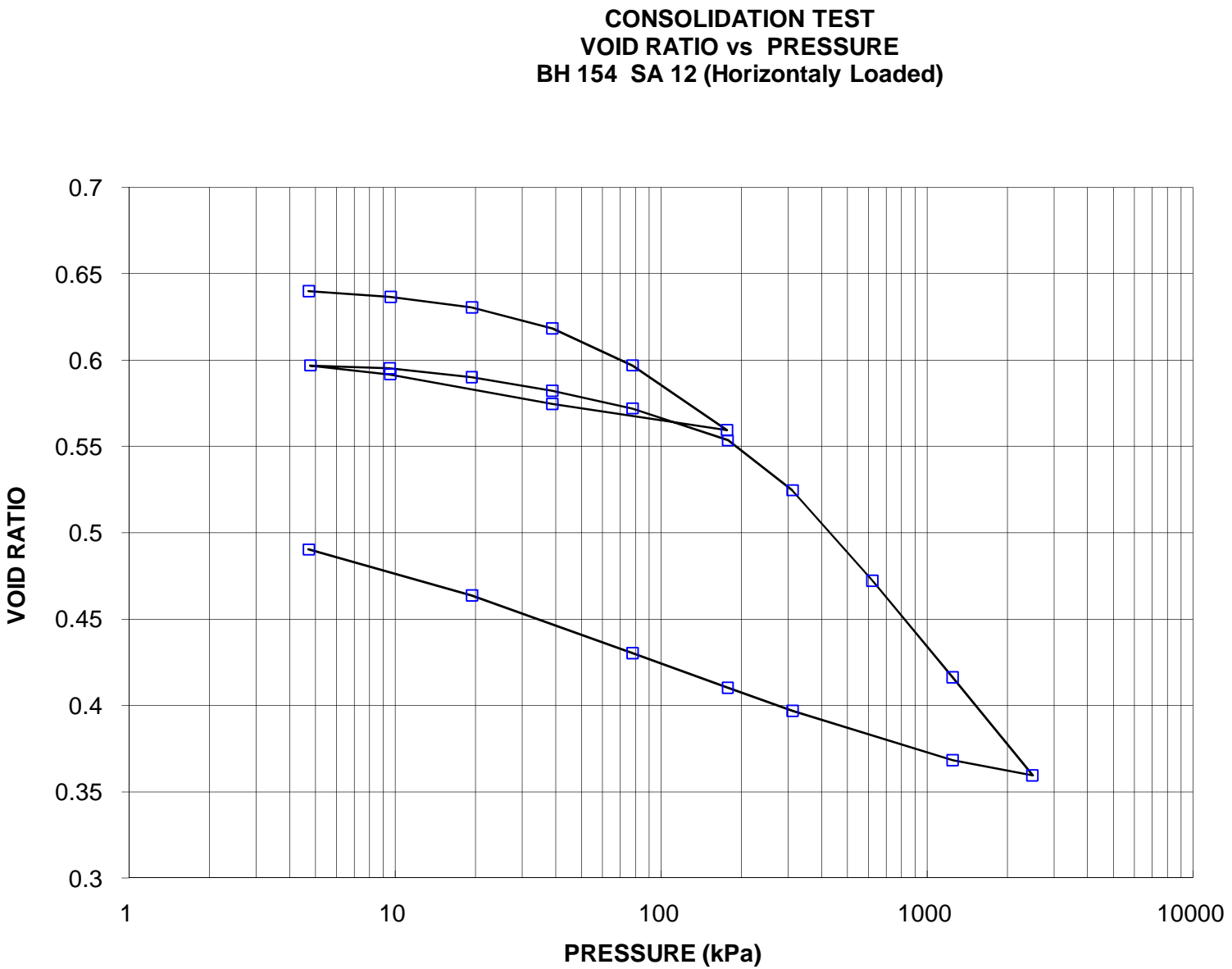


**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 154 SA 12 (Horizontally Loaded)



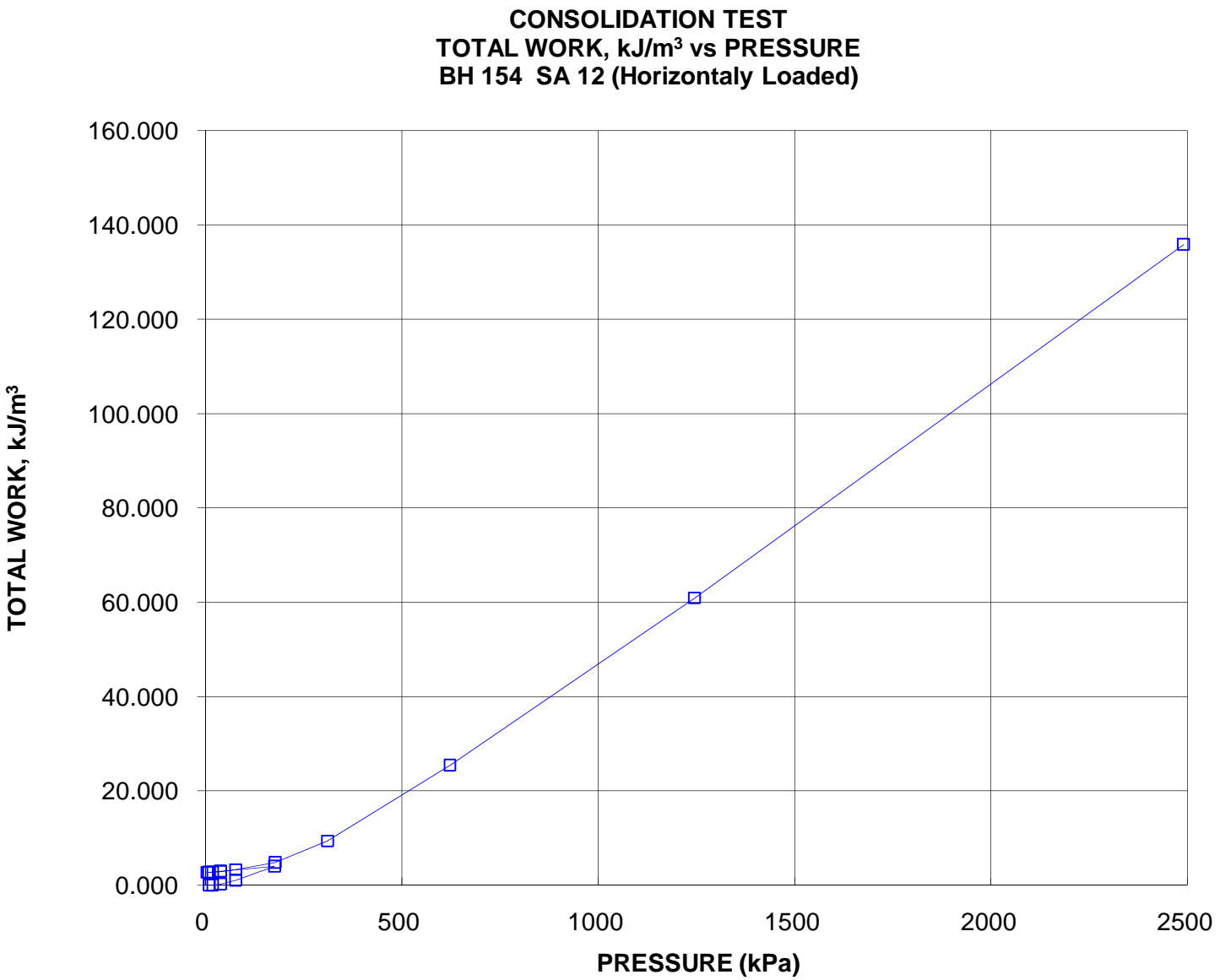
**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 154 SA 12 (Horizontally Loaded)





**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 154 SA 12 OED D**



Project No. 07-1130-2070

Prepared By: LFG

**Golder Associates**

Checked By: MM

**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 158 SA 4A OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	4A
Borehole Number	158	Sample Depth, m	3.1-3.5

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	9		
Date Started	10/08/2008		
Date Completed	10/20/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	19.70
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	15.81
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	59.89	Solids Height, cm	1.116
Water Content, %	24.61	Volume of Solids, cm <sup>3</sup>	35.11
Wet Mass, g	120.32	Volume of Voids, cm <sup>3</sup>	24.77
Dry Mass, g	96.56	Degree of Saturation, %	95.9

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.903	0.706	1.903				
4.72	1.903	0.706	1.903	2	3.84E-01	2.76E-17	1.04E-18
9.61	1.908	0.710	1.906	17	4.53E-02	-5.37E-04	-2.38E-06
19.62	1.902	0.705	1.905	32	2.40E-02	3.15E-04	7.42E-07
38.92	1.891	0.695	1.897	821	9.29E-04	2.99E-04	2.73E-08
77.92	1.875	0.680	1.883	46	1.63E-02	2.16E-04	3.45E-07
155.55	1.853	0.661	1.864	54	1.36E-02	1.49E-04	1.99E-07
311.12	1.824	0.635	1.838	155	4.62E-03	9.83E-05	4.45E-08
622.22	1.774	0.590	1.799	271	2.53E-03	8.43E-05	2.09E-08
1245.19	1.703	0.526	1.739	287	2.23E-03	5.99E-05	1.31E-08
2490.02	1.626	0.457	1.664	46	1.28E-02	3.25E-05	4.07E-08
1245.19	1.638	0.468	1.632				
311.12	1.682	0.508	1.660				
77.92	1.732	0.552	1.707				
19.62	1.766	0.583	1.749				

Note:

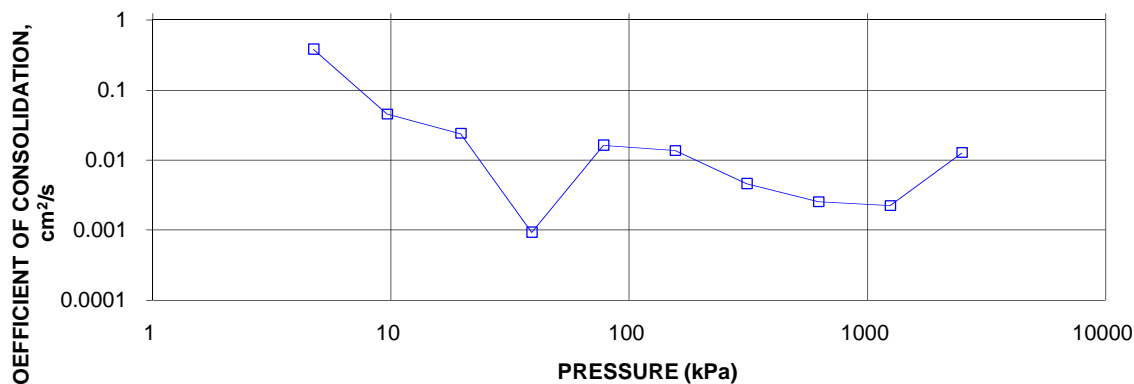
k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	1.77	Unit Weight, kN/m <sup>3</sup>	20.87
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	17.04
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	55.58	Solids Height, cm	1.116
Water Content, %	22.49	Volume of Solids, cm <sup>3</sup>	35.11
Wet Mass, g	118.28	Volume of Voids, cm <sup>3</sup>	20.46
Dry Mass, g	96.56		

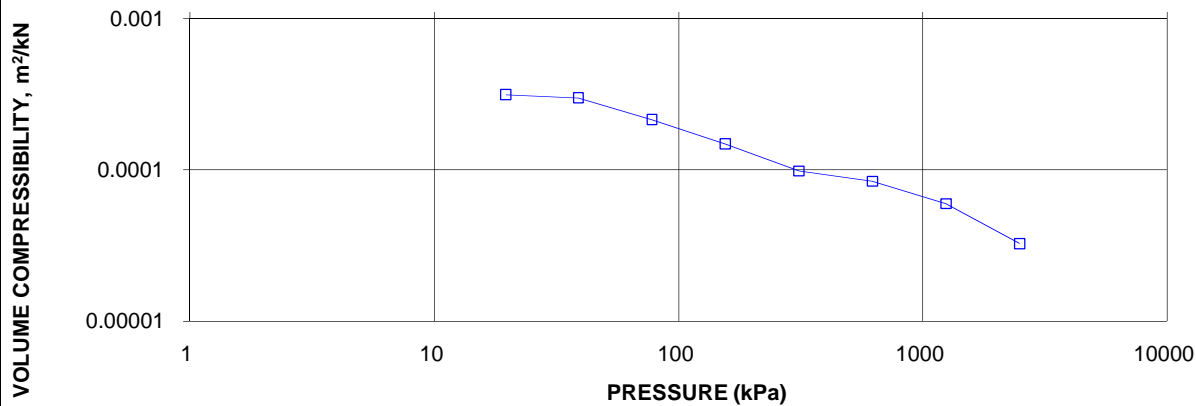
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 158 SA 4A OED B

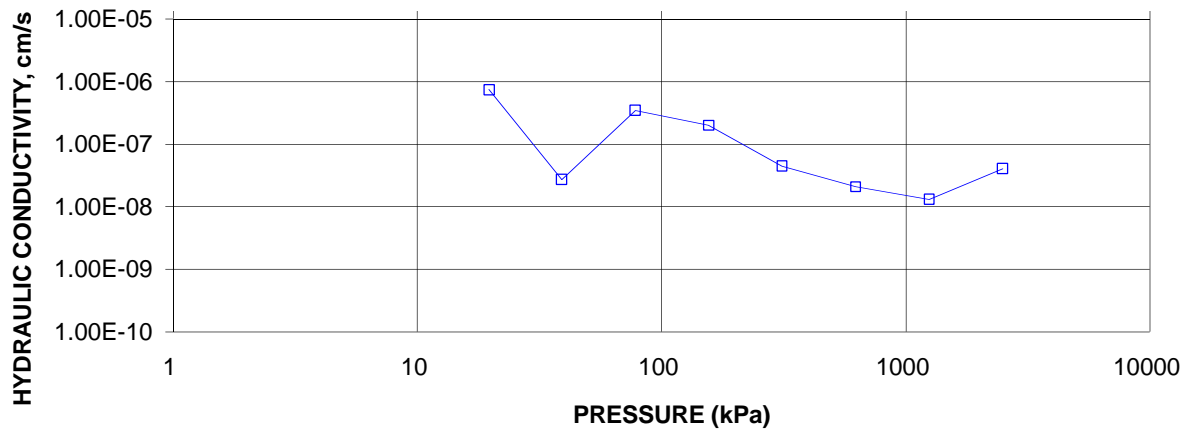
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 158 SA 4A



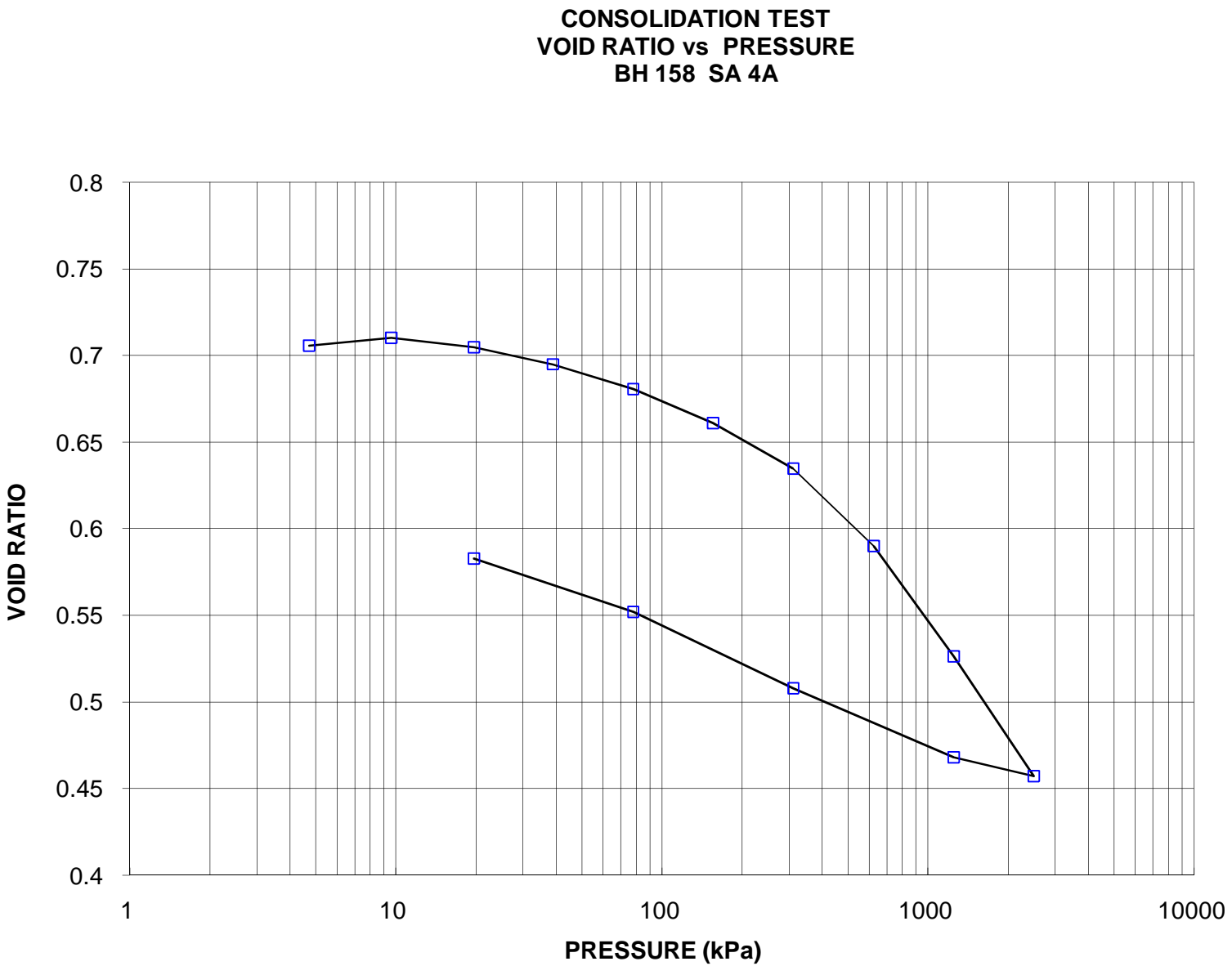
**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 158 SA 4A



**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 158 SA 4A

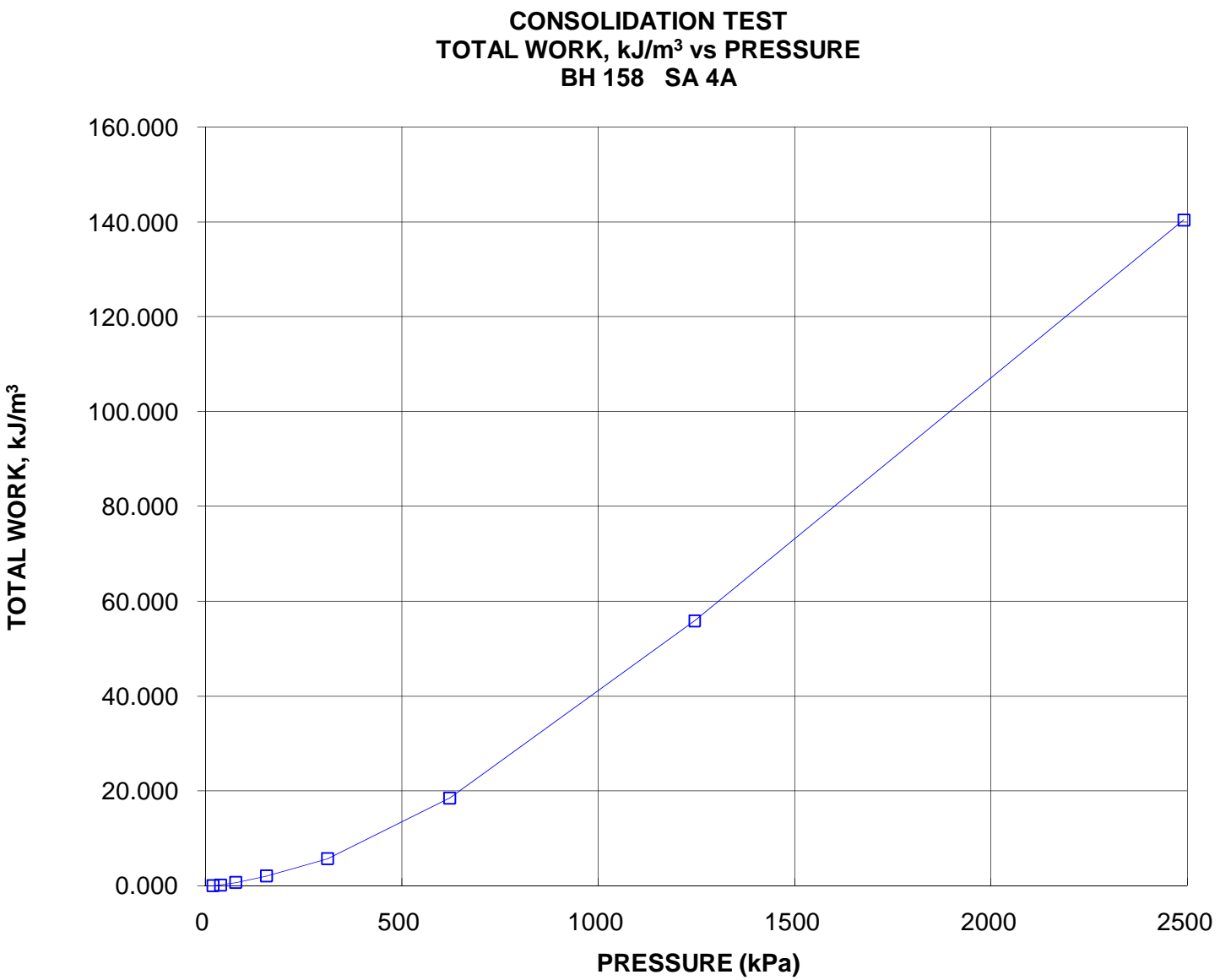






**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 158 SA 4A OED D**



Project No. 07-1130-2070

Prepared By: LFG

**Golder Associates**

Checked By: MM

**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 158 SA 4A OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	4A
Borehole Number	158	Sample Depth, m	3.1-3.5

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	12		
Date Started	11/12/2008		
Date Completed	12/04/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	2.55	Unit Weight, kN/m <sup>3</sup>	19.67
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	15.78
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	80.25	Solids Height, cm	1.492
Water Content, %	24.61	Volume of Solids, cm <sup>3</sup>	46.96
Wet Mass, g	160.93	Volume of Voids, cm <sup>3</sup>	33.28
Dry Mass, g	129.15	Degree of Saturation, %	95.5

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.550	0.709	2.550				
4.88	2.553	0.711	2.551	1	1.38E+00	-2.17E-04	-2.93E-05
9.61	2.552	0.710	2.552	1	1.38E+00	5.80E-05	7.85E-06
19.37	2.548	0.707	2.550	4	3.45E-01	1.61E-04	5.43E-06
51.00	2.531	0.696	2.540	17	8.04E-02	2.11E-04	1.66E-06
19.37	2.542	0.704	2.537				
4.88	2.563	0.717	2.552				
9.59	2.557	0.713	2.560	6	2.31E-01	5.08E-04	1.15E-05
19.62	2.553	0.710	2.555	14	9.88E-02	1.60E-04	1.55E-06
51.00	2.528	0.694	2.540	20	6.84E-02	3.06E-04	2.05E-06
77.92	2.520	0.689	2.524	27	5.00E-02	1.12E-04	5.50E-07
155.55	2.492	0.670	2.506	28	4.75E-02	1.45E-04	6.78E-07
311.18	2.437	0.633	2.464	15	8.58E-02	1.38E-04	1.16E-06
622.30	2.374	0.591	2.406	6	2.04E-01	7.88E-05	1.58E-06
1243.13	2.289	0.534	2.331	32	3.60E-02	5.41E-05	1.91E-07
2487.54	2.196	0.472	2.242	29	3.68E-02	2.92E-05	1.05E-07
1243.13	2.205	0.477	2.200				
622.30	2.233	0.496	2.219				
155.55	2.299	0.540	2.266				
51.00	2.349	0.574	2.324				
19.37	2.394	0.604	2.371				
4.88	2.451	0.642	2.422				

Note:

k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	2.45	Unit Weight, kN/m <sup>3</sup>	20.48
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	16.42
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	77.12	Solids Height, cm	1.492
Water Content, %	24.70	Volume of Solids, cm <sup>3</sup>	46.96
Wet Mass, g	161.05	Volume of Voids, cm <sup>3</sup>	30.16
Dry Mass, g	129.15		

Prepared By: LFG

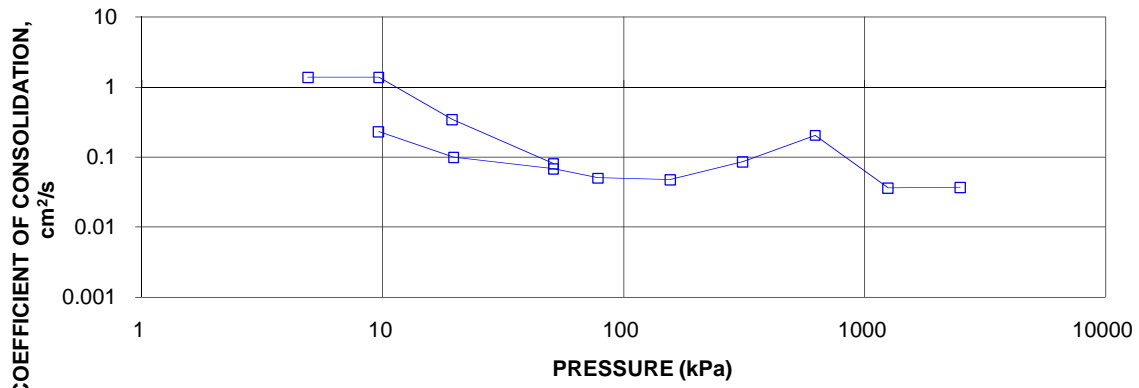
**Golder Associates**

Checked By: MM

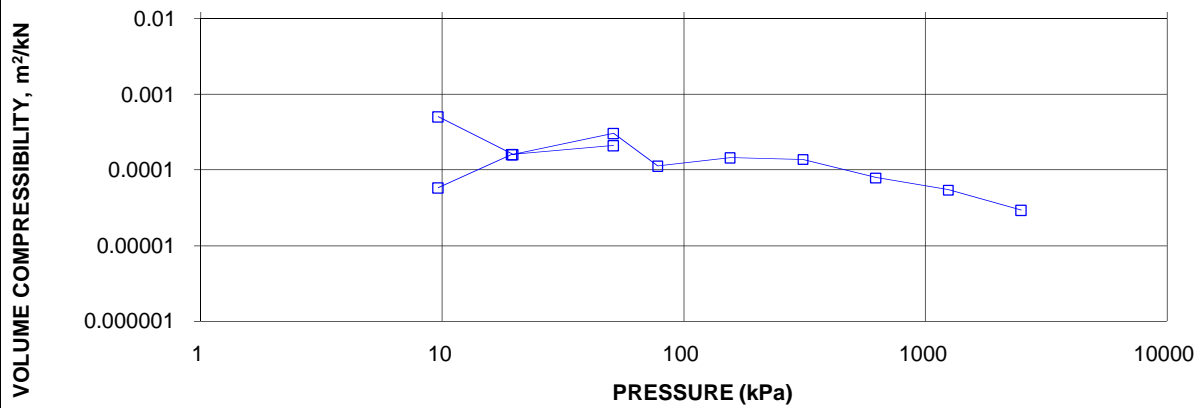
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 158 SA 4A OED B

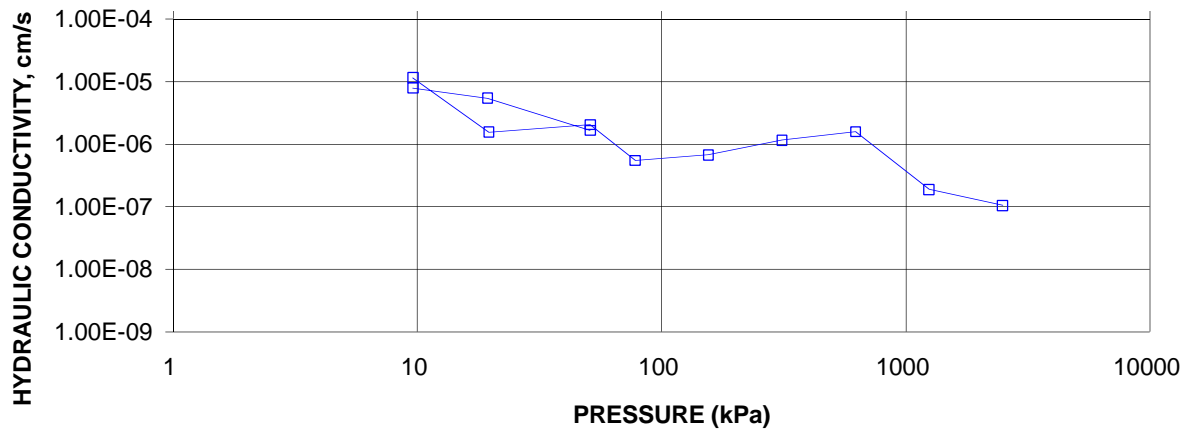
CONSOLIDATION TEST  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 158 SA 4A

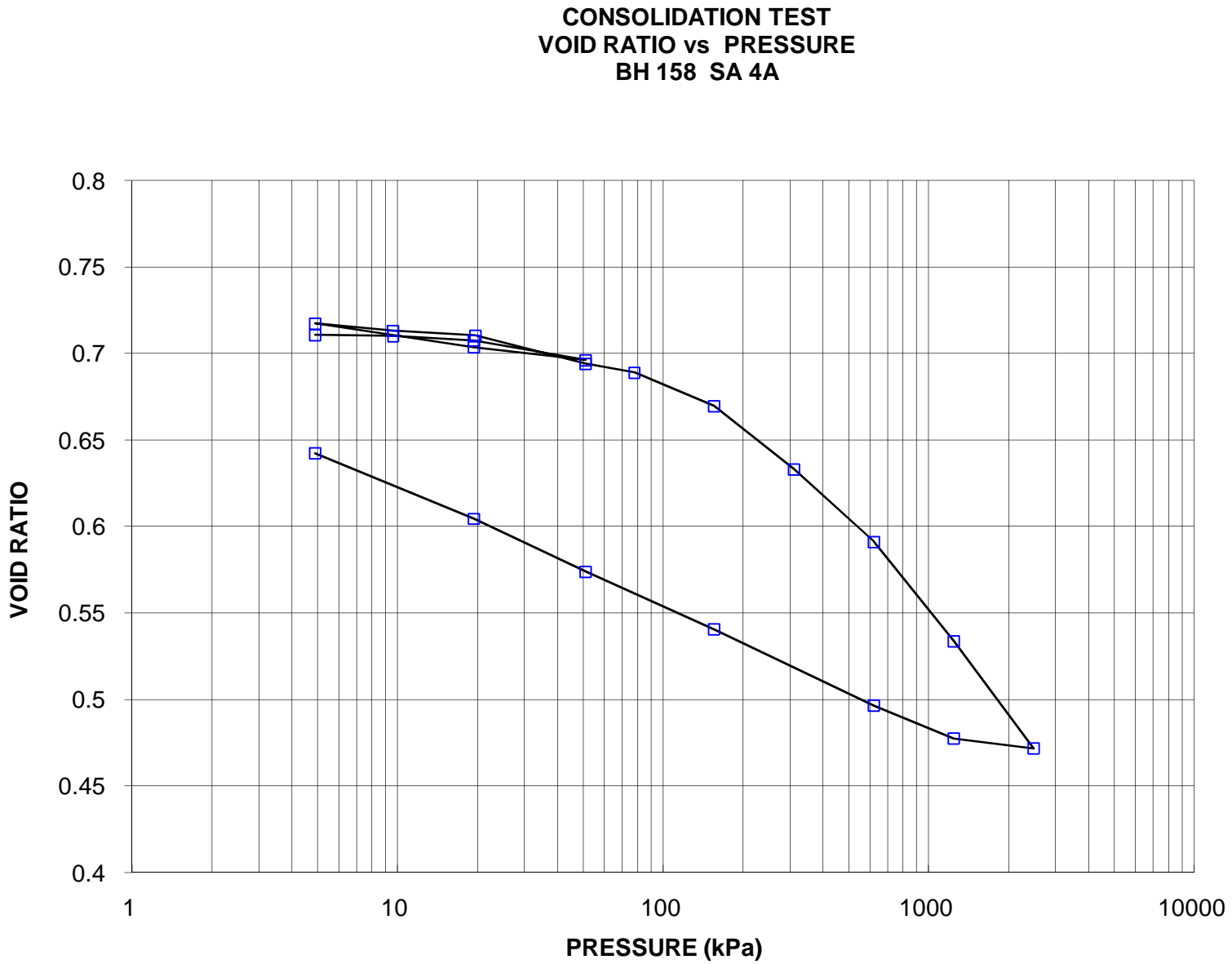


CONSOLIDATION TEST  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 158 SA 4A



CONSOLIDATION TEST  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 158 SA 4A

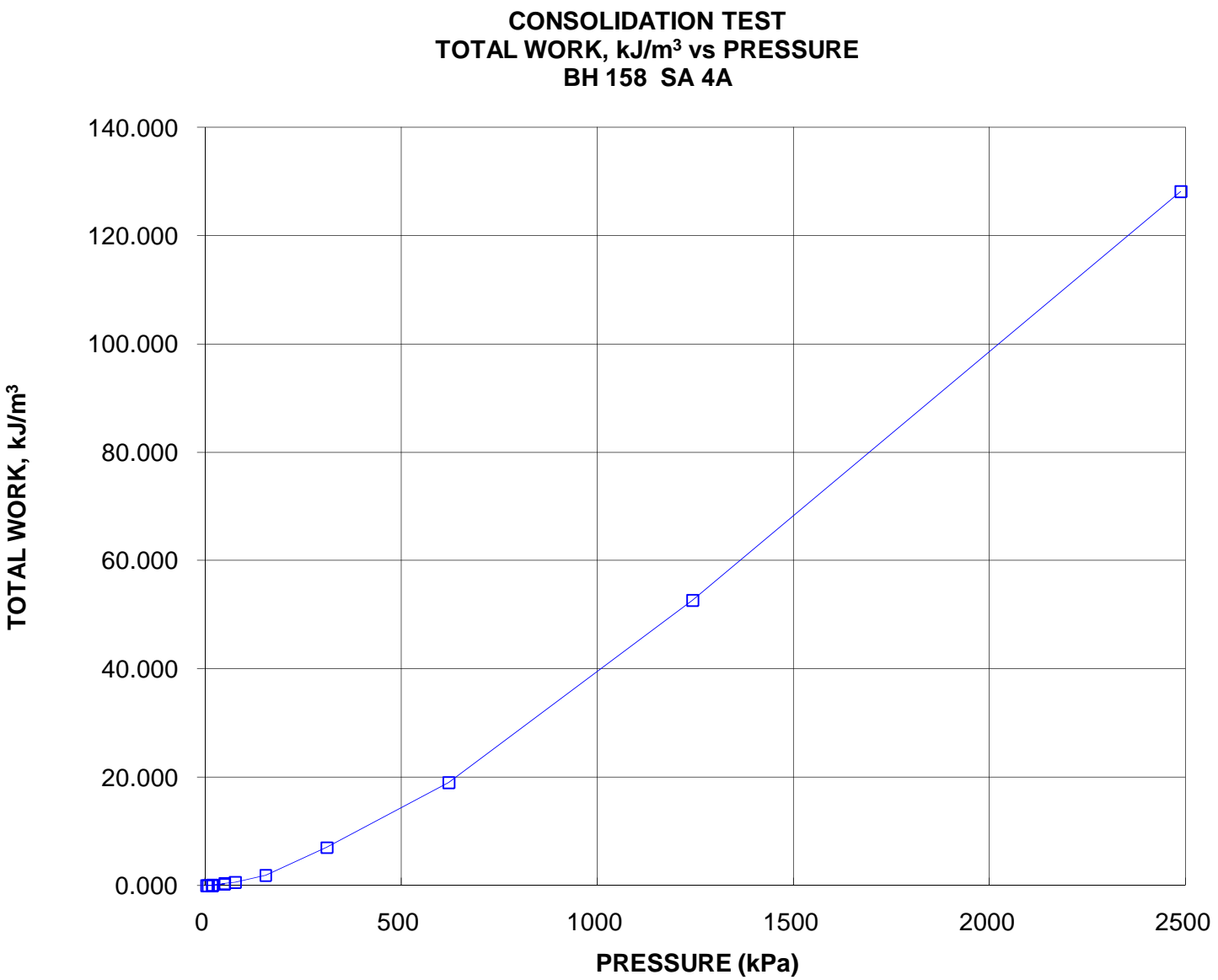






**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 158 SA 4A OED D**



**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 158 SA 8 OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	8
Borehole Number	158	Sample Depth, m	6.9-7.3

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	12		
Date Started	09/05/2008		
Date Completed	09/25/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	2.55	Unit Weight, kN/m <sup>3</sup>	19.47
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	15.20
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	80.25	Solids Height, cm	1.443
Water Content, %	28.05	Volume of Solids, cm <sup>3</sup>	45.41
Wet Mass, g	159.32	Volume of Voids, cm <sup>3</sup>	34.84
Dry Mass, g	124.42	Degree of Saturation, %	100.2

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.550	0.767	2.550				
4.88	2.551	0.768	2.551	7	1.97E-01	-8.04E-05	-1.55E-06
9.56	2.550	0.767	2.550	25	5.52E-02	1.17E-04	6.34E-07
19.23	2.543	0.762	2.546	32	4.30E-02	2.68E-04	1.13E-06
38.92	2.532	0.755	2.538	41	3.33E-02	2.19E-04	7.15E-07
77.88	2.507	0.737	2.520	46	2.93E-02	2.52E-04	7.21E-07
92.00	2.502	0.734	2.505	76	1.75E-02	1.39E-04	2.38E-07
38.88	2.512	0.741	2.507				
9.56	2.526	0.751	2.519				
38.93	2.518	0.745	2.522	21	6.42E-02	1.07E-04	6.72E-07
92.00	2.503	0.735	2.511	75	1.78E-02	1.11E-04	1.94E-07
155.66	2.483	0.721	2.493	76	1.73E-02	1.23E-04	2.09E-07
311.35	2.431	0.685	2.457	86	1.49E-02	1.31E-04	1.91E-07
622.32	2.335	0.618	2.383	315	3.82E-03	1.21E-04	4.53E-08
1242.91	2.220	0.539	2.278	240	4.58E-03	7.27E-05	3.26E-08
2487.76	2.108	0.461	2.164	89	1.12E-02	3.53E-05	3.86E-08
1242.91	2.119	0.469	2.114				
311.35	2.164	0.500	2.142				
92.00	2.217	0.536	2.191				
38.93	2.255	0.563	2.236				
4.88	2.338	0.620	2.297				

Note:

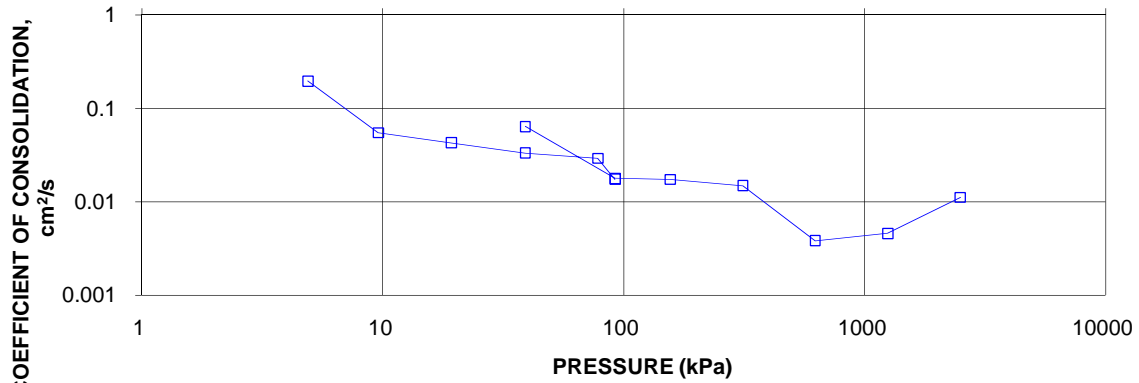
k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	2.34	Unit Weight, kN/m <sup>3</sup>	20.56
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	16.58
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	73.58	Solids Height, cm	1.443
Water Content, %	24.00	Volume of Solids, cm <sup>3</sup>	45.41
Wet Mass, g	154.28	Volume of Voids, cm <sup>3</sup>	28.17
Dry Mass, g	124.42		

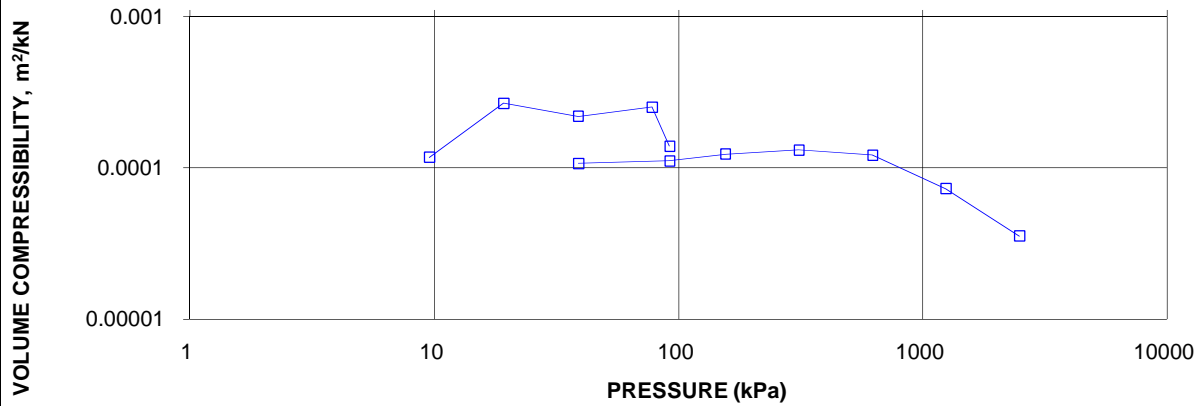
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 158 SA 8 OED B

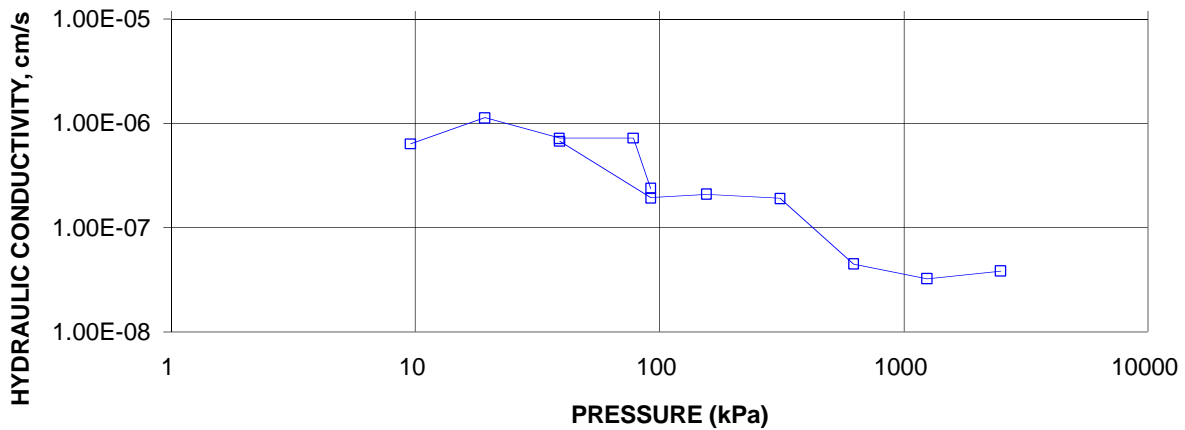
**CONSOLIDATION TEST**  
**CV cm<sup>2</sup>/s VS PRESSURE (kPa)**  
**BH 158 SA 8**

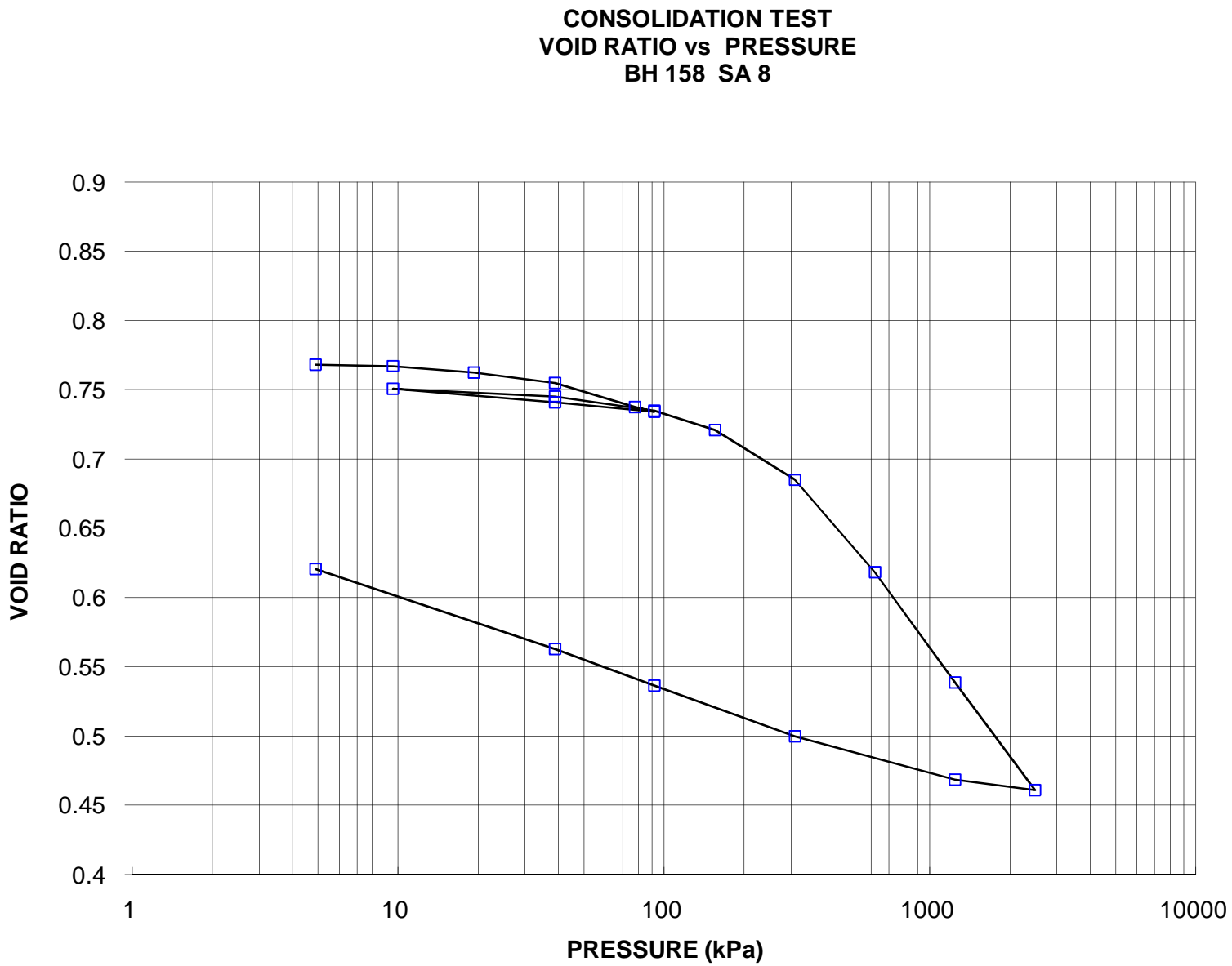


**CONSOLIDATION TEST**  
**MV m<sup>2</sup>/kN vs PRESSURE (kPa)**  
**BH 158 SA 8**



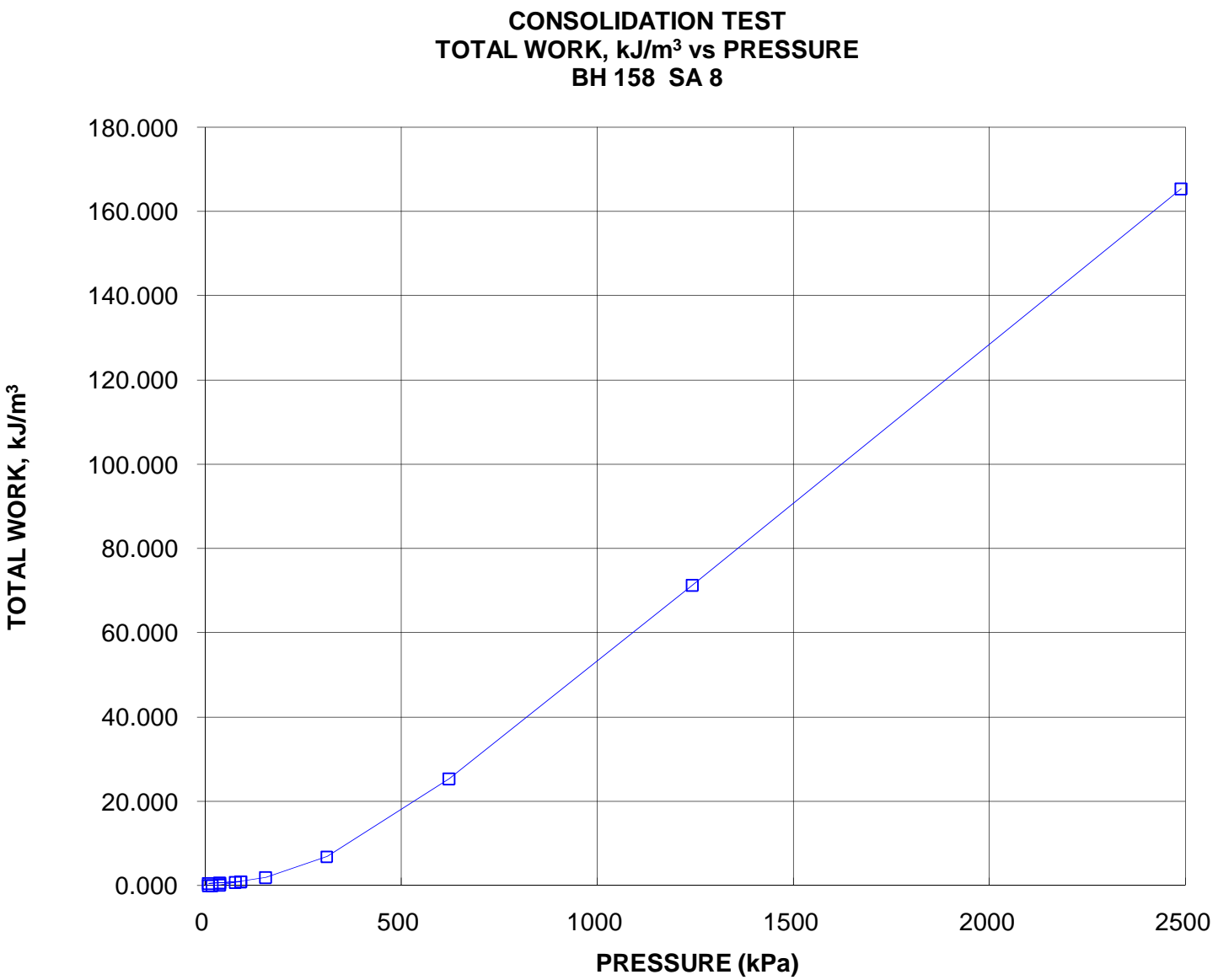
**CONSOLIDATION TEST**  
**HYDRAULIC CONDUCTIVITY vs PRESSURE**  
**BH 158 SA 8**





**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 158 SA 8 OED D**





**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 158 SA 10 OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	10
Borehole Number	158	Sample Depth, m	9.9-10.4

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	10		
Date Started	09/16/2008		
Date Completed	10/25/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	2.54	Unit Weight, kN/m <sup>3</sup>	19.48
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	15.25
Area, cm <sup>2</sup>	31.62	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	80.34	Solids Height, cm	1.442
Water Content, %	27.71	Volume of Solids, cm <sup>3</sup>	45.60
Wet Mass, g	159.57	Volume of Voids, cm <sup>3</sup>	34.74
Dry Mass, g	124.95	Degree of Saturation, %	99.6

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.541	0.762	2.541				
4.70	2.540	0.761	2.541	7	1.95E-01	8.37E-05	1.60E-06
9.55	2.538	0.760	2.539	2	6.83E-01	1.62E-04	1.09E-05
19.44	2.531	0.755	2.535	32	4.26E-02	2.79E-04	1.16E-06
38.74	2.516	0.745	2.524	82	1.65E-02	3.06E-04	4.93E-07
77.55	2.491	0.727	2.504	12	1.11E-01	2.54E-04	2.75E-06
121.15	2.471	0.713	2.481	60	2.17E-02	1.81E-04	3.85E-07
77.55	2.474	0.715	2.473				
19.44	2.491	0.727	2.483				
4.76	2.507	0.738	2.499				
19.44	2.501	0.734	2.504	37	3.59E-02	1.61E-04	5.66E-07
38.70	2.492	0.728	2.497	240	5.51E-03	1.84E-04	9.92E-08
77.02	2.479	0.719	2.486	270	4.85E-03	1.34E-04	6.35E-08
121.15	2.467	0.711	2.473	240	5.40E-03	1.07E-04	5.67E-08
155.03	2.455	0.702	2.461	240	5.35E-03	1.39E-04	7.31E-08
309.93	2.399	0.663	2.427	217	5.75E-03	1.42E-04	8.02E-08
619.44	2.303	0.597	2.351	409	2.86E-03	1.22E-04	3.43E-08
1239.14	2.198	0.524	2.251	480	2.24E-03	6.67E-05	1.46E-08
2472.75	2.096	0.453	2.147	151	6.47E-03	3.25E-05	2.06E-08
1239.14	2.104	0.459	2.100				
309.93	2.143	0.486	2.124				
121.15	2.181	0.512	2.162				
38.74	2.230	0.546	2.206				
4.70	2.306	0.599	2.268				

Note:

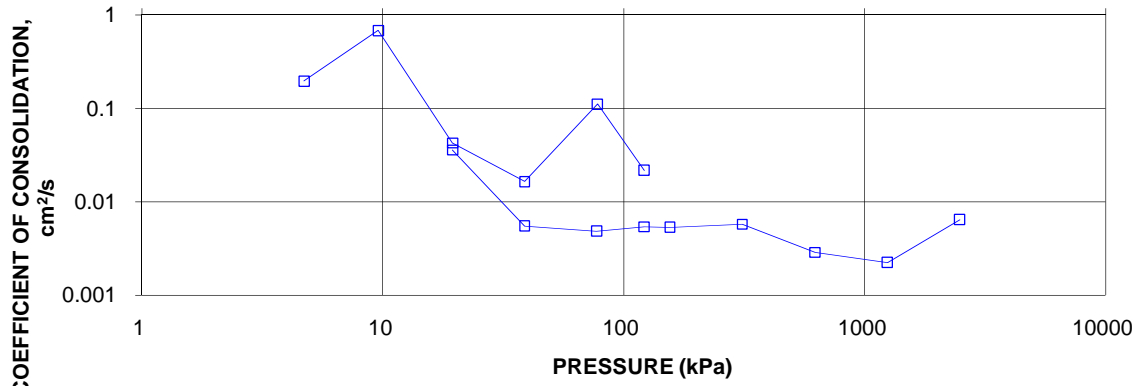
k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	2.31	Unit Weight, kN/m <sup>3</sup>	20.67
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	16.81
Area, cm <sup>2</sup>	31.62	Specific Gravity, measured	2.74
Volume, cm <sup>3</sup>	72.91	Solids Height, cm	1.442
Water Content, %	22.98	Volume of Solids, cm <sup>3</sup>	45.60
Wet Mass, g	153.66	Volume of Voids, cm <sup>3</sup>	27.31
Dry Mass, g	124.95		

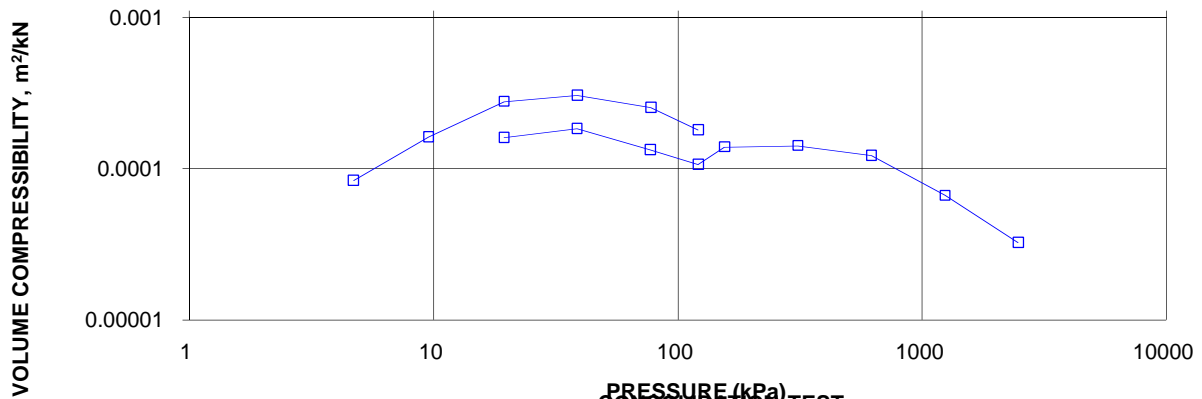
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 158 SA 10 OED B

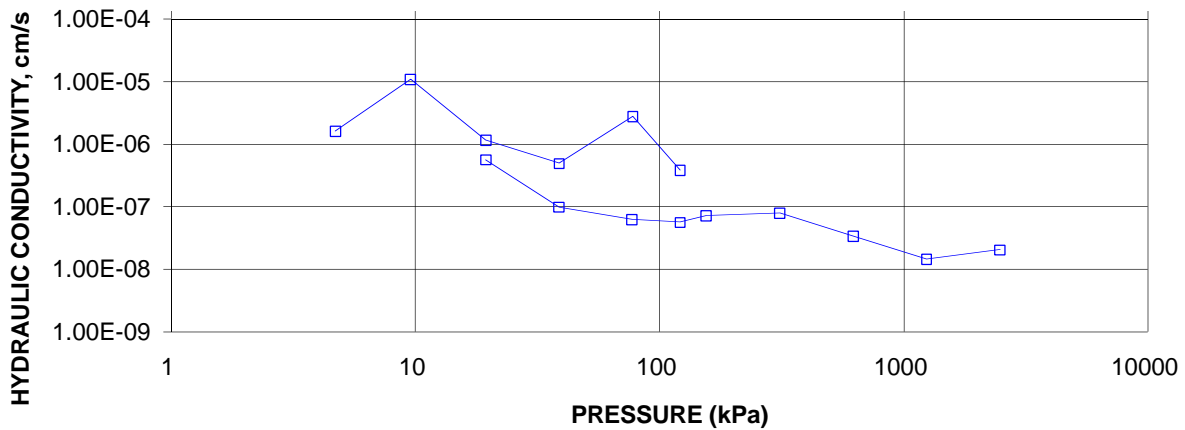
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 158 SA 10

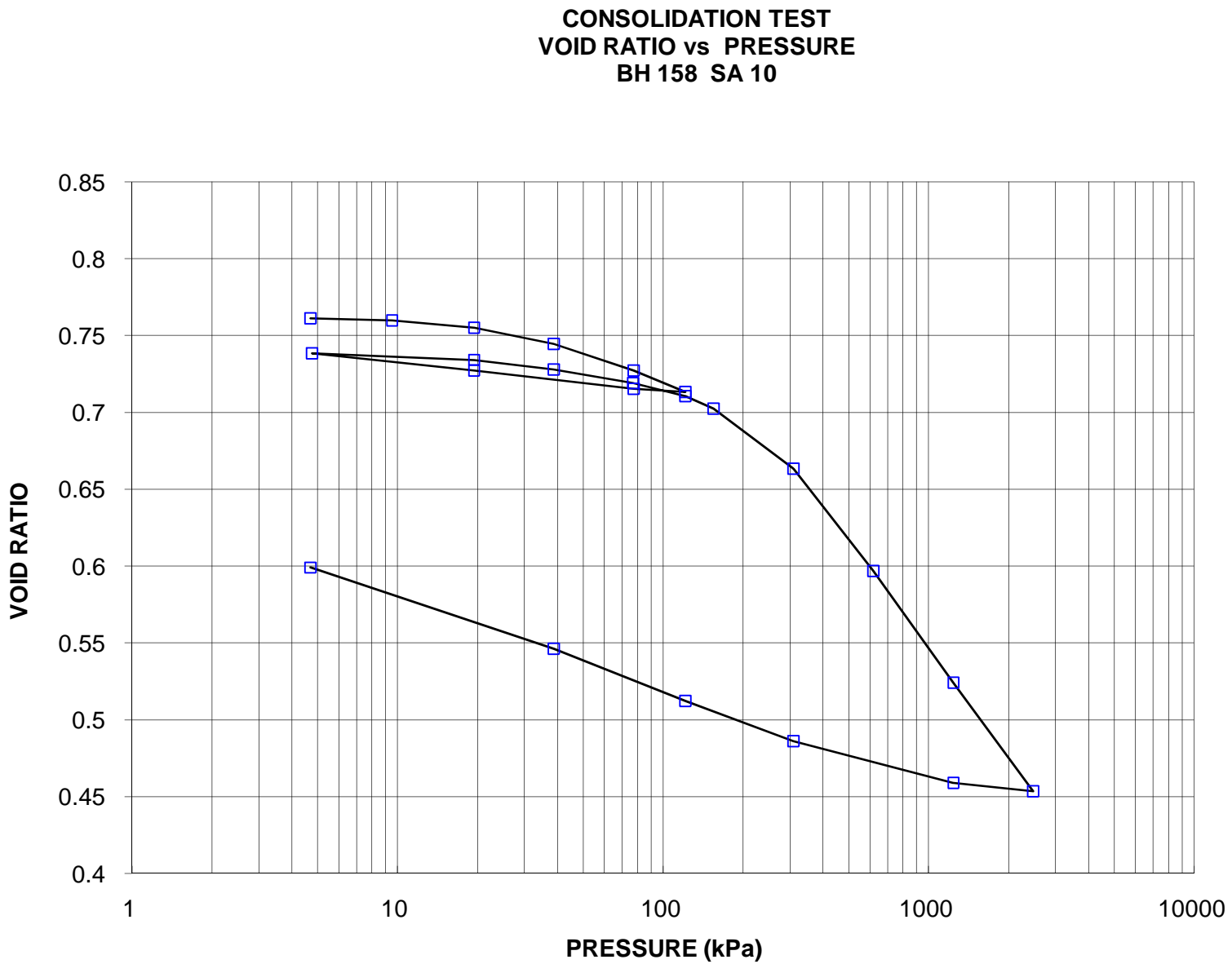


**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 158 SA 10



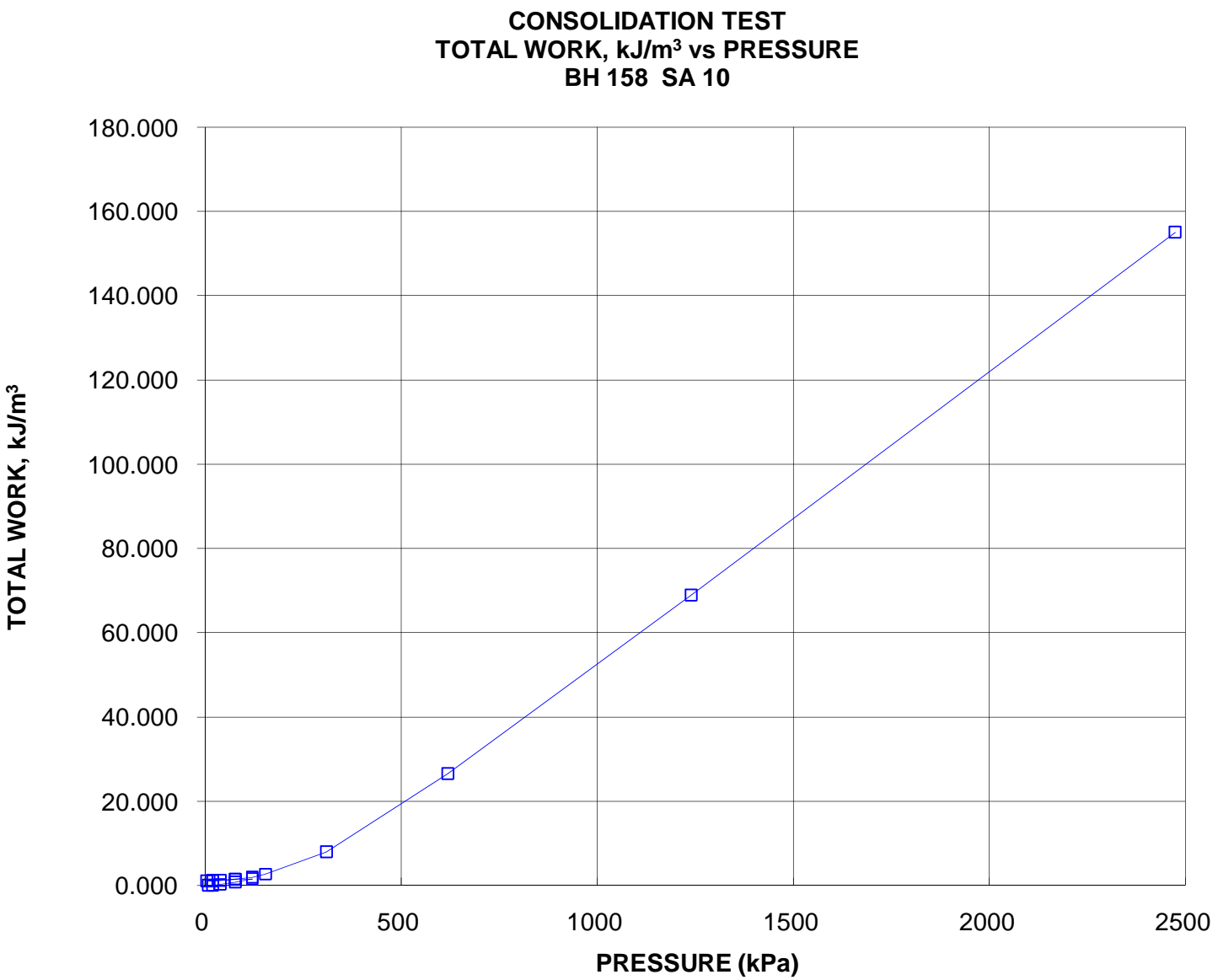
**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 158 SA 10





**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 158 SA 10 OED D**



# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 158 SA 14 OED A

## SAMPLE IDENTIFICATION

Project Number	07-1130-2070	Sample Number	14
Borehole Number	158	Sample Depth, m	16.0-16.5

## TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	12		
Date Started	10/20/2008		
Date Completed	11/14/2008		

## SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	2.55	Unit Weight, kN/m <sup>3</sup>	18.60
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	13.98
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	80.25	Solids Height, cm	1.322
Water Content, %	33.10	Volume of Solids, cm <sup>3</sup>	41.59
Wet Mass, g	152.23	Volume of Voids, cm <sup>3</sup>	38.66
Dry Mass, g	114.37	Degree of Saturation, %	97.9

## TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.550	0.930	2.550				
4.85	2.545	0.926	2.547	20	6.88E-02	4.12E-04	2.78E-06
9.59	2.534	0.917	2.539	43	3.18E-02	9.35E-04	2.91E-06
19.37	2.506	0.896	2.520	76	1.77E-02	1.13E-03	1.96E-06
38.88	2.460	0.861	2.483	2594	5.04E-04	9.19E-04	4.53E-08
77.81	2.399	0.816	2.430	1283	9.75E-04	6.09E-04	5.83E-08
159.04	2.323	0.758	2.361	146	8.10E-03	3.67E-04	2.91E-07
190.15	2.303	0.743	2.313	360	3.15E-03	2.56E-04	7.90E-08
78.01	2.312	0.749	2.307				
19.62	2.337	0.769	2.325				
4.72	2.365	0.789	2.351				
9.56	2.358	0.784	2.361	154	7.67E-03	5.75E-04	4.33E-07
19.62	2.354	0.781	2.356	386	3.05E-03	1.60E-04	4.77E-08
38.93	2.340	0.771	2.347	540	2.16E-03	2.78E-04	5.89E-08
77.87	2.325	0.760	2.333	240	4.81E-03	1.46E-04	6.88E-08
155.63	2.305	0.744	2.315	290	3.92E-03	1.05E-04	4.03E-08
190.00	2.293	0.735	2.299	195	5.74E-03	1.37E-04	7.71E-08
311.38	2.237	0.693	2.265	462	2.35E-03	1.80E-04	4.15E-08
623.01	2.148	0.626	2.193	112	9.10E-03	1.11E-04	9.93E-08
1245.06	2.055	0.555	2.101	49	1.91E-02	5.91E-05	1.11E-07
2488.59	1.961	0.484	2.008	46	1.86E-02	2.95E-05	5.37E-08
1245.06	1.965	0.487	1.963				
311.38	2.017	0.526	1.991				
190.15	2.037	0.541	2.027				
77.87	2.069	0.565	2.053				
19.37	2.124	0.607	2.096				
4.85	2.172	0.643	2.148				

Note:

k calculated using cv based on t<sub>90</sub> values.

## SAMPLE DIMENSIONS AND PROPERTIES - FINAL

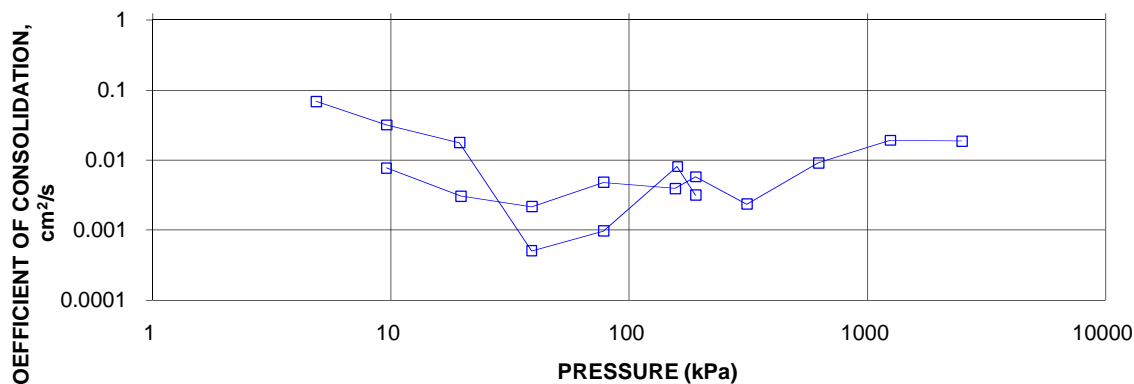
Sample Height, cm	2.30	Unit Weight, kN/m <sup>3</sup>	19.16
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	15.47
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	72.52	Solids Height, cm	1.322
Water Content, %	23.90	Volume of Solids, cm <sup>3</sup>	41.59
Wet Mass, g	141.71	Volume of Voids, cm <sup>3</sup>	30.93
Dry Mass, g	114.37		



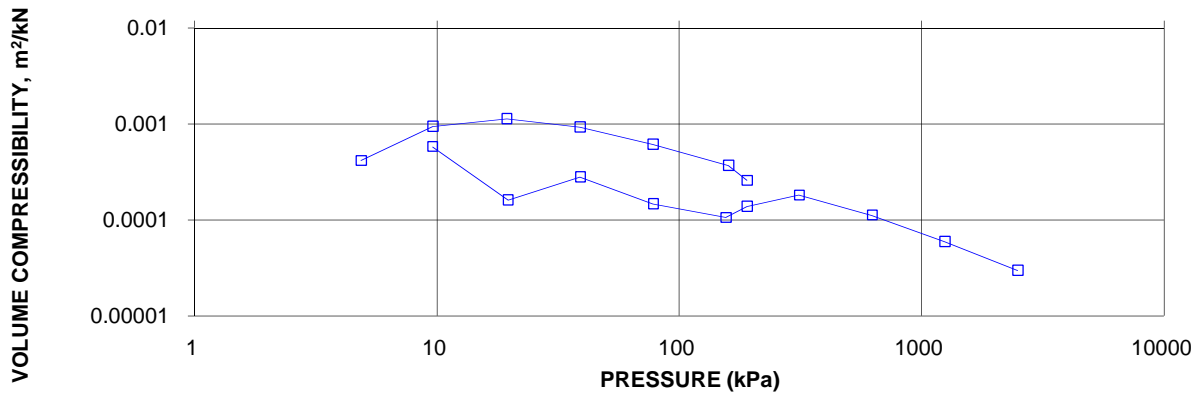
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 158 SA 14 OED B

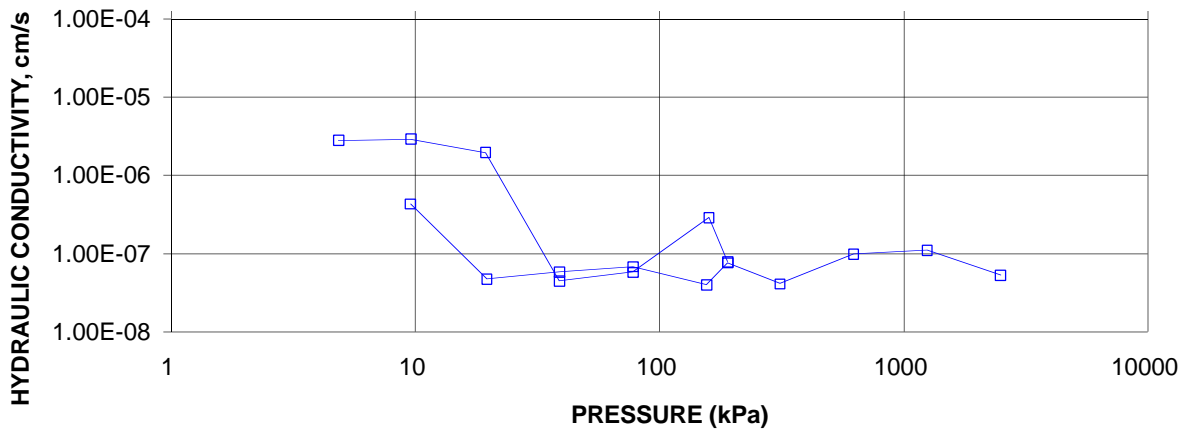
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 158 SA 14

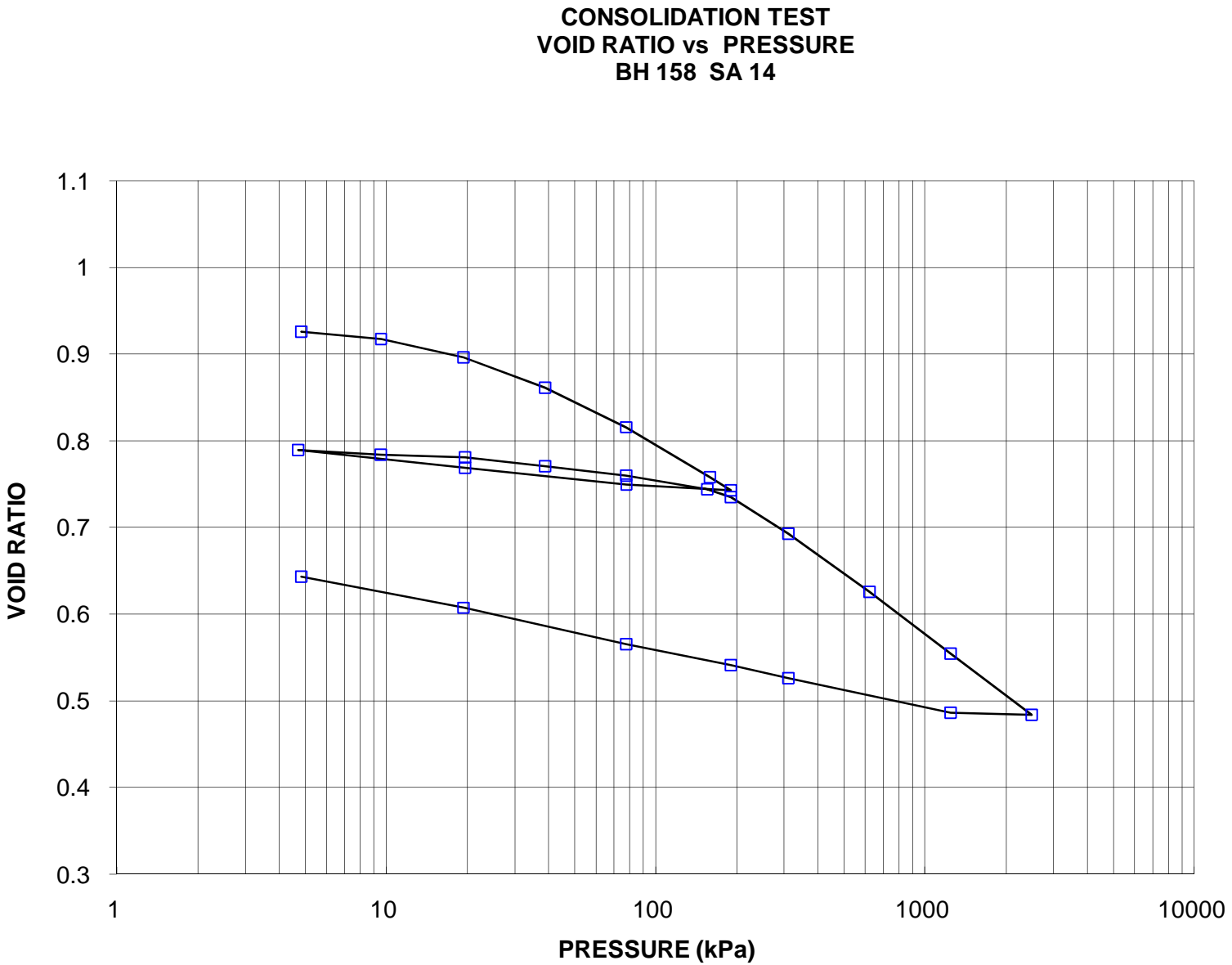


**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 158 SA 14



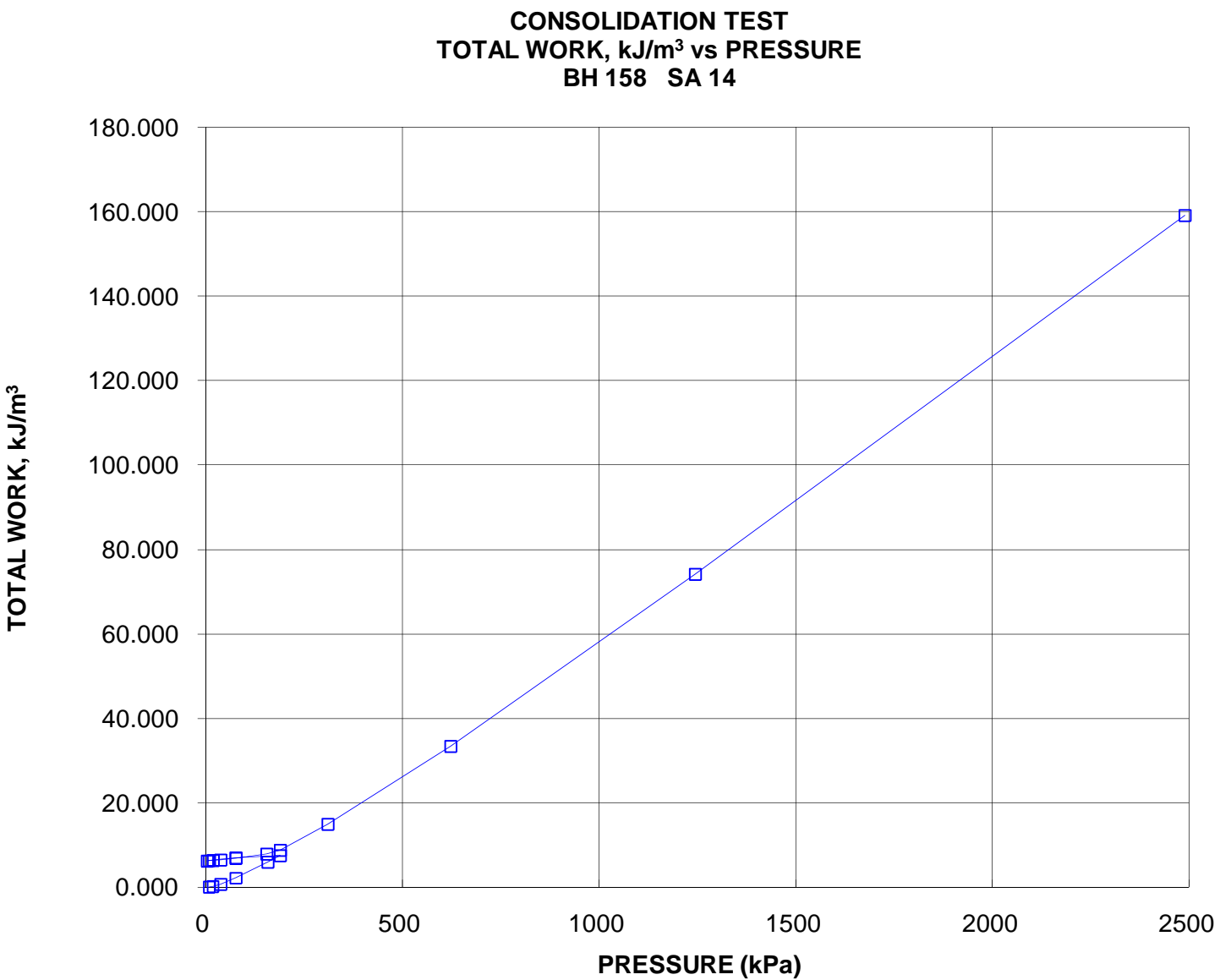
**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 158 SA 14





**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 158 SA 14 OED D**



# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 160 SA 8 OED A

## SAMPLE IDENTIFICATION

Project Number	07-1130-2070	Sample Number	8
Borehole Number	160	Sample Depth, m	6.1-6.7

## TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	12		
Date Started	09/22/2008		
Date Completed	10/10/2008		

## SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	2.55	Unit Weight, kN/m <sup>3</sup>	19.17
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	14.86
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	80.25	Solids Height, cm	1.400
Water Content, %	29.08	Volume of Solids, cm <sup>3</sup>	44.04
Wet Mass, g	156.91	Volume of Voids, cm <sup>3</sup>	36.21
Dry Mass, g	121.56	Degree of Saturation, %	97.6

## TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.550	0.822	2.550				
4.72	2.542	0.816	2.546	12	1.15E-01	6.65E-04	7.46E-06
9.51	2.529	0.807	2.536	21	6.49E-02	1.06E-03	6.77E-06
19.40	2.511	0.794	2.520	60	2.24E-02	7.14E-04	1.57E-06
38.92	2.486	0.776	2.499	76	1.74E-02	5.02E-04	8.57E-07
77.87	2.451	0.751	2.469	195	6.62E-03	3.52E-04	2.29E-07
157.00	2.397	0.713	2.424	240	5.19E-03	2.68E-04	1.36E-07
77.87	2.403	0.717	2.400				
19.40	2.427	0.734	2.415				
4.72	2.450	0.751	2.439				
19.40	2.441	0.744	2.446	146	8.68E-03	2.40E-04	2.05E-07
38.88	2.428	0.735	2.435	60	2.09E-02	2.62E-04	5.37E-07
78.01	2.412	0.723	2.420	240	5.17E-03	1.60E-04	8.13E-08
157.00	2.396	0.712	2.404	206	5.95E-03	7.94E-05	4.63E-08
311.24	2.322	0.659	2.359	240	4.92E-03	1.88E-04	9.06E-08
622.20	2.209	0.578	2.266	447	2.43E-03	1.43E-04	3.40E-08
1244.27	2.105	0.504	2.157	343	2.88E-03	6.56E-05	1.85E-08
2483.57	2.009	0.435	2.057	240	3.74E-03	3.04E-05	1.11E-08
622.20	2.035	0.454					
157.00	2.079	0.485					
38.92	2.134	0.525					
4.72	2.213	0.581					

Note:

k calculated using cv based on t<sub>90</sub> values.

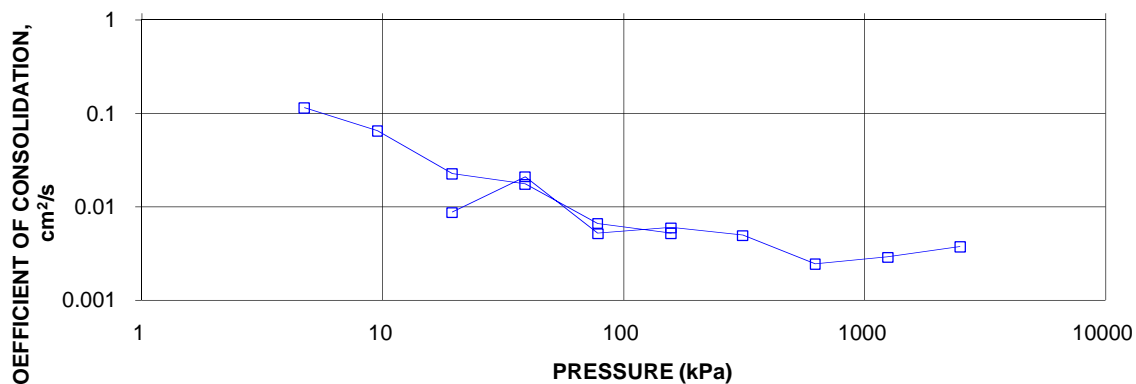
## SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	2.21	Unit Weight, kN/m <sup>3</sup>	20.84
Sample Diameter, cm	6.33	Dry Unit Weight, kN/m <sup>3</sup>	17.12
Area, cm <sup>2</sup>	31.47	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	69.64	Solids Height, cm	1.400
Water Content, %	21.75	Volume of Solids, cm <sup>3</sup>	44.04
Wet Mass, g	148.00	Volume of Voids, cm <sup>3</sup>	25.60
Dry Mass, g	121.56		

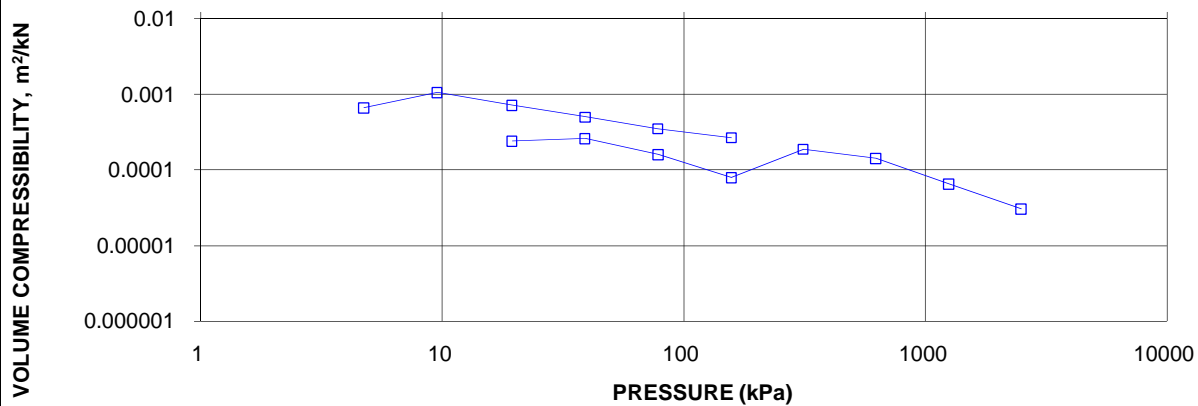
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 160 SA 8 OED B

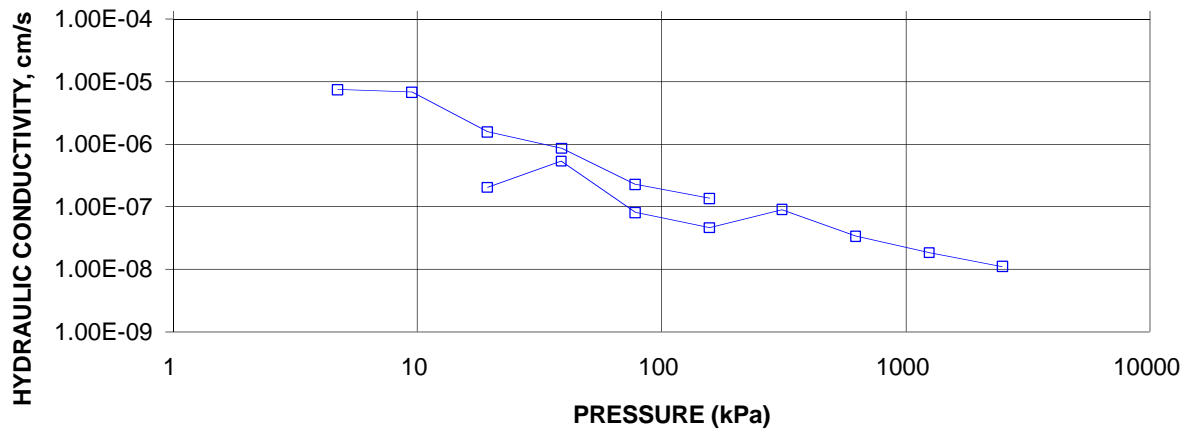
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 160 SA 8



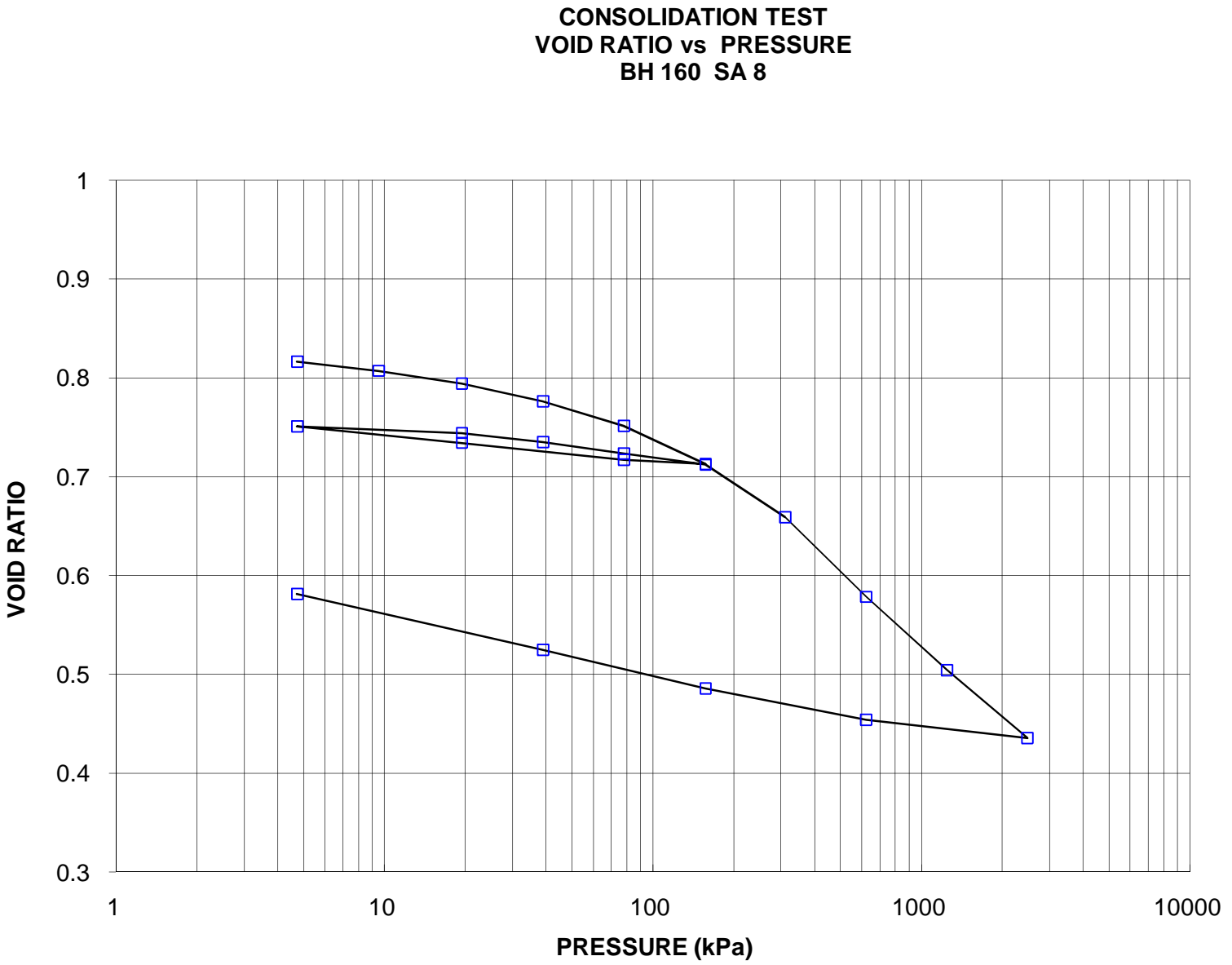
**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 160 SA 8



**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 160 SA 8

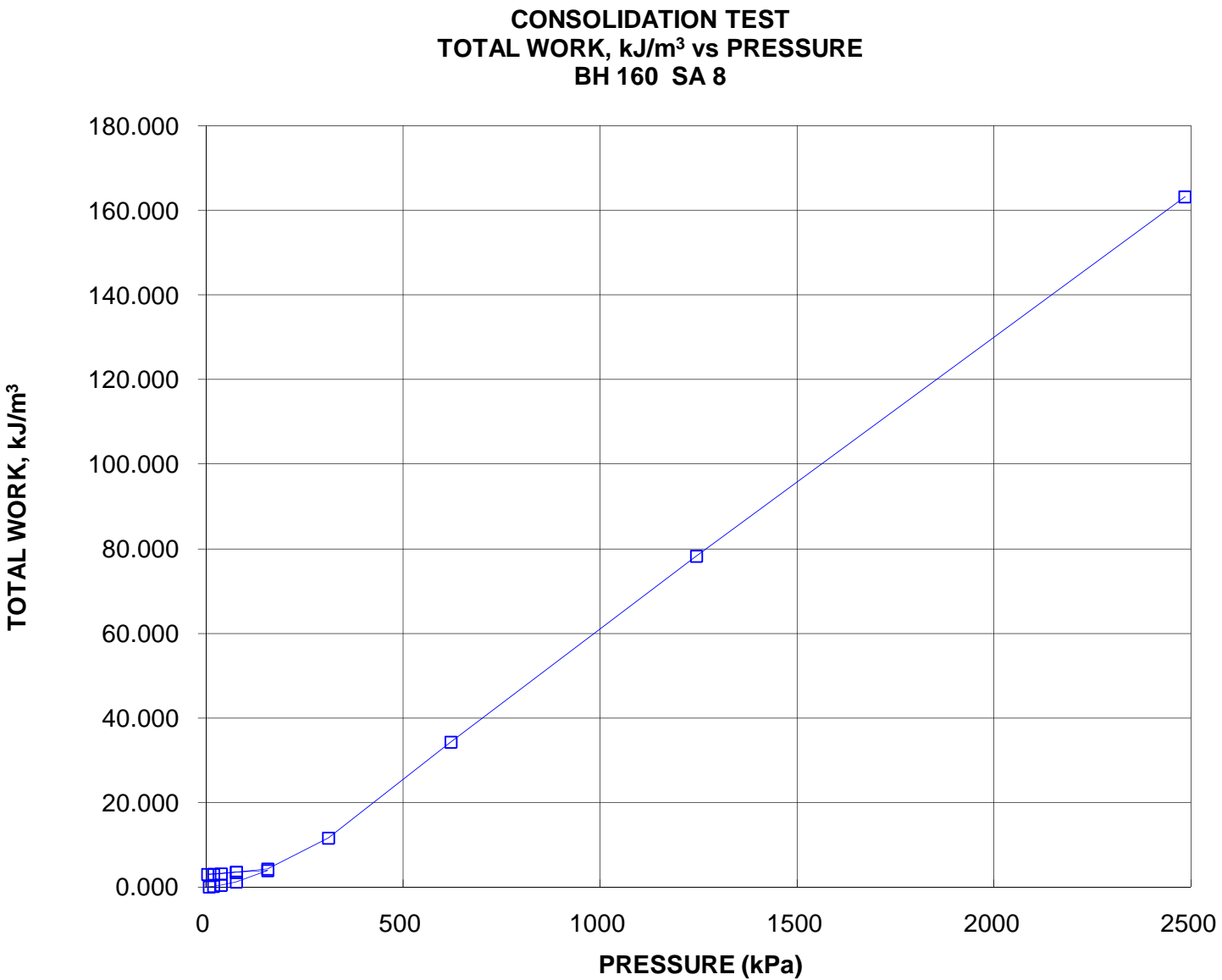






**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH160 SA 8 OED D**



# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 160 SA 8 OED A

## SAMPLE IDENTIFICATION

Project Number	07-1130-2070	Sample Number	8
Borehole Number	160	Sample Depth, m	6.1-6.7

## TEST CONDITIONS

Test Type	Standard	Load Duration, hr	24
Oedometer Number	10		
Date Started	08/12/2008		
Date Completed	08/28/2008		

## SAMPLE DIMENSIONS AND PROPERTIES - INITIAL

Sample Height, cm	2.54	Unit Weight, kN/m <sup>3</sup>	19.54
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	15.32
Area, cm <sup>2</sup>	31.62	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	80.34	Solids Height, cm	1.438
Water Content, %	27.58	Volume of Solids, cm <sup>3</sup>	45.47
Wet Mass, g	160.11	Volume of Voids, cm <sup>3</sup>	34.87
Dry Mass, g	125.5	Degree of Saturation, %	99.2

## TEST COMPUTATIONS

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.541	0.767	2.541				
4.76	2.516	0.750	2.529	21	6.45E-02	2.07E-03	1.31E-05
9.47	2.506	0.743	2.511	15	8.91E-02	8.36E-04	7.30E-06
19.52	2.487	0.729	2.497	15	8.81E-02	7.44E-04	6.42E-06
38.74	2.458	0.709	2.473	480	2.70E-03	5.94E-04	1.57E-07
77.64	2.411	0.677	2.435	185	6.79E-03	4.75E-04	3.16E-07
155.03	2.340	0.627	2.376	540	2.22E-03	3.61E-04	7.84E-08
309.64	2.250	0.565	2.295	195	5.73E-03	2.29E-04	1.29E-07
619.13	2.156	0.499	2.203	464	2.22E-03	1.20E-04	2.60E-08
1238.36	2.062	0.434	2.109	142	6.64E-03	5.97E-05	3.89E-08
2476.71	1.970	0.370	2.016	82	1.05E-02	2.92E-05	3.01E-08
1238.36	1.977	0.375	1.974				
309.64	2.010	0.398	1.994				
77.64	2.059	0.432	2.035				
19.52	2.114	0.470	2.087				
4.76	2.157	0.500	2.136				

Note:

**Specimen loaded horizontally**

k calculated using cv based on t<sub>90</sub> values.

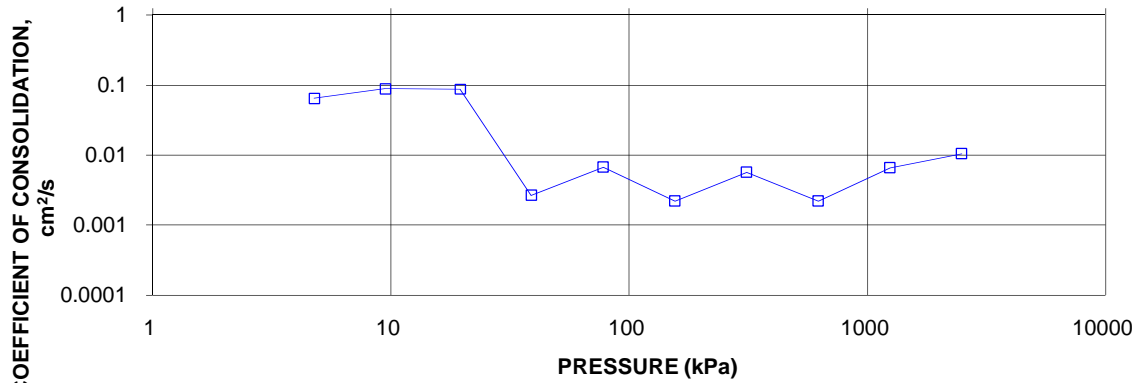
## SAMPLE DIMENSIONS AND PROPERTIES - FINAL

Sample Height, cm	2.16	Unit Weight, kN/m <sup>3</sup>	21.67
Sample Diameter, cm	6.35	Dry Unit Weight, kN/m <sup>3</sup>	18.05
Area, cm <sup>2</sup>	31.62	Specific Gravity, measured	2.76
Volume, cm <sup>3</sup>	68.20	Solids Height, cm	1.438
Water Content, %	20.10	Volume of Solids, cm <sup>3</sup>	45.47
Wet Mass, g	150.73	Volume of Voids, cm <sup>3</sup>	22.73
Dry Mass, g	125.5		

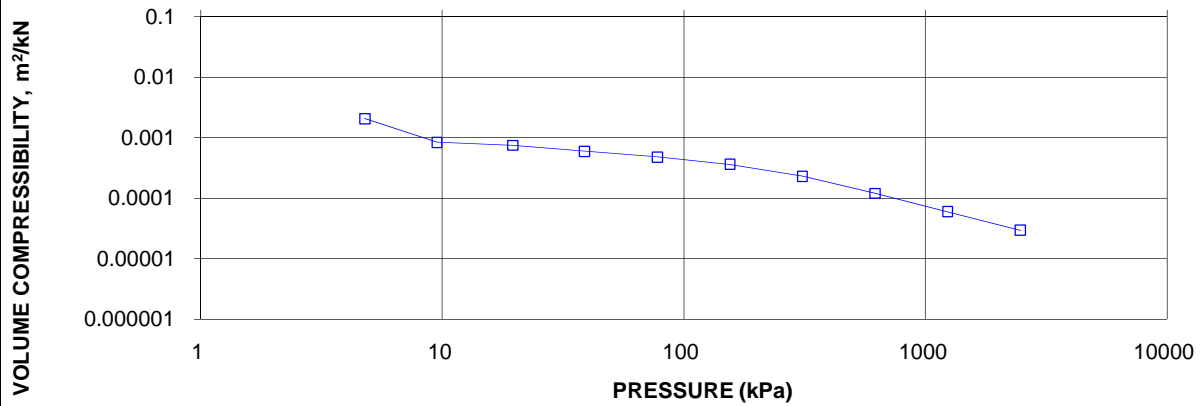
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 160 SA 8 OED B

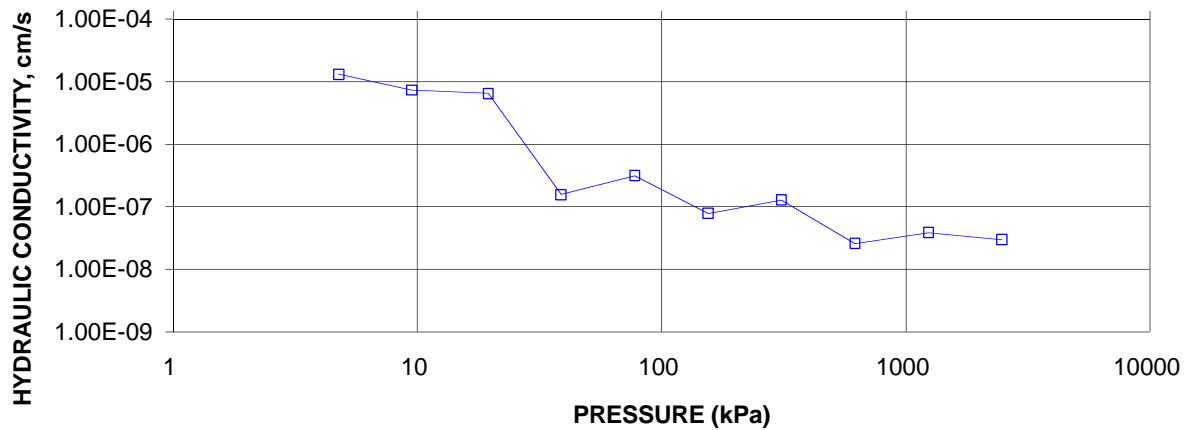
**CONSOLIDATION TEST**  
**CV cm<sup>2</sup>/s VS PRESSURE (kPa)**  
**BH 160 SA 8 (Horizontally Loaded)**

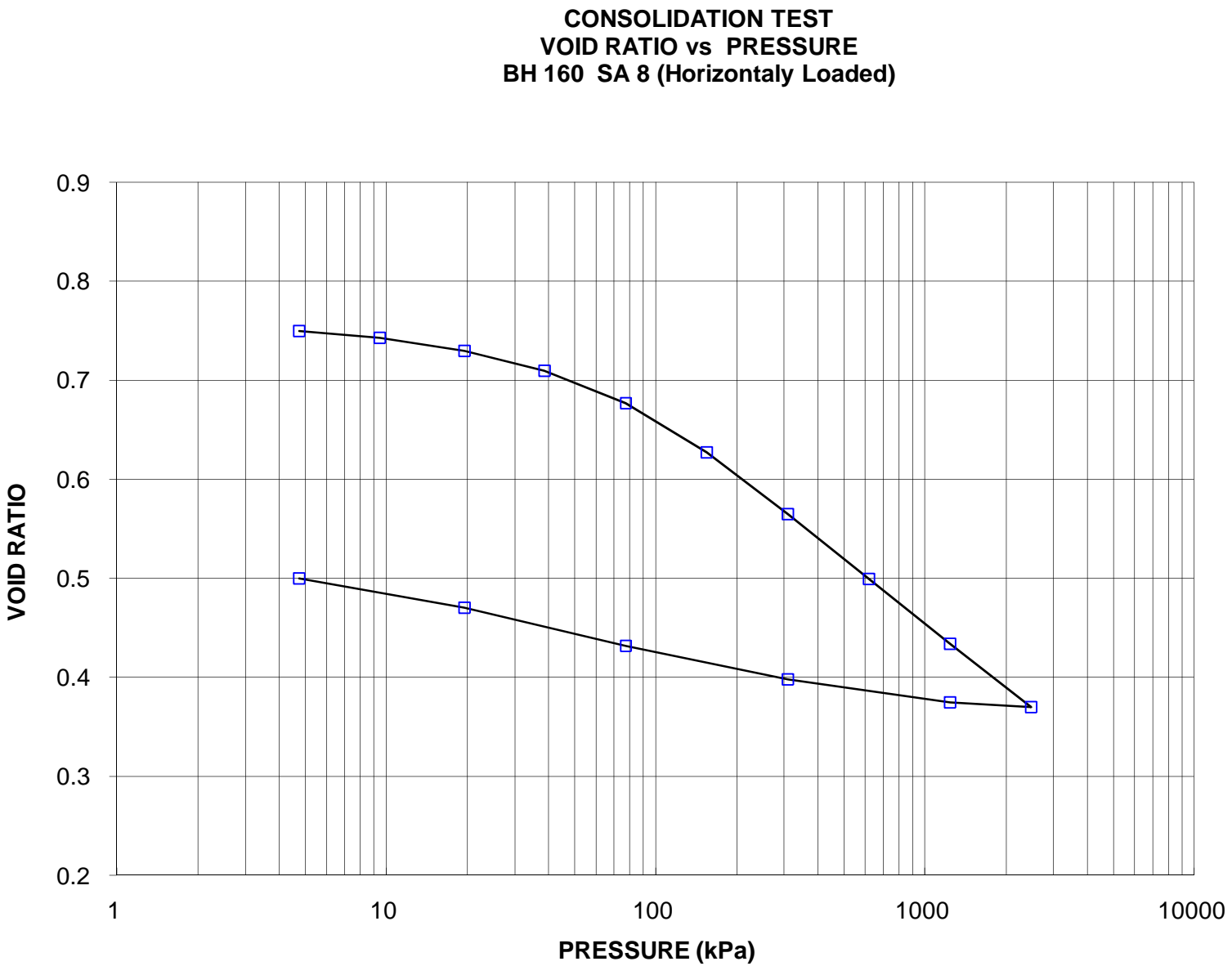


**CONSOLIDATION TEST**  
**MV m<sup>2</sup>/kN vs PRESSURE (kPa)**  
**BH 160 SA 8 (Horizontally Loaded)**



**CONSOLIDATION TEST**  
**HYDRAULIC CONDUCTIVITY vs PRESSURE**  
**BH 160 SA 8 (Horizontally Loaded)**

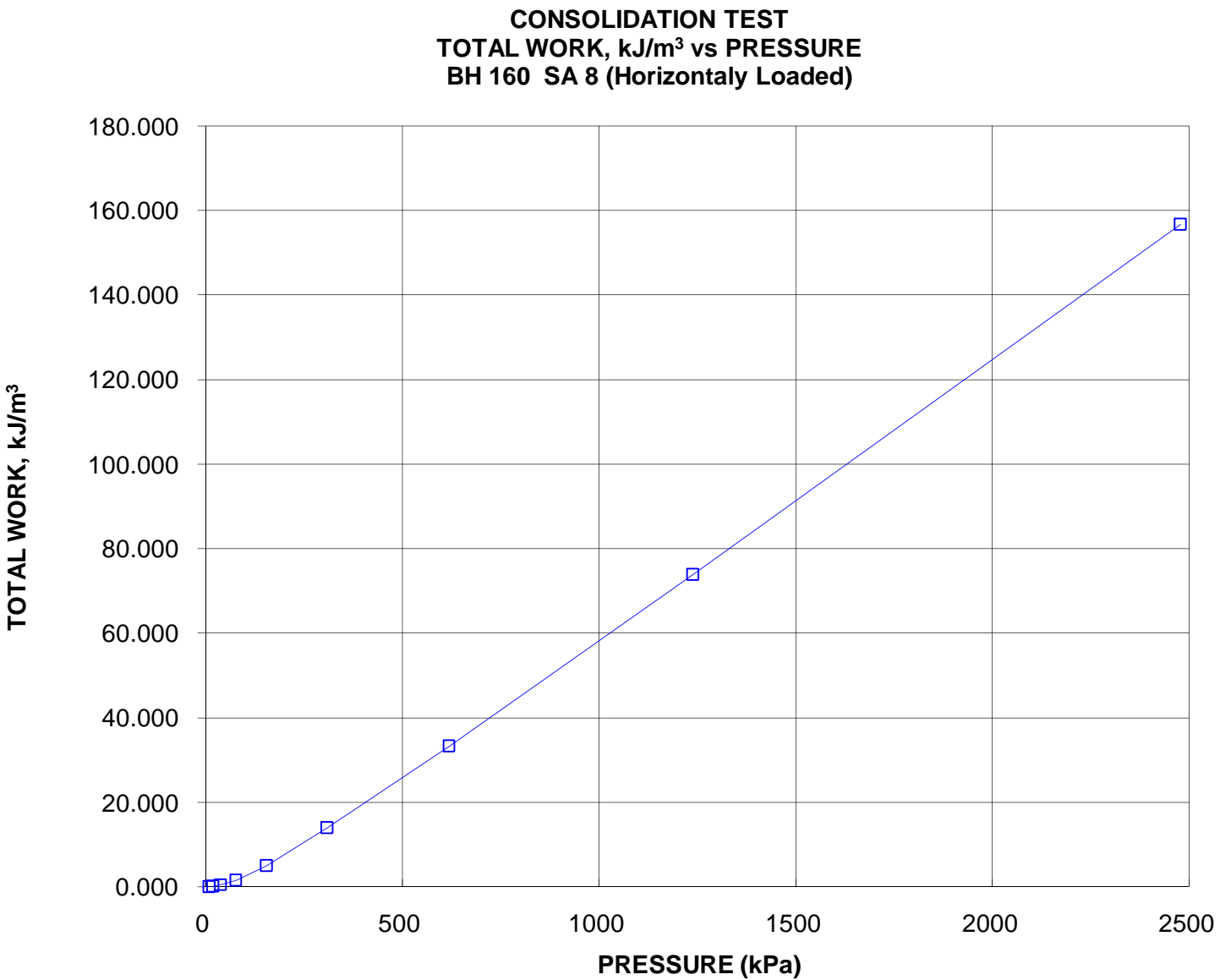






**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 160 SA 8 OED D**



**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 160 SA 13 OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	13
Borehole Number	160	Sample Depth, m	12.8

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	11		
Date Started	10/24/2008		
Date Completed	11/18/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	2.54	Unit Weight, kN/m <sup>3</sup>	18.13
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	13.15
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	80.16	Solids Height, cm	1.238
Water Content, %	37.83	Volume of Solids, cm <sup>3</sup>	39.10
Wet Mass, g	148.19	Volume of Voids, cm <sup>3</sup>	41.06
Dry Mass, g	107.52	Degree of Saturation, %	99.1

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv. cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	2.539	1.050	2.539				
4.87	2.538	1.049	2.538	15	9.11E-02	8.90E-05	7.94E-07
9.56	2.529	1.042	2.533	54	2.52E-02	7.56E-04	1.87E-06
19.47	2.511	1.027	2.520	60	2.24E-02	7.15E-04	1.57E-06
38.80	2.478	1.001	2.494	46	2.87E-02	6.72E-04	1.89E-06
77.64	2.432	0.964	2.455	29	4.41E-02	4.67E-04	2.02E-06
150.89	2.302	0.858	2.367	38	3.12E-02	7.00E-04	2.14E-06
38.81	2.336	0.886	2.319				
19.31	2.355	0.902	2.345				
9.56	2.370	0.913	2.362				
4.87	2.377	0.919	2.373				
9.48	2.376	0.918	2.376	46	2.60E-02	9.40E-05	2.40E-07
19.31	2.368	0.912	2.372	37	3.22E-02	3.21E-04	1.01E-06
38.76	2.354	0.901	2.361	60	1.97E-02	2.83E-04	5.47E-07
77.56	2.334	0.884	2.344	276	4.22E-03	2.04E-04	8.44E-08
150.89	2.308	0.863	2.321	118	9.68E-03	1.41E-04	1.33E-07
308.51	2.229	0.800	2.268	194	5.62E-03	1.97E-04	1.08E-07
618.18	2.100	0.695	2.164	480	2.07E-03	1.64E-04	3.33E-08
1238.59	1.986	0.603	2.043	195	4.54E-03	7.24E-05	3.22E-08
2480.59	1.876	0.515	1.931	276	2.86E-03	3.49E-05	9.79E-09
1238.59	1.887	0.524	1.882				
308.51	1.936	0.563	1.912				
150.89	2.002	0.616	1.969				
38.80	2.034	0.642	2.018				
19.47	2.063	0.666	2.049				
4.87	2.117	0.709	2.090				

Note:

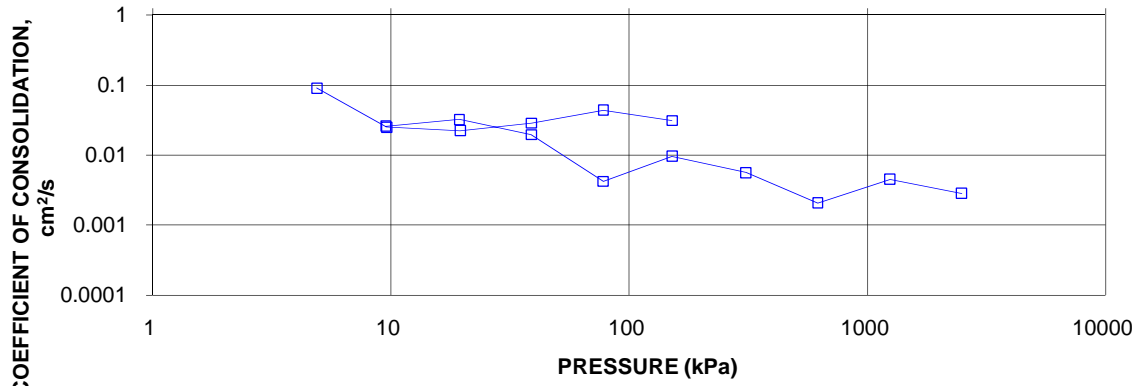
k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	2.12	Unit Weight, kN/m <sup>3</sup>	20.08
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	15.78
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	66.83	Solids Height, cm	1.238
Water Content, %	27.30	Volume of Solids, cm <sup>3</sup>	39.10
Wet Mass, g	136.87	Volume of Voids, cm <sup>3</sup>	27.73
Dry Mass, g	107.52		

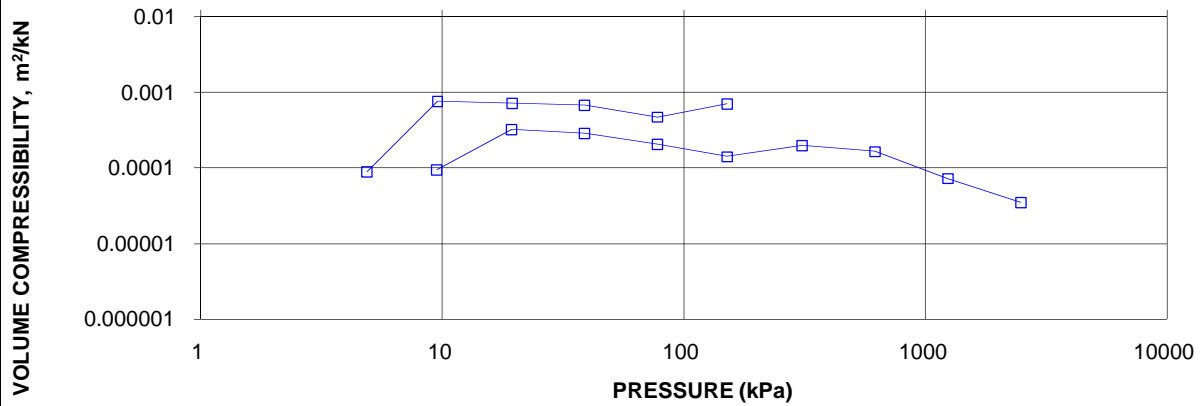
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 160 SA 13 OED B

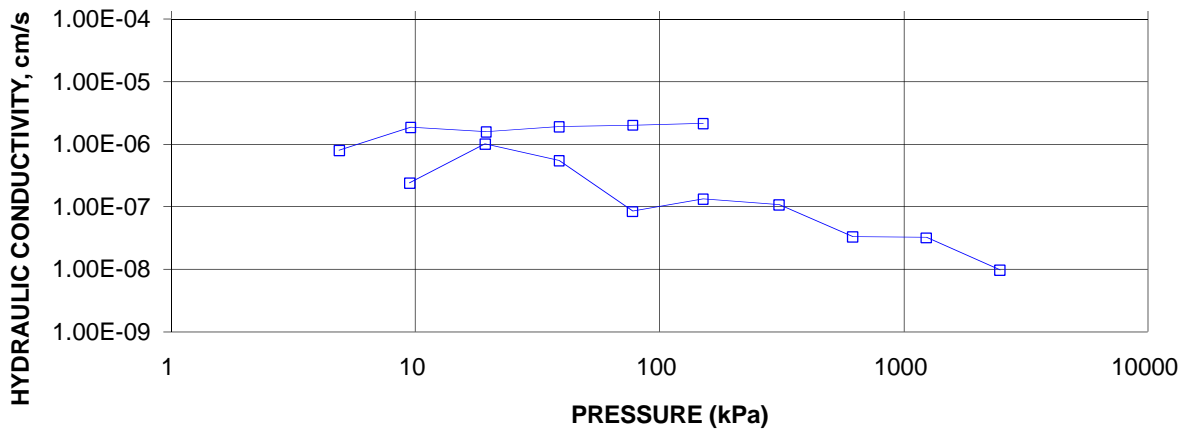
CONSOLIDATION TEST  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 160 SA 13

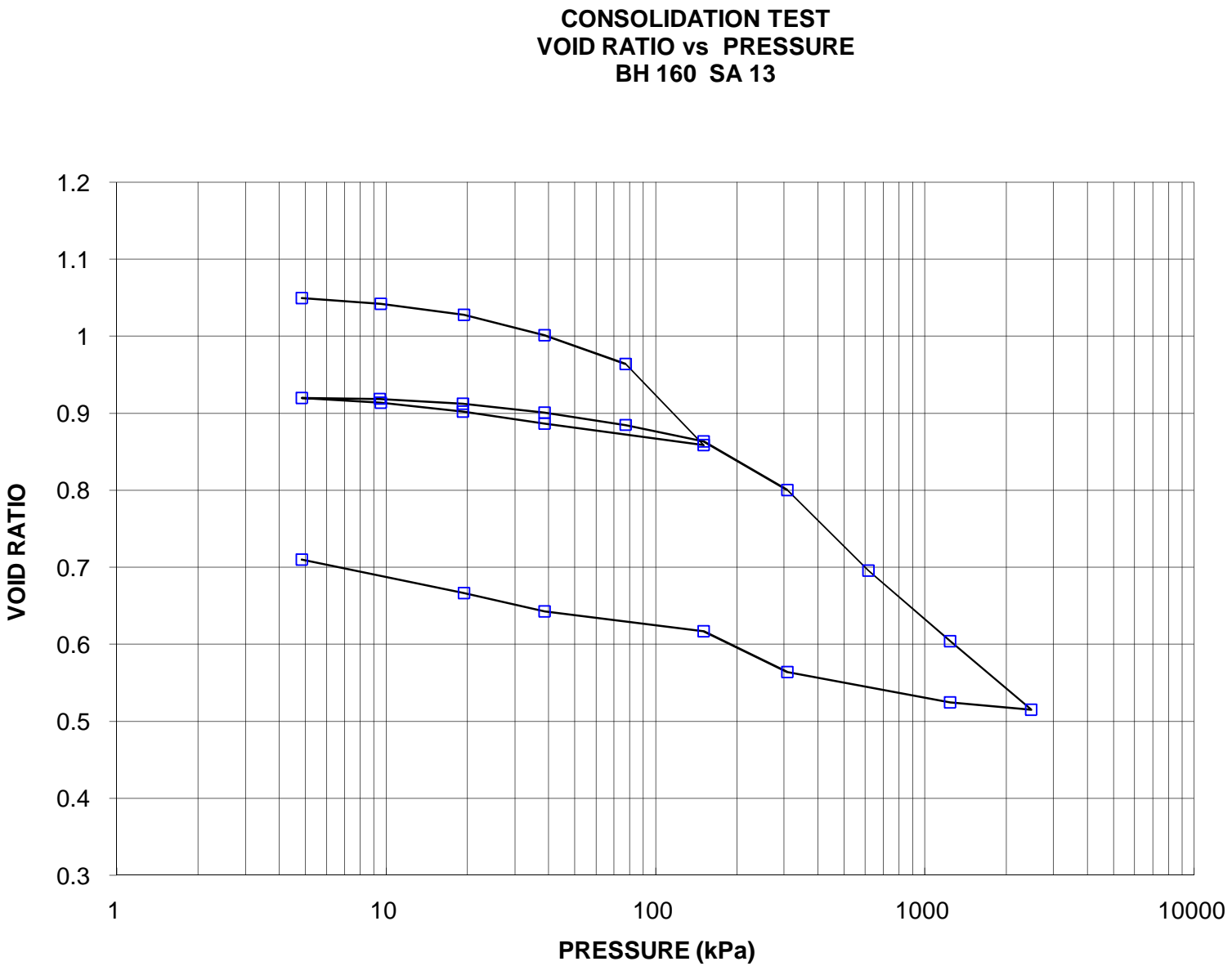


CONSOLIDATION TEST  
MV m²/kN vs PRESSURE (kPa)  
BH 160 SA 13



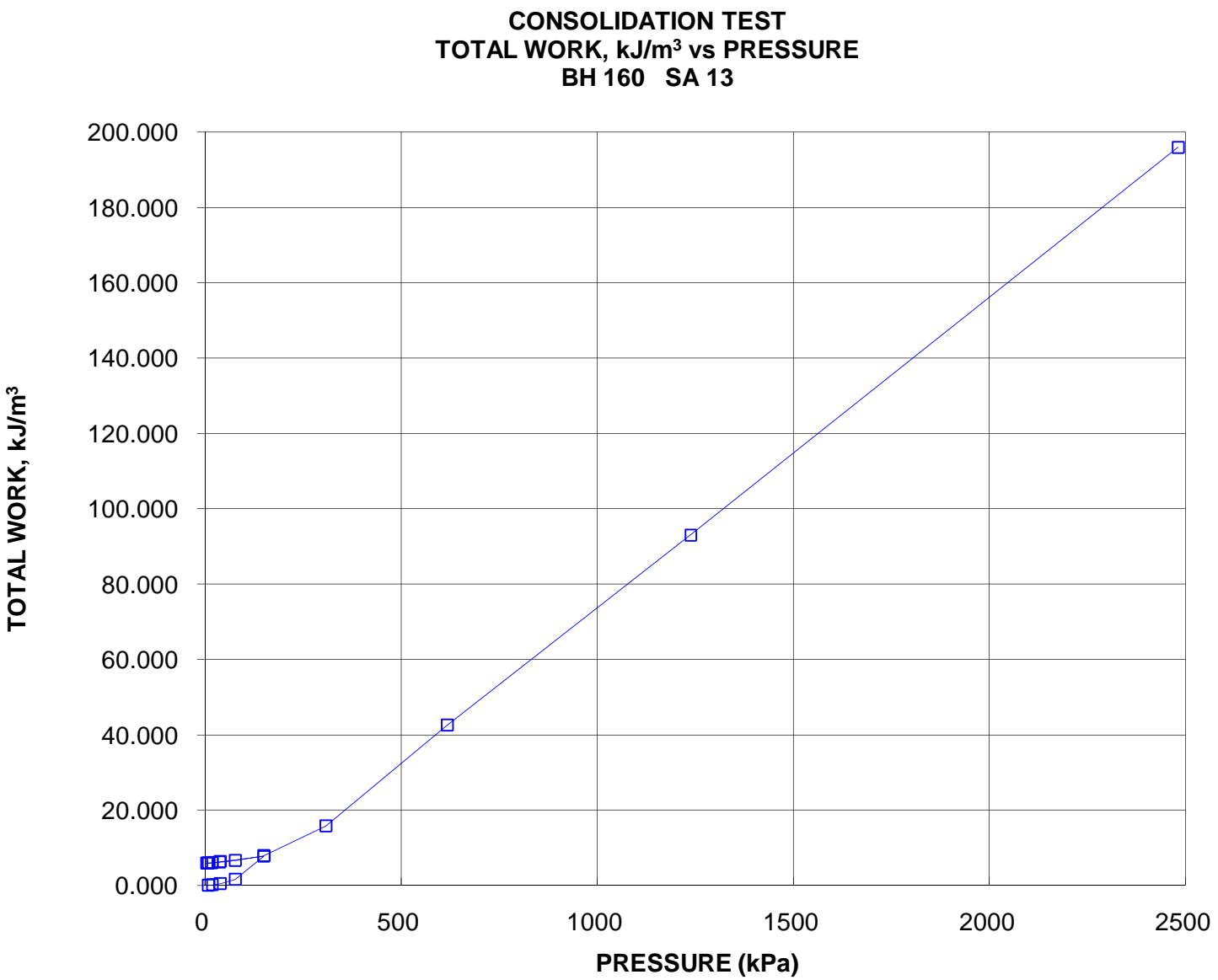
CONSOLIDATION TEST  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 160 SA 13





**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 160 SA 13 OED D**





**OEDOMETER CONSOLIDATION SUMMARY**

FIGURE BH 160 SA 16 OED A

**SAMPLE IDENTIFICATION**

Project Number	07-1130-2070	Sample Number	16
Borehole Number	160	Sample Depth, m	48.2

**TEST CONDITIONS**

Test Type	Standard	Load Duration, hr	24
Oedometer Number	6		
Date Started	10/27/2008		
Date Completed	11/18/2008		

**SAMPLE DIMENSIONS AND PROPERTIES - INITIAL**

Sample Height, cm	1.90	Unit Weight, kN/m <sup>3</sup>	20.66
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	17.36
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	59.86	Solids Height, cm	1.221
Water Content, %	18.96	Volume of Solids, cm <sup>3</sup>	38.54
Wet Mass, g	126.07	Volume of Voids, cm <sup>3</sup>	21.32
Dry Mass, g	105.98	Degree of Saturation, %	94.2

**TEST COMPUTATIONS**

Pressure kPa	Corr. Height cm	Void Ratio	Average Height cm	t <sub>90</sub> sec	cv, cm <sup>2</sup> /s	mv m <sup>2</sup> /kN	k cm/s
0.00	1.896	0.553	1.896				
4.71	1.893	0.551	1.895	15	5.07E-02	3.25E-04	1.61E-06
9.53	1.887	0.546	1.890	24	3.16E-02	6.24E-04	1.93E-06
19.31	1.877	0.538	1.882	34	2.21E-02	5.55E-04	1.20E-06
38.81	1.860	0.524	1.869	10	7.40E-02	4.54E-04	3.30E-06
77.14	1.839	0.506	1.849	7	1.04E-01	3.00E-04	3.05E-06
158.54	1.807	0.481	1.823	9	7.83E-02	2.02E-04	1.55E-06
208.02	1.789	0.466	1.798	39	1.76E-02	1.96E-04	3.38E-07
77.68	1.804	0.478	1.797				
19.31	1.823	0.493	1.814				
4.72	1.838	0.505	1.830				
9.53	1.835	0.504	1.837	20	3.58E-02	2.41E-04	8.45E-07
19.06	1.831	0.500	1.833	28	2.54E-02	2.38E-04	5.93E-07
38.87	1.822	0.493	1.827	10	7.07E-02	2.34E-04	1.62E-06
77.87	1.811	0.483	1.816	57	1.23E-02	1.58E-04	1.90E-07
155.27	1.795	0.471	1.803	12	5.74E-02	1.04E-04	5.83E-07
208.02	1.788	0.464	1.791	11	6.19E-02	7.90E-05	4.79E-07
310.18	1.767	0.447	1.777	7	9.56E-02	1.07E-04	1.01E-06
620.32	1.715	0.404	1.741	22	2.92E-02	8.88E-05	2.54E-07
1240.94	1.661	0.361	1.688	41	1.47E-02	4.56E-05	6.57E-08
2483.71	1.603	0.313	1.632	48	1.18E-02	2.46E-05	2.84E-08
1240.94	1.615	0.323	1.609				
310.18	1.639	0.343	1.627				
208.02	1.647	0.349	1.643				
77.14	1.673	0.370	1.660				
19.31	1.714	0.404	1.693				
4.71	1.744	0.428	1.729				

Note:

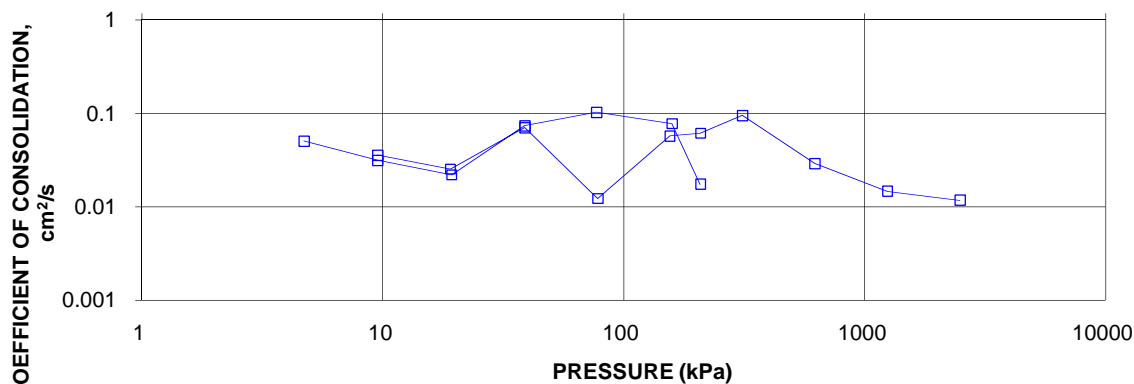
k calculated using cv based on t<sub>90</sub> values.**SAMPLE DIMENSIONS AND PROPERTIES - FINAL**

Sample Height, cm	1.74	Unit Weight, kN/m <sup>3</sup>	22.15
Sample Diameter, cm	6.34	Dry Unit Weight, kN/m <sup>3</sup>	18.88
Area, cm <sup>2</sup>	31.57	Specific Gravity, measured	2.75
Volume, cm <sup>3</sup>	55.04	Solids Height, cm	1.221
Water Content, %	17.30	Volume of Solids, cm <sup>3</sup>	38.54
Wet Mass, g	124.31	Volume of Voids, cm <sup>3</sup>	16.51
Dry Mass, g	105.98		

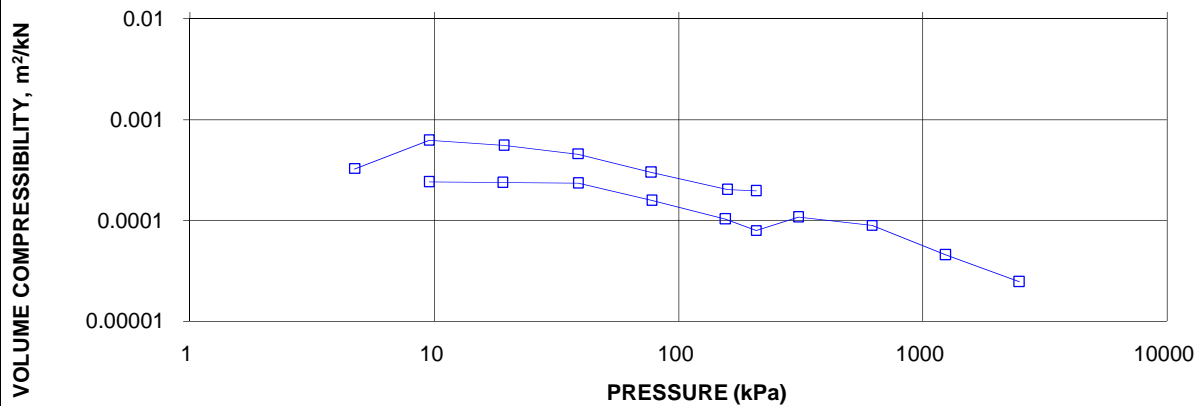
# OEDOMETER CONSOLIDATION SUMMARY

FIGURE BH 160 SA 16 OED B

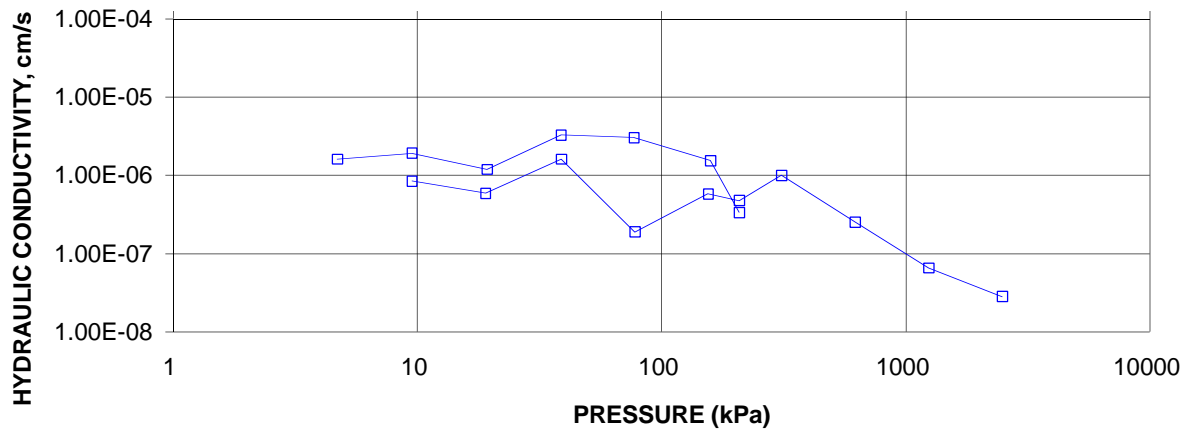
**CONSOLIDATION TEST**  
CV cm<sup>2</sup>/s VS PRESSURE (kPa)  
BH 160 SA 16

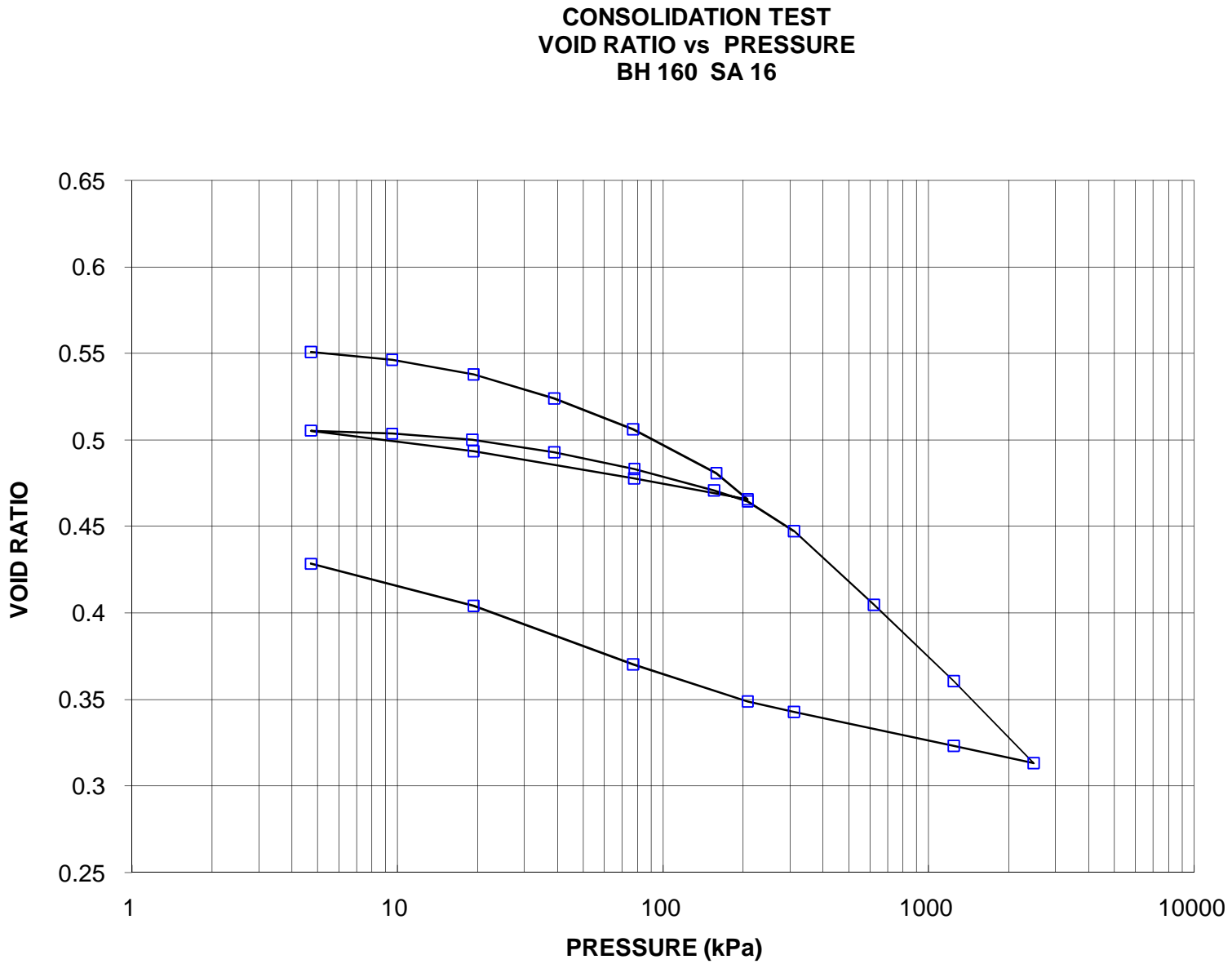


**CONSOLIDATION TEST**  
MV m<sup>2</sup>/kN vs PRESSURE (kPa)  
BH 160 SA 16



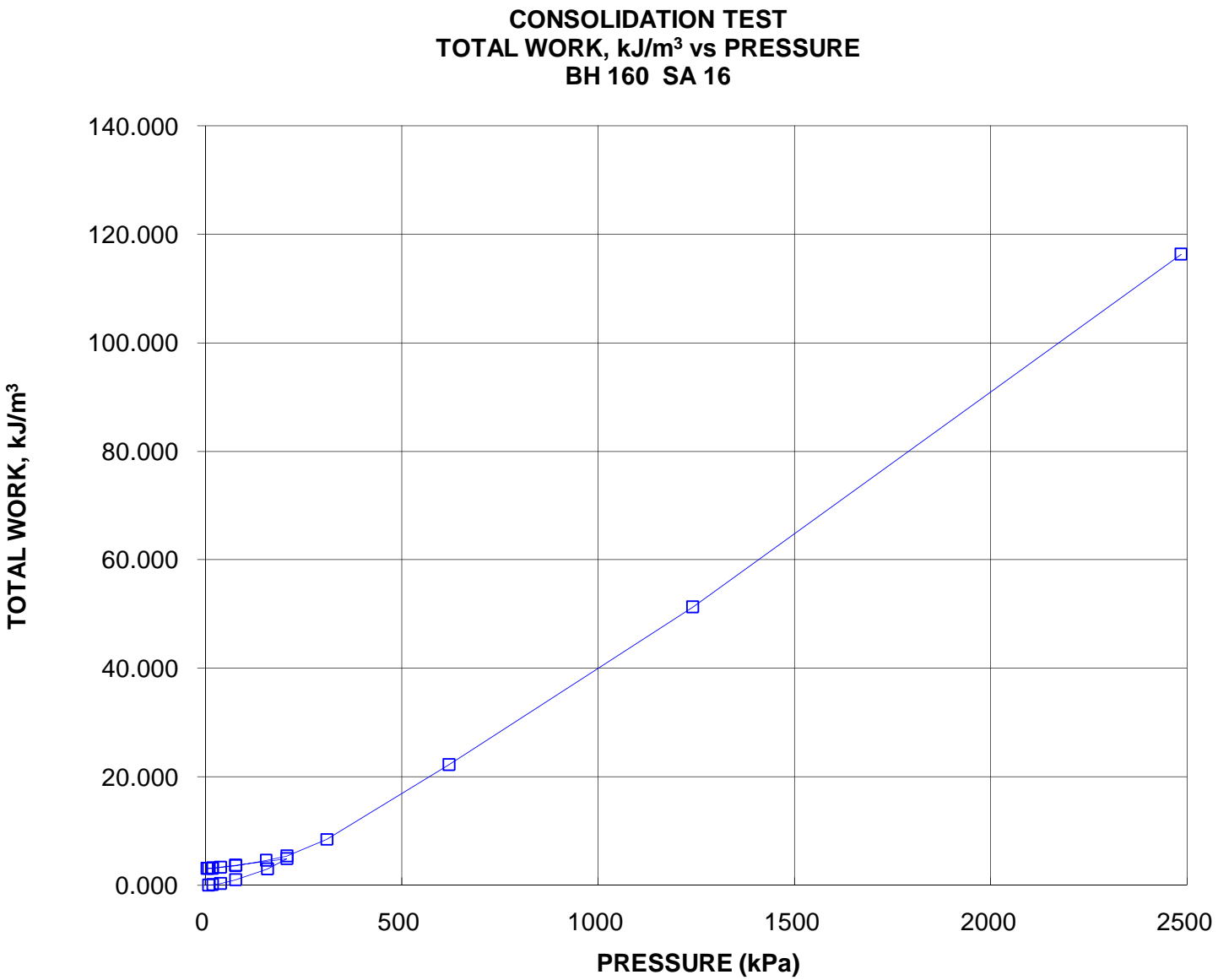
**CONSOLIDATION TEST**  
HYDRAULIC CONDUCTIVITY vs PRESSURE  
BH 160 SA 16

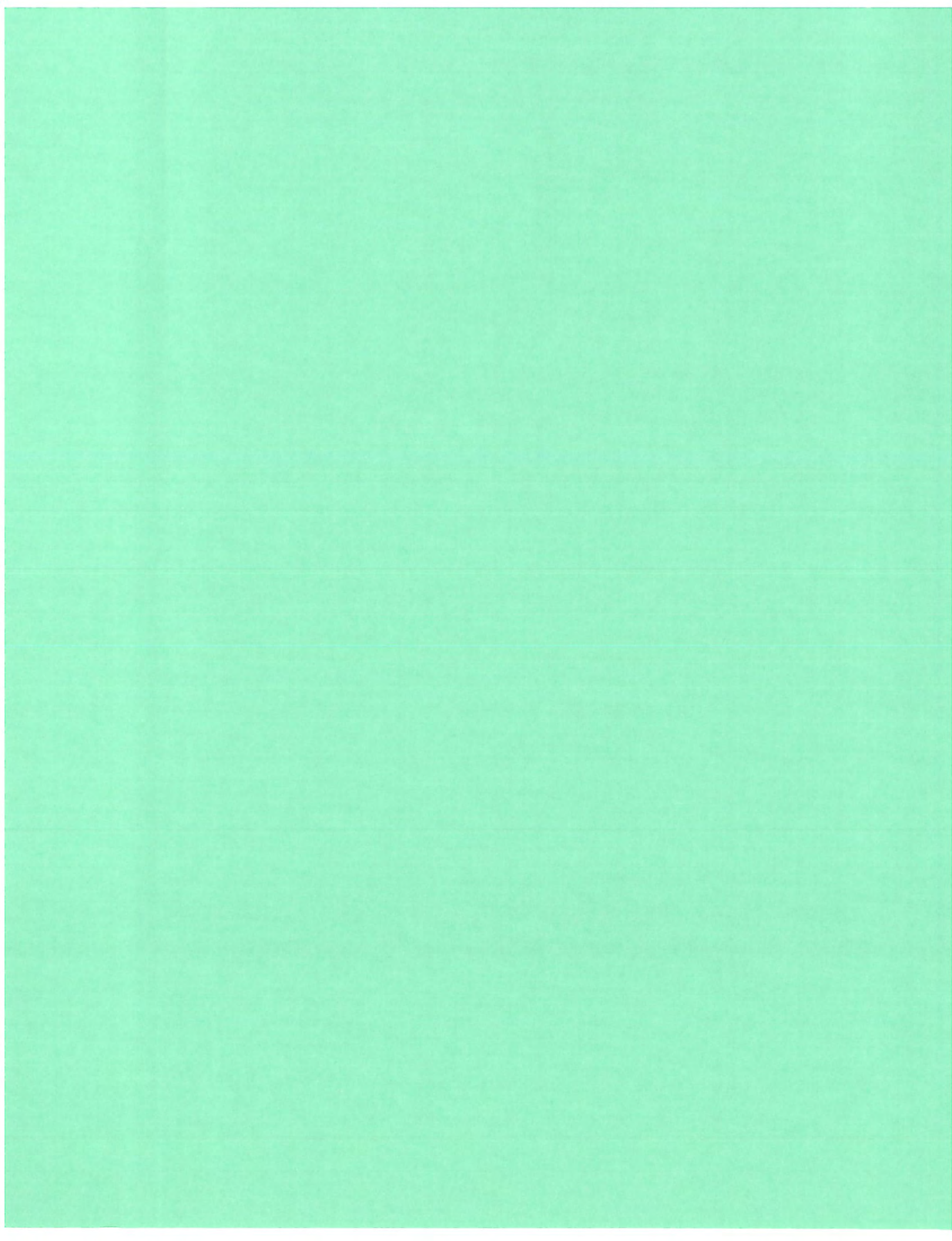




**CONSOLIDATION TEST  
TOTAL WORK VS PRESSURE**

**FIGURE BH 160 SA 16 OED D**







**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

**FIGURE BH 1  
SA 5, 10, 14  
CIUC A**

TEST STAGE	A	B	C
BOREHOLE NUMBER	1	1	1
SAMPLE	5	10	14
SPECIMEN DIAMETER, cm	5.00	5.00	5.01
SPECIMEN HEIGHT, cm	10.13	10.09	10.00
WATER CONTENT BEFORE CONSOLIDATION, %	17.8	20.9	23.2
CELL PRESSURE, $\sigma_3$ , kPa	310.0	275.0	300.0
BACK PRESSURE, kPa	275.0	205.0	205.0
PORE PRESSURE PARAMETER "B"	0.96	0.95	0.99
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	35.0	70.0	95.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.2	3.5	7.1
WATER CONTENT AFTER CONSOLIDATION, %	17.2	19.0	26.6
AVERAGE RATE OF STRAIN, %/hr	0.5	0.5	0.5
TIME TO FAILURE, DAYS	1	1	1
WATER CONTENT AFTER TEST, %	16.8	18.4	24.6
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	101.5	113.1	122.2
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	19.9	20.2	16.9
MAX EFFECTIVE PRINCIPAL STRESS RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.5	3.4	3.1
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	57.5	110.7	111.1
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	4.9	9.3	10.1
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.13	0.14	0.27
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.20	0.21	0.38
NATURAL WATER CONTENT, %	16.4	19.5	28.3
DRY DENSITY, Mg/m <sup>3</sup>	1.89	1.82	1.55
FILTER DRAINS USED, y/n	y	y	y
TEST NOTES:			
CHANGED RATE OF STRAIN, %/hr	-	-	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	-	-
FAILURE PLANE NUMBER	-	-	-
ANGLE OF FAILURE, DEGREES	bulging	bulging	bulging

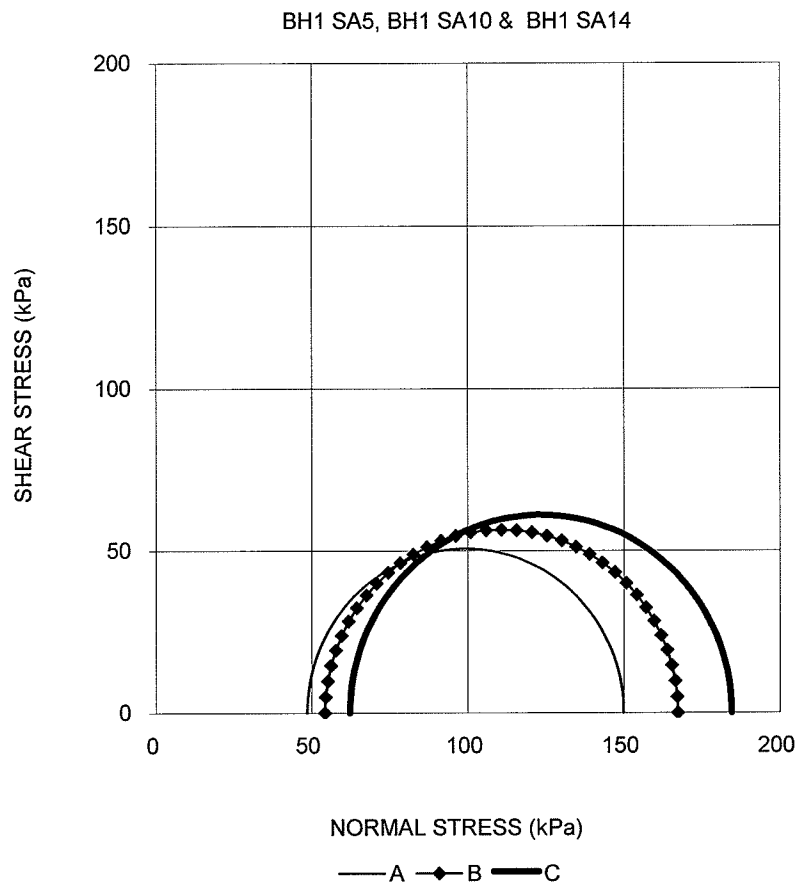
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Project No. 04-1111-060

**Golder Associates**

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Checked By: MM

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 1  
SA 5, 10, 14  
CIUC B



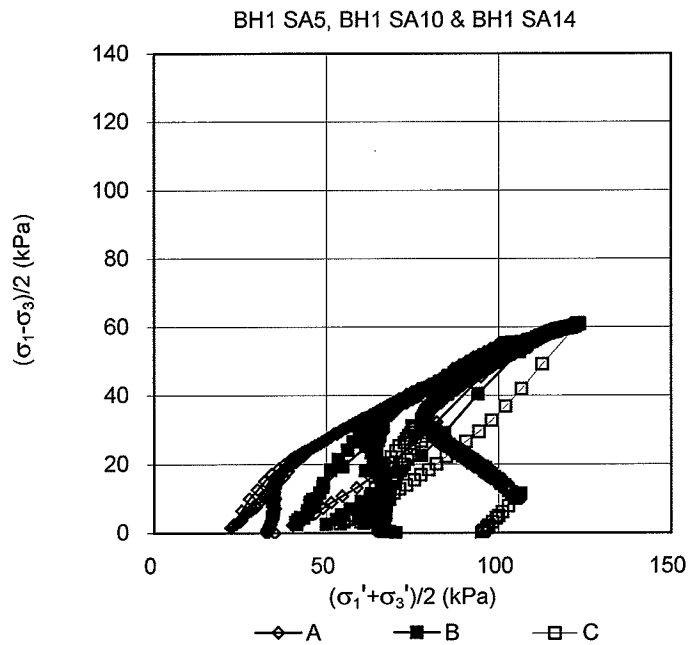
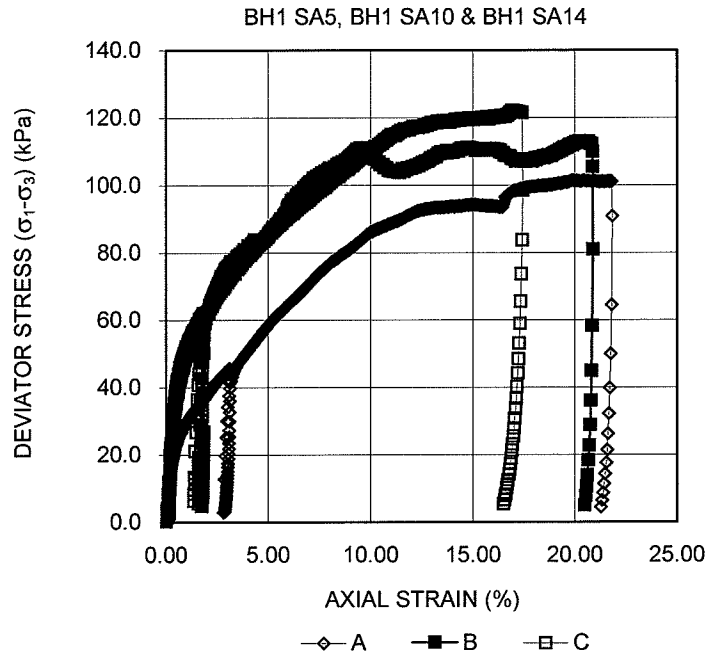
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 1  
SA 5, 10, 14  
CIUC C**



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Project No. 04-1111-060

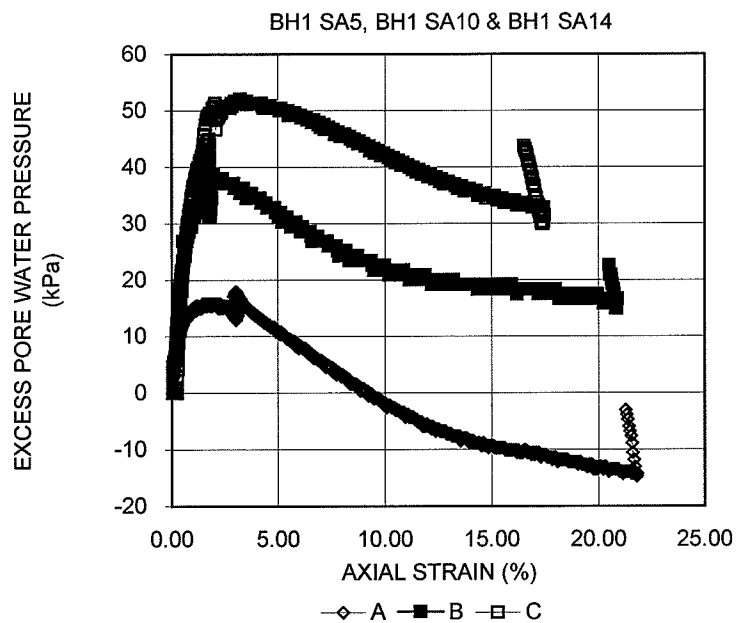
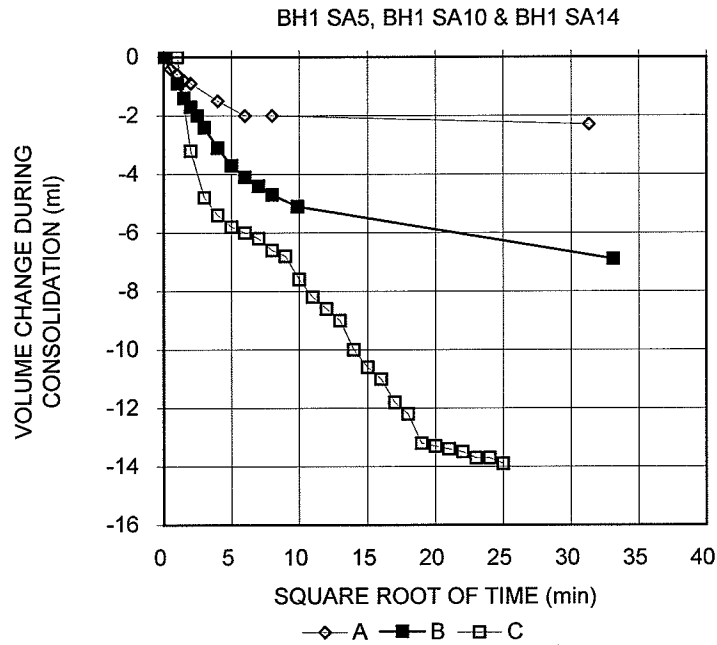
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Checked By: MM

**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS**

**SHEET 4 OF 4**

**FIGURE BH 1  
SA 5, 10, 14  
CIUC D**



Date: 10/31/2006  
Project No. 04-1111-060

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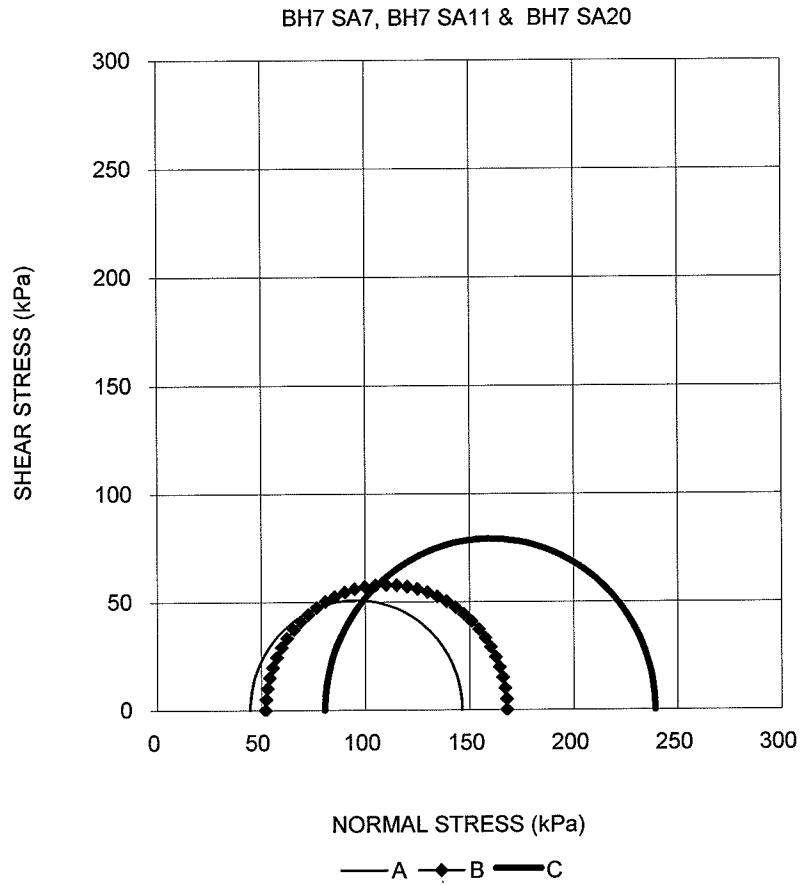
Prepared By LFG  
Checked By: MM

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 7 SA 7, 11, 20 CIUC A</b>	
TEST STAGE	A	B	C
BOREHOLE NUMBER	7	7	7
SAMPLE	7	11	20
SPECIMEN DIAMETER, cm	4.98	4.96	4.96
SPECIMEN HEIGHT, cm	10.13	10.10	10.11
WATER CONTENT BEFORE CONSOLIDATION, %	20.4	23.0	22.0
CELL PRESSURE, $\sigma_3$ , kPa	248.0	208.0	265.0
BACK PRESSURE, kPa	205.0	135.0	135.0
PORE PRESSURE PARAMETER "B"	0.96	0.96	0.96
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	43.0	73.0	130.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	2.1	1.3	3.9
WATER CONTENT AFTER CONSOLIDATION, %	19.2	22.2	19.7
AVERAGE RATE OF STRAIN, %/hr	0.5	0.5	0.5
TIME TO FAILURE, DAYS	1	1	1
WATER CONTENT AFTER TEST, %	18.4	21.8	19.6
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	101.9	116.2	159.4
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	9.6	5.1	12.0
MAX EFFECTIVE PRINCIPAL STRESS			
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	4.1	3.4	3.1
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	71.3	105.3	158.9
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	2.3	2.2	10.1
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.02	0.19	0.33
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.28	0.28	0.33
NATURAL WATER CONTENT, %	18.2	21.9	19.0
DRY DENSITY, Mg/m <sup>3</sup>	1.83	1.71	1.75
FILTER DRAINS USED, y/n	y	y	y
TEST NOTES:			
CHANGED RATE OF STRAIN, %/hr	-	-	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	-	-
FAILURE PLANE NUMBER	-	-	-
ANGLE OF FAILURE, DEGREES	bulged	bulged	bulged
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 7  
SA 7, 11, 20  
CIUC B



Date: 11/10/2006  
Project No. 04-1111-060

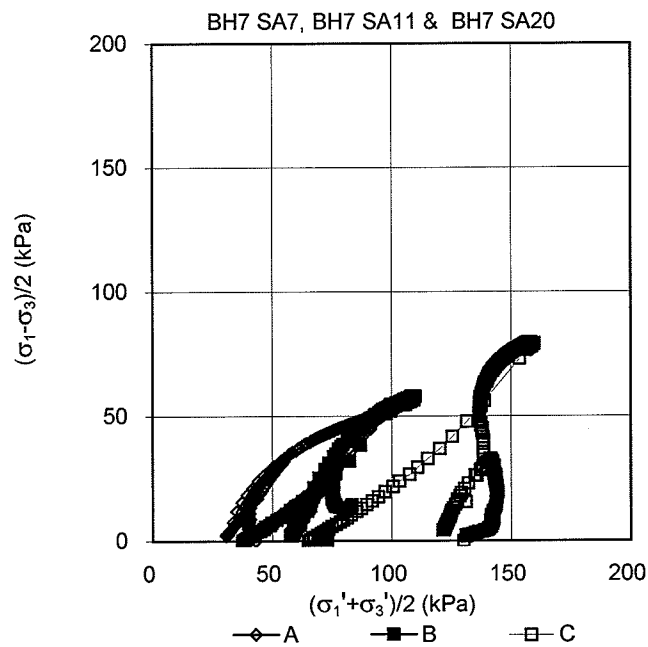
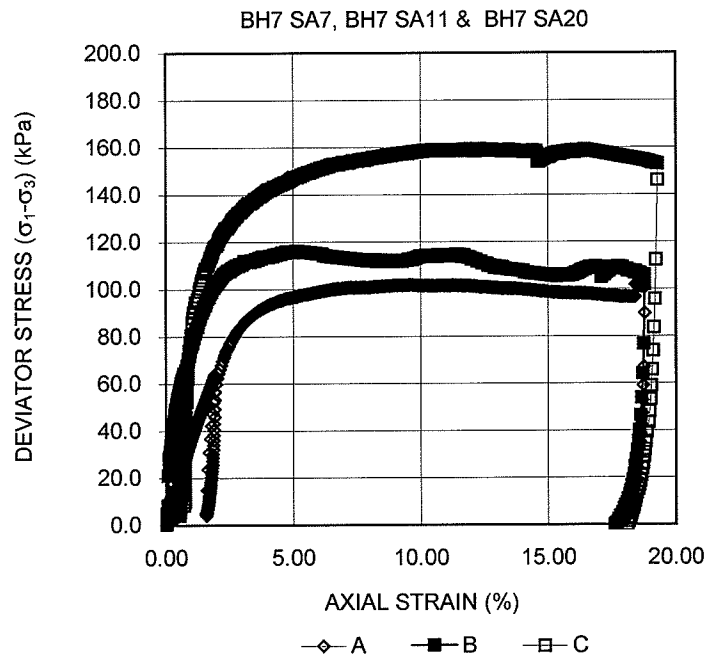
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS**

**SHEET 3 OF 4**

**FIGURE BH 7  
SA 7, 11, 20  
CIUC C**



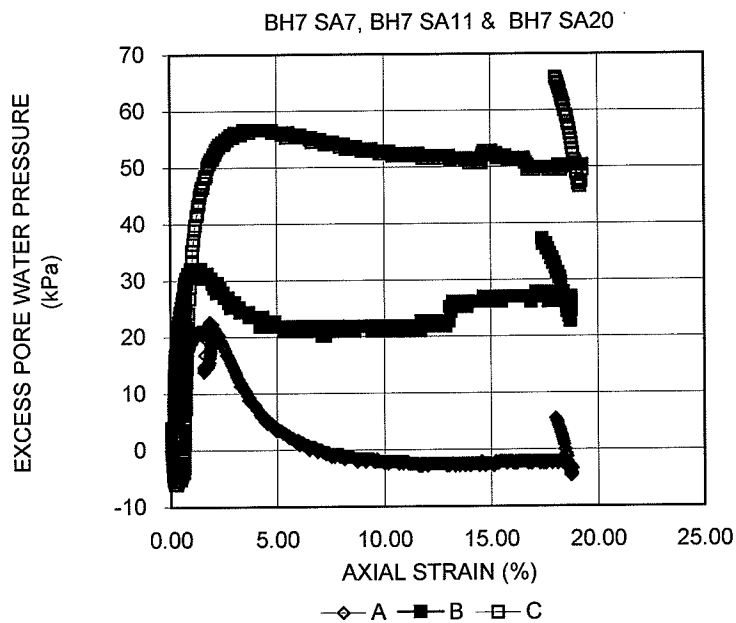
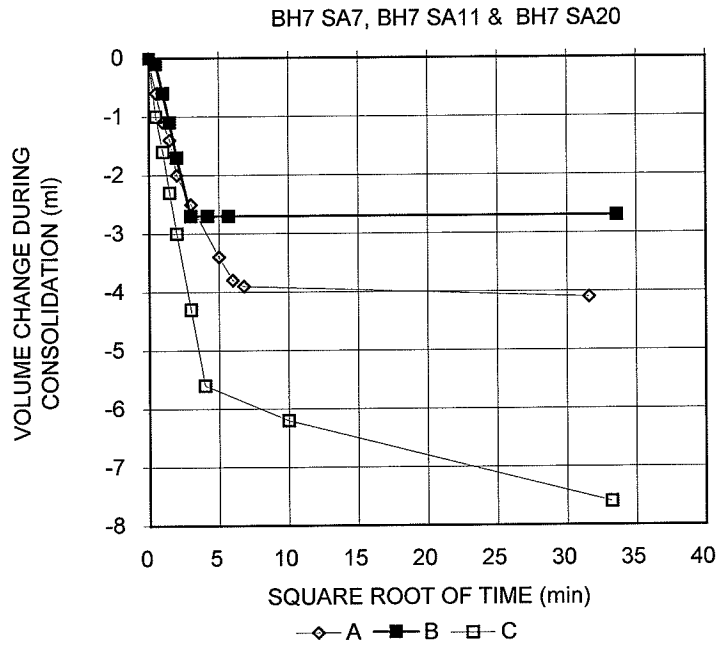
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 7  
SA 7, 11, 20  
CIUC D



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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

**FIGURE BH 14  
SA 9, 11, 16  
CIUC A**

TEST STAGE	A	B	C
BOREHOLE NUMBER	14	14	14
SAMPLE	9	11	16
SPECIMEN DIAMETER, cm	4.97	4.98	4.92
SPECIMEN HEIGHT, cm	10.16	10.19	10.10
WATER CONTENT BEFORE CONSOLIDATION, %	23.5	24.1	18.5
CELL PRESSURE, $\sigma_3$ , kPa	255.0	271.0	228.0
BACK PRESSURE, kPa	205.0	205.0	135.0
PORE PRESSURE PARAMETER "B"	0.96	0.97	0.97
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	50.0	66.0	93.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.7	2.5	3.9
WATER CONTENT AFTER CONSOLIDATION, %	22.5	22.6	16.4
AVERAGE RATE OF STRAIN, %/hr	0.5	0.5	0.5
TIME TO FAILURE, DAYS	1	1	1
WATER CONTENT AFTER TEST, %	21.3	22.6	15.8
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	100.4	97.2	132.8
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	8.5	5.5	14.7
MAX EFFECTIVE PRINCIPAL STRESS			
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.9	3.4	3.3
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	83.6	90.2	123.0
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	1.9	2.9	7.2
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.05	0.24	0.24
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.02	0.31	0.32
NATURAL WATER CONTENT, %	21.6	21.8	17.0
DRY DENSITY, Mg/m <sup>3</sup>	1.71	1.68	1.84
FILTER DRAINS USED, y/n	y	y	y
TEST NOTES:			
CHANGED RATE OF STRAIN, %/hr	-	-	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	-	-
FAILURE PLANE NUMBER	-	1.0	1.0
ANGLE OF FAILURE, DEGREES	-	60.0	55.0

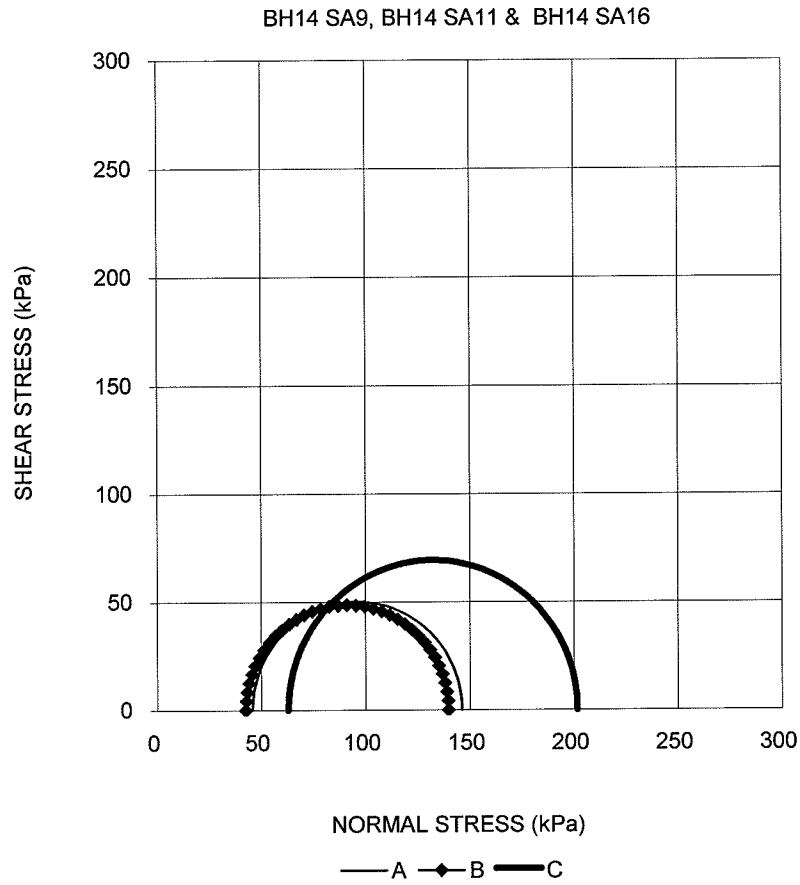
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 14  
SA 9, 11, 16  
CIUC B



Date: 11/10/2006  
Project No. 04-1111-060

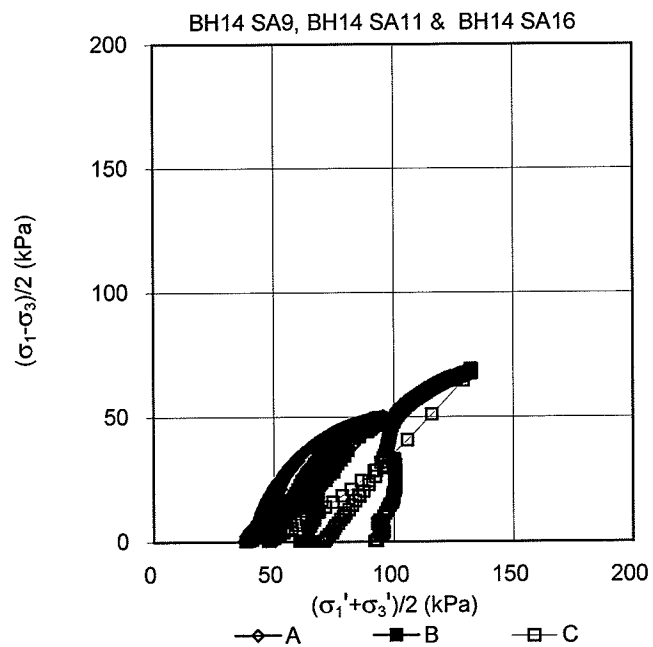
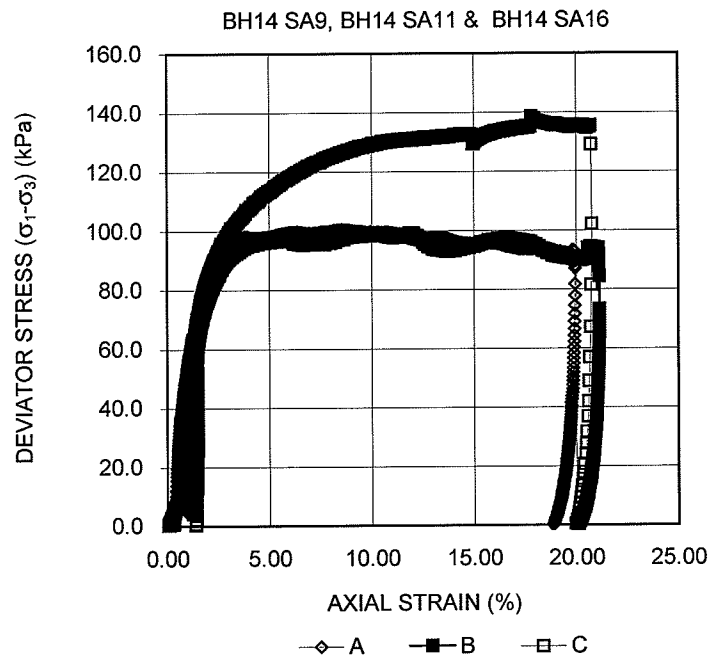
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 14  
SA 9, 11, 16  
CIUC C**



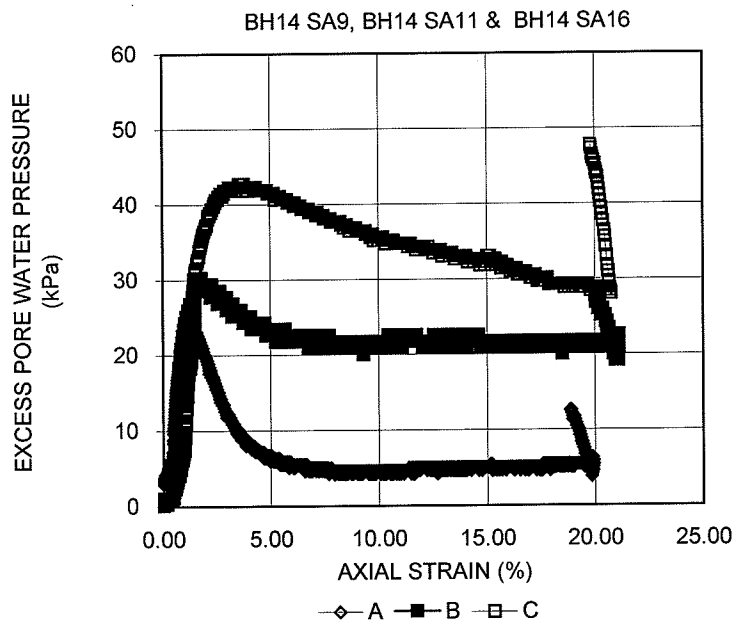
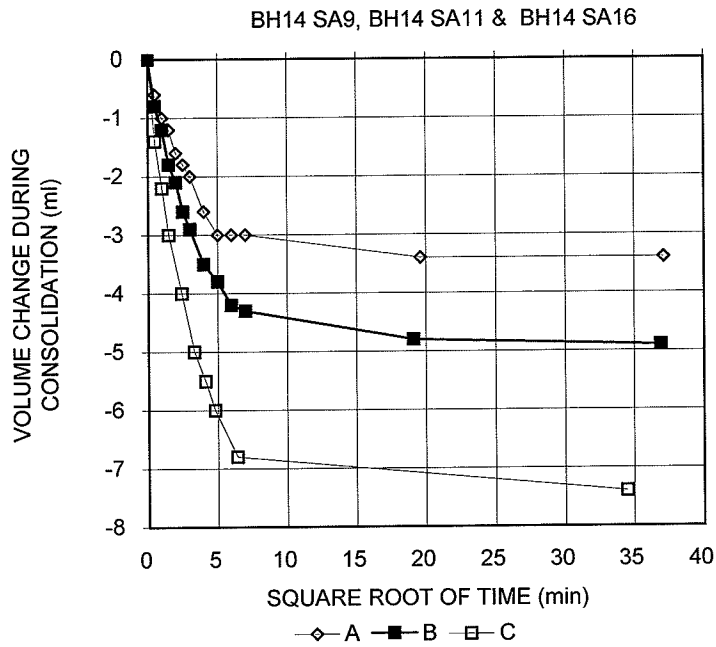
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 14  
SA 9, 11, 16  
CIUC D**



Date: 11/10/2006  
Project No. 04-1111-060

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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

**FIGURE BH 23  
SA 7, 13, 15  
CIUC A**

TEST STAGE	A	B	C
BOREHOLE NUMBER	23	23	23
SAMPLE	7	13	15
SPECIMEN DIAMETER, cm	5.13	4.95	5.04
SPECIMEN HEIGHT, cm	10.18	10.10	10.13
WATER CONTENT BEFORE CONSOLIDATION, %	29.6	20.1	22.1
CELL PRESSURE, $\sigma_3$ , kPa	178.0	289.0	371.0
BACK PRESSURE, kPa	135.0	205.0	275.0
PORE PRESSURE PARAMETER "B"	0.96	0.97	0.96
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	43.0	84.0	96.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.9	3.6	2.7
WATER CONTENT AFTER CONSOLIDATION, %	28.3	18.1	20.8
AVERAGE RATE OF STRAIN, %/hr	0.5	0.5	0.5
TIME TO FAILURE, DAYS	1	1	1
WATER CONTENT AFTER TEST, %	29.4	17.2	20.8
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	56.1	155.0	189.1
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	8.9	17.9	20.4
MAX EFFECTIVE PRINCIPAL STRESS			
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.6	3.6	3.0
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	53.1	117.6	133.5
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	2.4	5.3	4.0
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.34	0.12	-0.09
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.43	0.33	0.22
NATURAL WATER CONTENT, %	31.6	18.8	20.5
DRY DENSITY, Mg/m <sup>3</sup>	1.53	1.82	1.74
FILTER DRAINS USED, y/n	y	y	y
TEST NOTES:			
CHANGED RATE OF STRAIN, %/hr	-	-	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	-	-
FAILURE PLANE NUMBER	1.0	2.0	1.0
ANGLE OF FAILURE, DEGREES	40.0	40.0	55.0

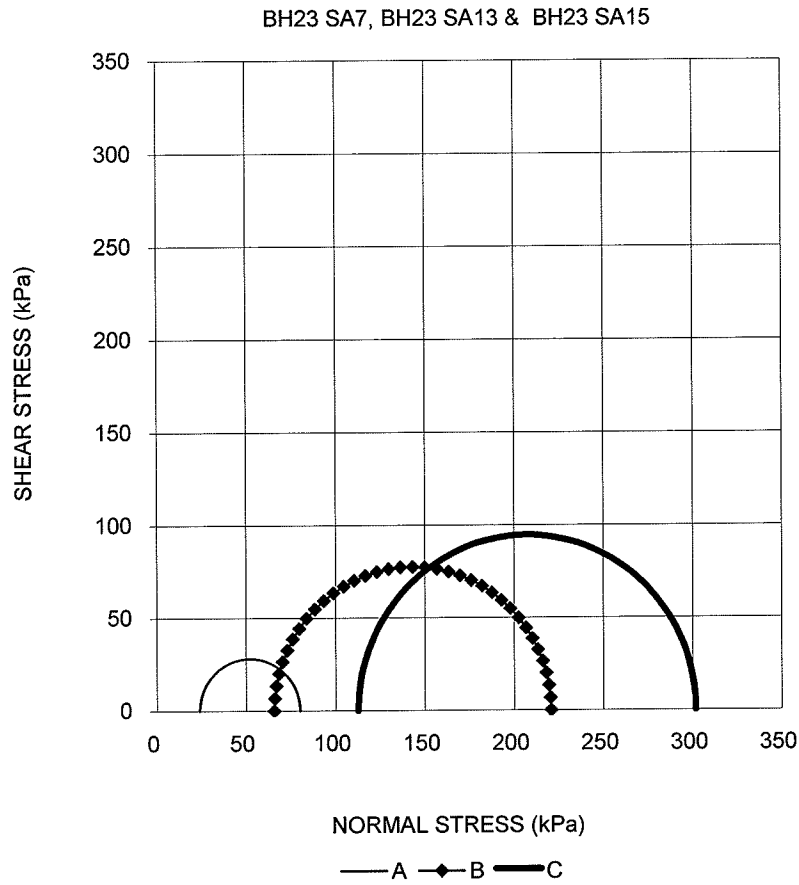
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 23  
SA 7, 13, 15  
CIUC B



Date: 12/04/2006  
Project No. 04-1111-060

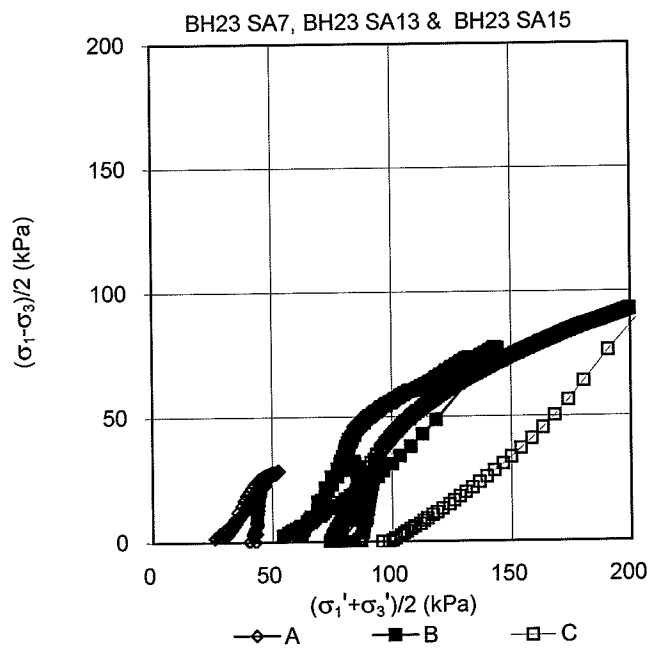
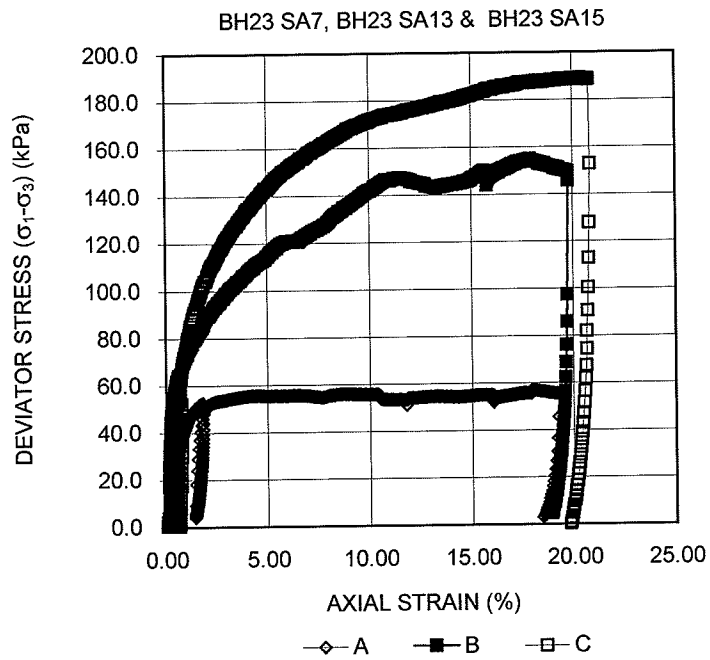
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS**

**SHEET 3 OF 4**

**FIGURE BH 23  
SA 7, 13, 15  
CIUC C**



Date: 12/04/2006  
Project No. 04-1111-060

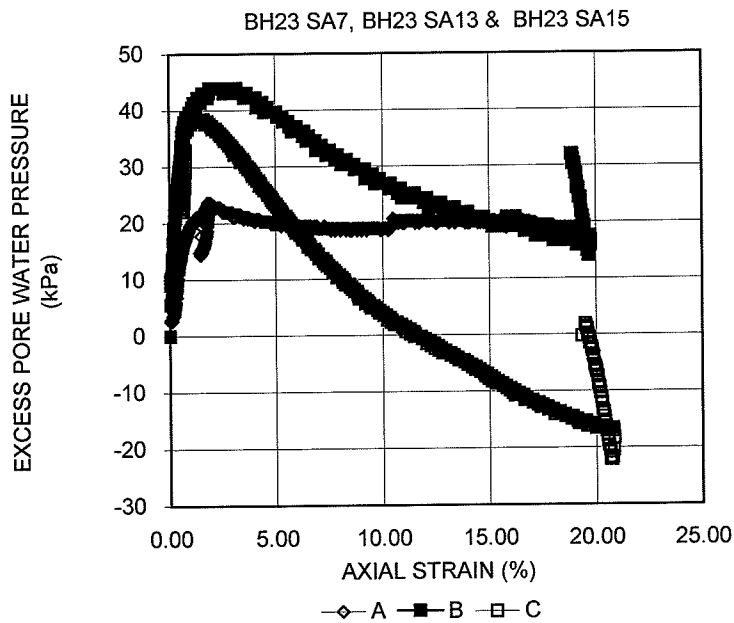
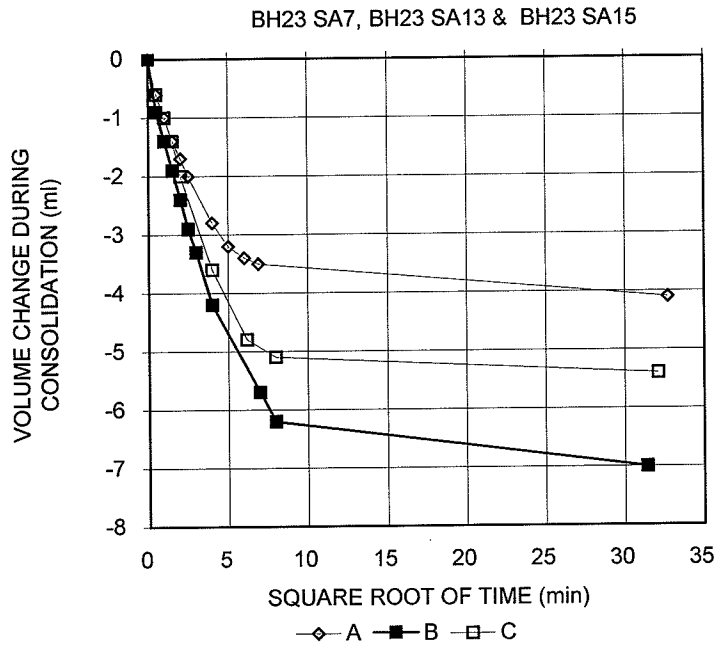
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS**  
**SHEET 4 OF 4**

**FIGURE BH 23  
SA 7, 13, 15  
CIUC D**



Date: 12/04/2006  
Project No. 04-1111-060

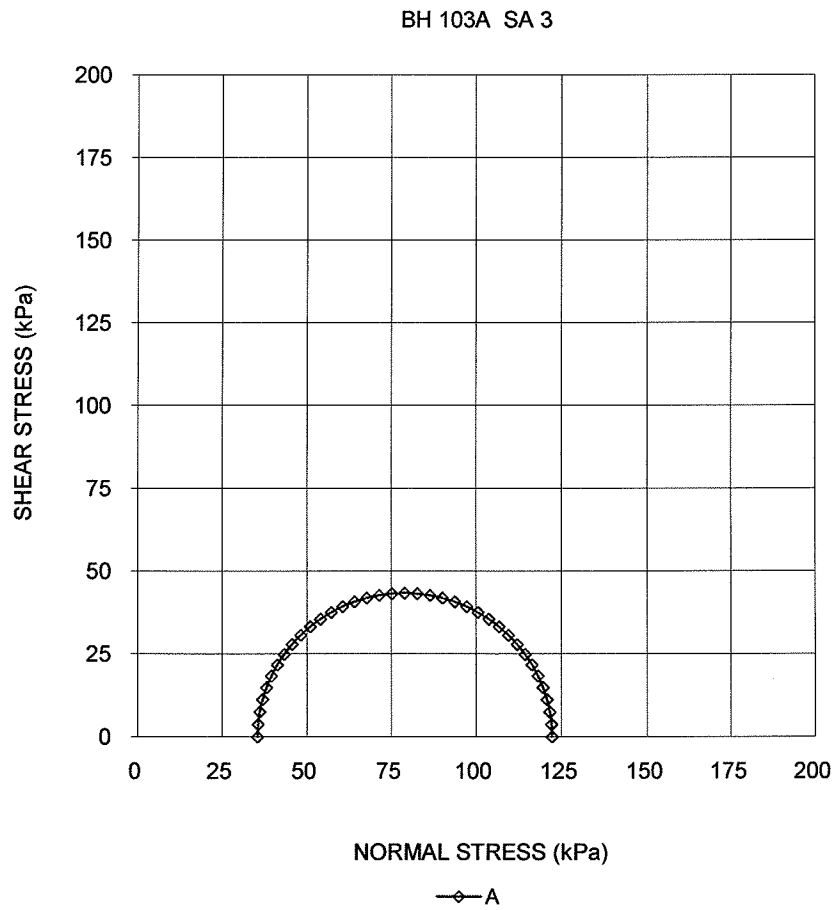
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<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 103A SA 3 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	103A	
SAMPLE	3	
SPECIMEN DIAMETER, cm	5.02	
SPECIMEN HEIGHT, cm	10.13	
WATER CONTENT BEFORE CONSOLIDATION, %	17.7	
CELL PRESSURE, $\sigma_3$ , kPa	166.0	
BACK PRESSURE, kPa	135.0	
PORE PRESSURE PARAMETER "B"	0.99	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	31.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	4.2	
WATER CONTENT AFTER CONSOLIDATION, %	15.5	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	16.2	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	119.9	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	15.5	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.5	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	72.6	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	2.5	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.24	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.03	
NATURAL WATER CONTENT, %	14.6	
DRY DENSITY, Mg/m <sup>3</sup>	1.93	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	bulged	
<div> <div>Date: 12/15/2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By MM</div> <div>Checked By: RO</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 103A SA 3 CIUC B



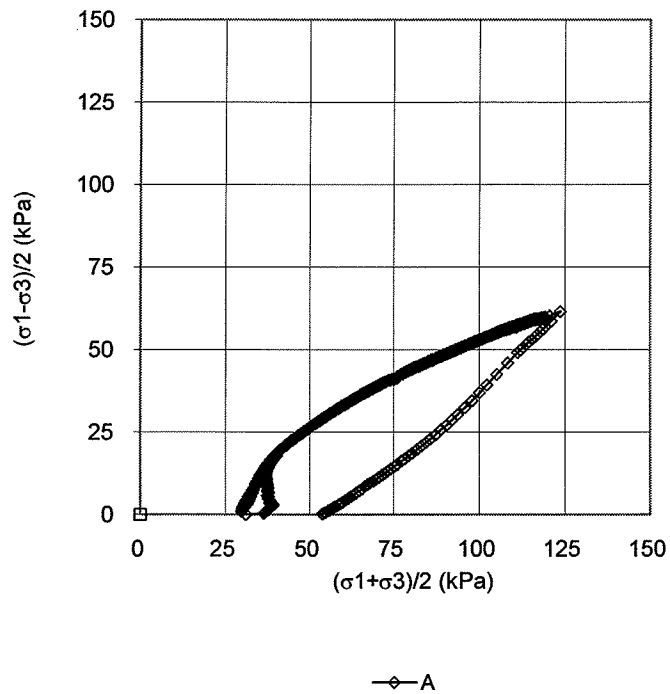
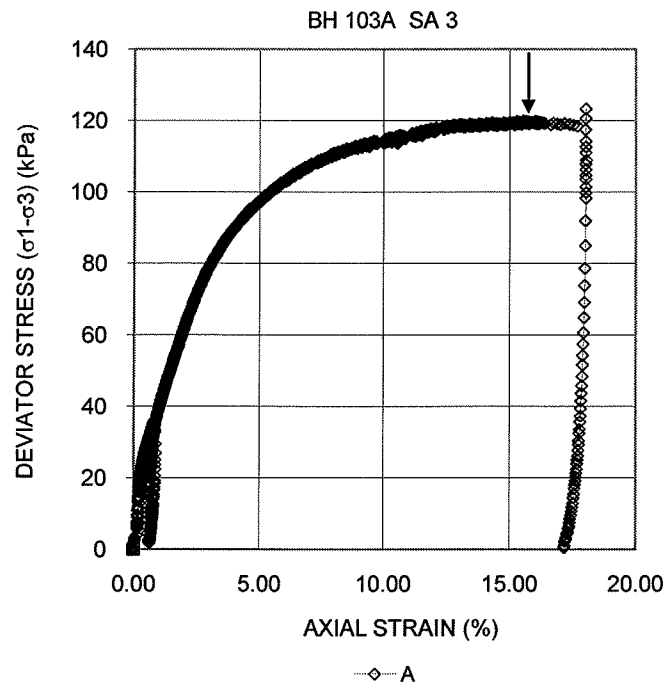
Date: 12/15/2008  
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 103A SA 3 CIUC C



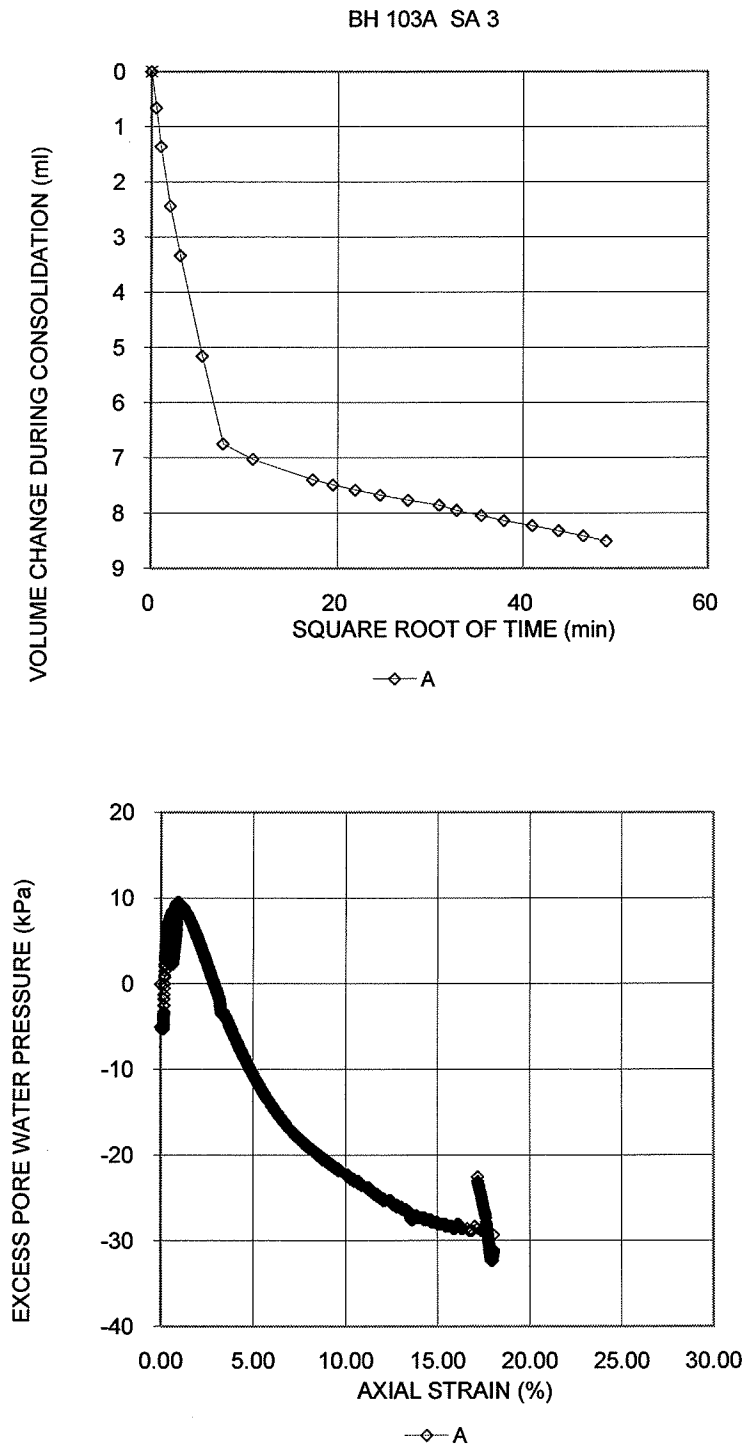
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 103A SA 3 CIUC D



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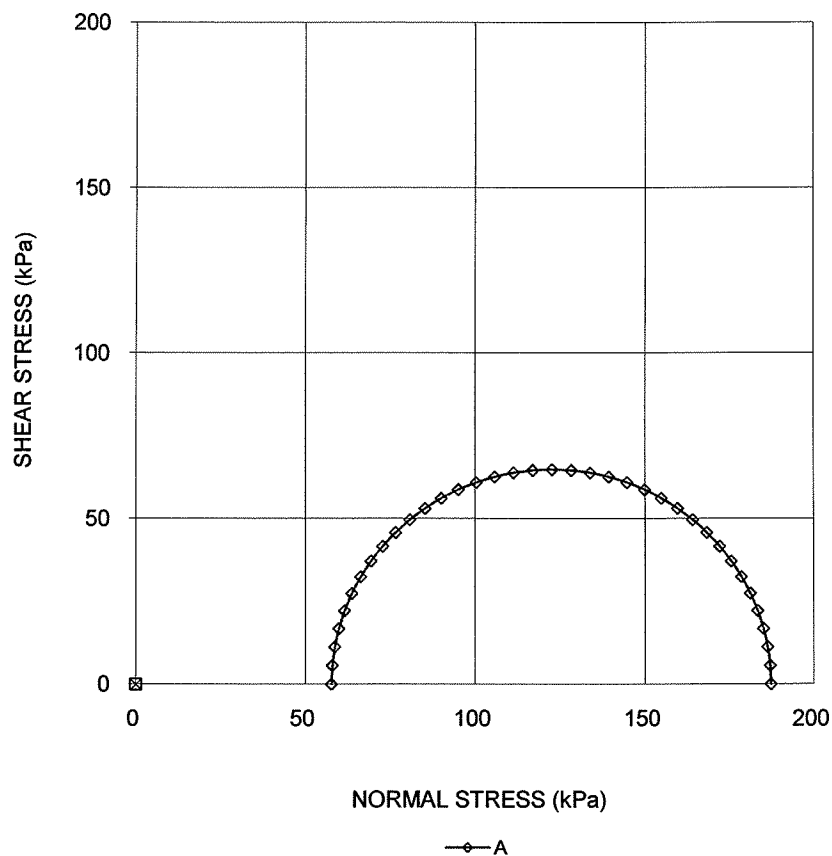
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<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 105 SA 8 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	105	
SAMPLE	8	
SPECIMEN DIAMETER, cm	4.94	
SPECIMEN HEIGHT, cm	10.08	
WATER CONTENT BEFORE CONSOLIDATION, %	17.1	
CELL PRESSURE, $\sigma_3$ , kPa	445.0	
BACK PRESSURE, kPa	415.0	
PORE PRESSURE PARAMETER "B"	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	30.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.1	
WATER CONTENT AFTER CONSOLIDATION, %	16.5	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	16.3	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	129.6	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	8.1	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.6	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	84.4	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	3.2	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.21	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	-0.03	
NATURAL WATER CONTENT, %	15.4	
DRY DENSITY, $Mg/m^3$	1.92	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1	
ANGLE OF FAILURE, DEGREES	40.0	
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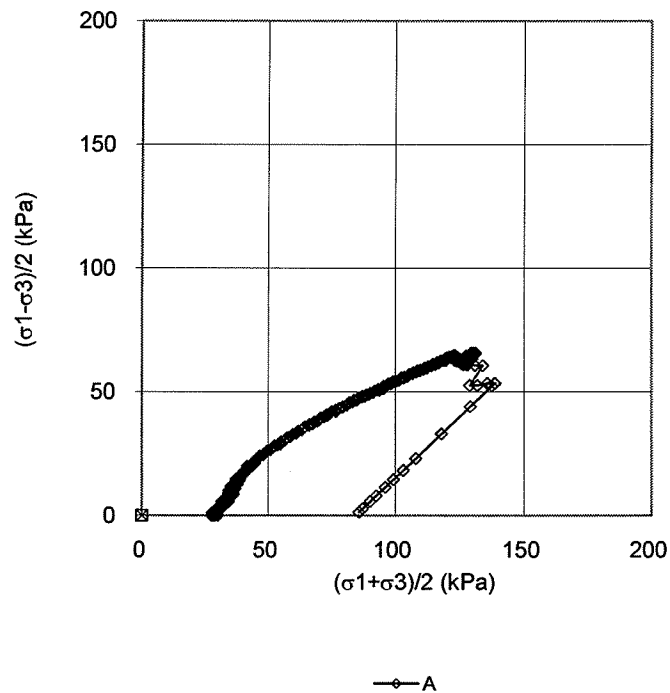
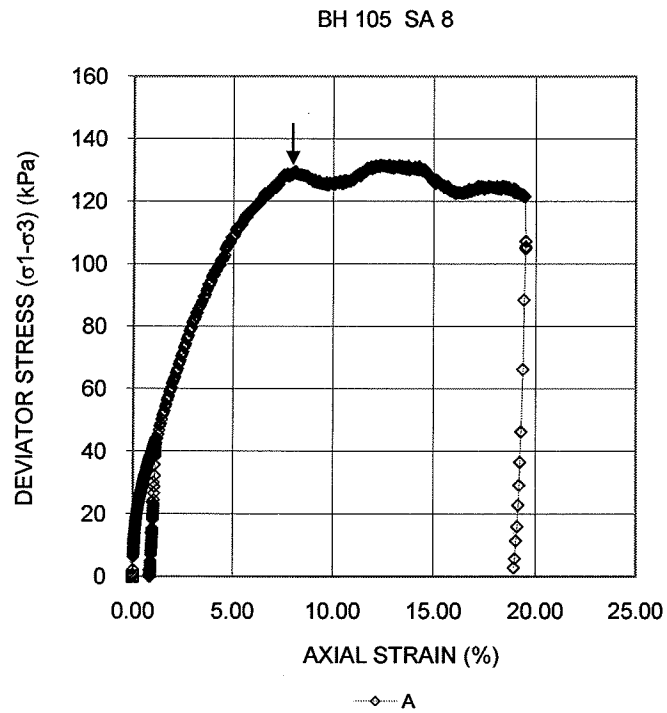
BH 105 SA 8



CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS

SHEET 3 OF 4

FIGURE BH 105 SA 8 CIUC C



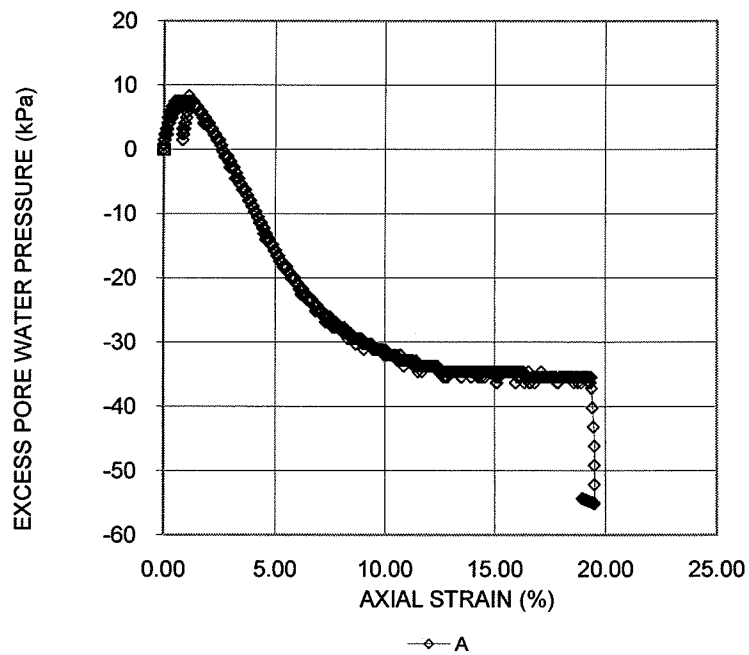
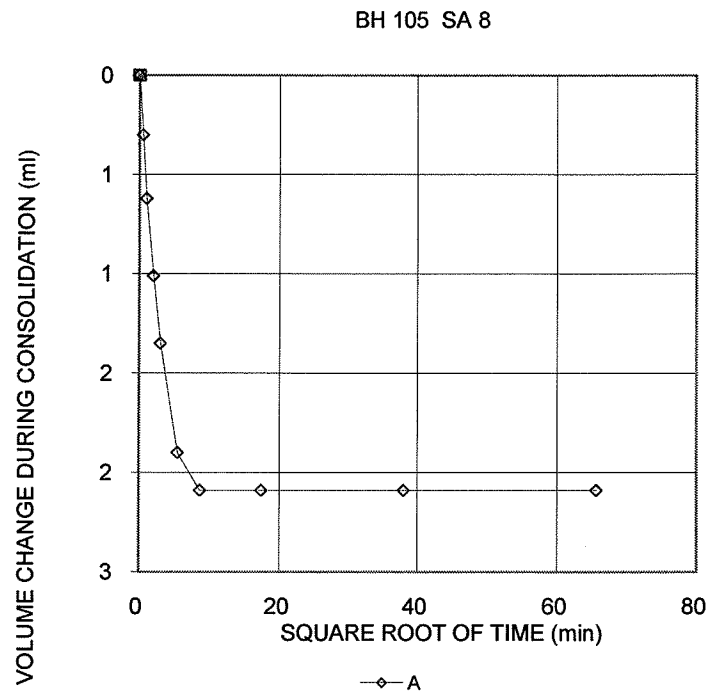
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 105 SA 8 CIUC D



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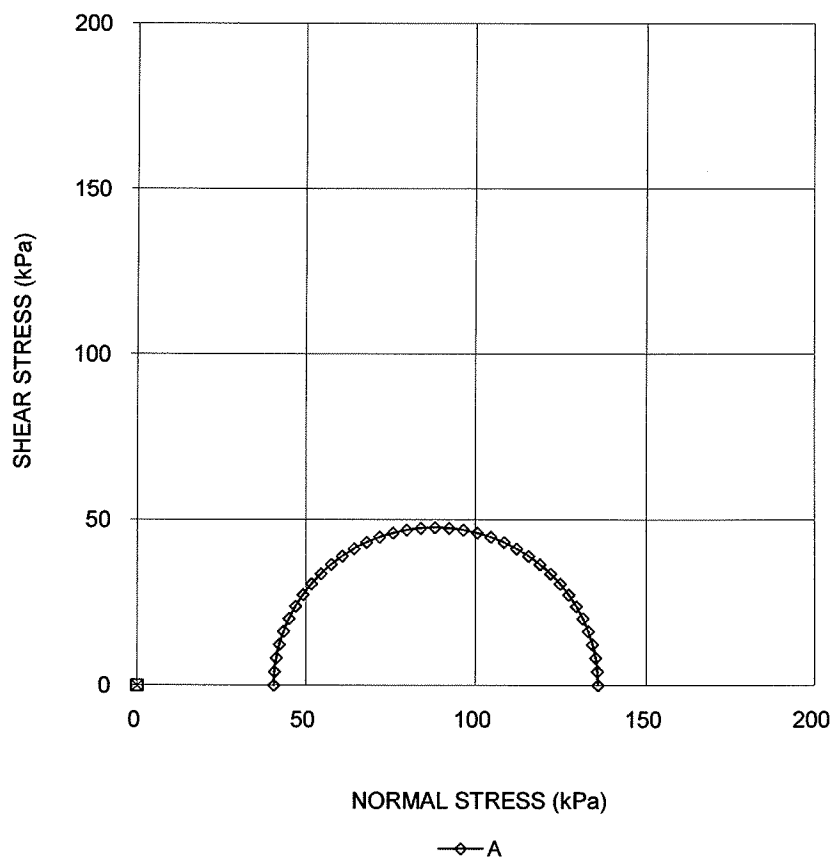
<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 105 SA 11 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	105	
SAMPLE	11	
SPECIMEN DIAMETER, cm	4.96	
SPECIMEN HEIGHT, cm	10.06	
WATER CONTENT BEFORE CONSOLIDATION, %	18.8	
CELL PRESSURE, $\sigma_3$ , kPa	600.0	
BACK PRESSURE, kPa	555.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	45.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.8	
WATER CONTENT AFTER CONSOLIDATION, %	17.8	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	17.3	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	95.3	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	9.3	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.5	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	72.0	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	3.5	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.05	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.23	
NATURAL WATER CONTENT, %	17.2	
DRY DENSITY, $Mg/m^3$	1.85	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	Bulged	
<div> <div>Date: 04/15/2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <b>Golder Associates</b> </div> <div> <div>Prepared By MM</div> <div>Checked By: RO</div> </div>		



CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 105 SA 11 CIUC B

BH 105 SA 11



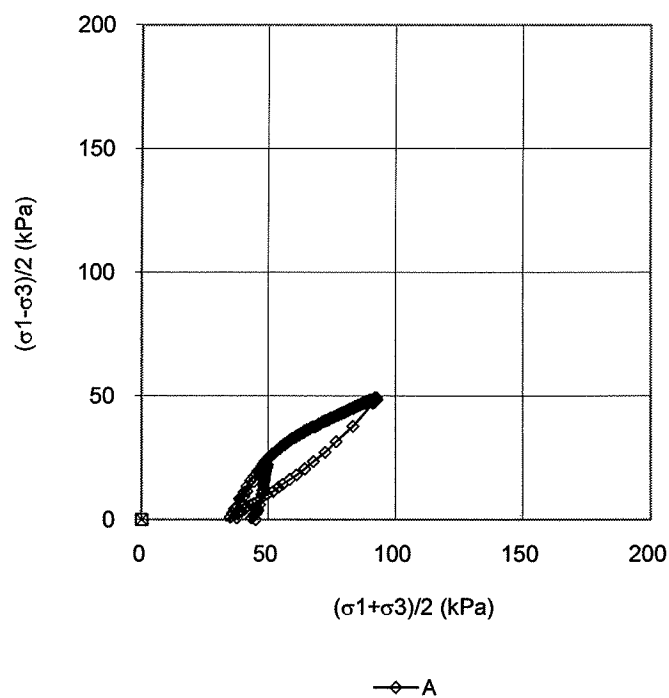
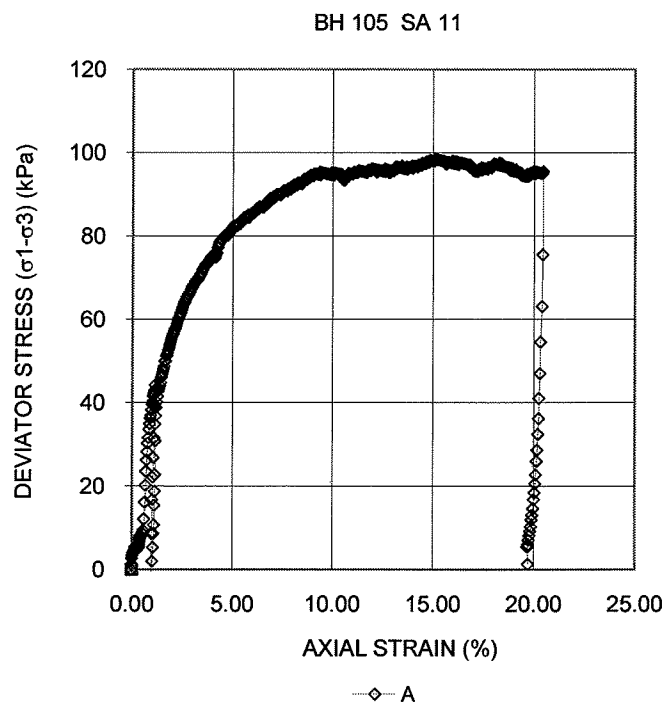
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 105 SA 11 CIUC C**



Date: 04/15/2008  
Project No. 07-1130-2070

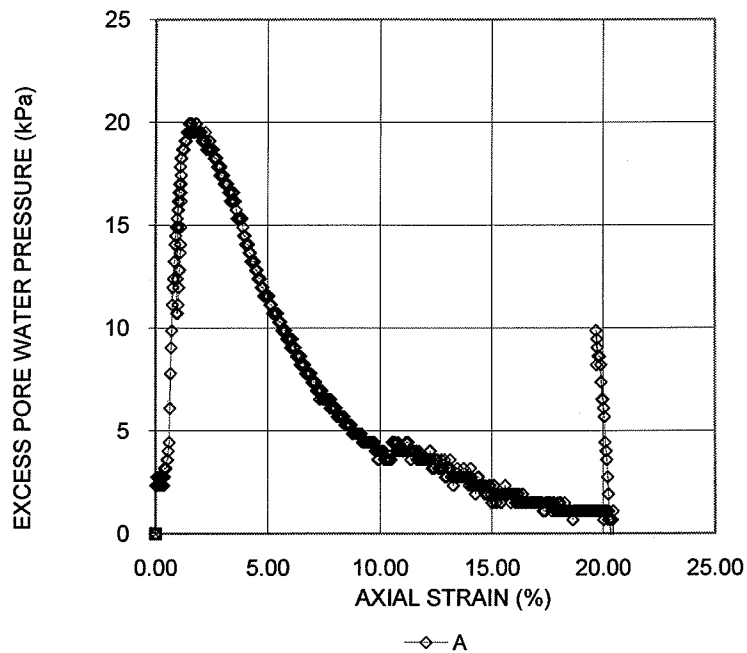
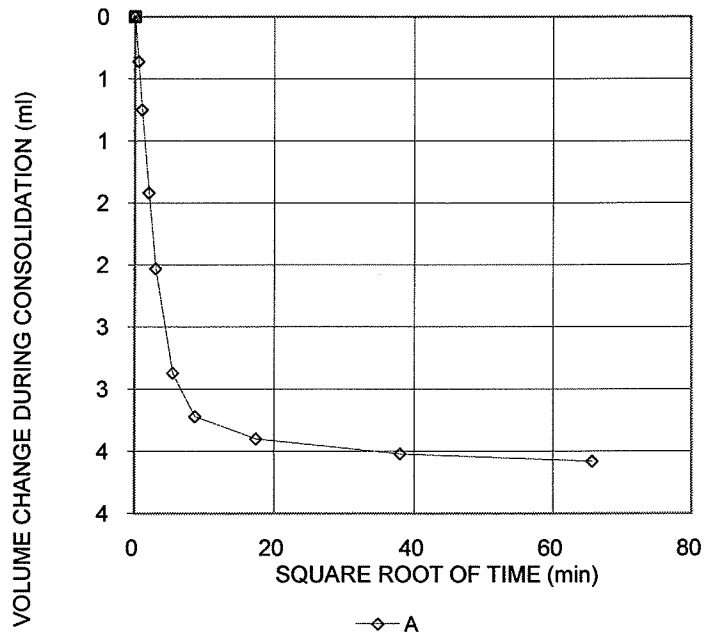
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 105 SA 11 CIUC D

BH 105 SA 11



Date: 04/15/2008  
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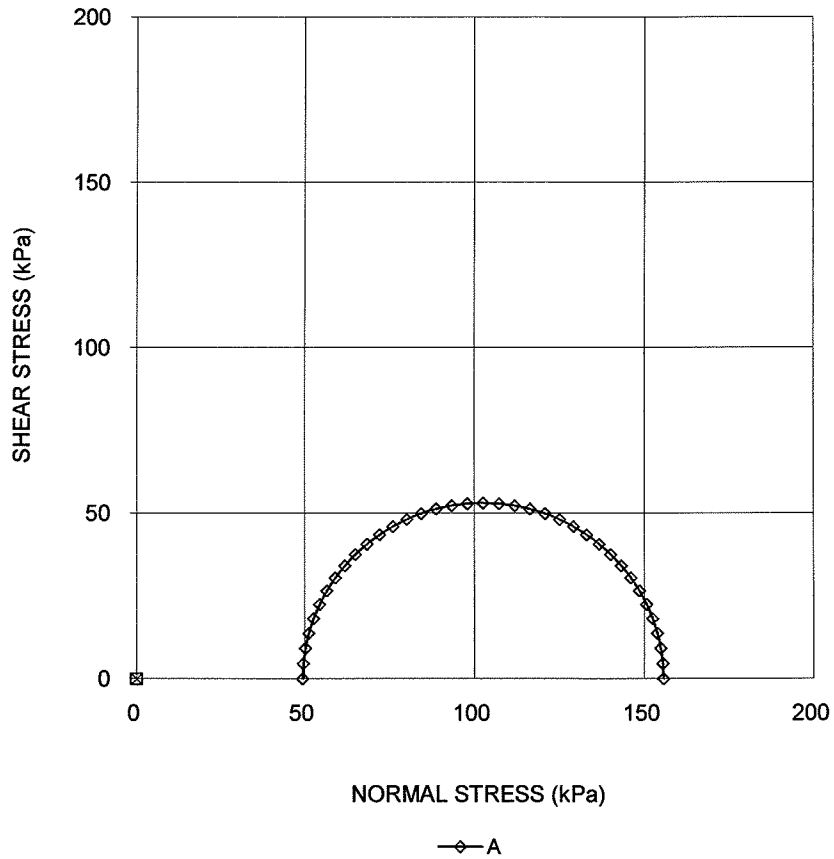
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Checked By: RO

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 105 SA 15 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	105	
SAMPLE	15	
SPECIMEN DIAMETER, cm	4.96	
SPECIMEN HEIGHT, cm	10.11	
WATER CONTENT BEFORE CONSOLIDATION, %	23.1	
CELL PRESSURE, $\sigma_3$ , kPa	550.0	
BACK PRESSURE, kPa	485.0	
PORE PRESSURE PARAMETER "B"	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	65.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.1	
WATER CONTENT AFTER CONSOLIDATION, %	21.4	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	22.4	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	106.2	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	10.6	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.4	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	94.9	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	5.5	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.15	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.26	
NATURAL WATER CONTENT, %	21.9	
DRY DENSITY, Mg/m <sup>3</sup>	1.70	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1	
ANGLE OF FAILURE, DEGREES	55	
<div> <div> Date: 04/18/2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By AH  Checked By: RO </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 105 SA 15 CIUC B

BH 105 SA



Date: 04/18/2008  
Project No. 07-1130-2070

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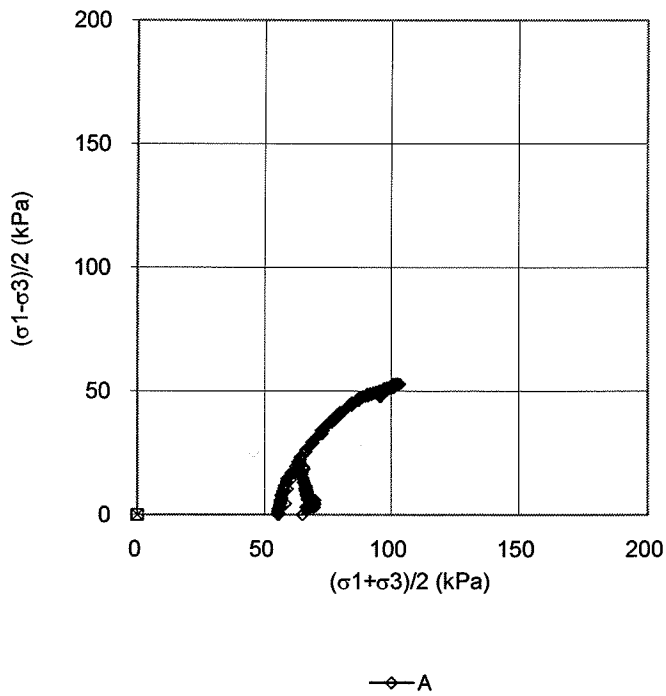
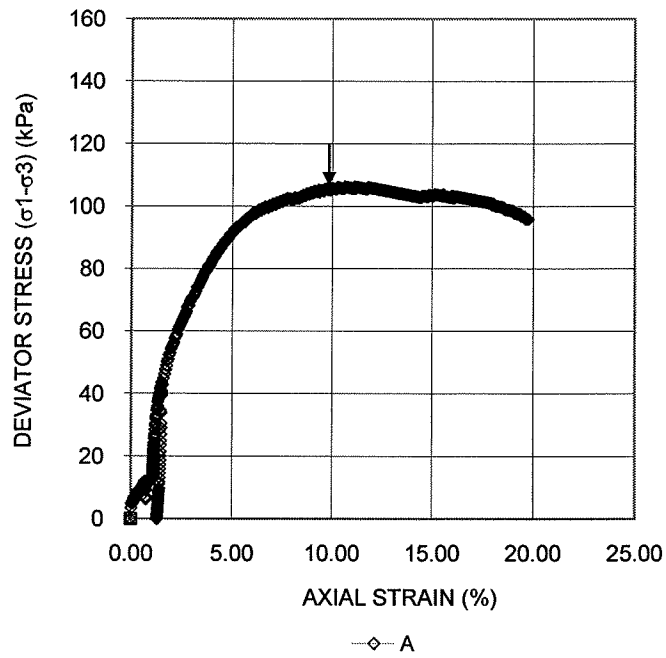
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 105 SA 15 CIUC C

BH 105 SA 15



Date: 04/18/2008  
Project No. 07-1130-2070

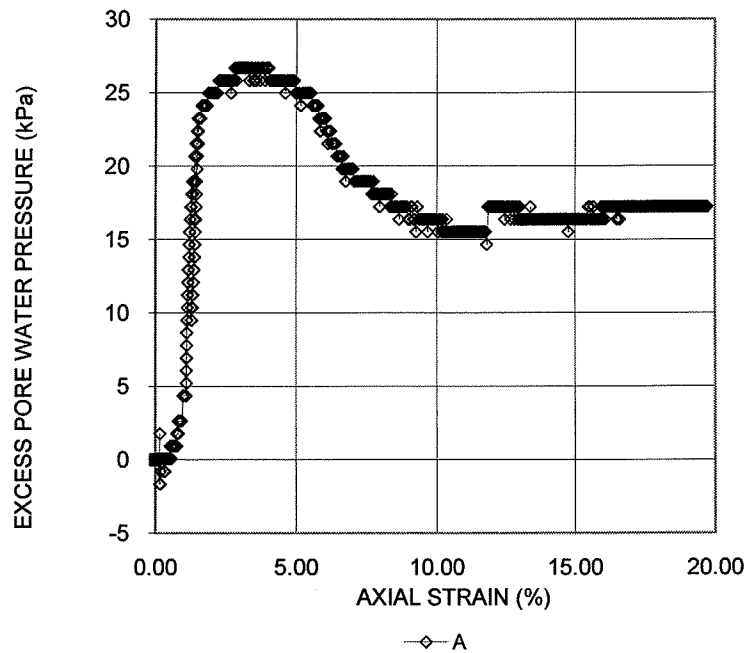
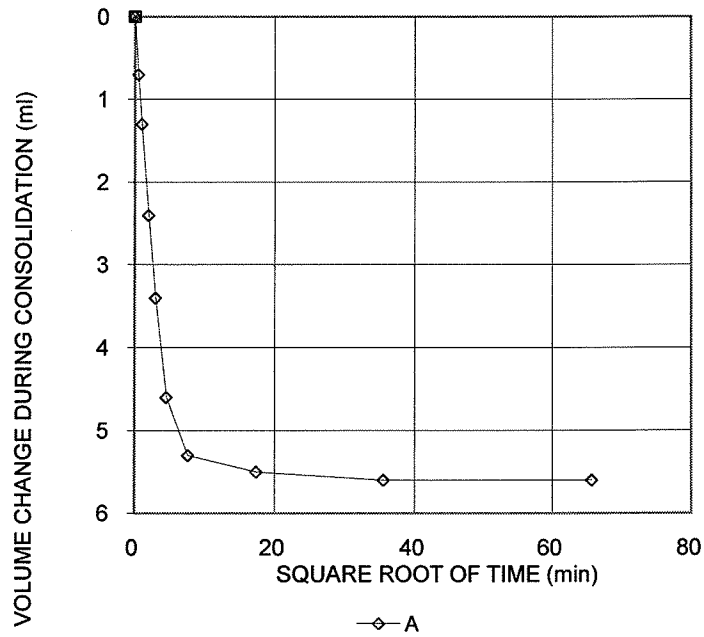
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 105 SA 15 CIUC D

BH 105 SA 15



Date: 04/18/2008  
Project No. 07-1130-2070

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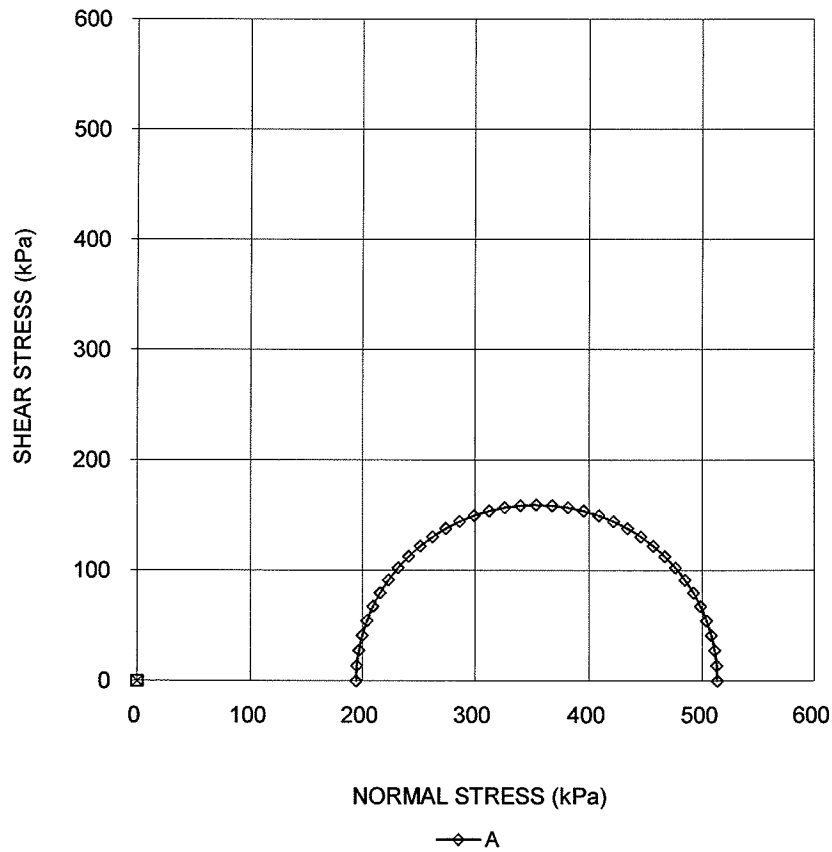
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<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 105 SA 20 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	105	
SAMPLE	20	
SPECIMEN DIAMETER, cm	5.00	
SPECIMEN HEIGHT, cm	10.13	
WATER CONTENT BEFORE CONSOLIDATION, %	24.0	
CELL PRESSURE, $\sigma_3$ , kPa	645.0	
BACK PRESSURE, kPa	555.0	
PORE PRESSURE PARAMETER "B"	0.86	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	90.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	3.8	
WATER CONTENT AFTER CONSOLIDATION, %	21.8	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	20.2	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	318.8	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	16.2	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	1.8	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	52.6	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	0.4	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.33	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.51	
NATURAL WATER CONTENT, %	18.7	
DRY DENSITY, Mg/m <sup>3</sup>	1.77	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	Bulged	
<div> <div> Date: 04/30/2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By AH  Checked By: MM </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 105 SA 20 CIUC B

BH 105 SA 20



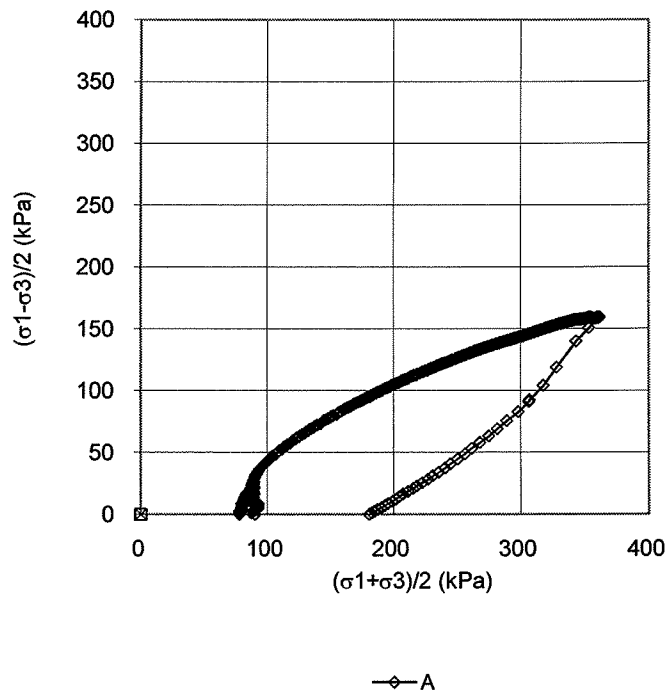
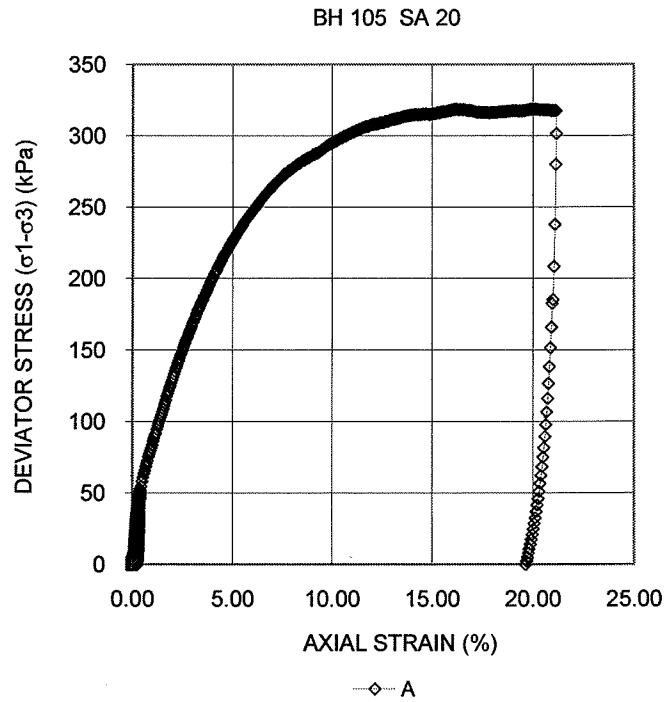
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
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FIGURE BH 105 SA 20 CIUC C



Date: 04/30/2008  
Project No. 07-1130-2070

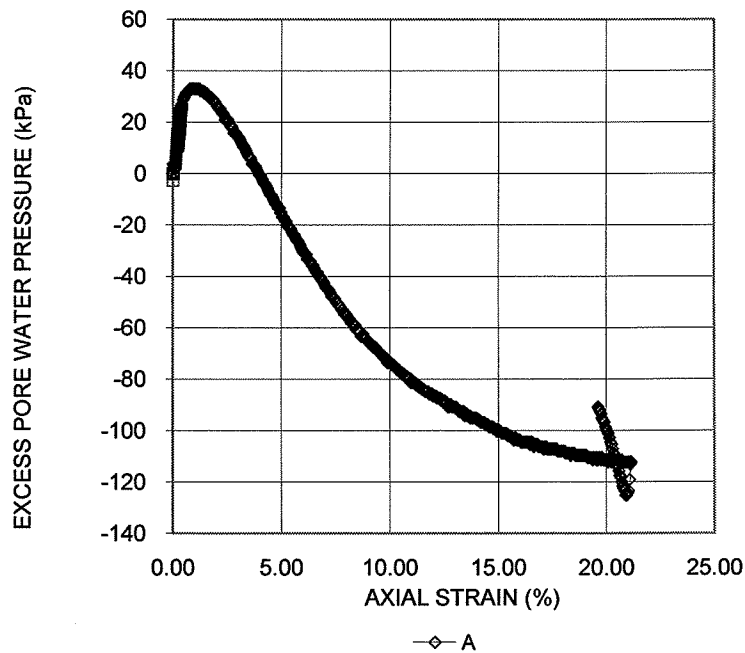
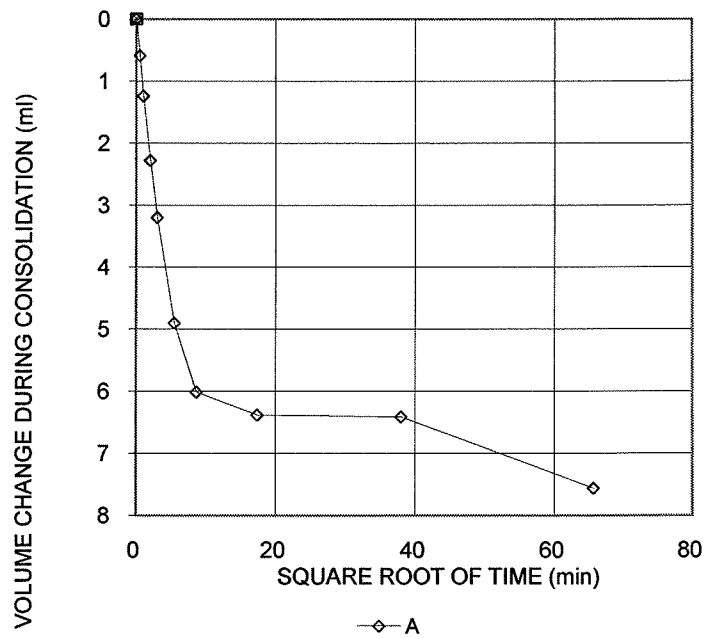
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
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FIGURE BH 105 SA 20 CIUC D

BH 105 SA 20



Date: 04/30/2008  
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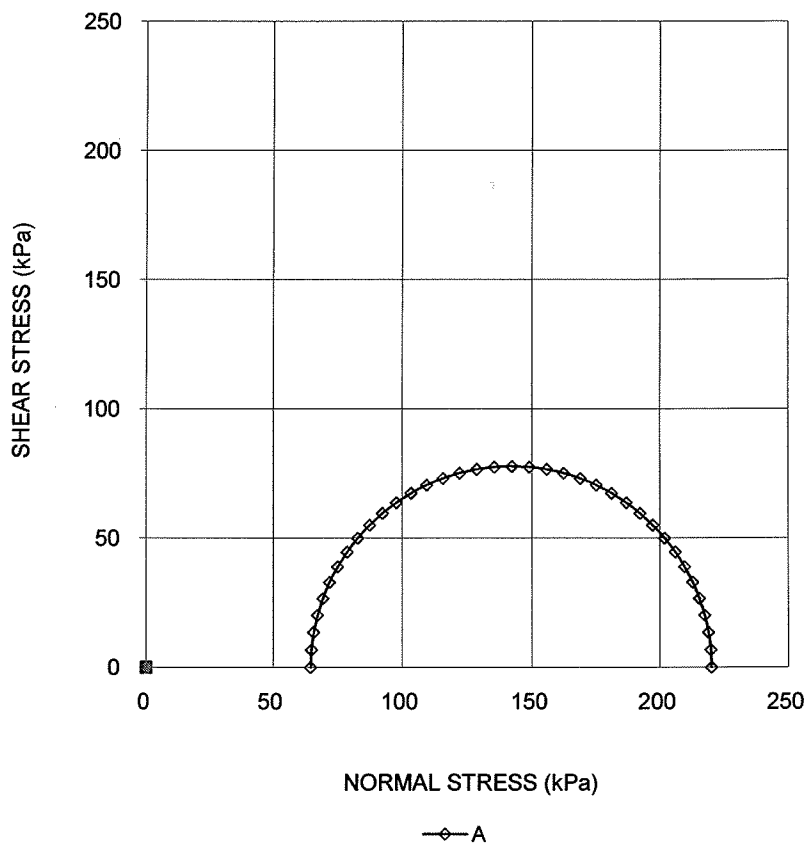


<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 112 SA 7 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	112	
SAMPLE	7	
SPECIMEN DIAMETER, cm	4.95	
SPECIMEN HEIGHT, cm	10.02	
WATER CONTENT BEFORE CONSOLIDATION, %	15.1	
CELL PRESSURE, $\sigma_3$ , kPa	240.0	
BACK PRESSURE, kPa	205.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	35.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	8.8	
WATER CONTENT AFTER CONSOLIDATION, %	10.6	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	14.5	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	155.5	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	10.8	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	4.4	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	94.6	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	2.4	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.19	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.08	
NATURAL WATER CONTENT, %	13.0	
DRY DENSITY, Mg/m <sup>3</sup>	1.95	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1.0	
ANGLE OF FAILURE, DEGREES	55.0	
<div> <div>Date: March 31, 2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By AH</div> <div>Checked By: MM</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 112 SA 7 CIUC B

BH 112 SA 7



Date: March 31, 2008  
Project No. 07-1130-2070

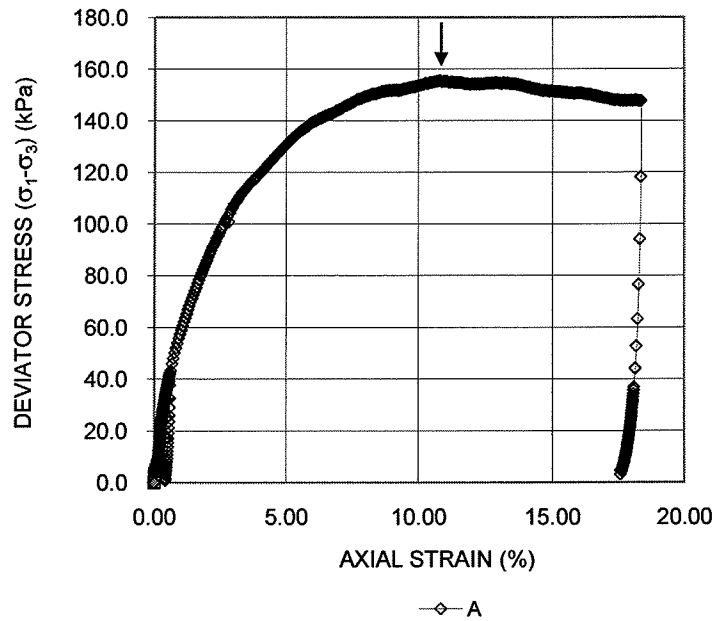
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Prepared By LFG  
Checked By: MM

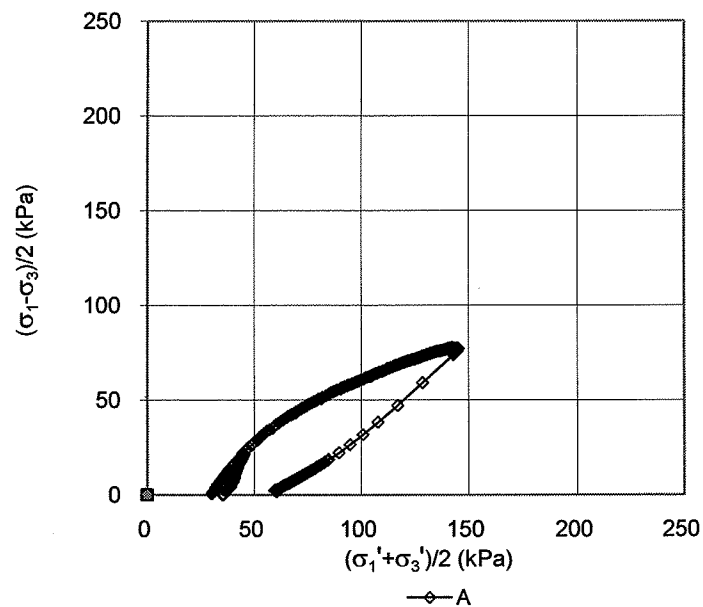
**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 112 SA 7 CIUC C**

BH 112 SA 7



BH 112 SA 7



Date: March 31, 2008  
Project No. 07-1130-2070

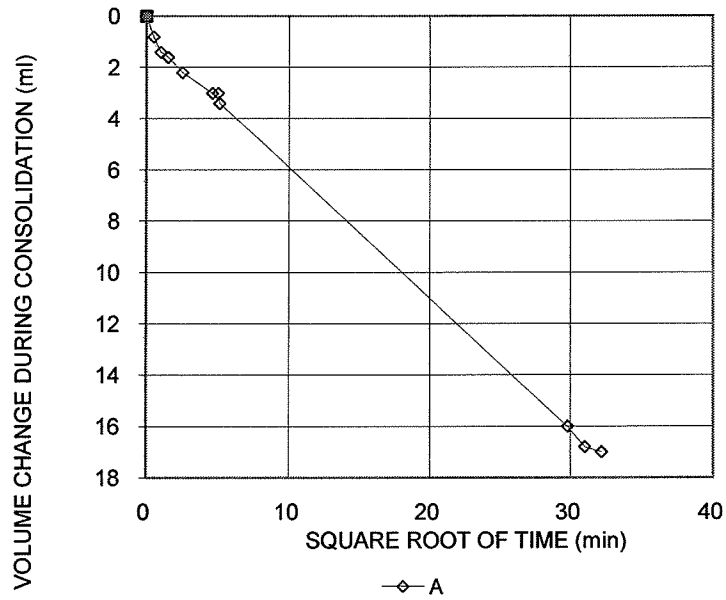
**Golder Associates**

Prepared By LFG  
Checked By: MM

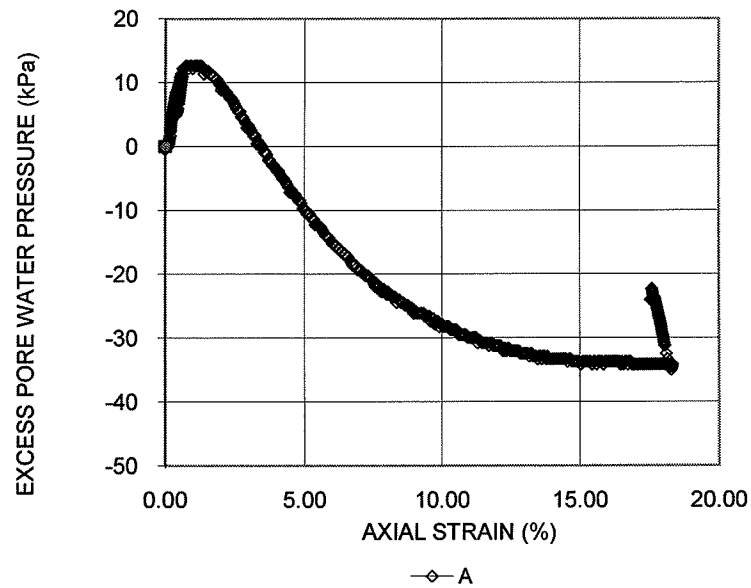
**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 112 SA 7 CIUC D**

BH 112 SA 7



BH 112 SA 7



Date: March 31, 2008

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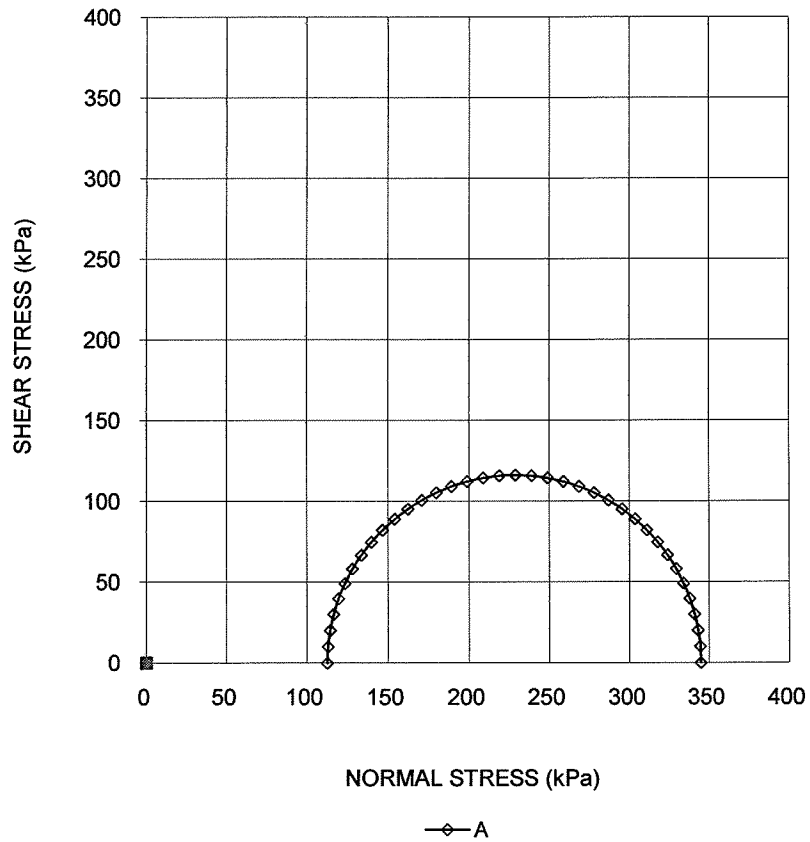
Checked By: MM

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 112 SA 18 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	112	
SAMPLE	18	
SPECIMEN DIAMETER, cm	4.88	
SPECIMEN HEIGHT, cm	9.99	
WATER CONTENT BEFORE CONSOLIDATION, %	16.2	
CELL PRESSURE, $\sigma_3$ , kPa	240.0	
BACK PRESSURE, kPa	145.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	95.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	11.2	
WATER CONTENT AFTER CONSOLIDATION, %	10.1	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	16.1	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	232.2	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	16.1	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.5	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	170.4	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	4.3	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.08	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.13	
NATURAL WATER CONTENT, %	15.2	
DRY DENSITY, Mg/m <sup>3</sup>	1.88	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	bulging	
<div> <div>Date: March 31, 2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By AH</div> <div>Checked By: MM</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 112 SA 18 CIUC B

BH 112 SA 18



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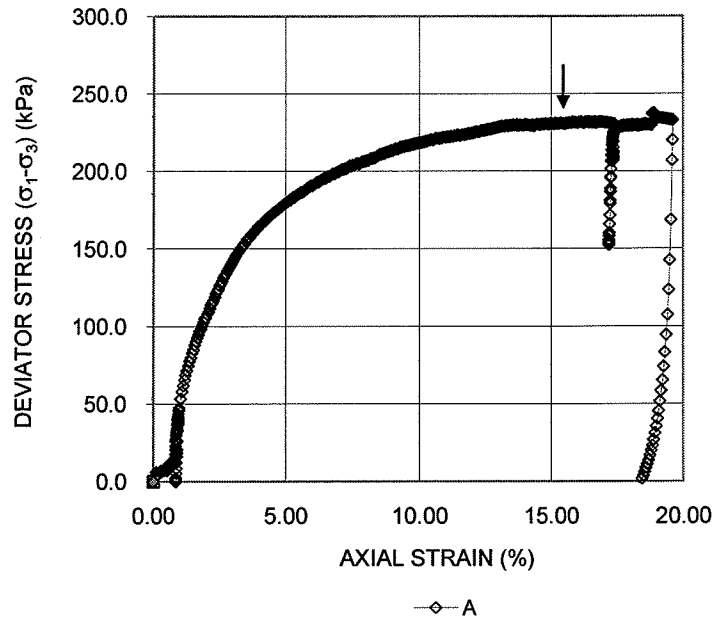
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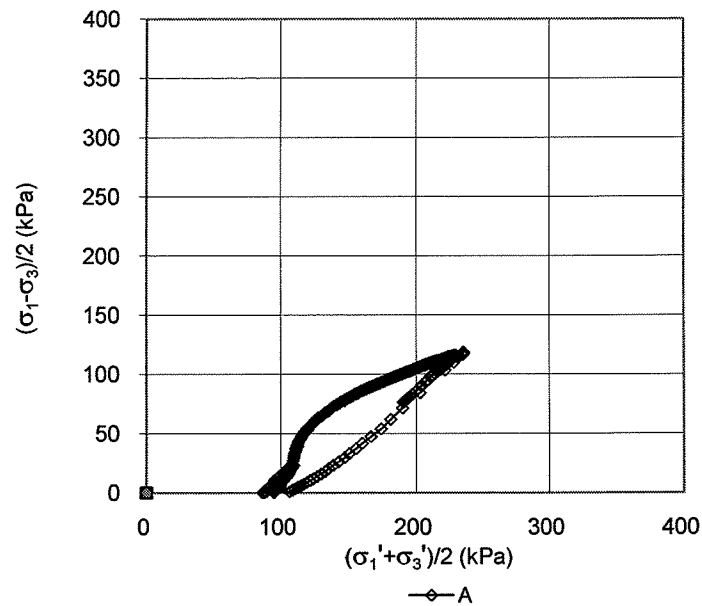
CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 112 SA 18 CIUC C

BH 112 SA 18



BH 112 SA 18



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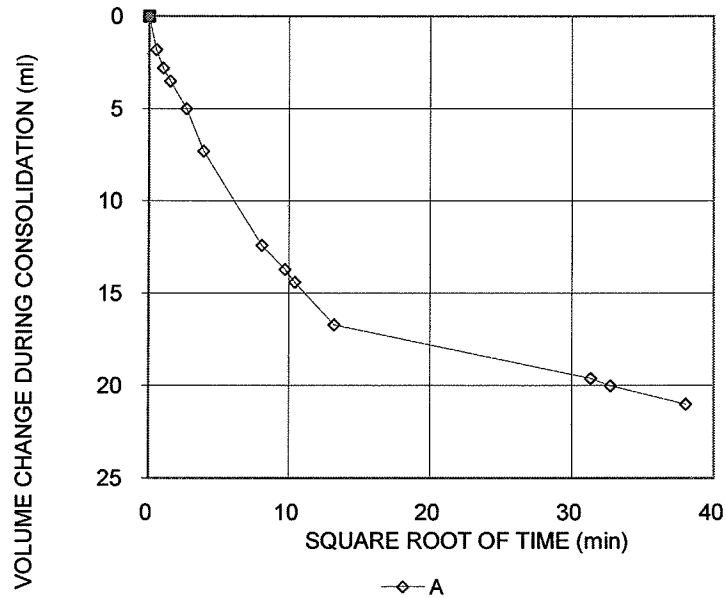
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Checked By: MM

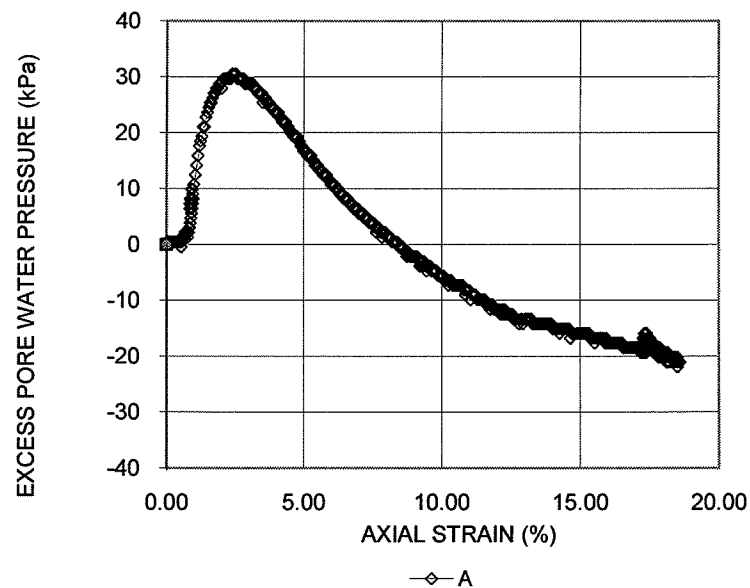
CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 112 SA 18 CIUC D

BH 112 SA 18



BH 112 SA 18



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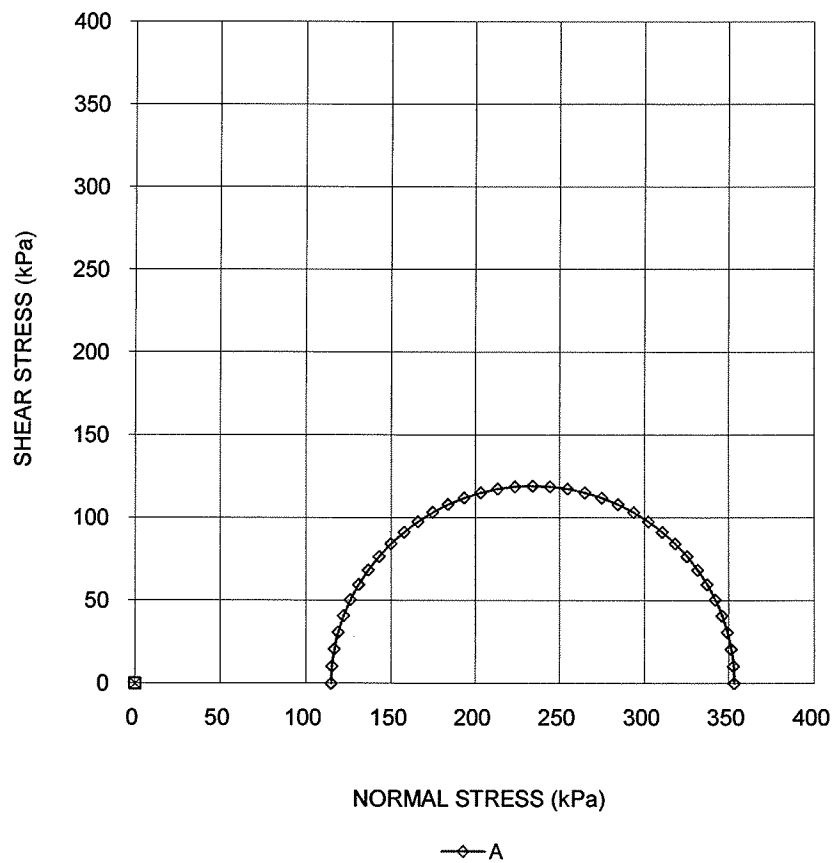
Prepared By LFG  
Checked By: MM

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 112 SA 19 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	112	
SAMPLE	19	
SPECIMEN DIAMETER, cm	4.99	
SPECIMEN HEIGHT, cm	9.96	
WATER CONTENT BEFORE CONSOLIDATION, %	21.4	
CELL PRESSURE, $\sigma_3$ , kPa	305.0	
BACK PRESSURE, kPa	205.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	100.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	10.3	
WATER CONTENT AFTER CONSOLIDATION, %	15.5	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	20.2	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	238.3	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	12.2	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.2	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	175.8	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	5.5	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.06	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.12	
NATURAL WATER CONTENT, %	19.3	
DRY DENSITY, $Mg/m^3$	1.74	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1.0	
ANGLE OF FAILURE, DEGREES	55.0	
<div> <div>Date: March 31, 2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By AH</div> <div>Checked By: MM</div> </div>		

**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4**

**FIGURE BH 112 SA 19 CIUC B**

BH 112 SA 19



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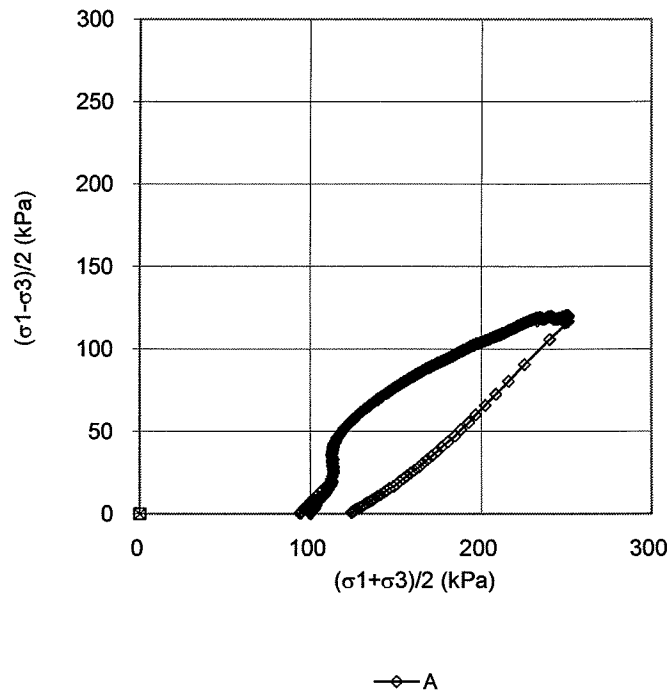
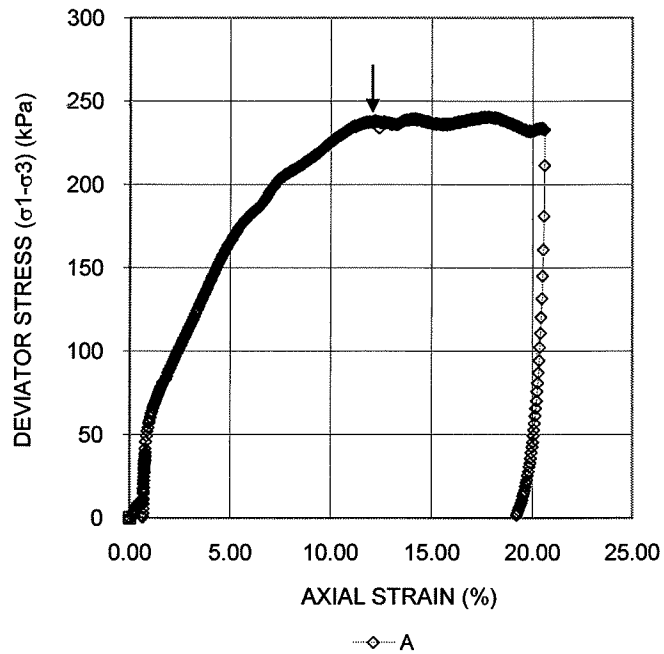
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 112 SA 19 CIUC C**

BH 112 SA 19



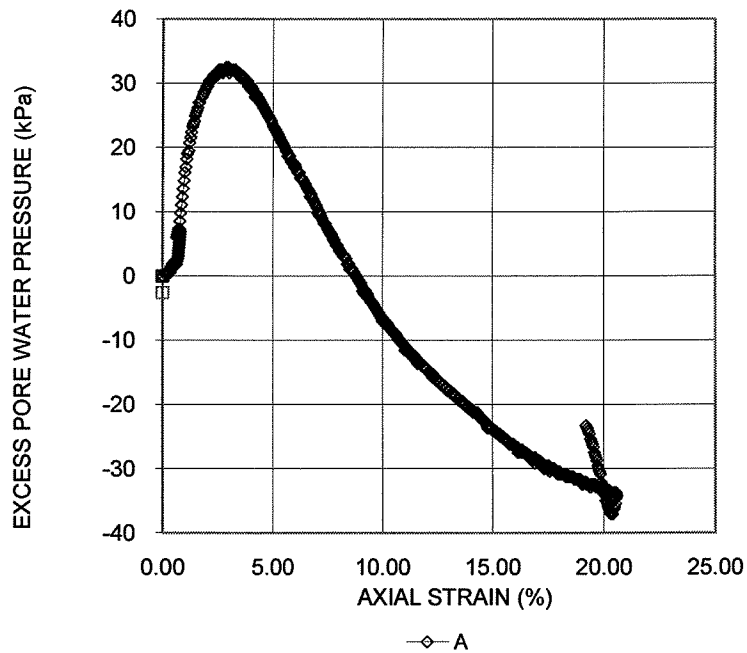
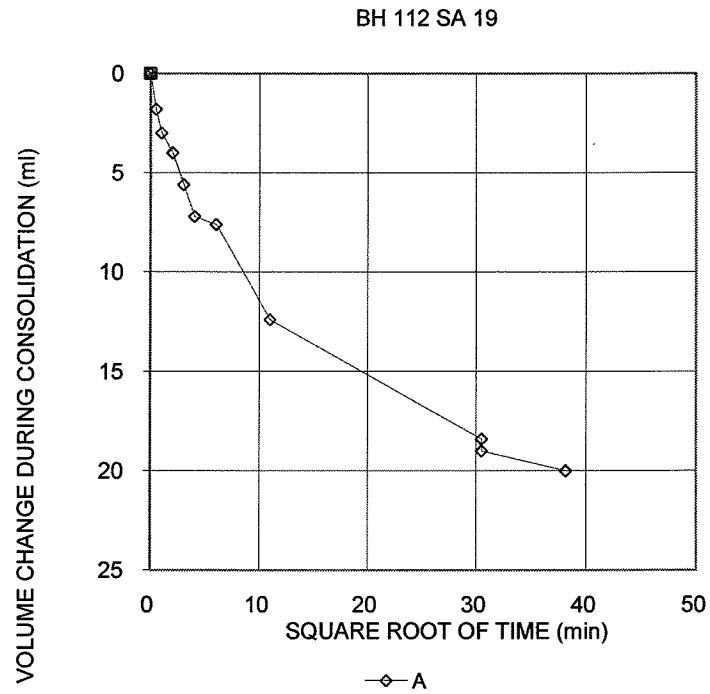
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 112 SA 19 CIUC D



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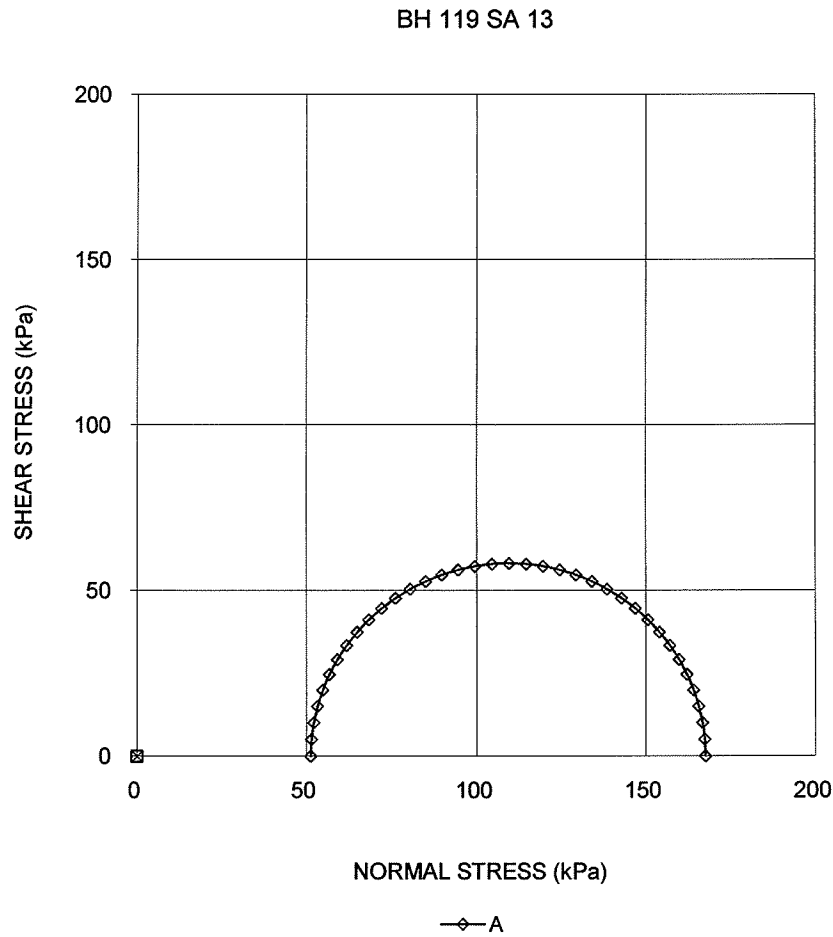
Prepared By AH  
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<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 119 SA 13 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	119	
SAMPLE	13	
SPECIMEN DIAMETER, cm	4.98	
SPECIMEN HEIGHT, cm	10.10	
WATER CONTENT BEFORE CONSOLIDATION, %	22.0	
CELL PRESSURE, $\sigma_3$ , kPa	125.0	
BACK PRESSURE, kPa	65.0	
PORE PRESSURE PARAMETER "B"	0.98	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	60.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	3.0	
WATER CONTENT AFTER CONSOLIDATION, %	20.2	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	20.7	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	116.4	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	5.7	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.4	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	112.1	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	3.9	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.07	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.11	
NATURAL WATER CONTENT, %	20.2	
DRY DENSITY, Mg/m <sup>3</sup>	1.74	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1.0	
ANGLE OF FAILURE, DEGREES	55.0	
<div> <div>Date: April 7, 2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By LFG</div> <div>Checked By: MM</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 119 SA 13 CIUC B



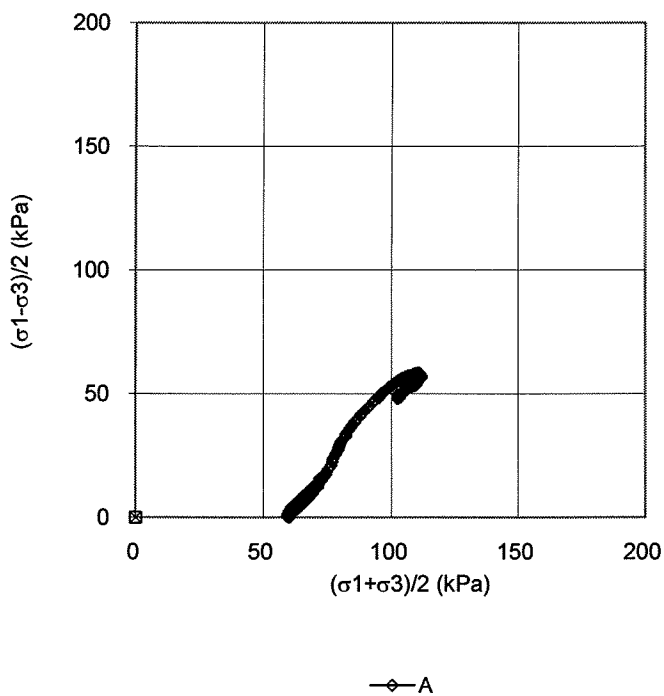
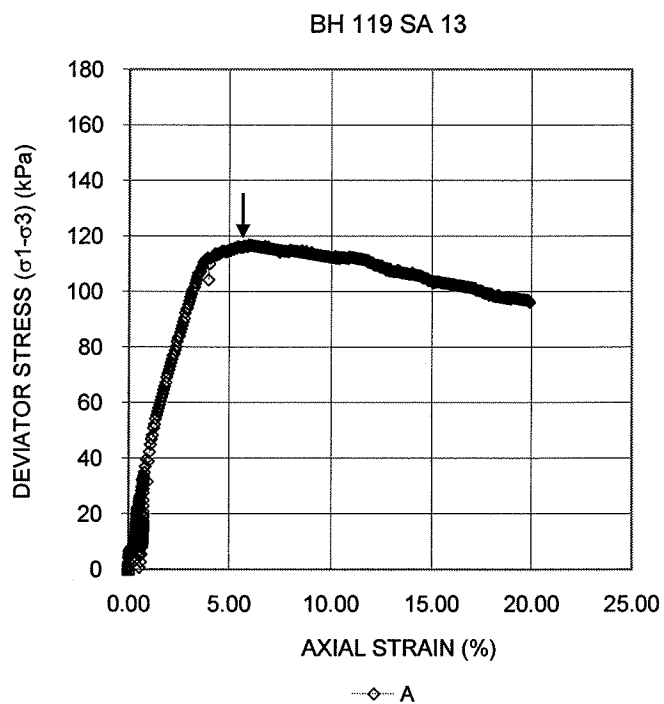
Date: April 7, 2008  
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 119 SA 13 CIUC C**



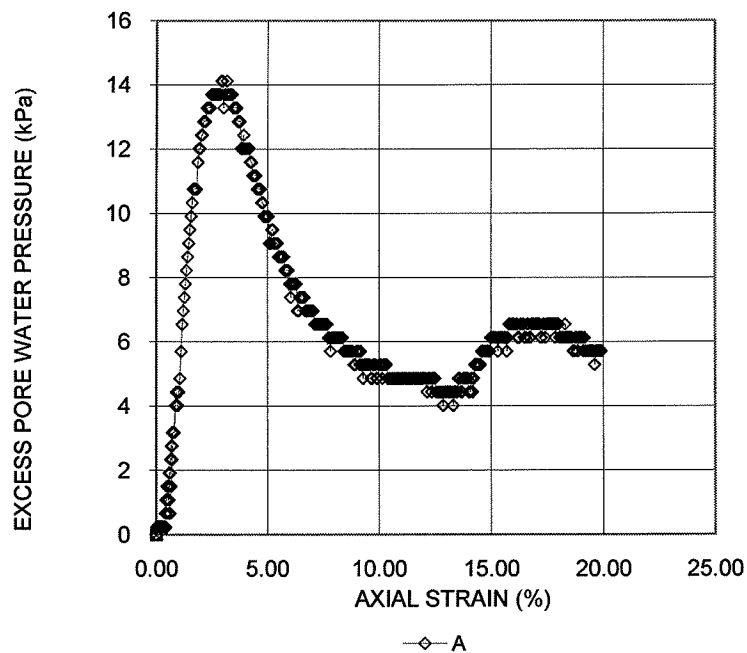
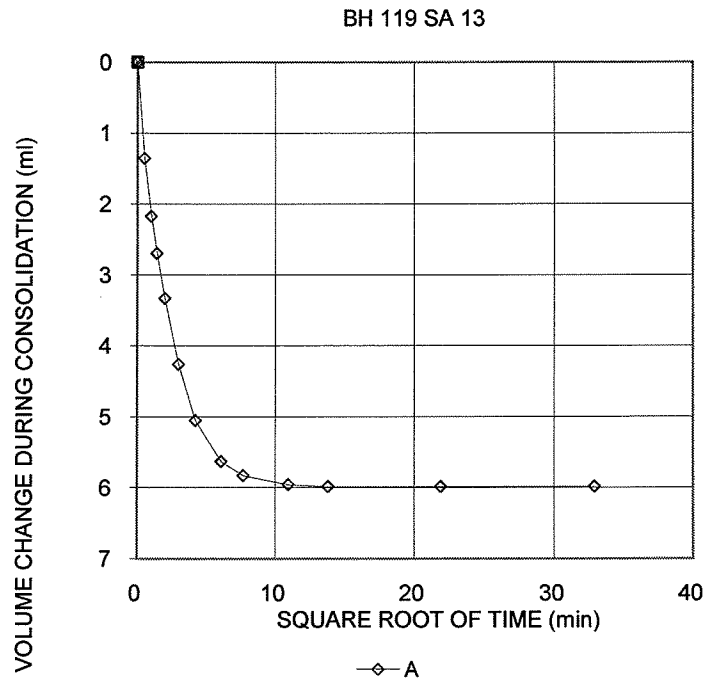
Date: April 7, 2008  
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 119 SA 13 CIUC D



Date: April 7, 2008  
Project No. 07-1130-2070

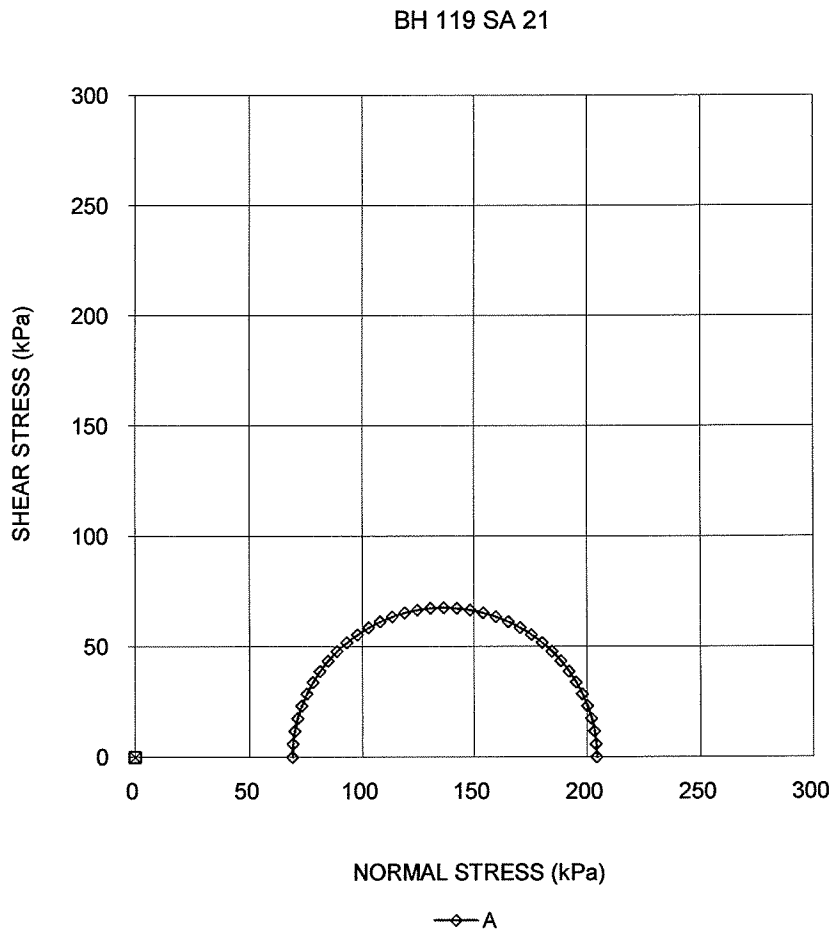
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<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 119 SA 21 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	119	
SAMPLE	21	
SPECIMEN DIAMETER, cm	5.00	
SPECIMEN HEIGHT, cm	10.09	
WATER CONTENT BEFORE CONSOLIDATION, %	25.2	
CELL PRESSURE, $\sigma_3$ , kPa	585.0	
BACK PRESSURE, kPa	485.0	
PORE PRESSURE PARAMETER "B"	0.99	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	100.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	4.7	
WATER CONTENT AFTER CONSOLIDATION, %	22.5	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	19.9	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	135.3	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	9.2	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.0	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	120.9	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	6.2	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.23	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.33	
NATURAL WATER CONTENT, %	20.4	
DRY DENSITY, $Mg/m^3$	1.74	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	Bulged	
ANGLE OF FAILURE, DEGREES	-	
<div> <div> Date: April 7, 2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By LFG  Checked By: MM </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
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FIGURE BH 119 SA 21 CIUC B



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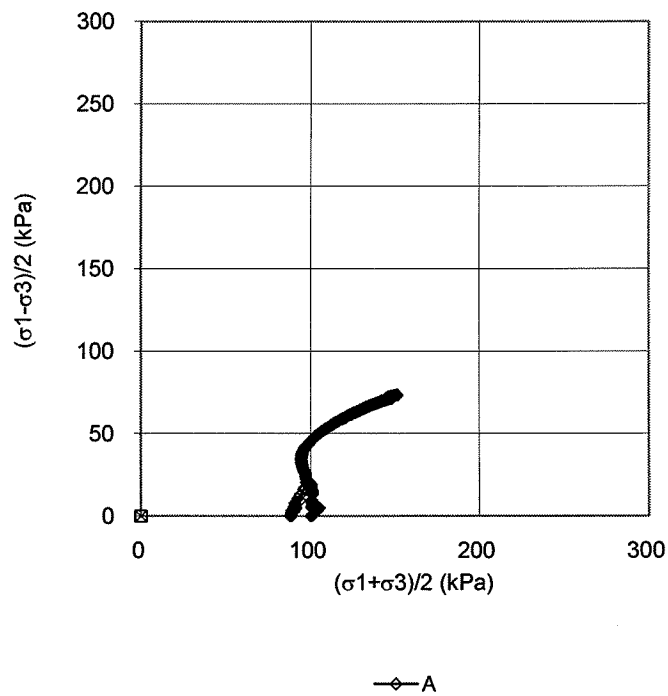
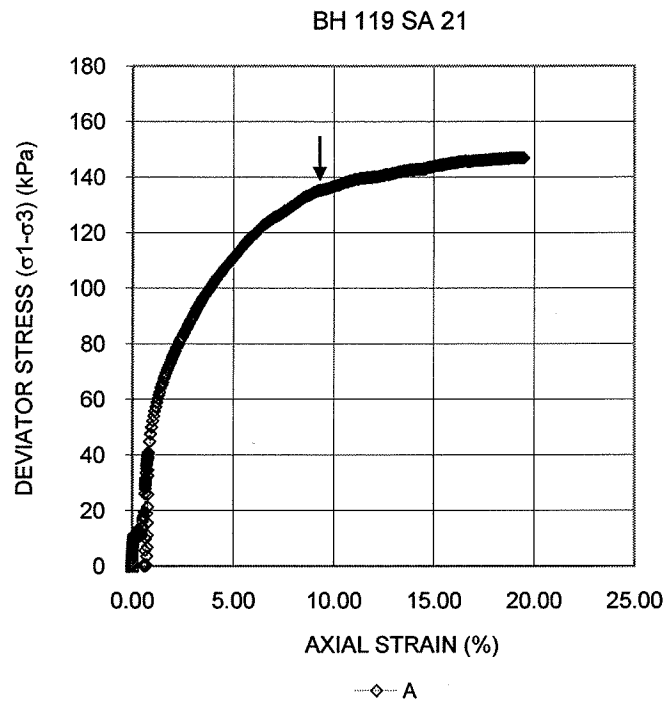
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 119 SA 21 CIUC C



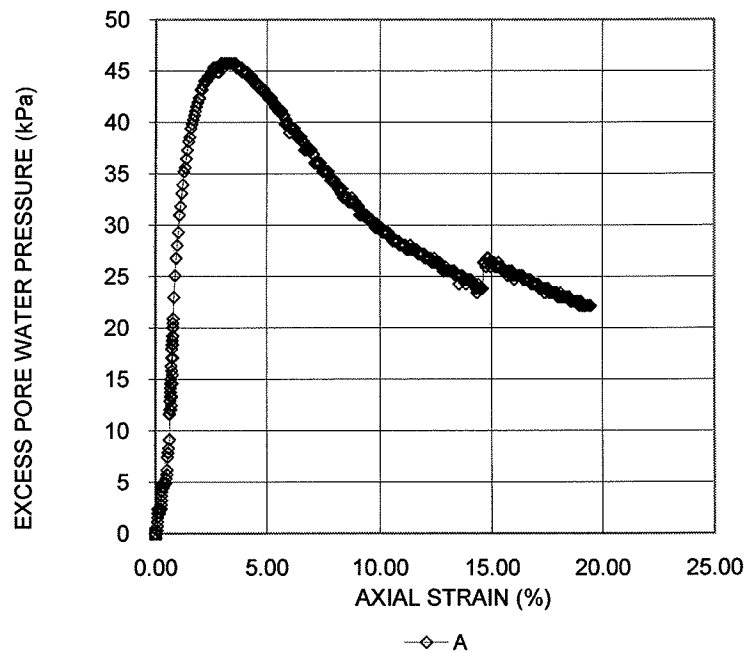
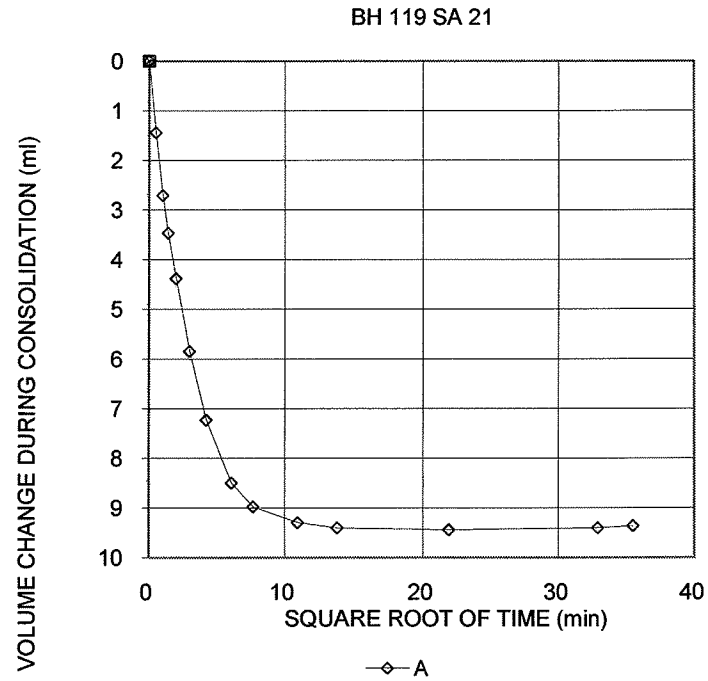
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
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FIGURE BH 119 SA 21 CIUC D



Date: April 7, 2008  
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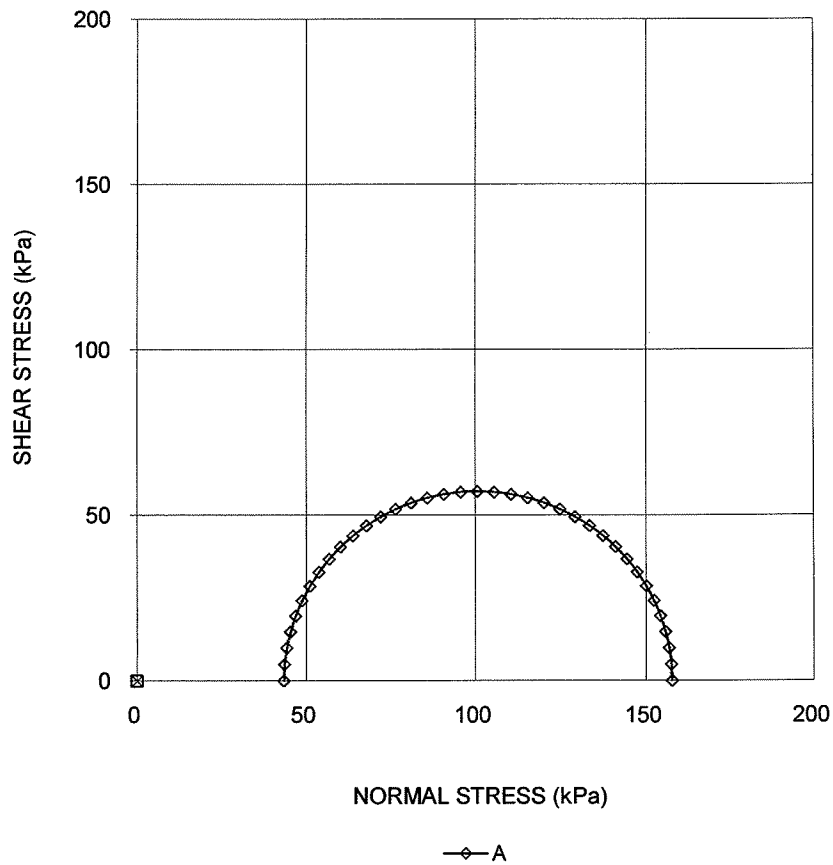
Prepared By LFG  
Checked By: MM

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 122 SA 6 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	122	
SAMPLE	6	
SPECIMEN DIAMETER, cm	5.00	
SPECIMEN HEIGHT, cm	10.09	
WATER CONTENT BEFORE CONSOLIDATION, %	22.9	
CELL PRESSURE, $\sigma_3$ , kPa	165.0	
BACK PRESSURE, kPa	135.0	
PORE PRESSURE PARAMETER "B"	0.99	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	30.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.6	
WATER CONTENT AFTER CONSOLIDATION, %	22.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	21.2	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	114.3	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	10.0	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	5.3	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	73.0	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	3.4	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.12	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.18	
NATURAL WATER CONTENT, %	20.1	
DRY DENSITY, $Mg/m^3$	1.74	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1.0	
ANGLE OF FAILURE, DEGREES	60.0	
<div> <div> Date: March 26, 2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By AH  Checked By: RO </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
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FIGURE BH 122 SA 6 CIUC B

BH 122 SA 6



Date: March 26, 2008  
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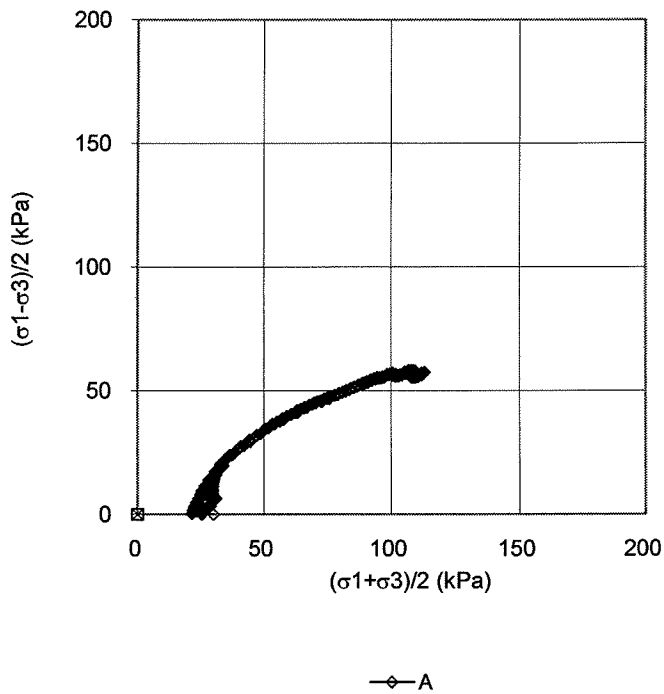
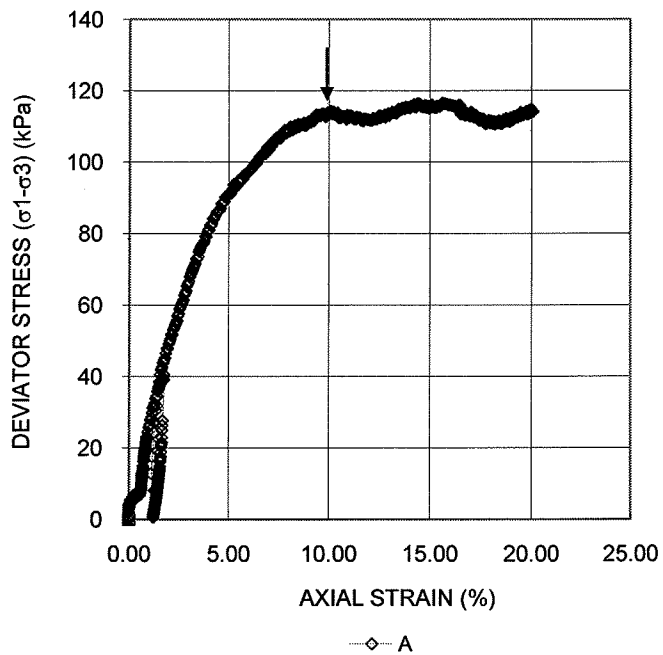
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 122 SA 6 CIUC C

BH 122 SA 6



Date: March 26, 2008  
Project No. 07-1130-2070

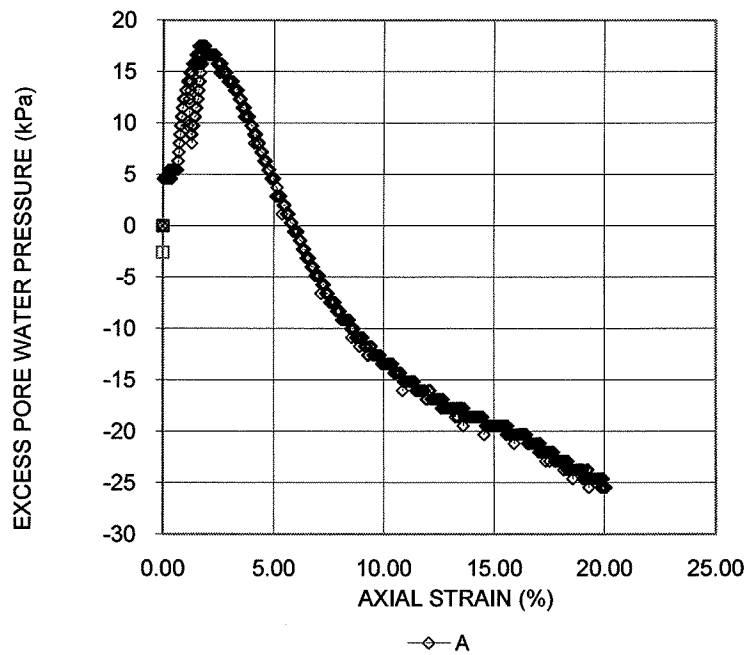
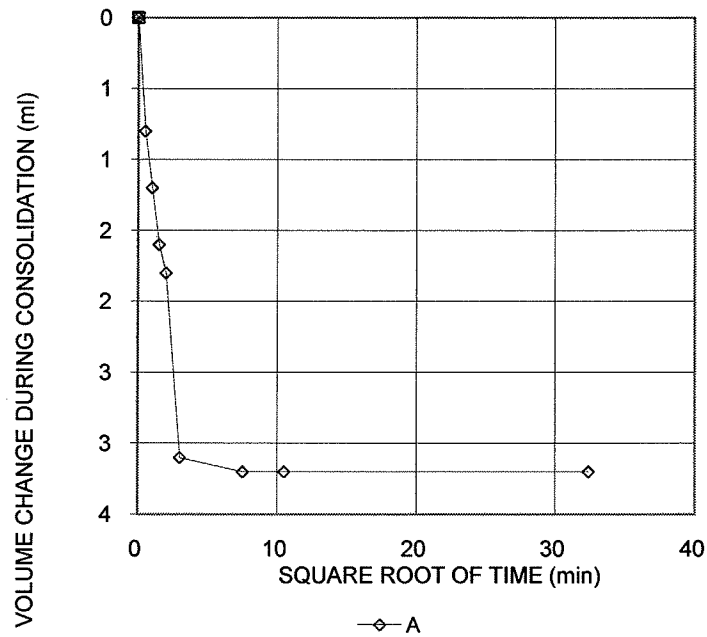
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 122 SA 6 CIUC D**

BH 122 SA 6



Date: March 26, 2008  
Project No. 07-1130-2070

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Prepared By: MM  
Checked By: RO

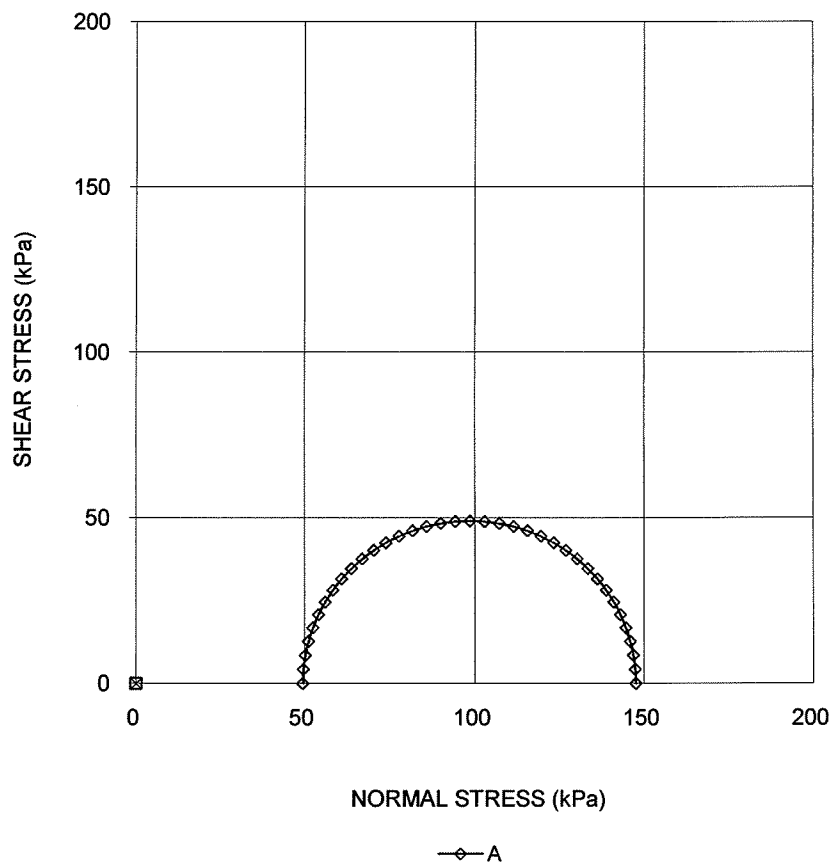


<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 122 SA 14 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	122	
SAMPLE	14	
SPECIMEN DIAMETER, cm	5.05	
SPECIMEN HEIGHT, cm	10.00	
WATER CONTENT BEFORE CONSOLIDATION, %	22.1	
CELL PRESSURE, $\sigma_3$ , kPa	205.0	
BACK PRESSURE, kPa	135.0	
PORE PRESSURE PARAMETER "B"	0.99	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	70.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	11.2	
WATER CONTENT AFTER CONSOLIDATION, %	15.5	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	16.1	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	98.1	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	11.2	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.0	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	88.6	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	6.8	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.21	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.30	
NATURAL WATER CONTENT, %	22.0	
DRY DENSITY, Mg/m <sup>3</sup>	1.71	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1	
ANGLE OF FAILURE, DEGREES	55	
<div> <div>Date: March 5, 2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By AH</div> <div>Checked By: MM</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
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FIGURE BH 122 SA 14 CIUC B

BH 122 SA 14



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Project No. 07-1130-2070

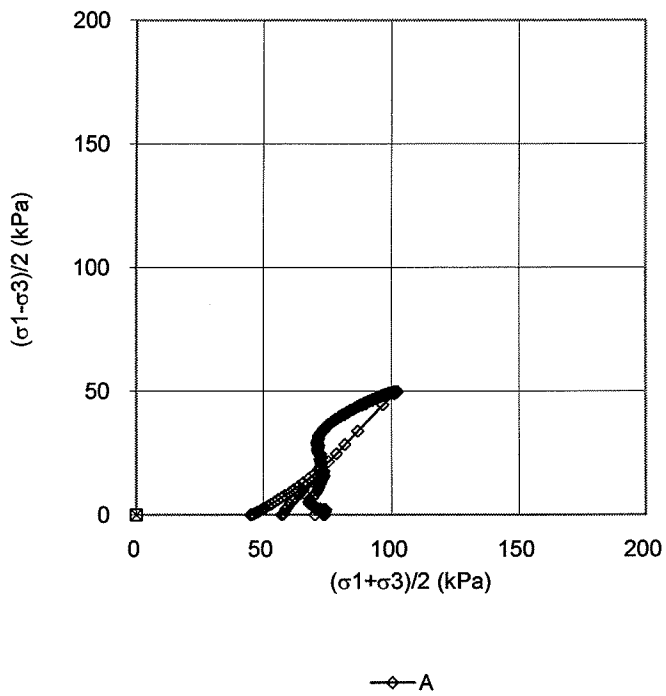
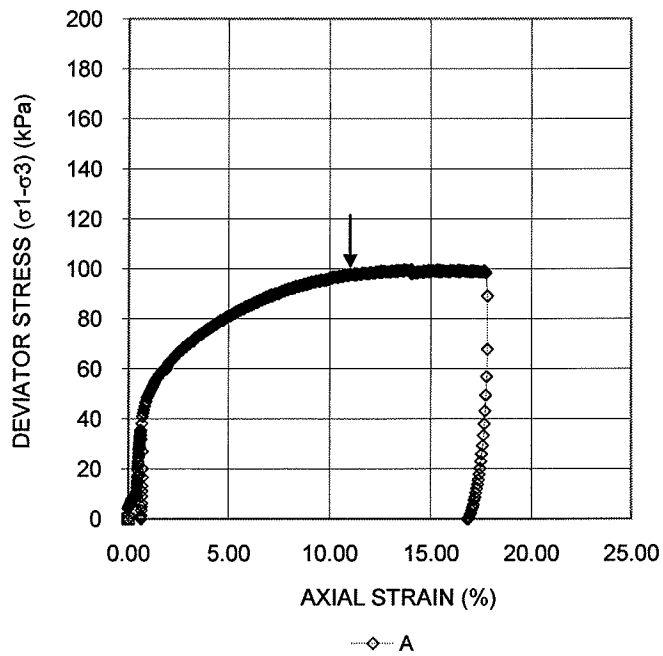
**Golder Associates**

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Checked By: MM

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 122 SA 14 CIUC C

BH 122 SA 14



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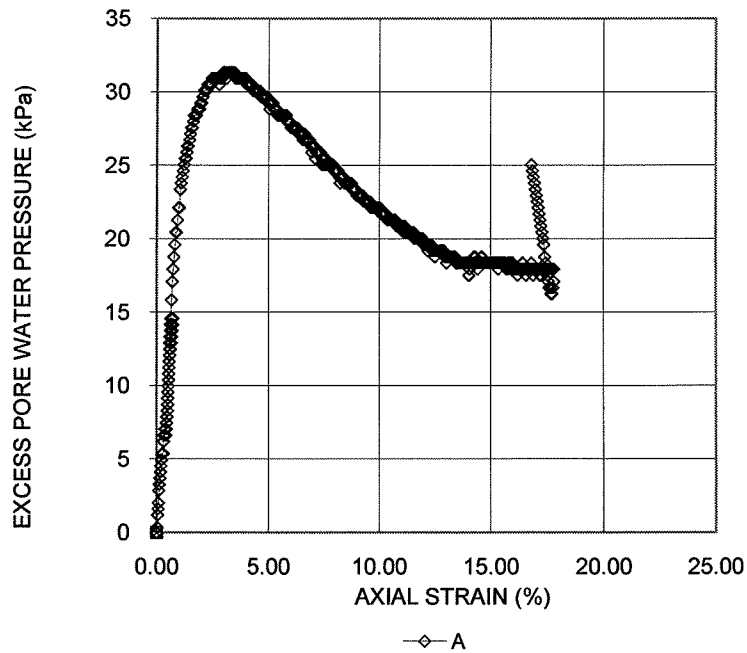
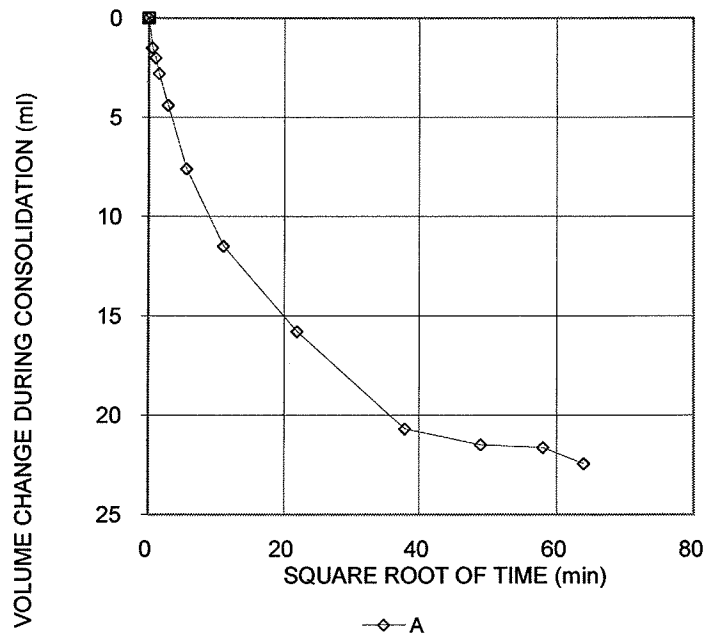
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 122 SA 14 CIUC D

BH 122 SA 14



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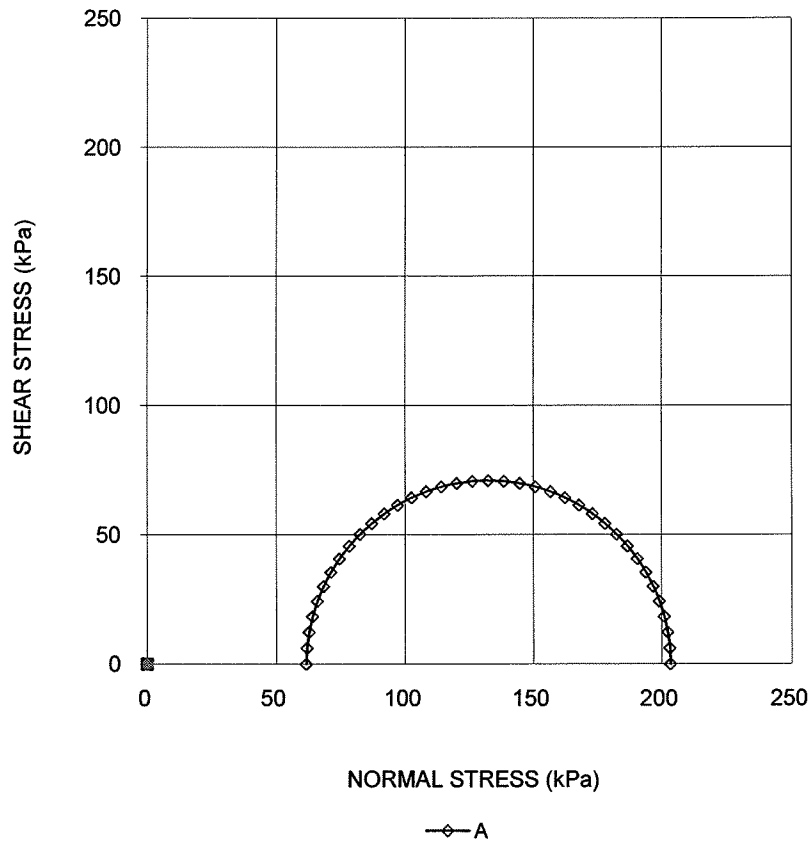
Prepared By AH  
Checked By: MM

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 122 SA 19 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	122	
SAMPLE	19	
SPECIMEN DIAMETER, cm	5.02	
SPECIMEN HEIGHT, cm	10.00	
WATER CONTENT BEFORE CONSOLIDATION, %	19.3	
CELL PRESSURE, $\sigma_3$ , kPa	230.0	
BACK PRESSURE, kPa	135.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	95.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	15.7	
WATER CONTENT AFTER CONSOLIDATION, %	15.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	15.5	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	141.8	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	14.9	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.6	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	117.4	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	7.8	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.24	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.41	
NATURAL WATER CONTENT, %	16.9	
DRY DENSITY, $Mg/m^3$	1.86	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	bulging	
<div> <div>Date: February 28, 2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <b>Golder Associates</b> </div> <div> <div>Prepared By LFG</div> <div>Checked By: MM</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 122 SA 19 CIUC B

BH 122 SA 19



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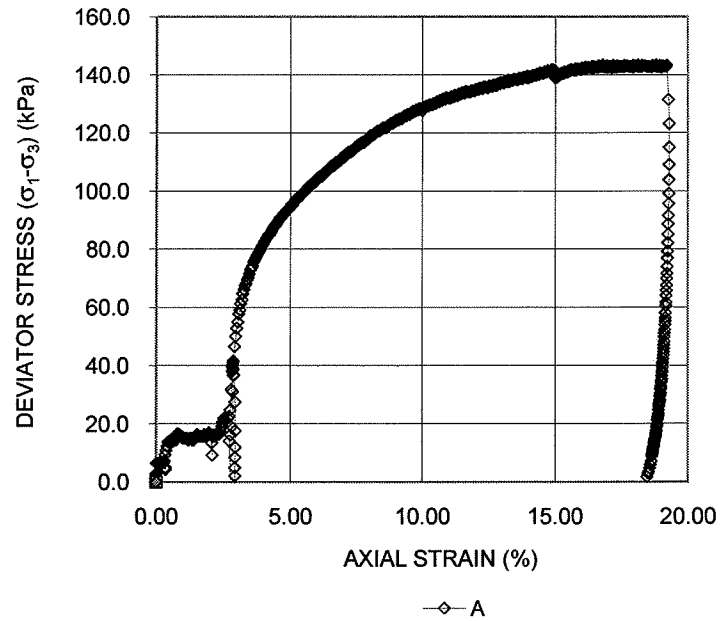
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Checked By: MM



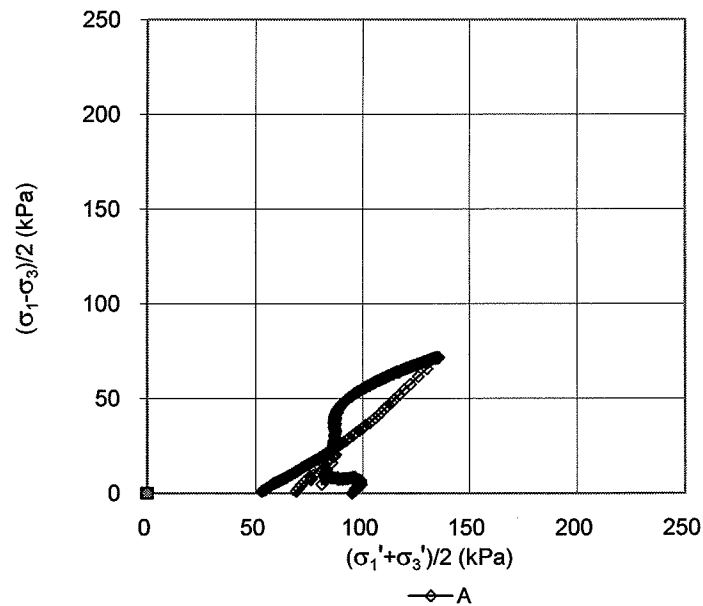
CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 122 SA 19 CIUC C

BH 122 SA 19



BH 122 SA 19



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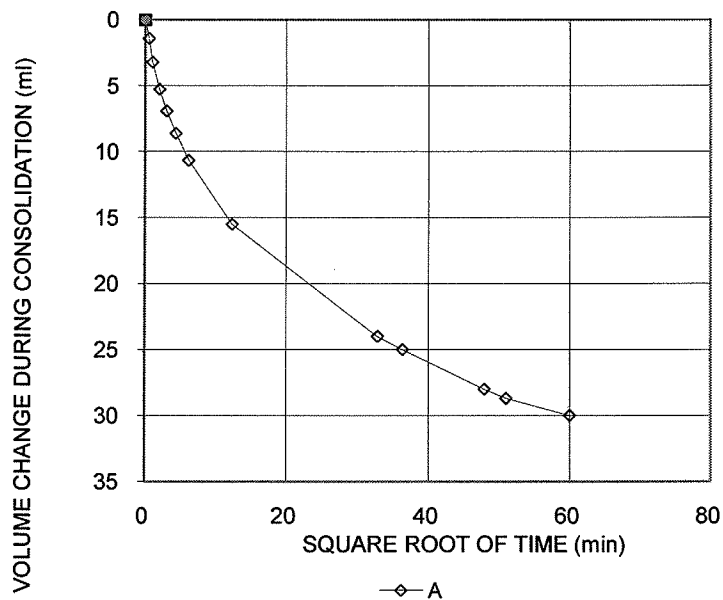
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Checked By: MM

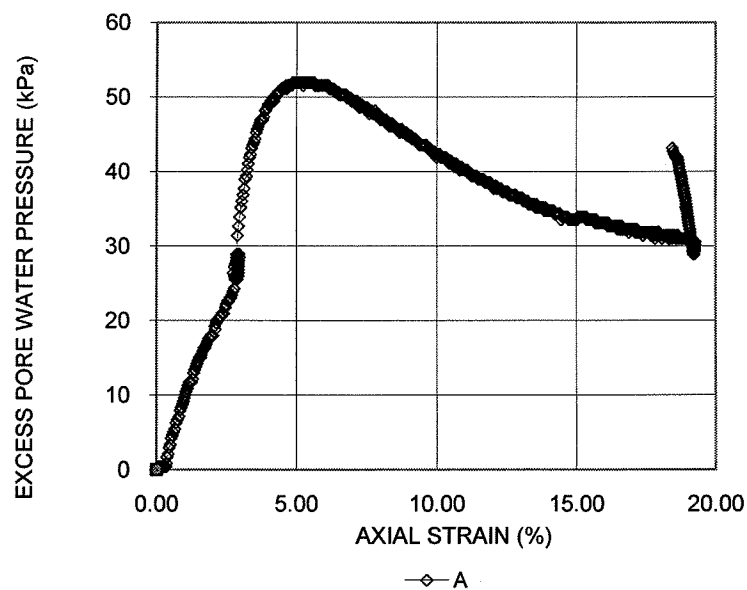
**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 122 SA 19 CIUC D**

BH 122 SA 19



BH 122 SA 19



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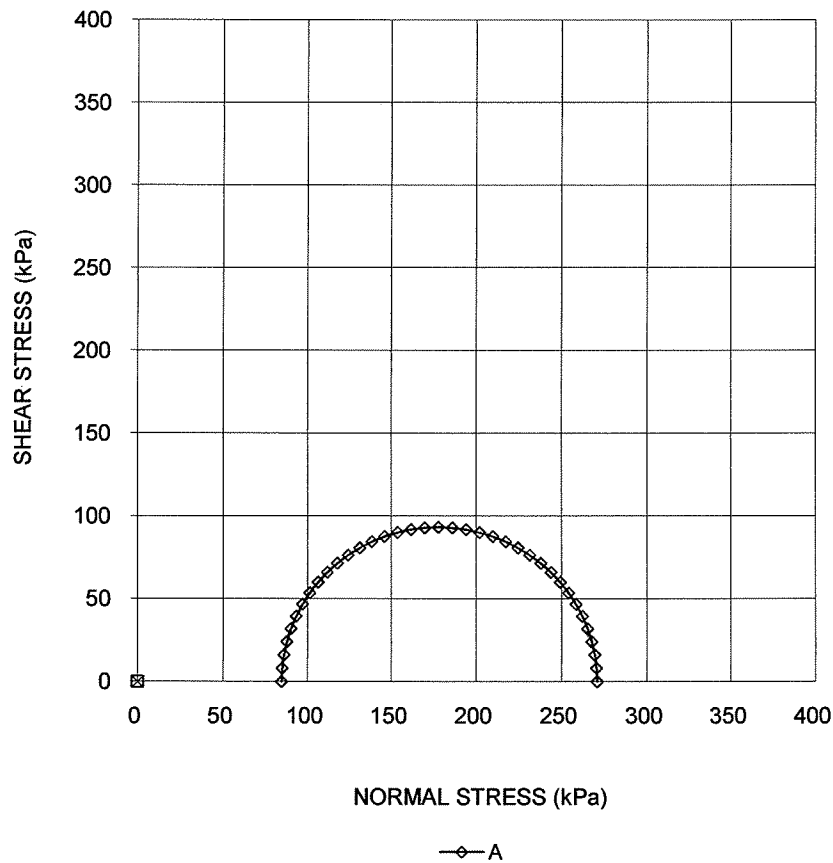
Checked By: MM

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 122 SA 22 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	122	
SAMPLE	22	
SPECIMEN DIAMETER, cm	5.04	
SPECIMEN HEIGHT, cm	9.99	
WATER CONTENT BEFORE CONSOLIDATION, %	18.1	
CELL PRESSURE, $\sigma_3$ , kPa	455.0	
BACK PRESSURE, kPa	345.0	
PORE PRESSURE PARAMETER "B"	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	110.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	3.5	
WATER CONTENT AFTER CONSOLIDATION, %	16.2	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	15.9	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	186.5	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	12.2	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.4	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	148.0	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	5.0	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.14	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.33	
NATURAL WATER CONTENT, %	16.6	
DRY DENSITY, Mg/m <sup>3</sup>	1.83	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1	
ANGLE OF FAILURE, DEGREES	60	
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 122 SA 22 CIUC B

BH 122 SA 22



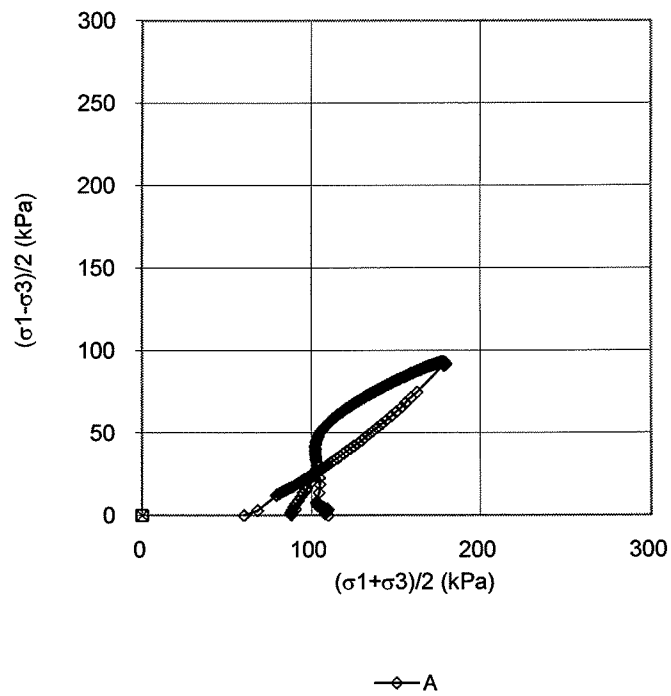
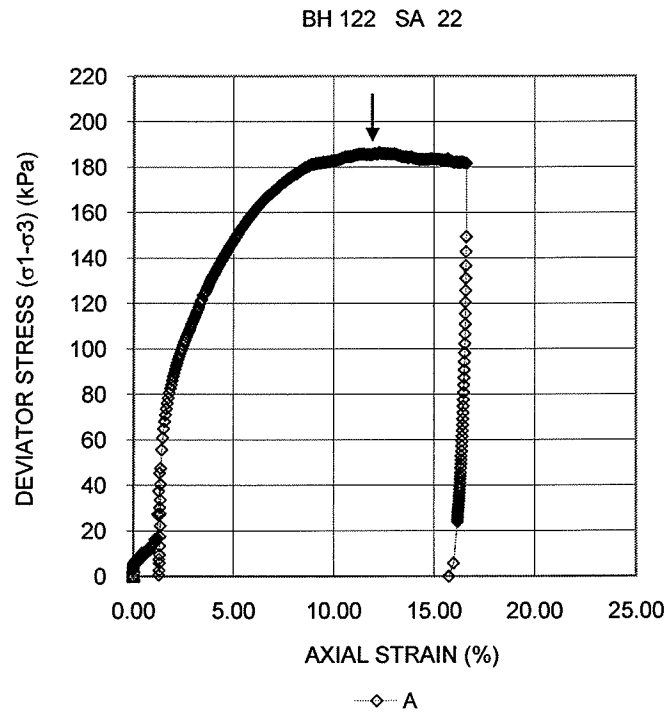
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Project No. 07-1130-2070

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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 122 SA 22 CIUC C



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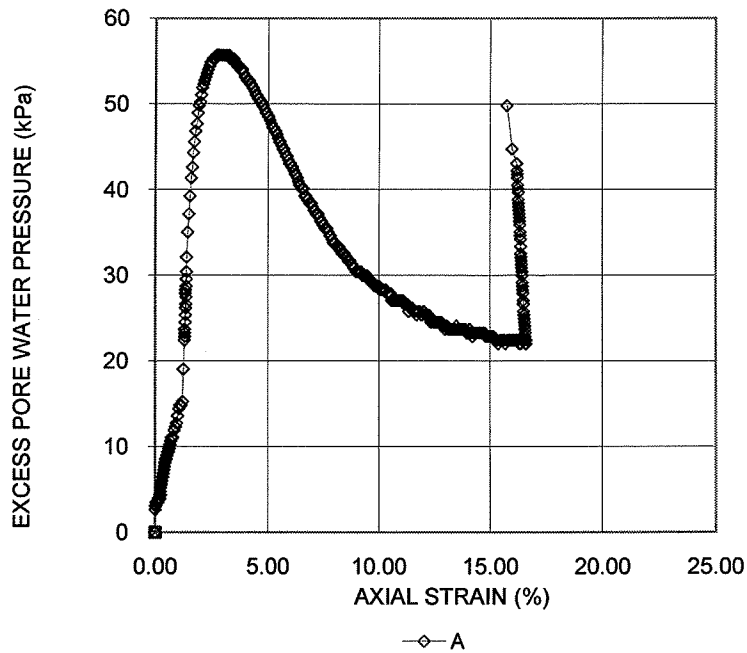
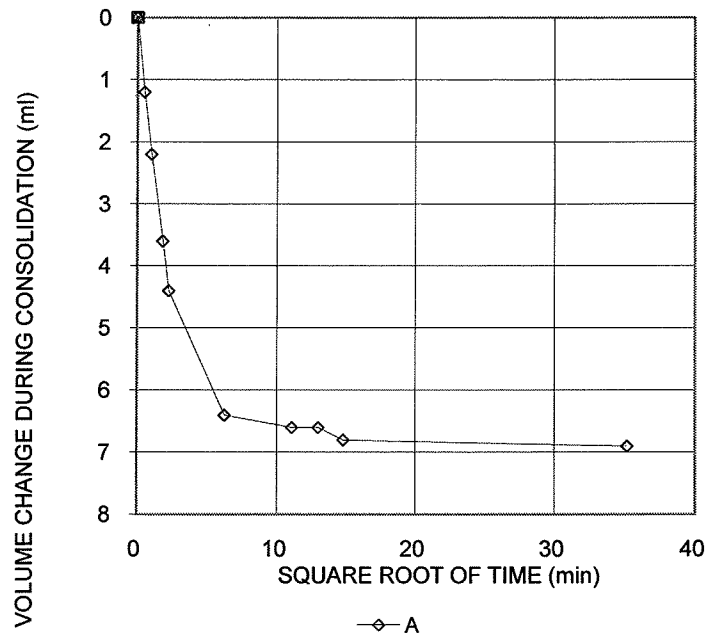
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 122 SA 22 CIUC D

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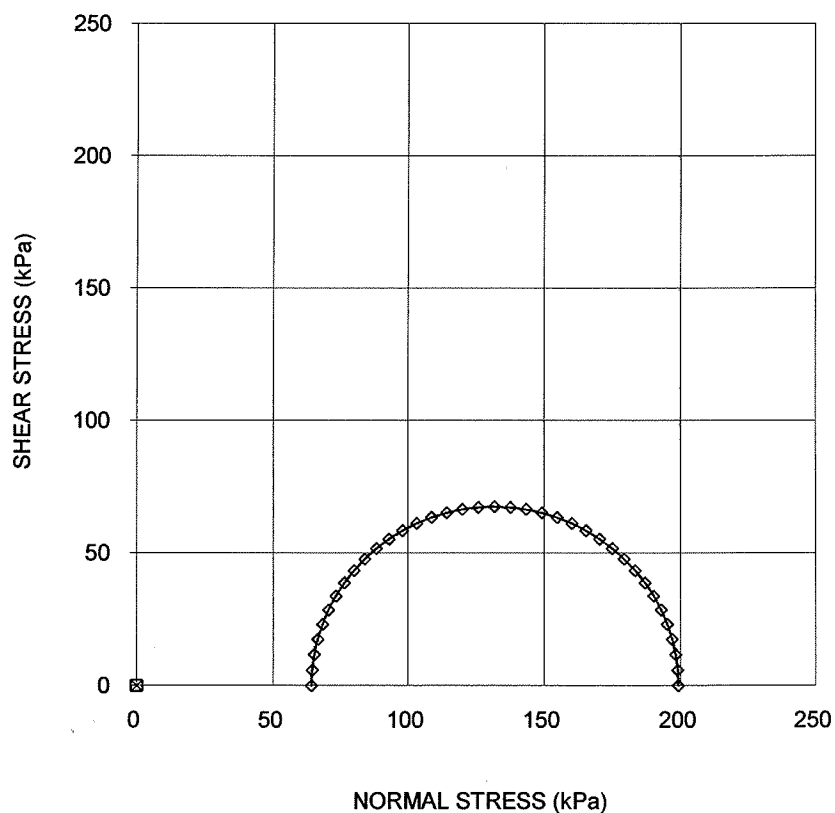


<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 129 SA 8 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	129	
SAMPLE	8	
SPECIMEN DIAMETER, cm	4.97	
SPECIMEN HEIGHT, cm	10.05	
WATER CONTENT BEFORE CONSOLIDATION, %	27.1	
CELL PRESSURE, $\sigma_3$ , kPa	462.0	
BACK PRESSURE, kPa	415.0	
PORE PRESSURE PARAMETER "B"	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	47.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	7.9	
WATER CONTENT AFTER CONSOLIDATION, %	22.3	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	24.8	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	135.0	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	6.9	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.6	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	119.1	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	3.5	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.128	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.003	
NATURAL WATER CONTENT, %	23.8	
DRY DENSITY, $Mg/m^3$	1.65	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1.0	
ANGLE OF FAILURE, DEGREES	65.0	
<div> <div>Date: 09/15/2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By MM</div> <div>Checked By: RO</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 129 SA 8 CIUC B

BH 129 SA



—◇— A

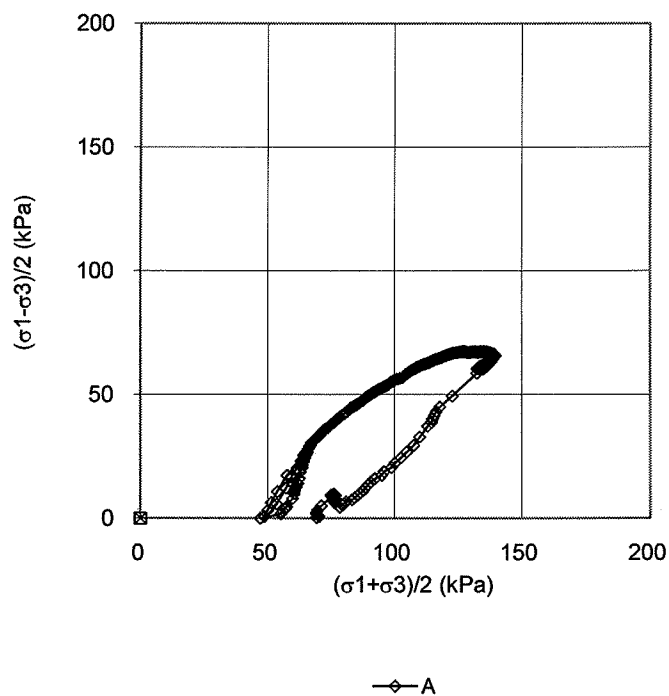
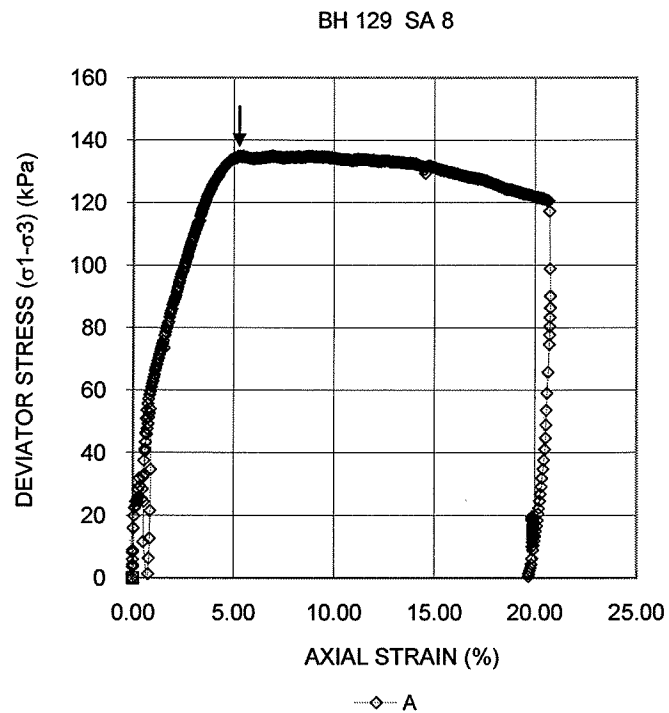
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 129 SA 8 CIUC C



Date: 09/15/2008  
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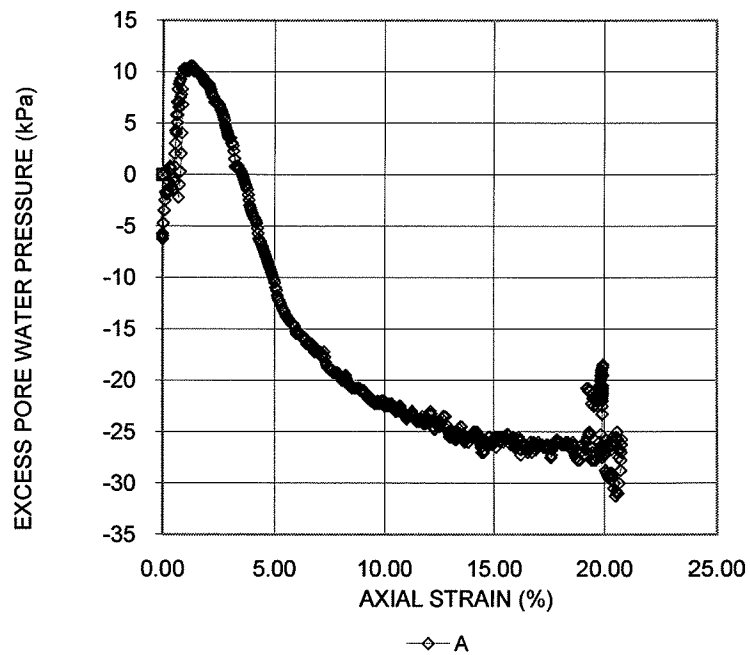
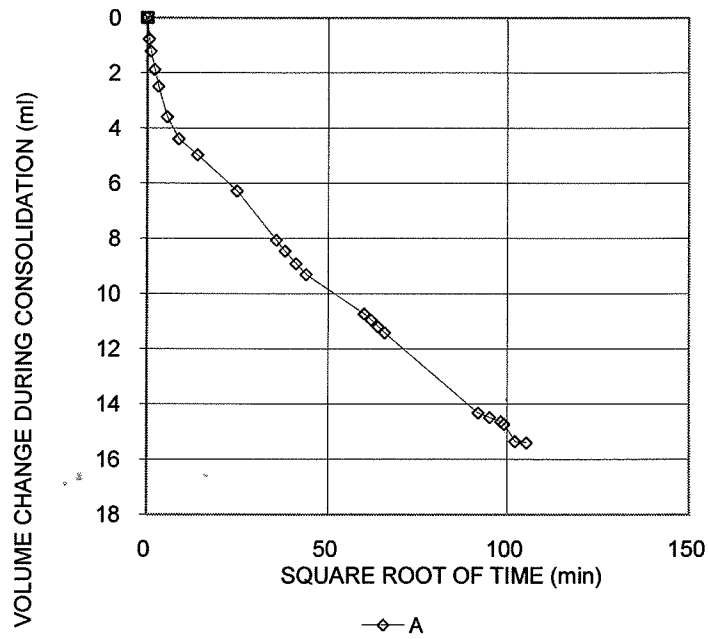
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 129 SA 8 CIUC D

BH 129 SA 8



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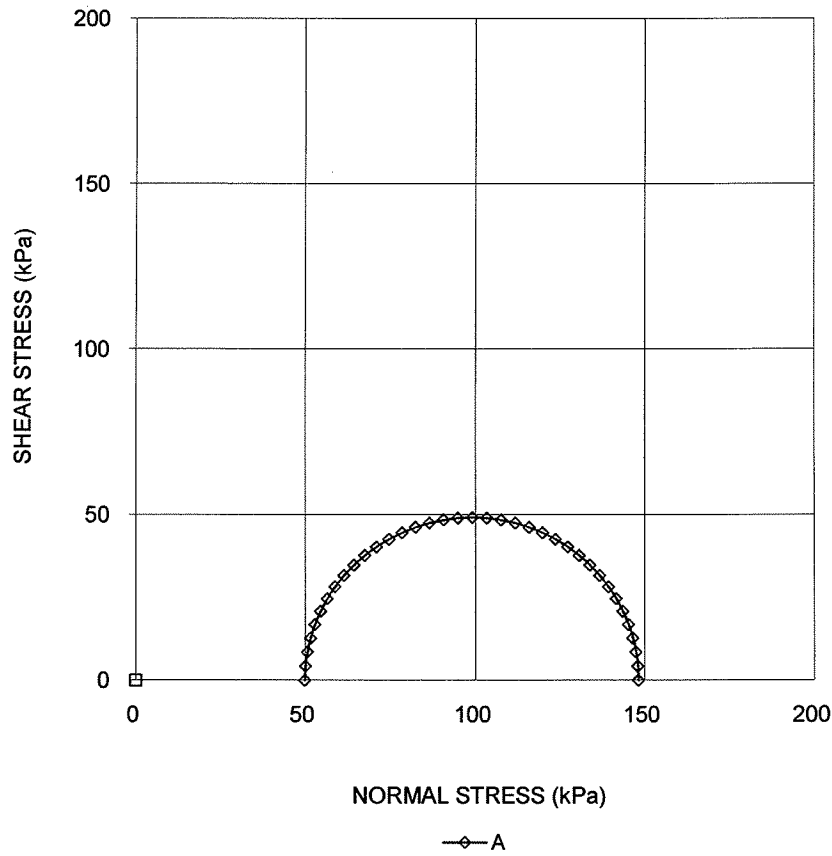
Prepared By MM  
Checked By: RO

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 129 SA 12 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	129	
SAMPLE	12	
SPECIMEN DIAMETER, cm	4.95	
SPECIMEN HEIGHT, cm	10.07	
WATER CONTENT BEFORE CONSOLIDATION, %	22.2	
CELL PRESSURE, $\sigma_3$ , kPa	285.0	
BACK PRESSURE, kPa	205.0	
PORE PRESSURE PARAMETER "B"	0.99	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	80.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	3.9	
WATER CONTENT AFTER CONSOLIDATION, %	19.9	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	21.4	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	98.2	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	11.0	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.1	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	89.4	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	6.2	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.31	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.42	
NATURAL WATER CONTENT, %	21.9	
DRY DENSITY, Mg/m <sup>3</sup>	1.68	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1	
ANGLE OF FAILURE, DEGREES	60	
<div> <div> Date: 08/31/2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By MM  Checked By: RO </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
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FIGURE BH 129 SA 12 CIUC B

BH 129 SA 12



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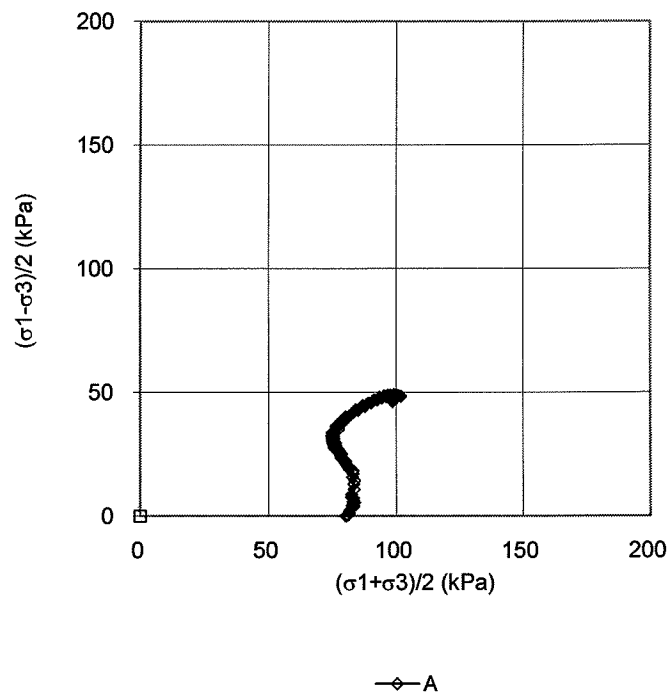
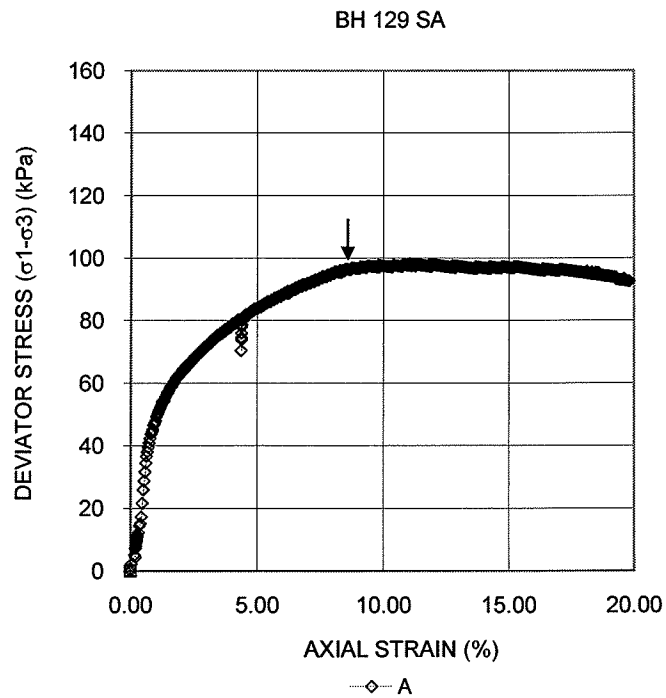
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 129 SA 12 CIUC C**



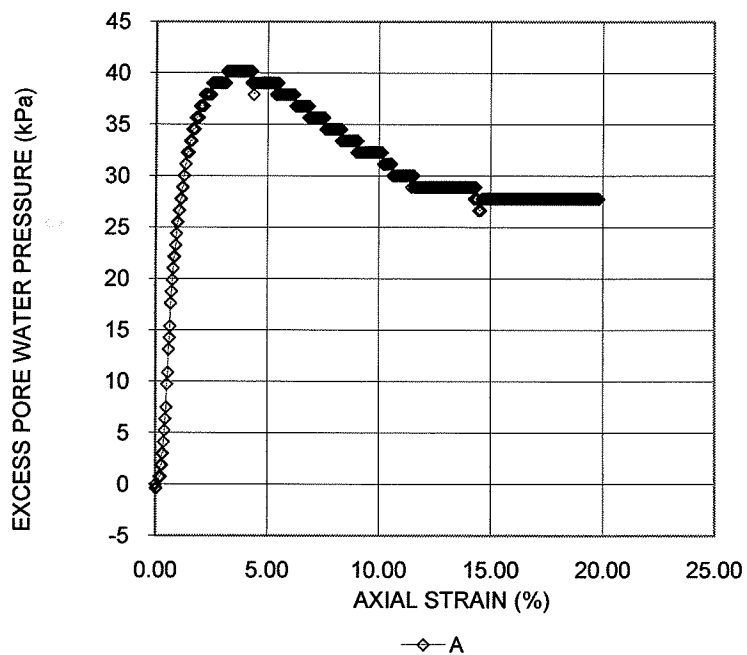
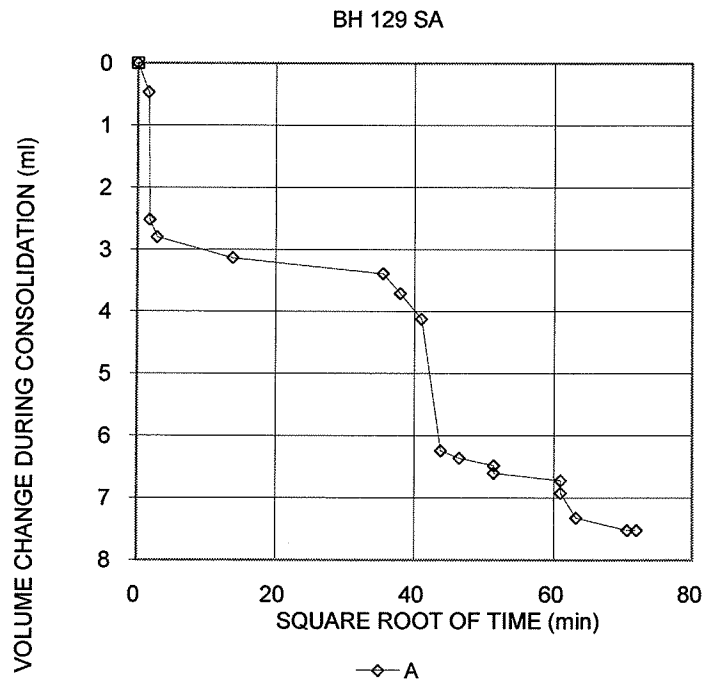
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 129 SA 12 CIUC D**



Date: 08/31/2008  
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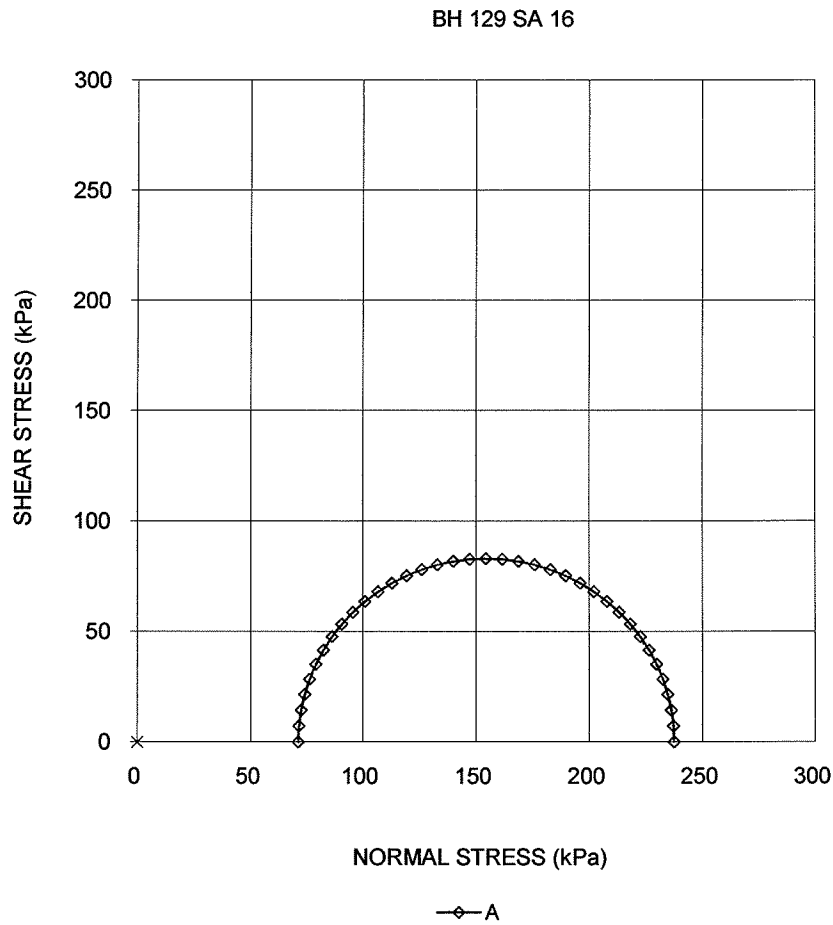
**Golder Associates**

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Checked By: RO

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 129 SA 16 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	129	
SAMPLE	16	
SPECIMEN DIAMETER, cm	4.96	
SPECIMEN HEIGHT, cm	10.13	
WATER CONTENT BEFORE CONSOLIDATION, %	19.0	
CELL PRESSURE, $\sigma_3$ , kPa	737.0	
BACK PRESSURE, kPa	625.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	112.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	6.4	
WATER CONTENT AFTER CONSOLIDATION, %	15.7	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	14.4	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	166.1	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	9.9	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.5	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	136.9	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	4.5	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.24	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.41	
NATURAL WATER CONTENT, %	15.2	
DRY DENSITY, $Mg/m^3$	1.93	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1.0	
ANGLE OF FAILURE, DEGREES	50.0	
<div> <div> Date: 09/12/2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By MM  Checked By: RO </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 129 SA 16 CIUC B



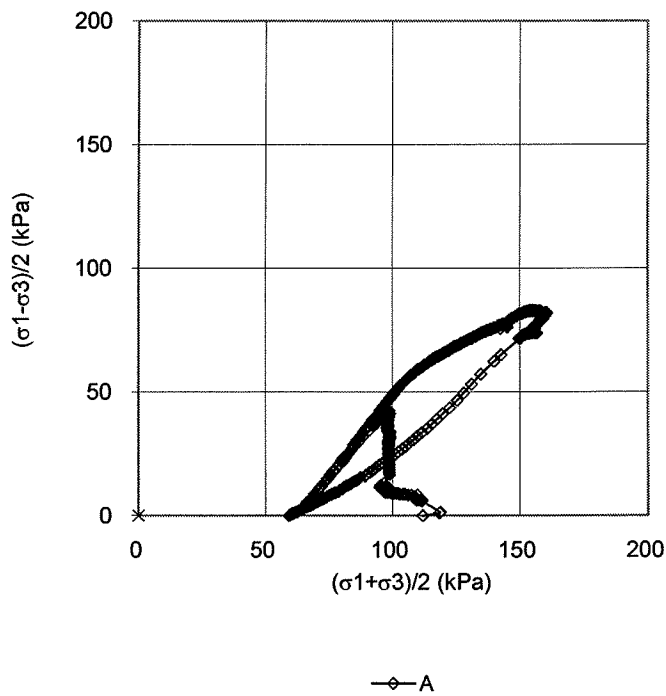
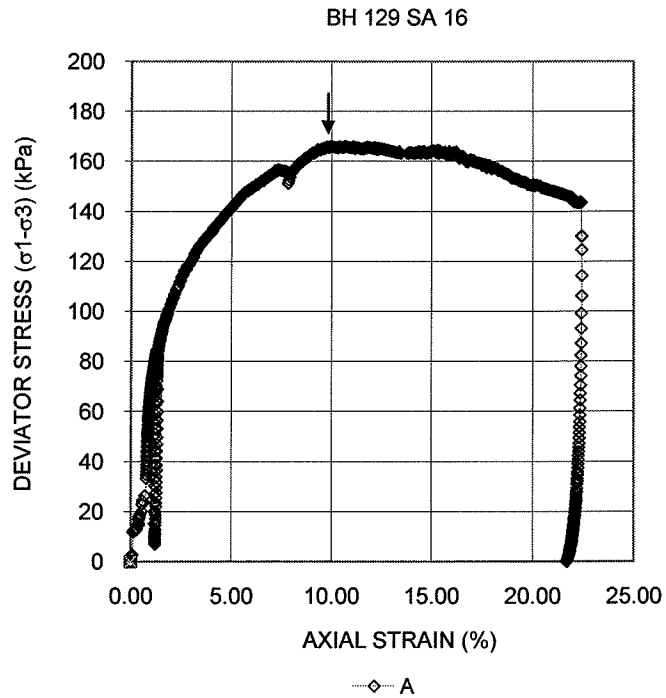
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 129 SA 16 CIUC C



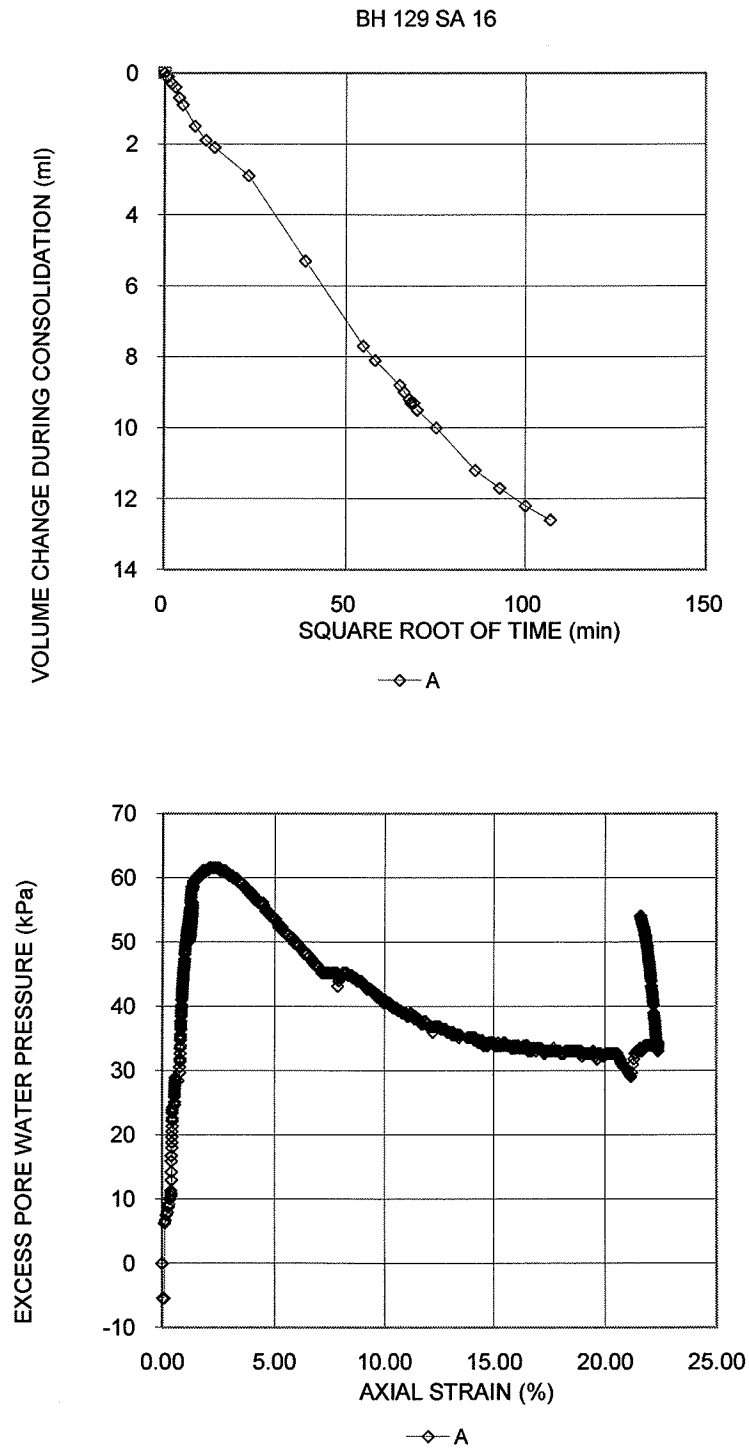
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
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FIGURE BH 129 SA 16 CIUC D



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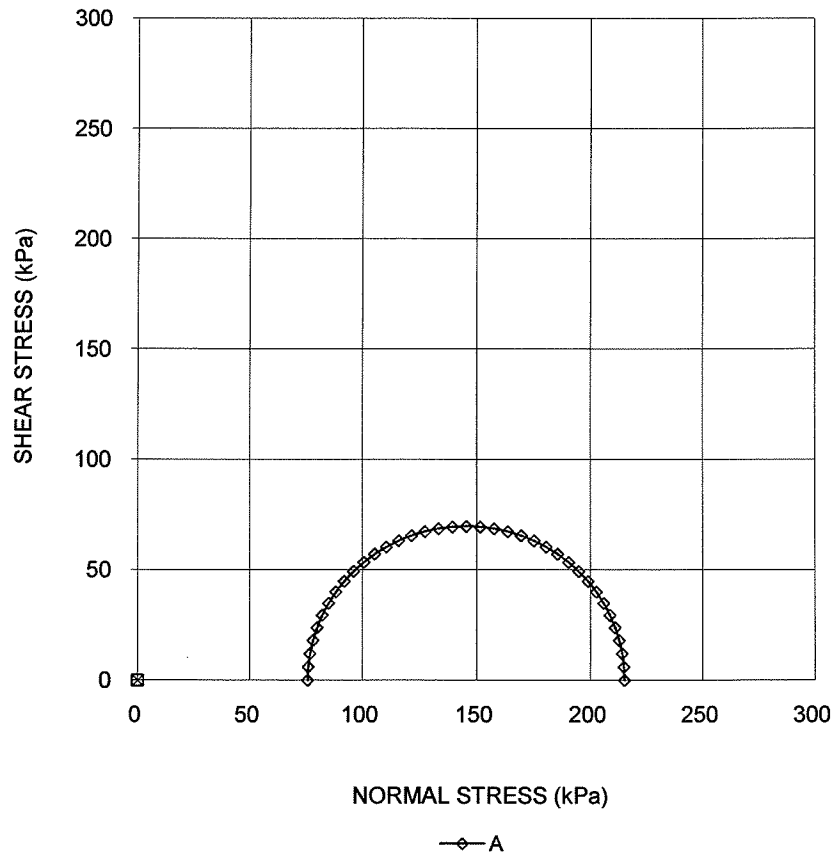


<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 129 SA 21 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	129	
SAMPLE	21	
SPECIMEN DIAMETER, cm	4.95	
SPECIMEN HEIGHT, cm	10.16	
WATER CONTENT BEFORE CONSOLIDATION, %	22.9	
CELL PRESSURE, $\sigma_3$ , kPa	288.0	
BACK PRESSURE, kPa	135.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	153.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	8.4	
WATER CONTENT AFTER CONSOLIDATION, %	17.9	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	21.7	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	139.4	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	9.2	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.8	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	139.1	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	9.1	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.55	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.56	
NATURAL WATER CONTENT, %	21.8	
DRY DENSITY, Mg/m <sup>3</sup>	1.67	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1	
ANGLE OF FAILURE, DEGREES	55	
<div> <div> Date: 08/31/2008 Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By MM Checked By: RO </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 129 SA 21 CIUC B

BH 129 SA 21



Date: 08/31/2008  
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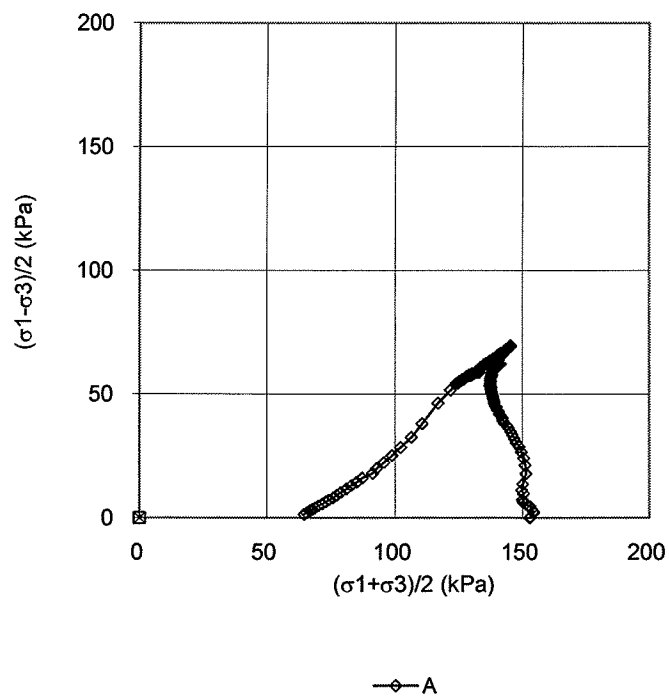
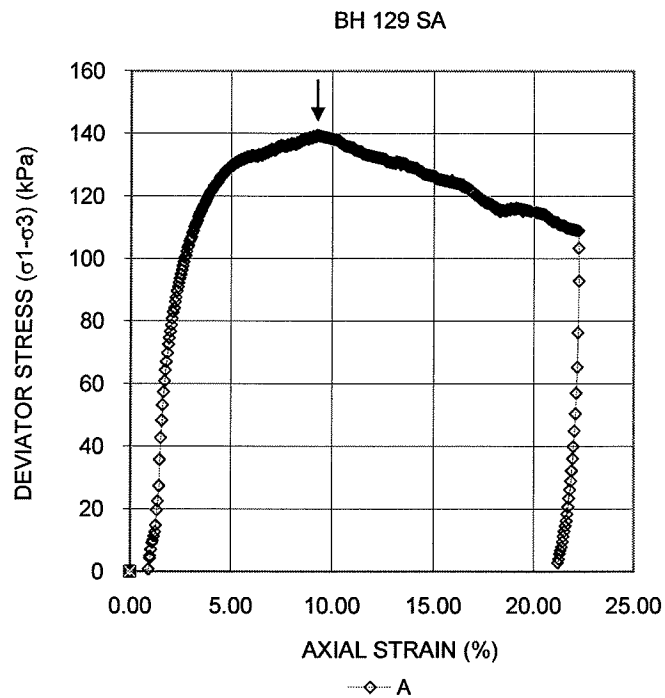
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS

SHEET 3 OF 4

FIGURE BH 129 SA 21 CIUC C



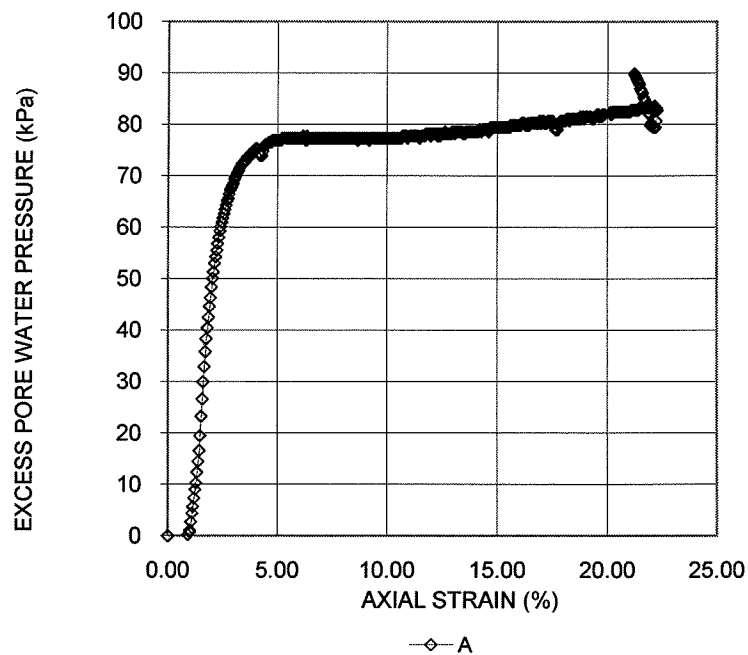
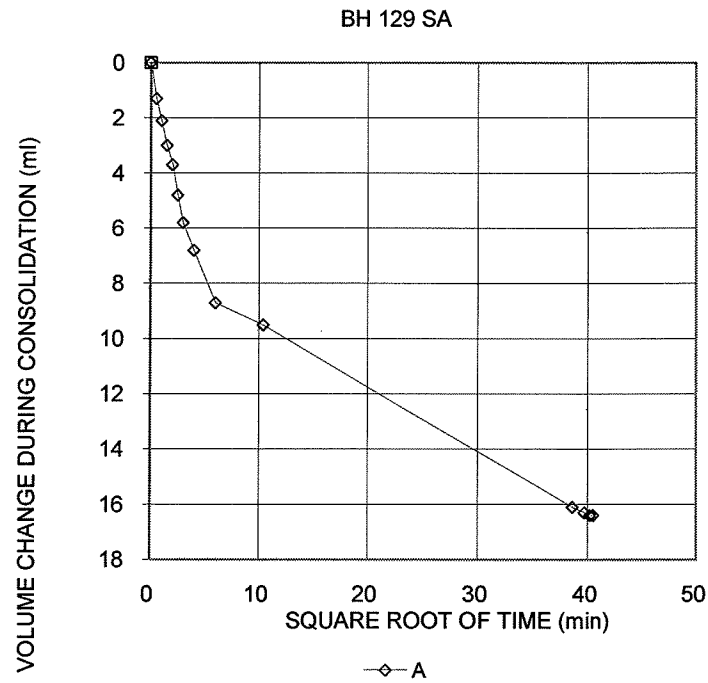
Date: 08/31/2008  
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 129 SA 21 CIUC D



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Project No. 07-1130-2070

**Golder Associates**

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<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 132 SA 7 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	132	
SAMPLE	7	
SPECIMEN DIAMETER, cm	4.97	
SPECIMEN HEIGHT, cm	10.13	
WATER CONTENT BEFORE CONSOLIDATION, %	23.7	
CELL PRESSURE, $\sigma_3$ , kPa	329.0	
BACK PRESSURE, kPa	275.0	
PORE PRESSURE PARAMETER "B"	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	54.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	9.1	
WATER CONTENT AFTER CONSOLIDATION, %	18.3	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	24.3	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	100.9	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	6.4	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.6	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	83.5	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	3.4	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.10	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.26	
NATURAL WATER CONTENT, %	23.3	
DRY DENSITY, $Mg/m^3$	1.66	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1.0	
ANGLE OF FAILURE, DEGREES	65.0	

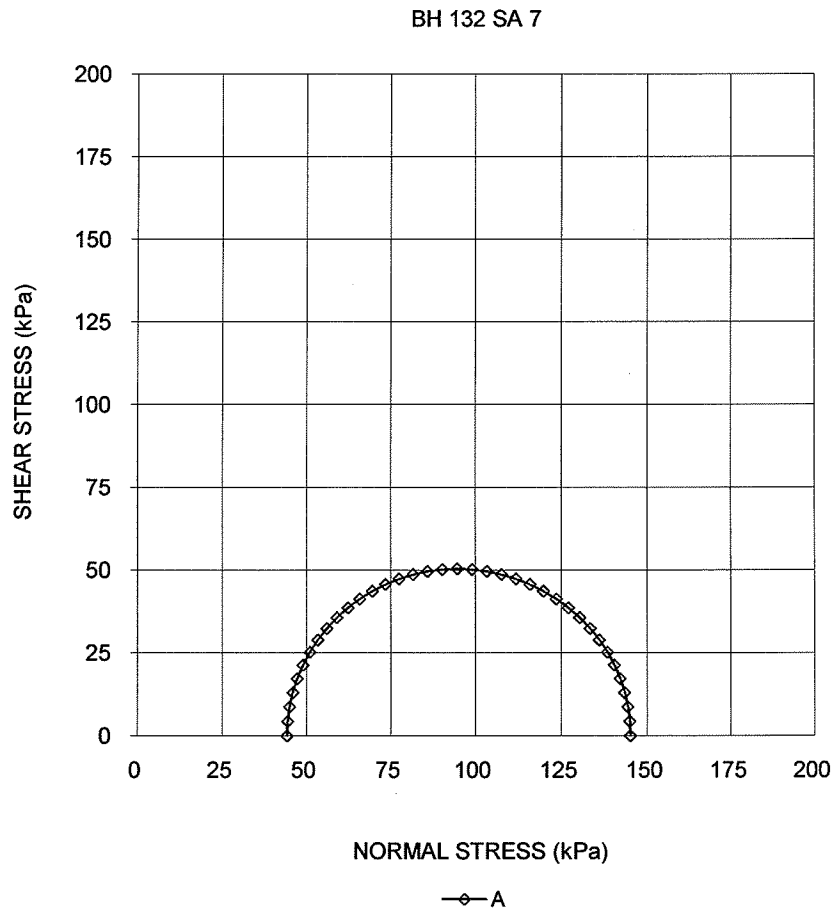
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 132 SA 7 CIUC B



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Project No. 07-1130-2070

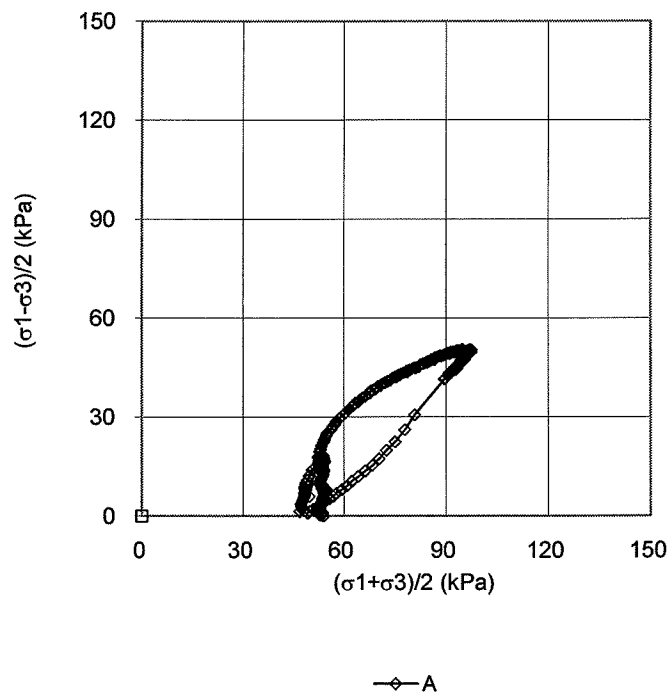
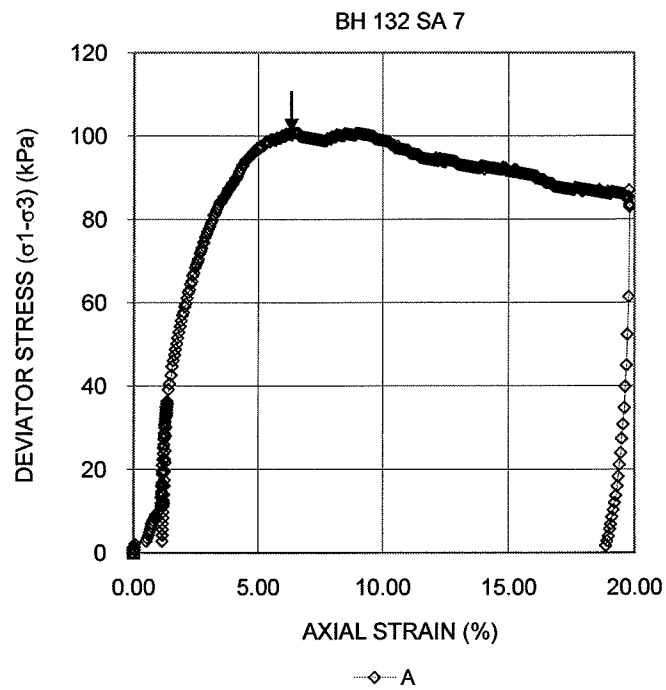
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 132 SA 7 CIUC C



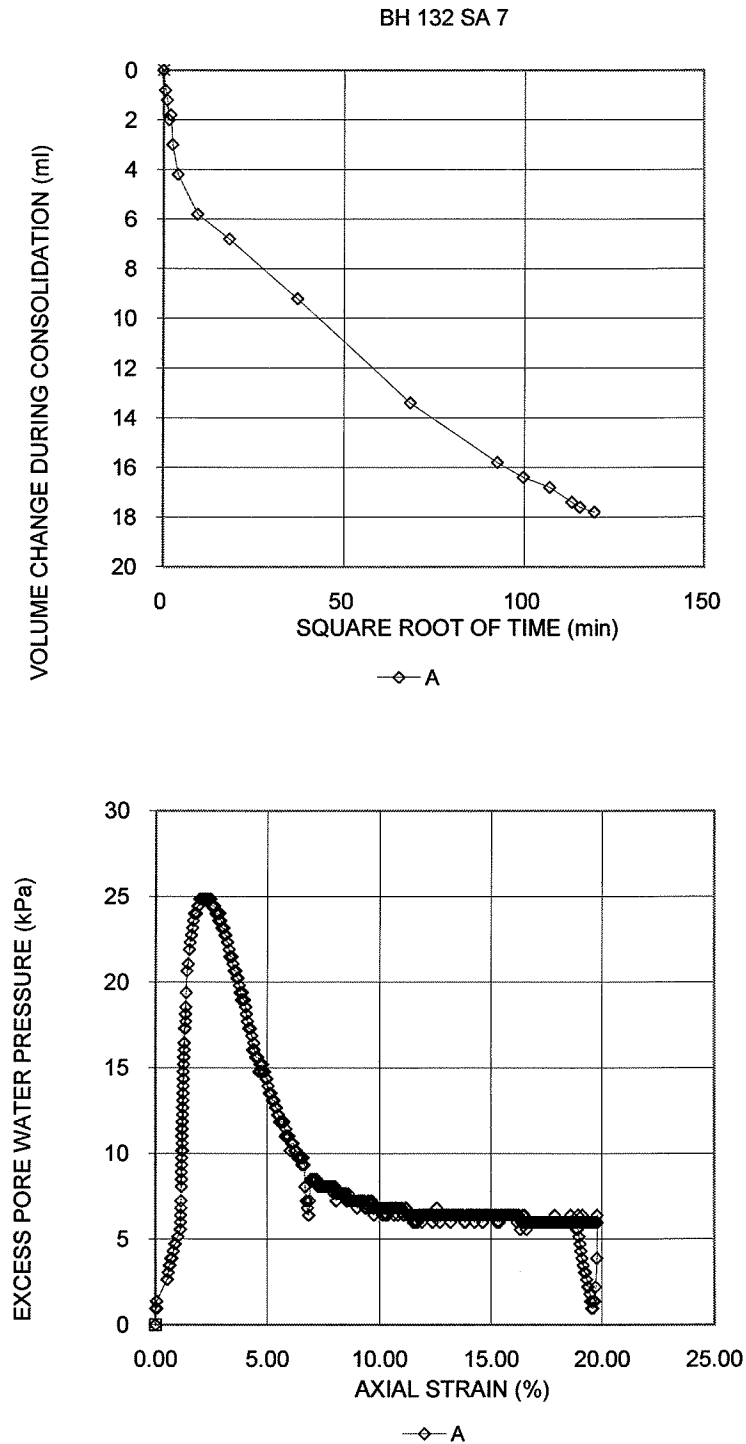
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 132 SA 7 CIUC D



Date: 10/12/2008  
Project No. 07-1130-2070

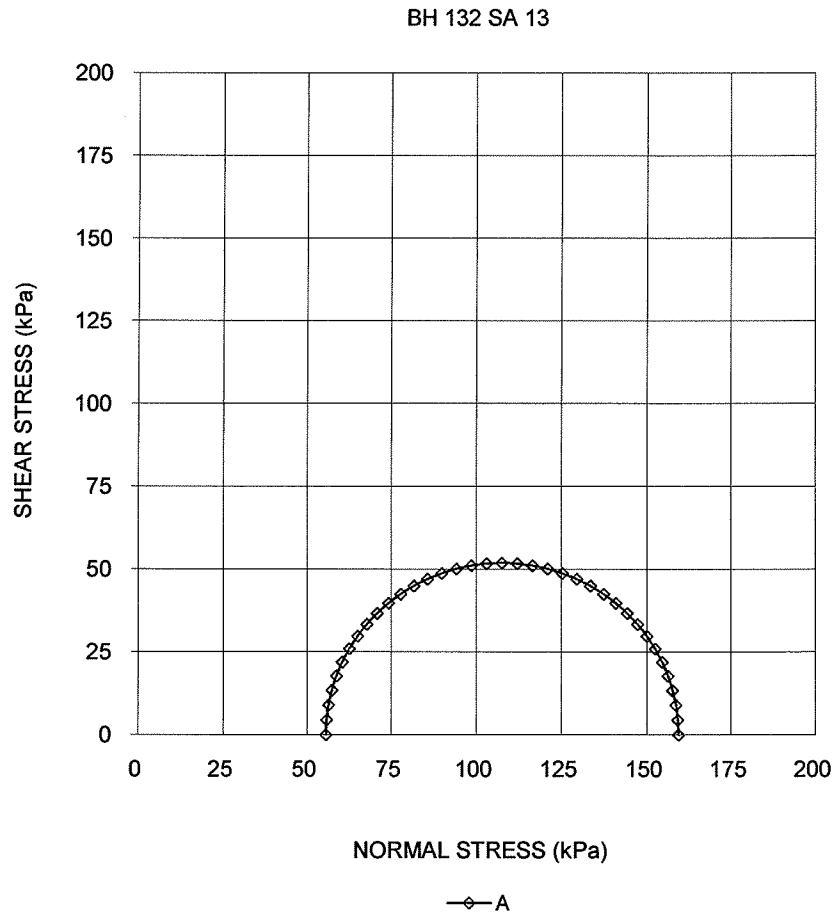
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Checked By: RO

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 132 SA 13 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	132	
SAMPLE	13	
SPECIMEN DIAMETER, cm	5.00	
SPECIMEN HEIGHT, cm	10.15	
WATER CONTENT BEFORE CONSOLIDATION, %	25.5	
CELL PRESSURE, $\sigma_3$ , kPa	361.0	
BACK PRESSURE, kPa	275.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	86.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	8.4	
WATER CONTENT AFTER CONSOLIDATION, %	20.4	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	23.8	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	103.8	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	5.6	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.9	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	97.7	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	2.7	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.29	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.36	
NATURAL WATER CONTENT, %	24.7	
DRY DENSITY, Mg/m <sup>3</sup>	1.63	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	bulged	
<div> <div> Date: 10/01/2008 Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By MM Checked By: RO </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 132 SA 13 CIUC B



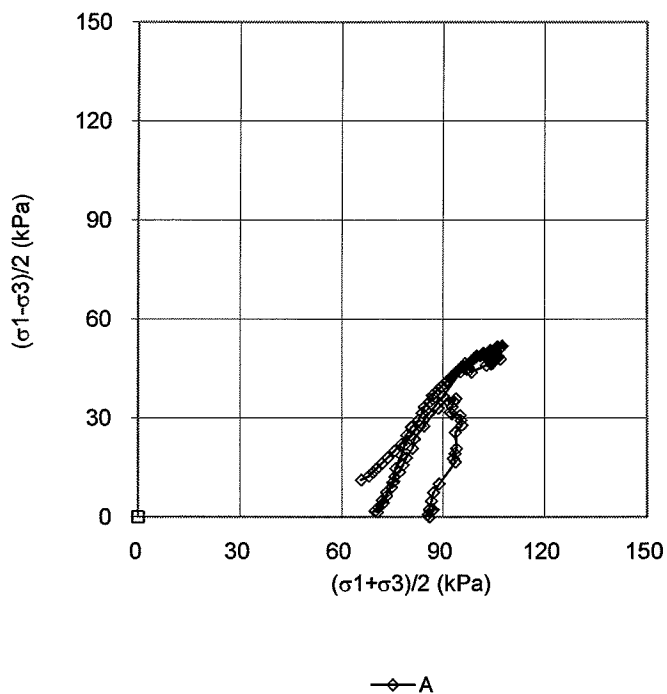
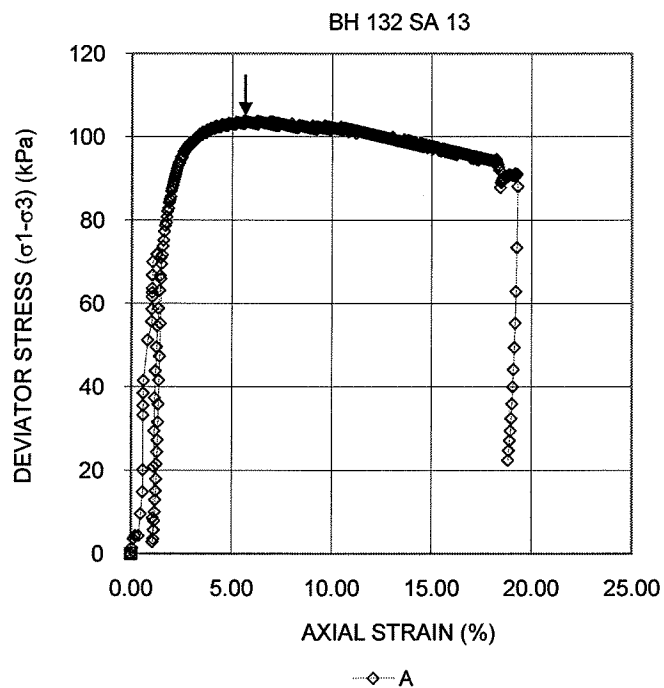
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 132 SA 13 CIUC C



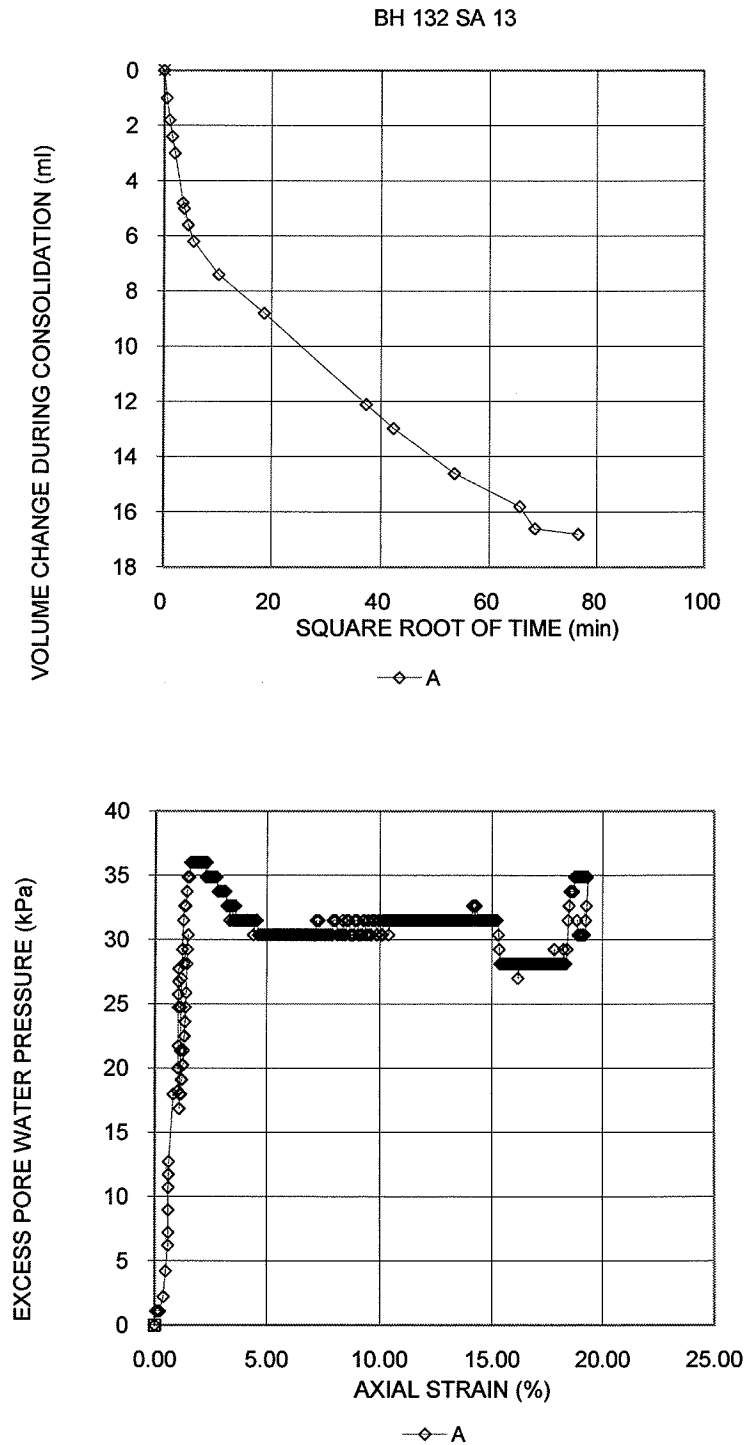
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 132 SA 13 CIUC D



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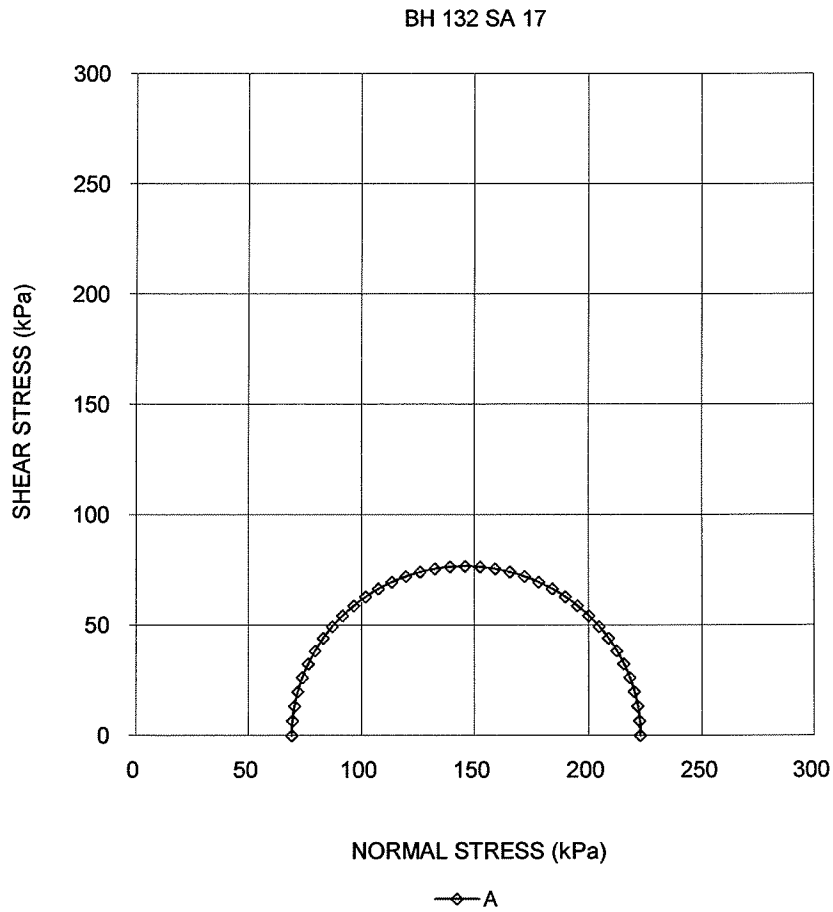
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<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 132 SA 17 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	132	
SAMPLE	17	
SPECIMEN DIAMETER, cm	4.97	
SPECIMEN HEIGHT, cm	10.07	
WATER CONTENT BEFORE CONSOLIDATION, %	18.5	
CELL PRESSURE, $\sigma_3$ , kPa	184.0	
BACK PRESSURE, kPa	65.0	
PORE PRESSURE PARAMETER "B"	0.98	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	119.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	5.9	
WATER CONTENT AFTER CONSOLIDATION, %	15.3	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	15.5	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	153.4	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	9.3	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.2	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	150.9	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	7.4	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.32	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.34	
NATURAL WATER CONTENT, %	15.9	
DRY DENSITY, Mg/m <sup>3</sup>	1.87	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1.0	
ANGLE OF FAILURE, DEGREES	65.0	
<div> <div>Date: 09/30/2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By MM</div> <div>Checked By: MM</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 132 SA 17 CIUC B



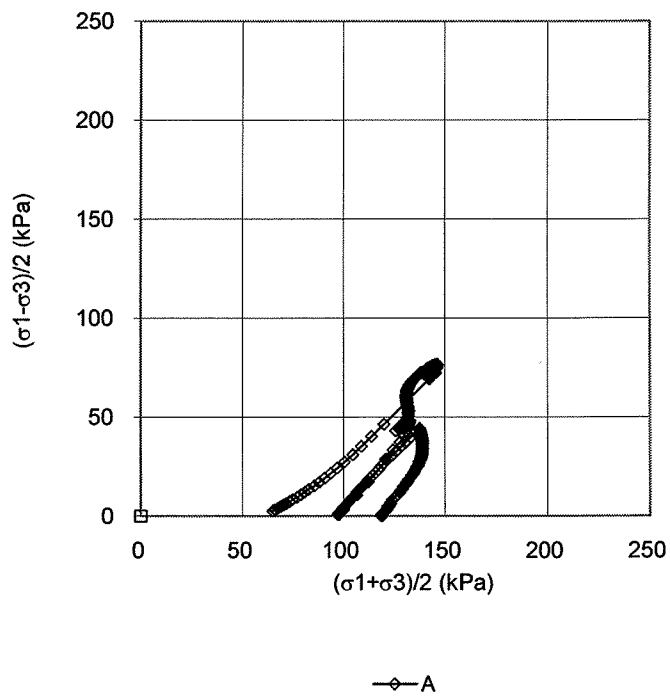
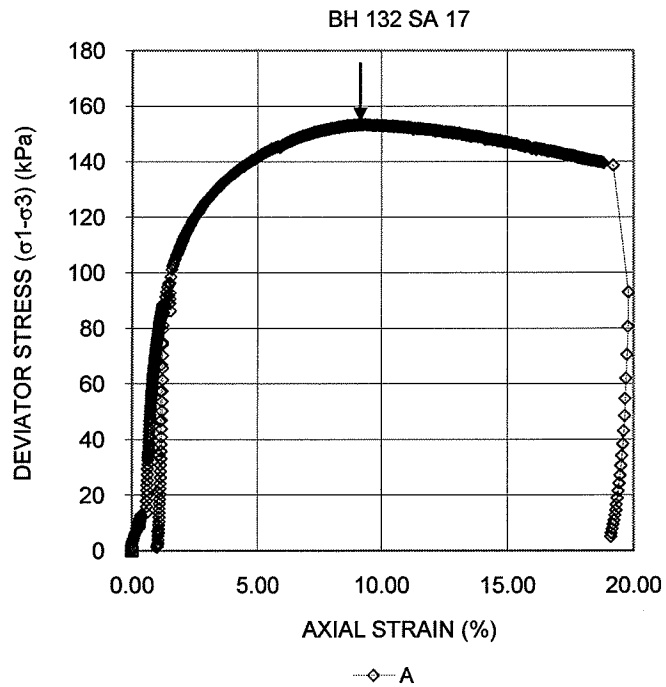
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 132 SA 17 CIUC C



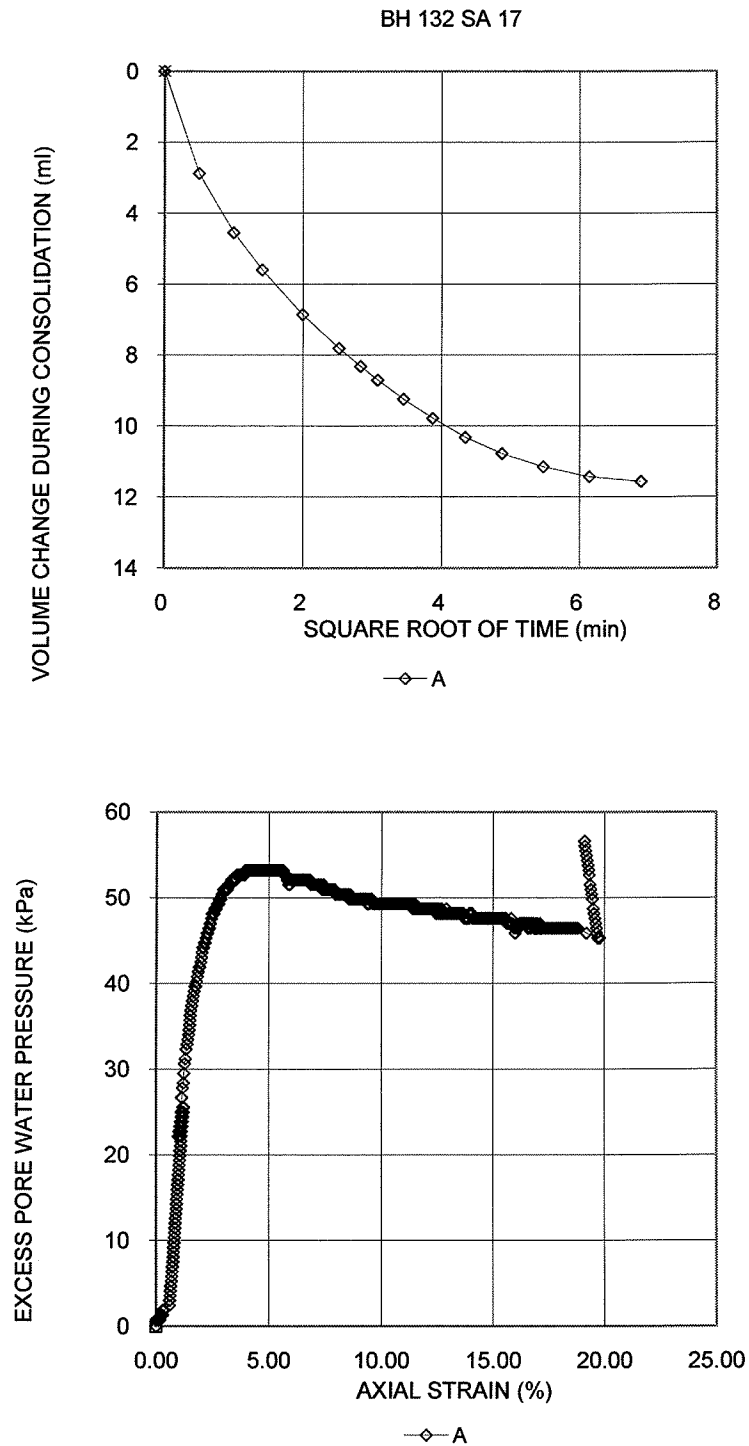
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 132 SA 17 CIUC D**



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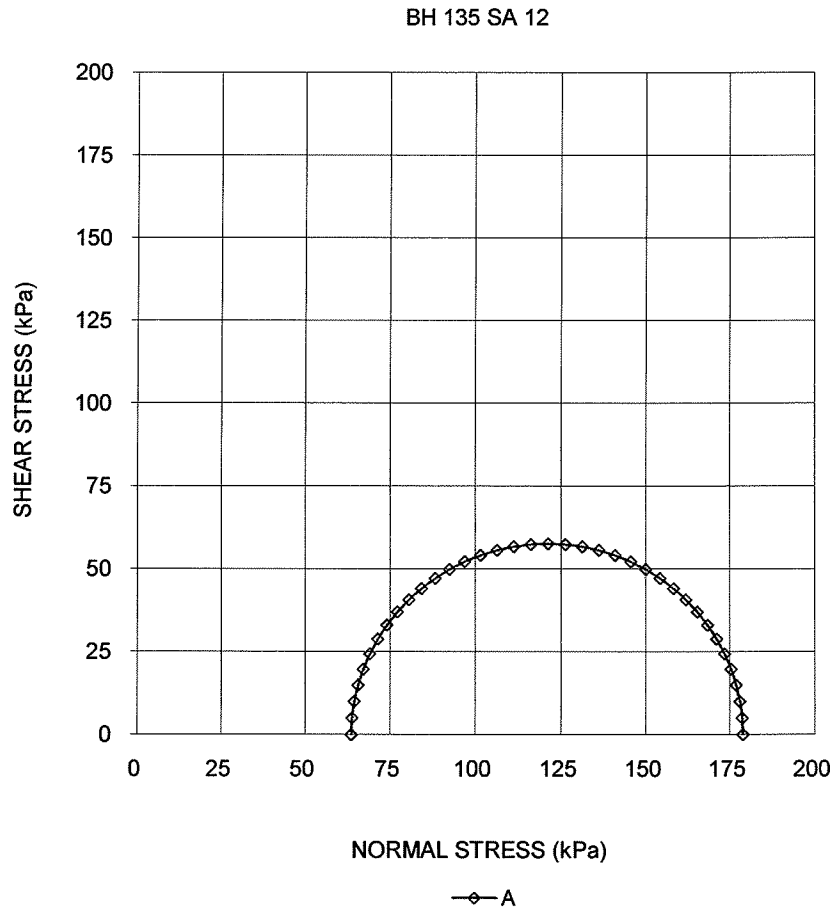
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Checked By: MM

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 135 SA 12 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	135	
SAMPLE	12	
SPECIMEN DIAMETER, cm	4.99	
SPECIMEN HEIGHT, cm	10.15	
WATER CONTENT BEFORE CONSOLIDATION, %	25.0	
CELL PRESSURE, $\sigma_3$ , kPa	356.0	
BACK PRESSURE, kPa	275.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	81.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	8.0	
WATER CONTENT AFTER CONSOLIDATION, %	20.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	23.5	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	115.2	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	14.9	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.8	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	120.0	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	11.8	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.15	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.13	
NATURAL WATER CONTENT, %	24.3	
DRY DENSITY, $Mg/m^3$	1.62	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	bulged	
<div> <div>Date: 10/12/2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By MM</div> <div>Checked By: RO</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 135 SA 12 CIUC B



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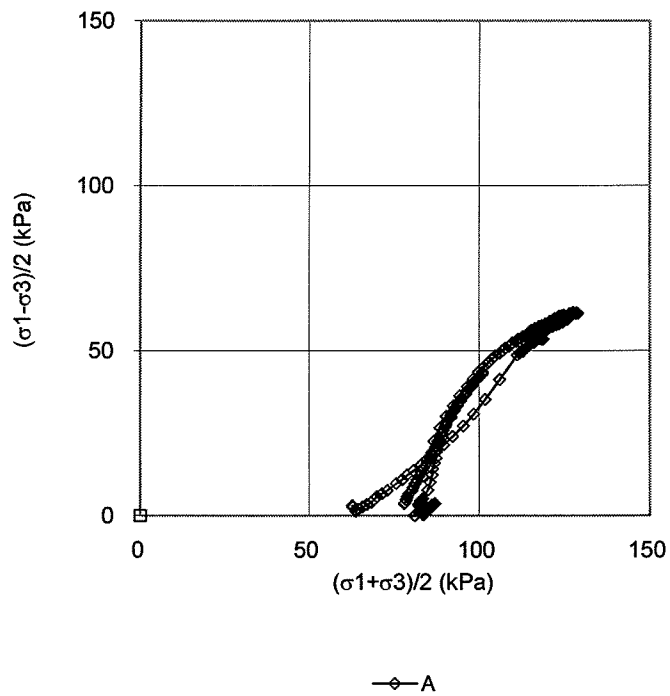
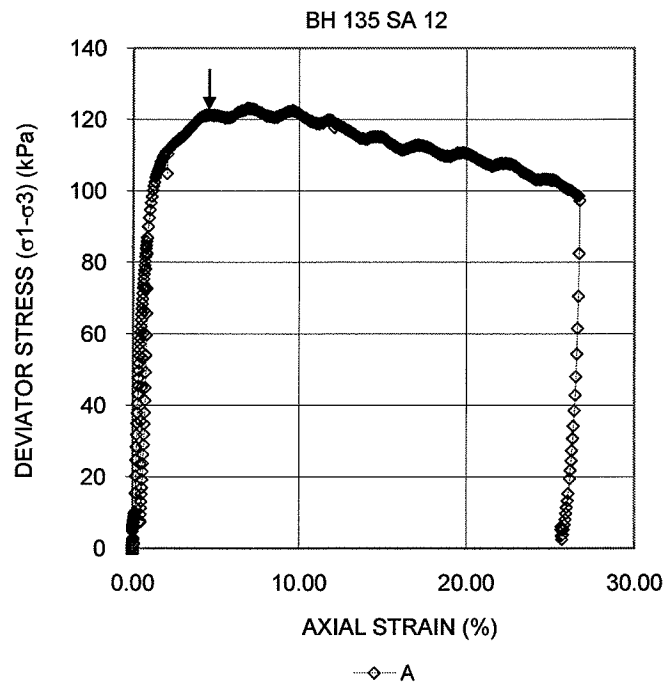
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 135 SA 12 CIUC C



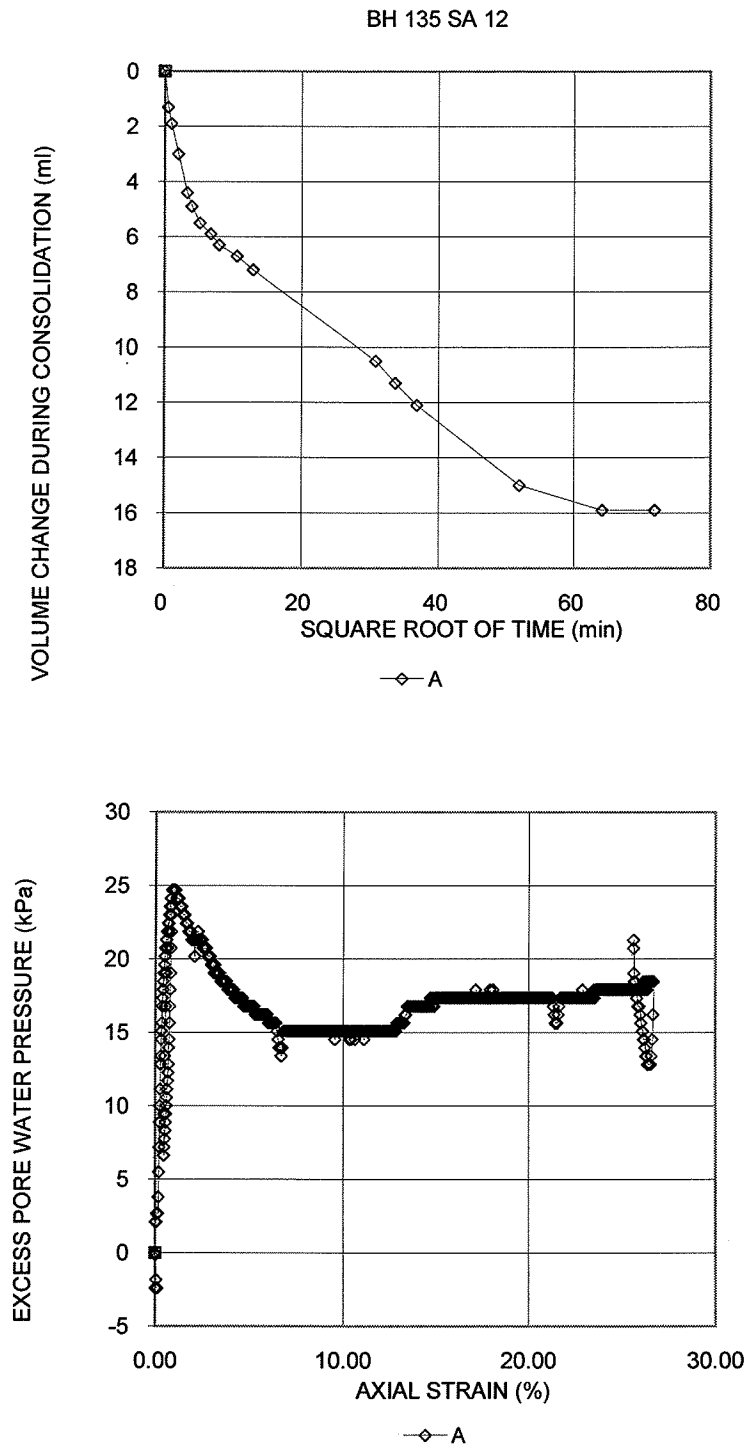
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
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FIGURE BH 135 SA 12 CIUC D



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Project No. 07-1130-2070

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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

**FIGURE BH 135 SA 14 CIUC A**

TEST STAGE	A
BOREHOLE NUMBER	135
SAMPLE	14

SPECIMEN DIAMETER, cm	5.01
SPECIMEN HEIGHT, cm	10.16

WATER CONTENT BEFORE CONSOLIDATION, %	36.2
CELL PRESSURE, $\sigma_3$ , kPa	373.0
BACK PRESSURE, kPa	275.0
PORE PRESSURE PARAMETER "B"	0.96
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	98.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	6.7
WATER CONTENT AFTER CONSOLIDATION, %	31.4
AVERAGE RATE OF STRAIN, %/hr	0.5
TIME TO FAILURE, DAYS	1
WATER CONTENT AFTER TEST, %	33.6

MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	89.9
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	10.2
MAX EFFECTIVE PRINCIPAL STRESS	
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.9
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	89.9
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	10.2
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.43
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.55

NATURAL WATER CONTENT, %	31.4
DRY DENSITY, Mg/m <sup>3</sup>	1.42

FILTER DRAINS USED, y/n	y
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TEST NOTES:

CHANGED RATE OF STRAIN, %/hr	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-
FAILURE PLANE NUMBER	-
ANGLE OF FAILURE, DEGREES	bulged

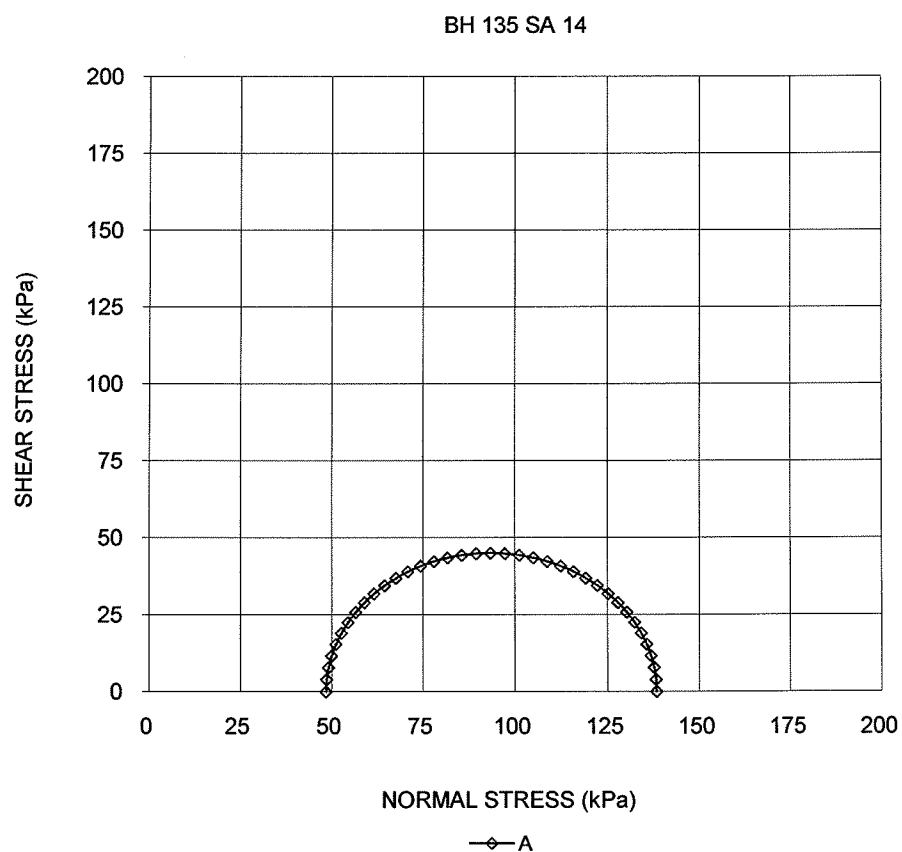
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 135 SA 14 CIUC B



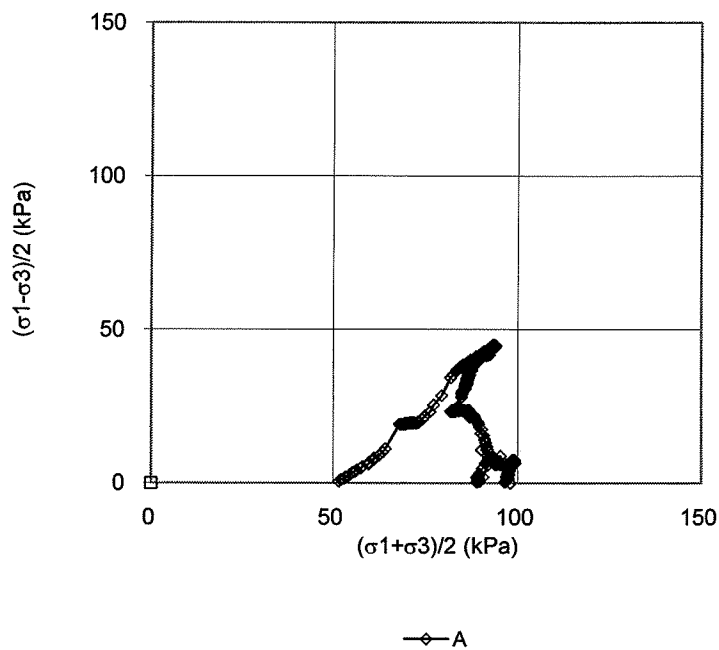
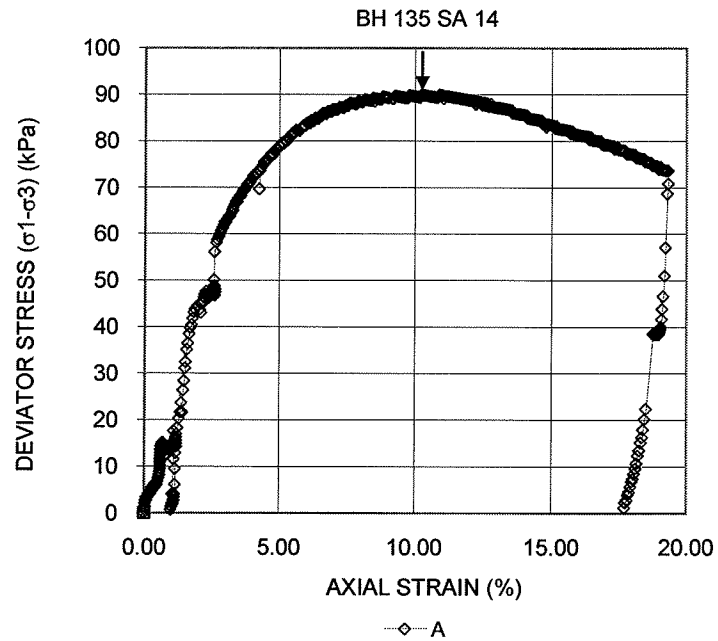
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 135 SA 14 CIUC C



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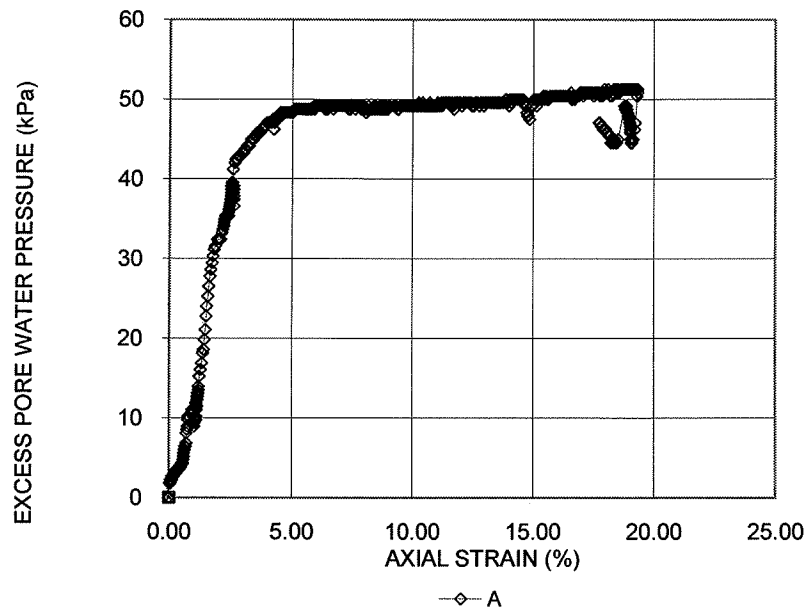
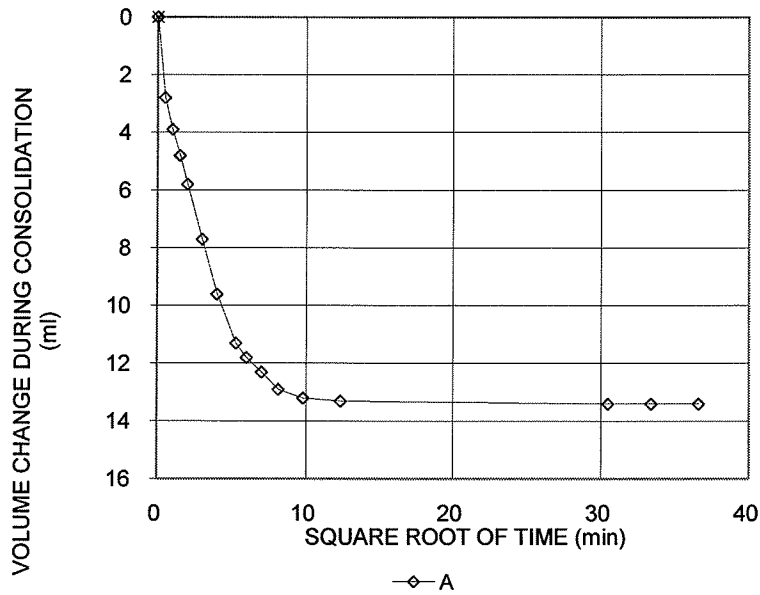
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 135 SA 14 CIUC D

BH 135 SA 14



Date: 10/12/2008  
Project No. 07-1130-2070

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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

**FIGURE BH 135 SA 7 CIUC A**

TEST STAGE	A
BOREHOLE NUMBER	135
SAMPLE	7
SPECIMEN DIAMETER, cm	4.96
SPECIMEN HEIGHT, cm	10.13
WATER CONTENT BEFORE CONSOLIDATION, %	22.1
CELL PRESSURE, $\sigma_3$ , kPa	250.0
BACK PRESSURE, kPa	205.0
PORE PRESSURE PARAMETER "B"	0.99
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	45.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	9.0
WATER CONTENT AFTER CONSOLIDATION, %	17.0
AVERAGE RATE OF STRAIN, %/hr	0.5
TIME TO FAILURE, DAYS	1
WATER CONTENT AFTER TEST, %	20.8
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	68.5
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	10.0
MAX EFFECTIVE PRINCIPAL STRESS	
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.9
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	59.9
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	2.0
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.12
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.24
NATURAL WATER CONTENT, %	20.9
DRY DENSITY, $Mg/m^3$	1.72
FILTER DRAINS USED, y/n	y
TEST NOTES:	
CHANGED RATE OF STRAIN, %/hr	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-
FAILURE PLANE NUMBER	1.0
ANGLE OF FAILURE, DEGREES	45.0

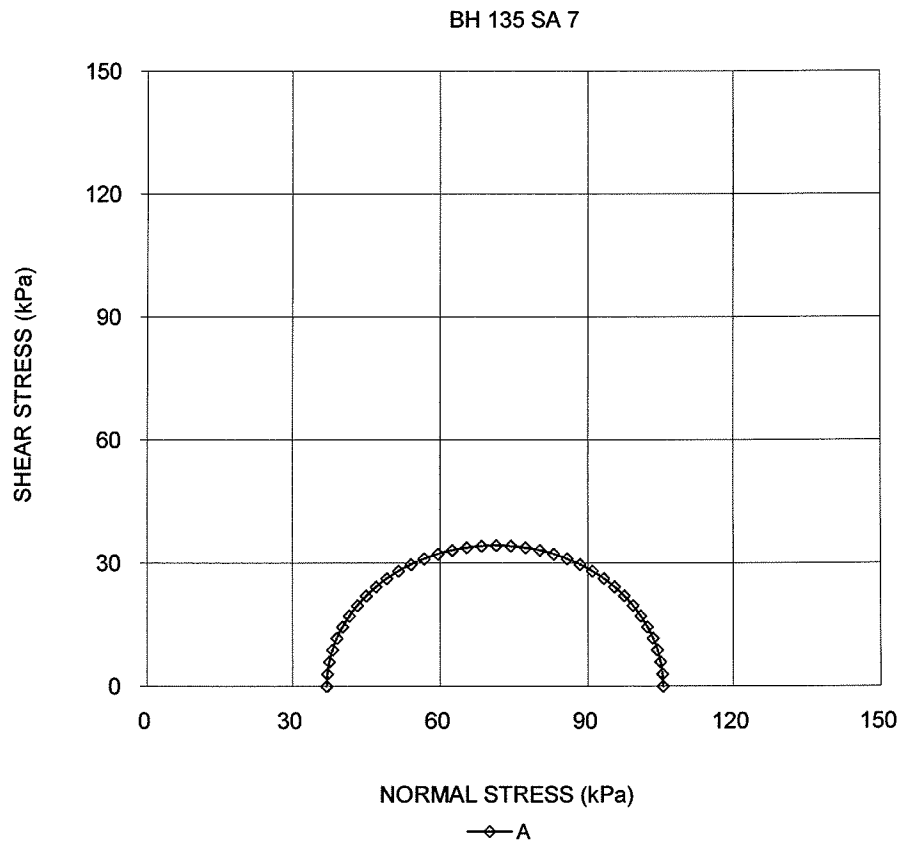
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 135 SA 7 CIUC B



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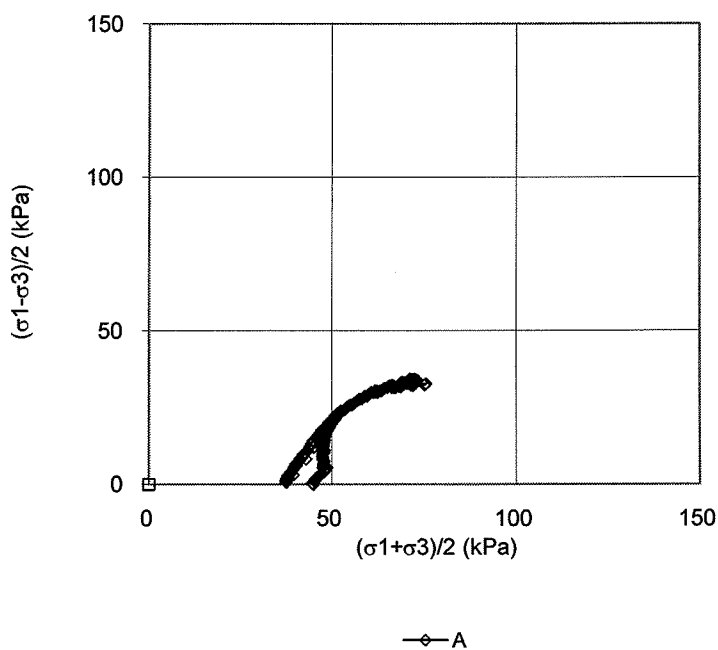
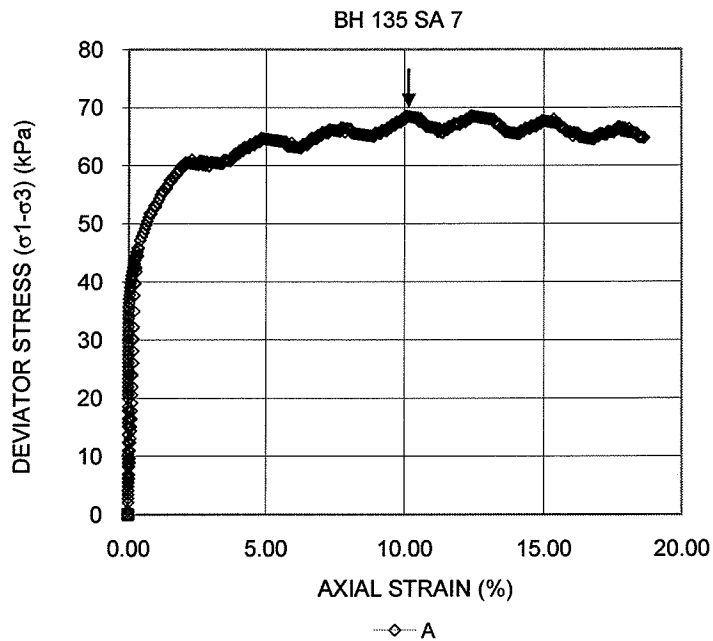
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS**

**SHEET 3 OF 4**

**FIGURE BH 135 SA 7 CIUC C**



Date: 10/12/2008  
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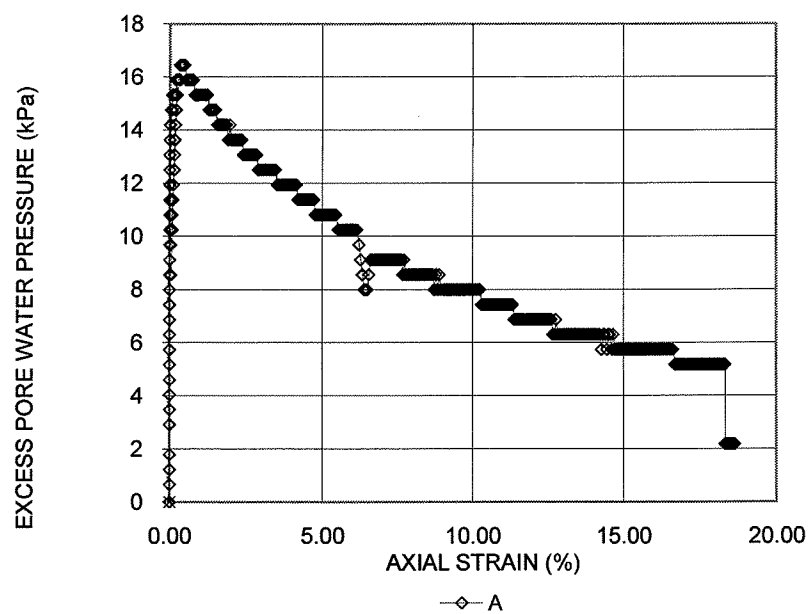
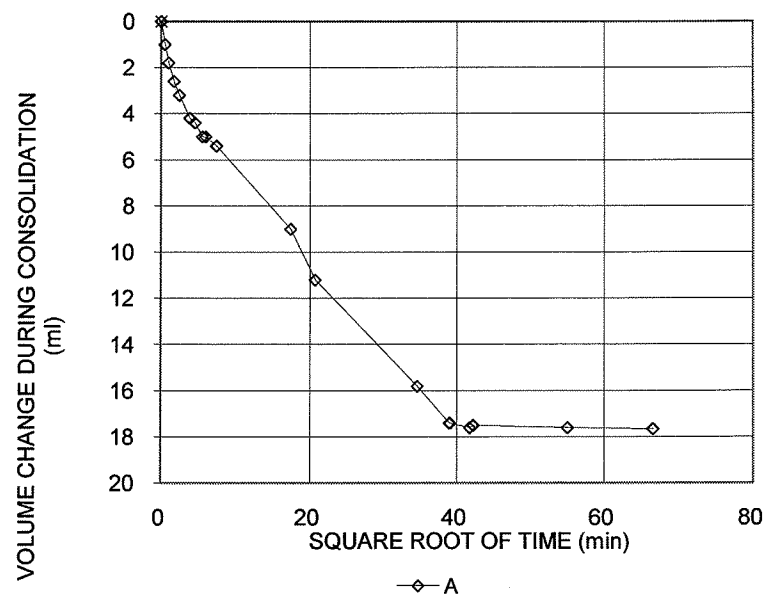
**Golder Associates**

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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 135 SA 7 CIUC D**

BH 135 SA 7



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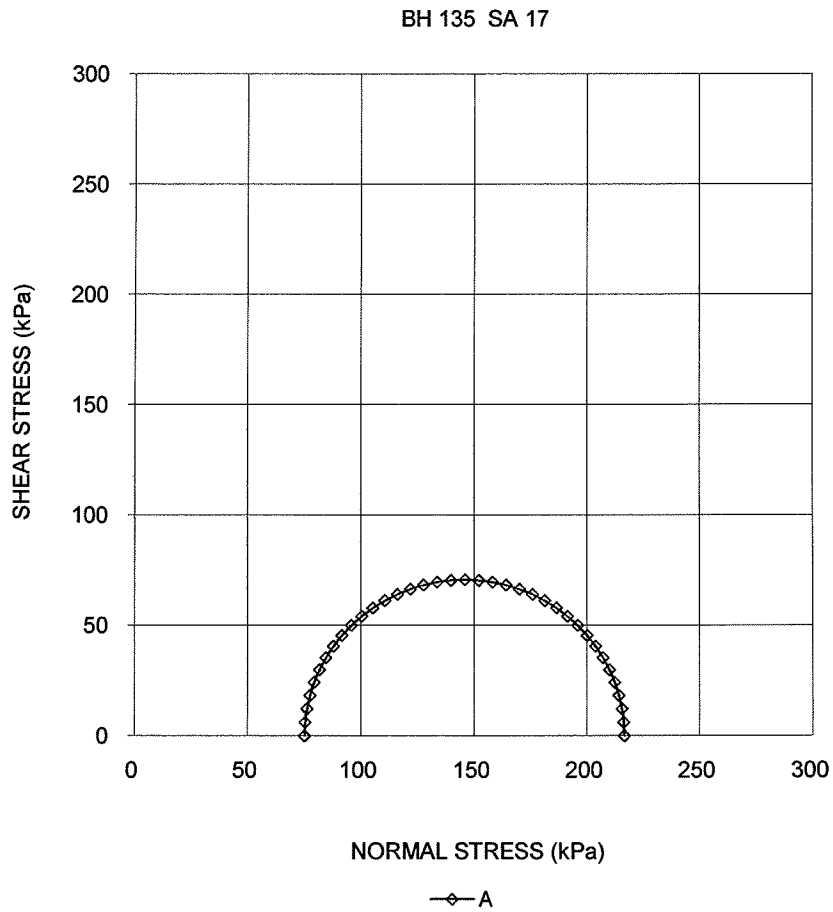
**Golder Associates**

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Checked By: RO

<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 135 SA 17 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	135	
SAMPLE	17	
SPECIMEN DIAMETER, cm	5.00	
SPECIMEN HEIGHT, cm	10.07	
WATER CONTENT BEFORE CONSOLIDATION, %	18.6	
CELL PRESSURE, $\sigma_3$ , kPa	327.0	
BACK PRESSURE, kPa	205.0	
PORE PRESSURE PARAMETER "B"	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	122.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	3.6	
WATER CONTENT AFTER CONSOLIDATION, %	16.6	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	17.4	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	141.4	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	14.9	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.9	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	134.4	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	8.3	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.33	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.39	
NATURAL WATER CONTENT, %	18.0	
DRY DENSITY, Mg/m <sup>3</sup>	1.82	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	bulged	
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 135 SA 17 CIUC B



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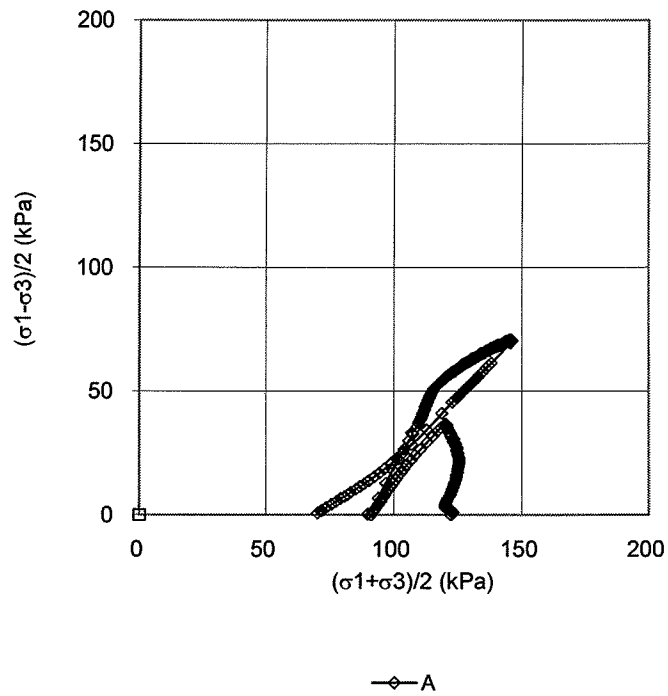
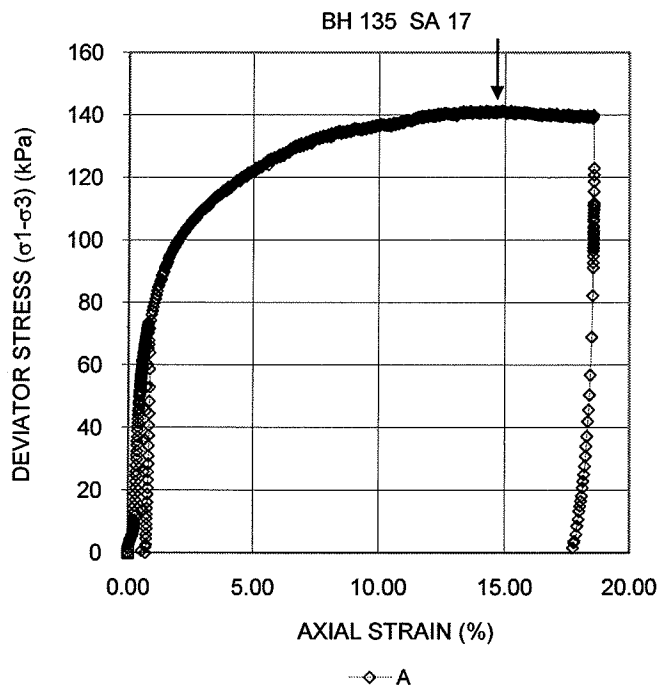
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS

SHEET 3 OF 4

FIGURE BH 135 SA 17 CIUC C



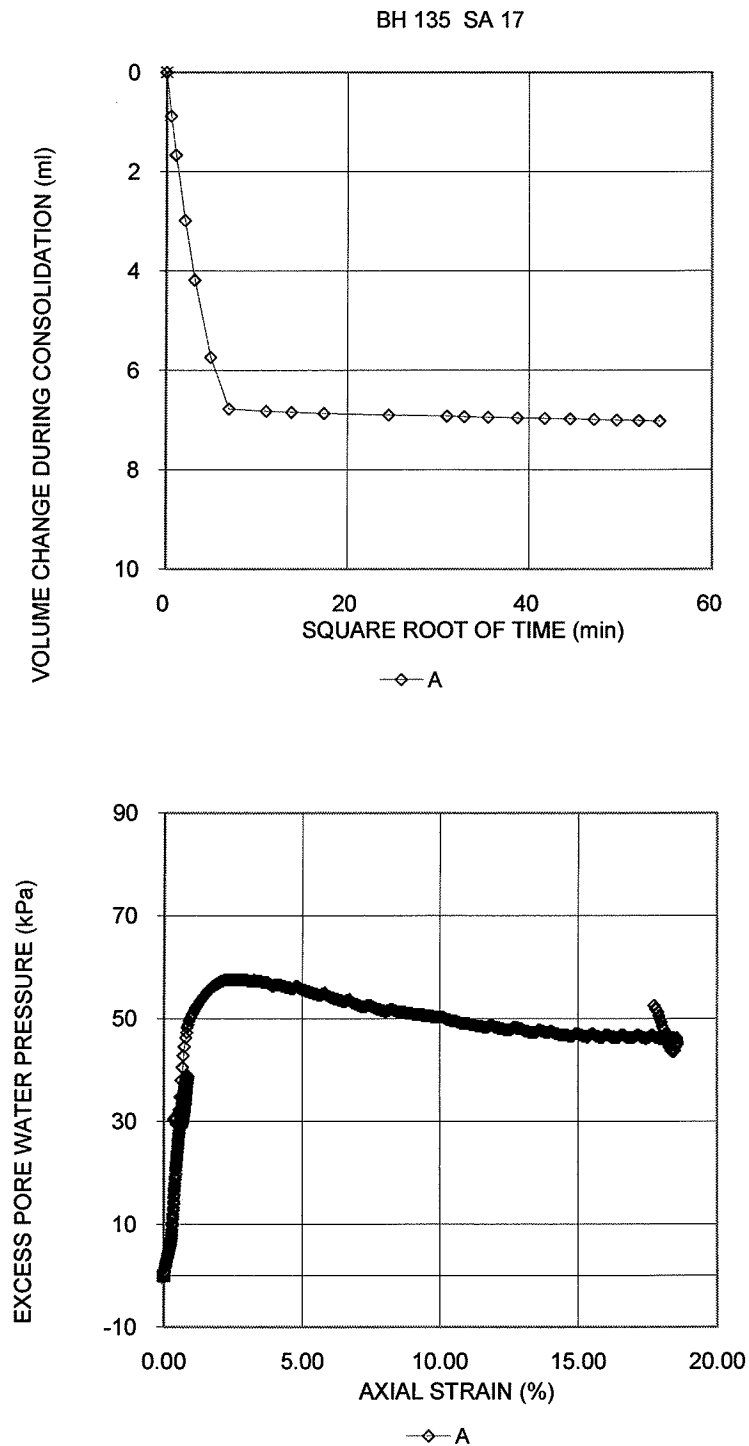
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 135 SA 17 CIUC D



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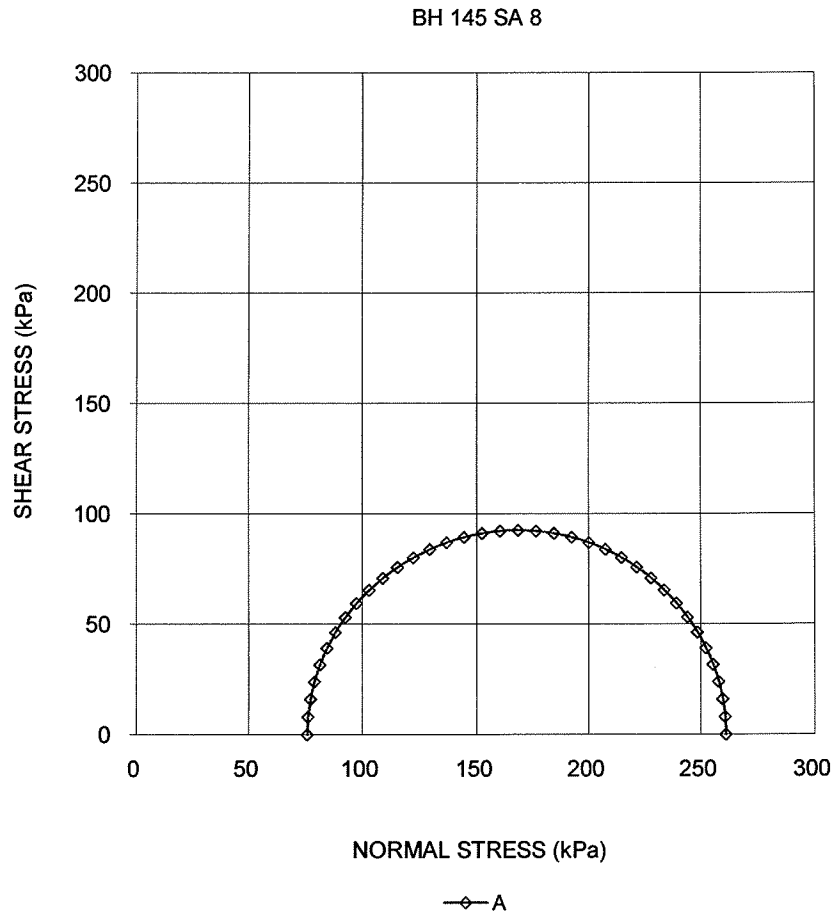
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<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 145 SA 8 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	145	
SAMPLE	8	
SPECIMEN DIAMETER, cm	4.99	
SPECIMEN HEIGHT, cm	10.09	
WATER CONTENT BEFORE CONSOLIDATION, %	18.1	
CELL PRESSURE, $\sigma_3$ , kPa	403.0	
BACK PRESSURE, kPa	345.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	58.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.3	
WATER CONTENT AFTER CONSOLIDATION, %	17.4	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	17.0	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	185.1	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	11.0	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.8	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	145.5	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	3.1	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.10	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.05	
NATURAL WATER CONTENT, %	17.1	
DRY DENSITY, $Mg/m^3$	1.83	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	BULGED	
<div> <div>Date: 10/02/2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By MM</div> <div>Checked By: RO</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 145 SA 8 CIUC B



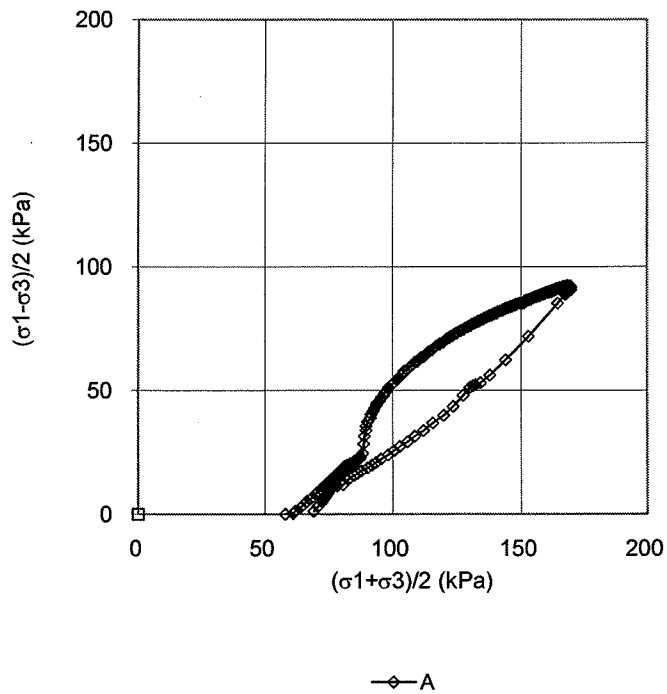
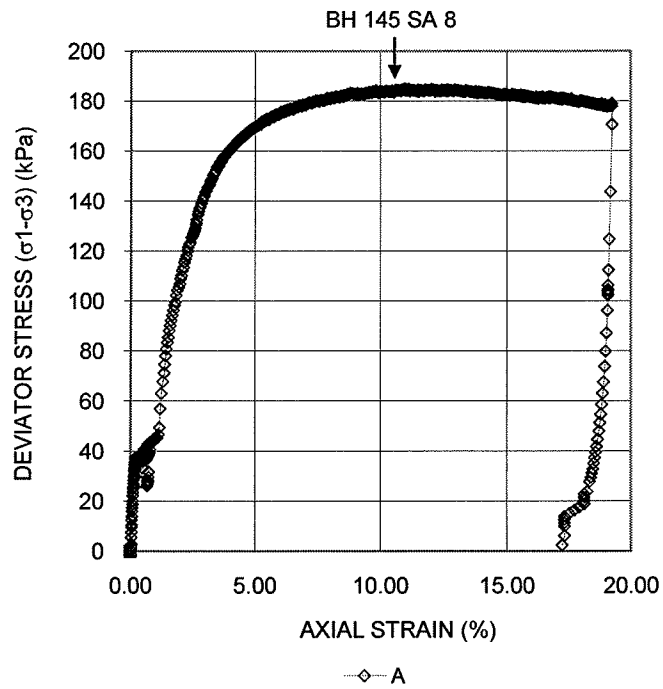
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 145 SA 8 CIUC C



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Project No. 07-1130-2070

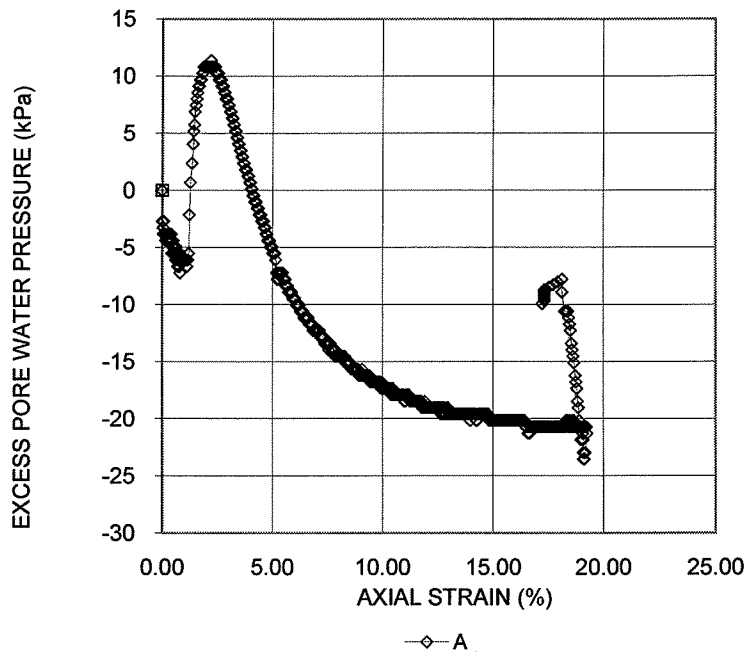
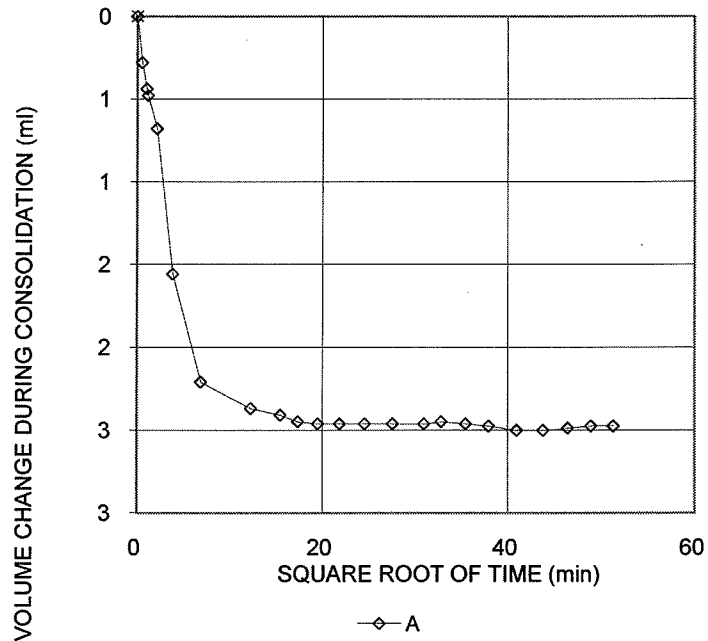
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 145 SA 8 CIUC D

BH 145 SA 8



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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

FIGURE BH 145 SA 13 CIUC A

TEST STAGE	A
BOREHOLE NUMBER	145
SAMPLE	13

SPECIMEN DIAMETER, cm	4.96
SPECIMEN HEIGHT, cm	10.12

WATER CONTENT BEFORE CONSOLIDATION, %	18.3
CELL PRESSURE, $\sigma_3$ , kPa	427.0
BACK PRESSURE, kPa	345.0
PORE PRESSURE PARAMETER "B"	0.96
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	82.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	8.6
WATER CONTENT AFTER CONSOLIDATION, %	16.5
AVERAGE RATE OF STRAIN, %/hr	0.5
TIME TO FAILURE, DAYS	1
WATER CONTENT AFTER TEST, %	17.0

MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	134.2
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	13.2
MAX EFFECTIVE PRINCIPAL STRESS	
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.2
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	112.8
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	4.7
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.12
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.27

NATURAL WATER CONTENT, %	17.8
DRY DENSITY, Mg/m <sup>3</sup>	1.83

FILTER DRAINS USED, y/n	y
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TEST NOTES:

CHANGED RATE OF STRAIN, %/hr	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-
FAILURE PLANE NUMBER	-
ANGLE OF FAILURE, DEGREES	bulged

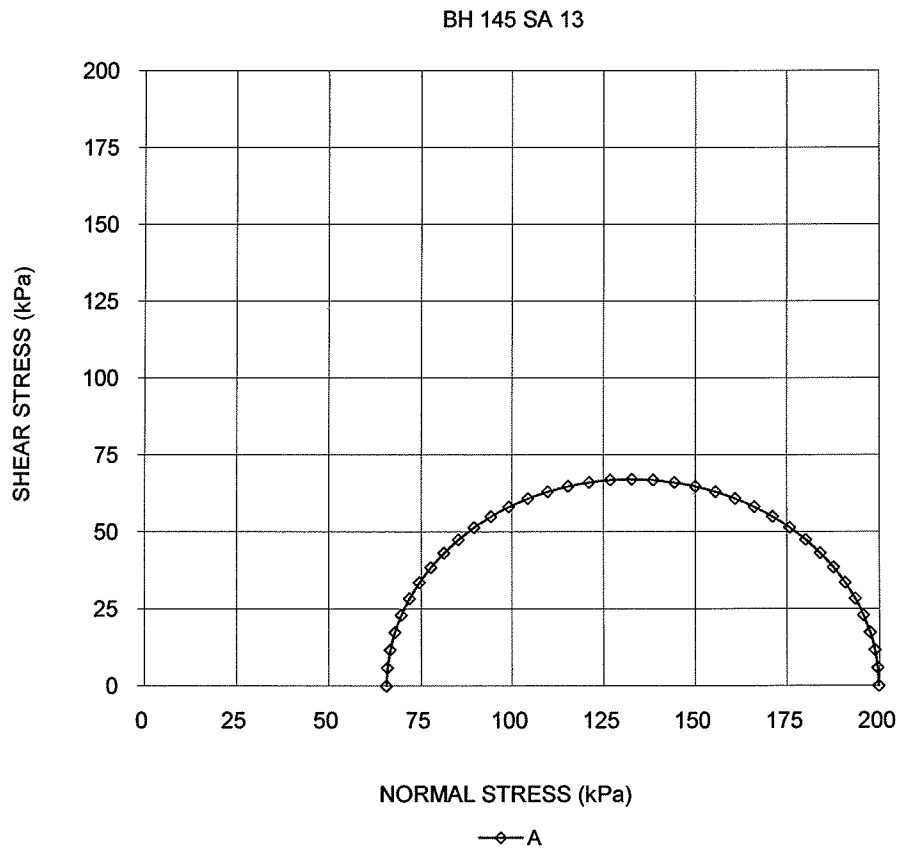
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 145 SA 13 CIUC B



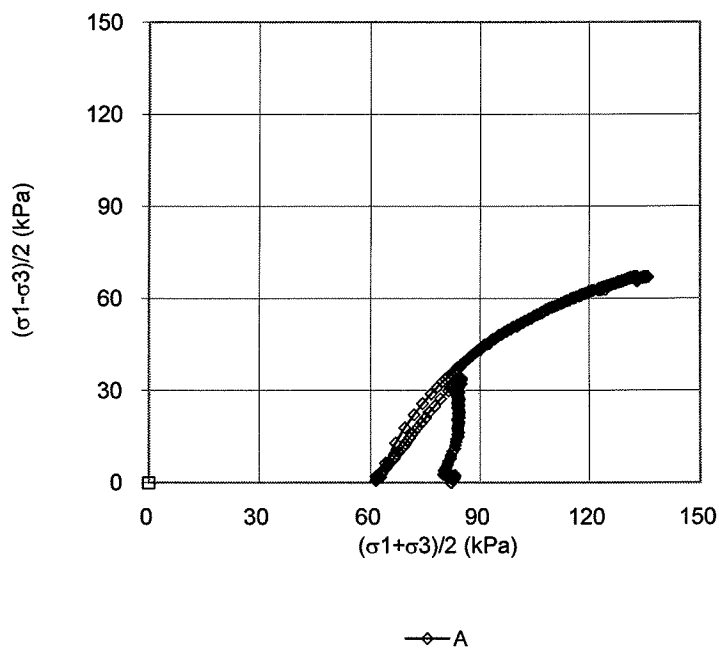
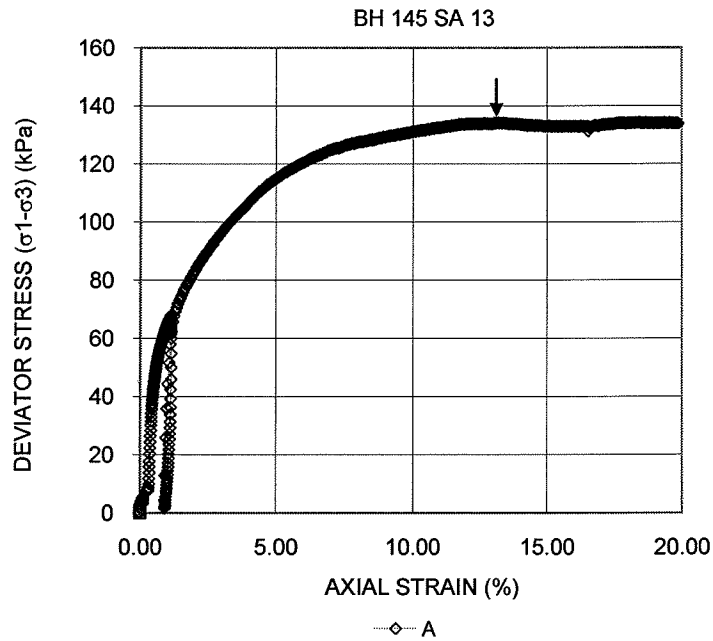
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 145 SA 13 CIUC C**



Date: 10/20/2008  
Project No. 07-1130-2070

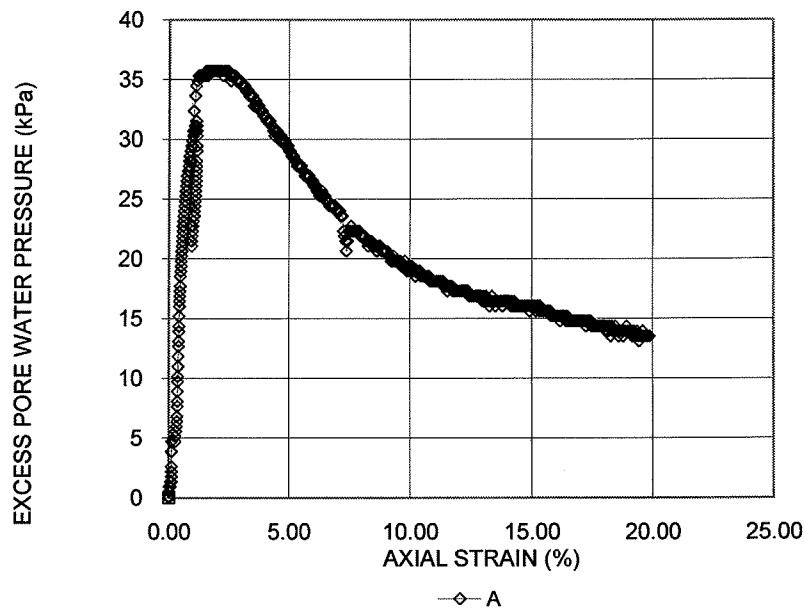
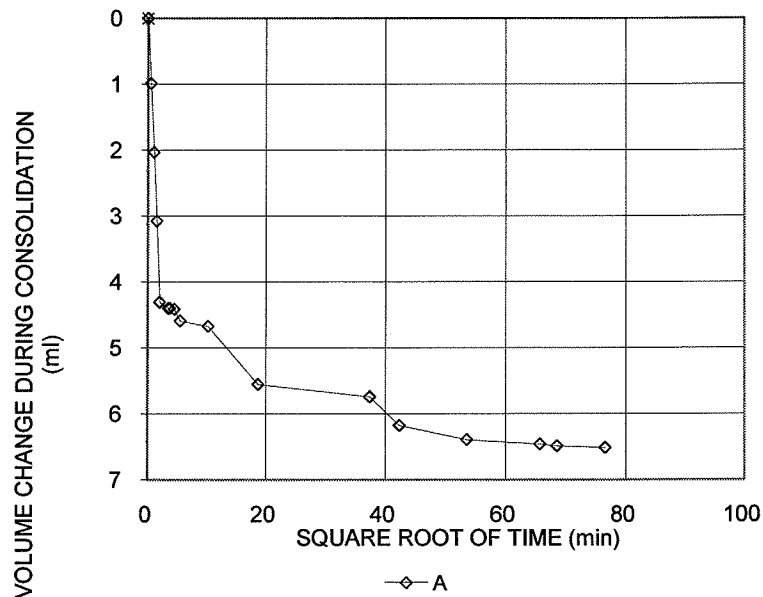
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 145 SA 13 CIUC D**

BH 145 SA 13



Date: 10/20/2008  
Project No. 07-1130-2070

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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

**FIGURE BH 145 SA 15 CIUC A**

TEST STAGE	A
BOREHOLE NUMBER	145
SAMPLE	15
SPECIMEN DIAMETER, cm	4.95
SPECIMEN HEIGHT, cm	10.02
WATER CONTENT BEFORE CONSOLIDATION, %	28.3
CELL PRESSURE, $\sigma_3$ , kPa	451.0
BACK PRESSURE, kPa	275.0
PORE PRESSURE PARAMETER "B"	0.96
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	176.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	21.3
WATER CONTENT AFTER CONSOLIDATION, %	16.8
AVERAGE RATE OF STRAIN, %/hr	0.5
TIME TO FAILURE, DAYS	1
WATER CONTENT AFTER TEST, %	14.9
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	171.3
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	8.9
MAX EFFECTIVE PRINCIPAL STRESS	
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	1.7
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	97.1
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	0.9
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.43
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.42
NATURAL WATER CONTENT, %	17.7
DRY DENSITY, Mg/m <sup>3</sup>	1.85
FILTER DRAINS USED, y/n	y
TEST NOTES:	
CHANGED RATE OF STRAIN, %/hr	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-
FAILURE PLANE NUMBER	1.0
ANGLE OF FAILURE, DEGREES	55.0

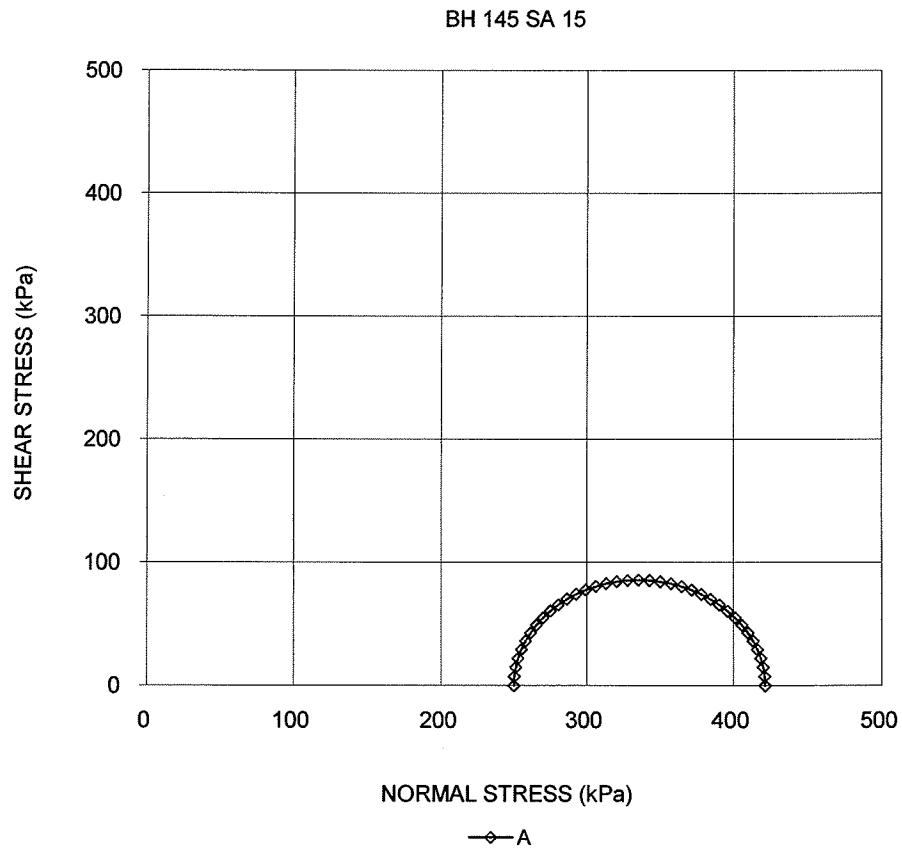
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 145 SA 15 CIUC B



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Project No. 07-1130-2070

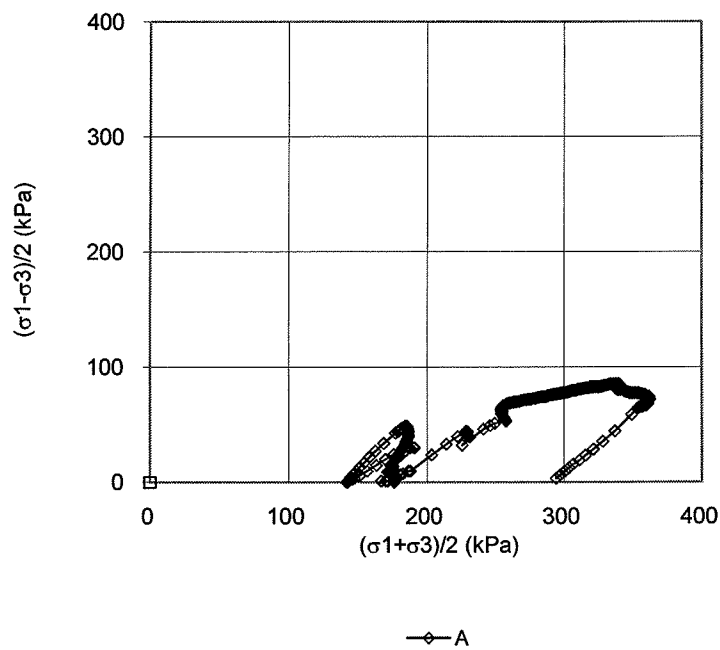
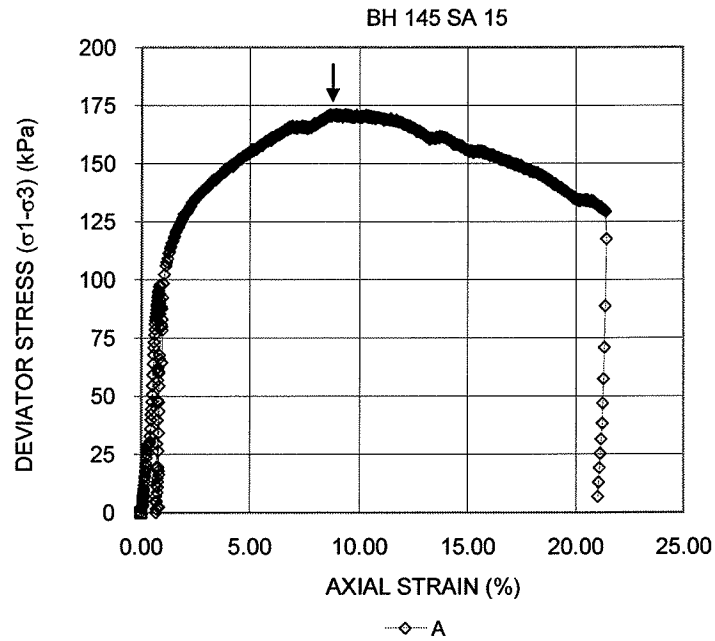
**Golder Associates**

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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 145 SA 15 CIUC C**



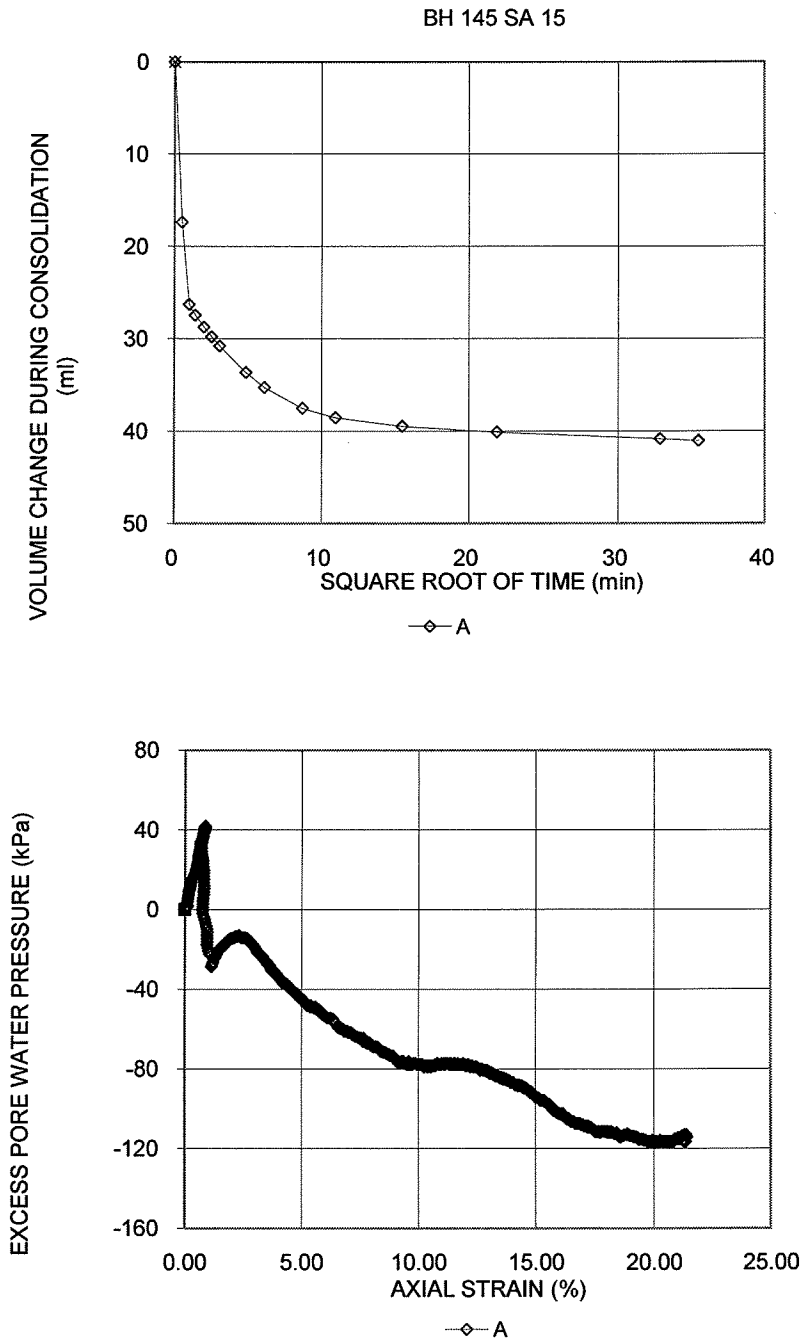
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 145 SA 15 CIUC D**



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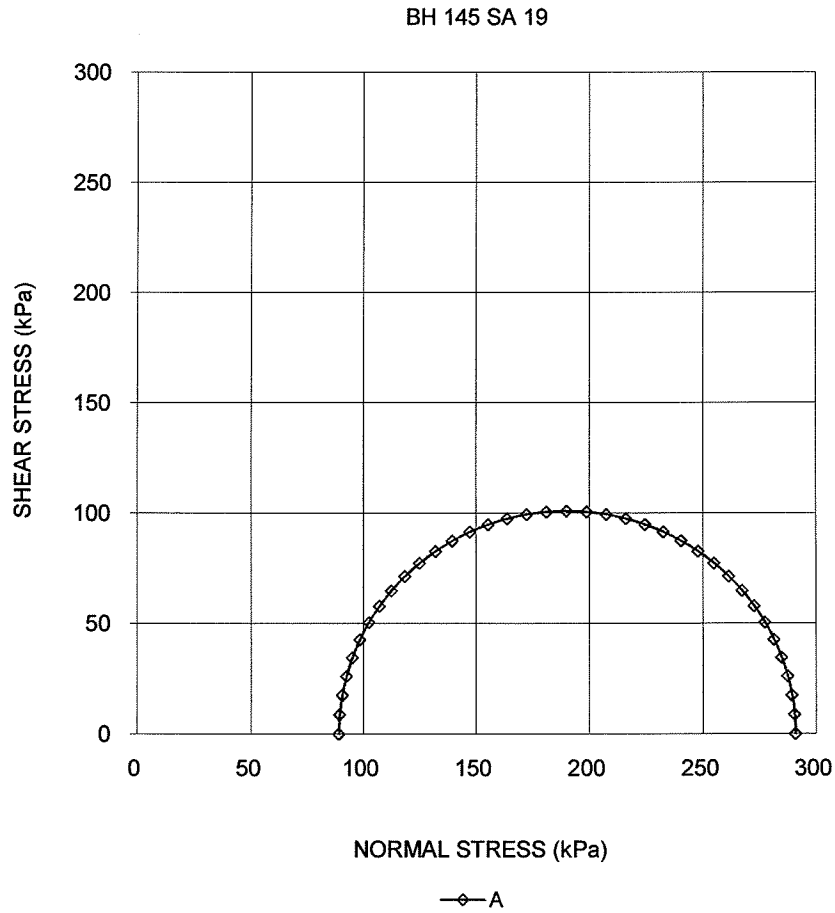
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<b>CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 145 SA 19 CIUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	145	
SAMPLE	19	
SPECIMEN DIAMETER, cm	5.07	
SPECIMEN HEIGHT, cm	10.03	
WATER CONTENT BEFORE CONSOLIDATION, %	21.3	
CELL PRESSURE, $\sigma_3$ , kPa	468.0	
BACK PRESSURE, kPa	345.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	123.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	8.7	
WATER CONTENT AFTER CONSOLIDATION, %	16.4	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	16.0	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	201.9	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	14.9	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.4	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	163.3	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	6.1	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.17	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.33	
NATURAL WATER CONTENT, %	18.4	
DRY DENSITY, Mg/m <sup>3</sup>	1.78	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	1.0	
ANGLE OF FAILURE, DEGREES	65.0	
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 145 SA 19 CIUC B



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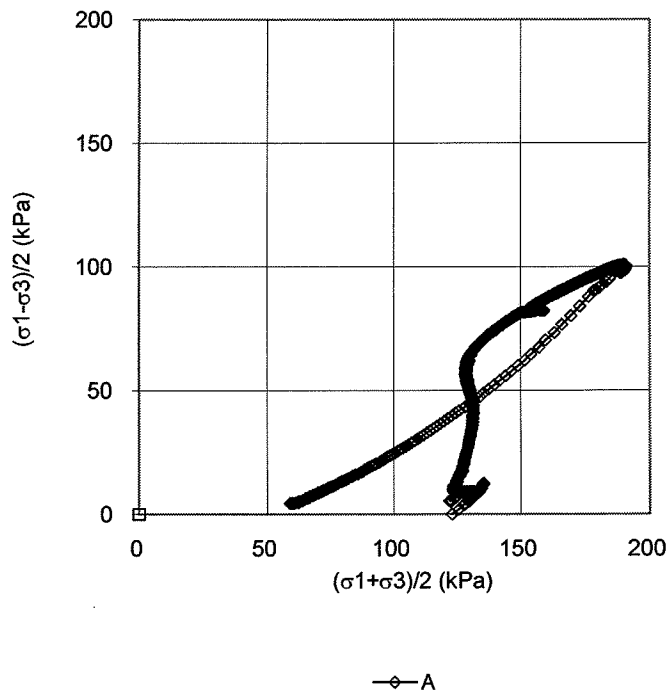
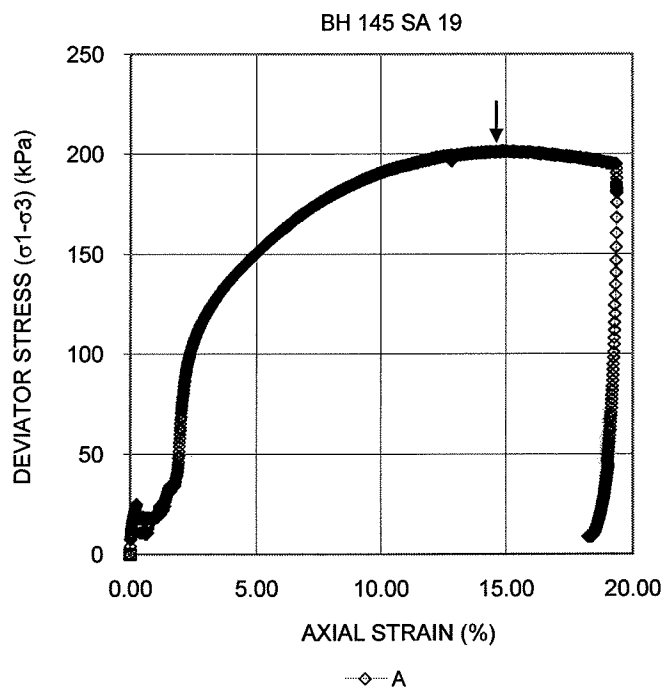
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS**

**SHEET 3 OF 4**

**FIGURE BH 145 SA 19 CIUC C**



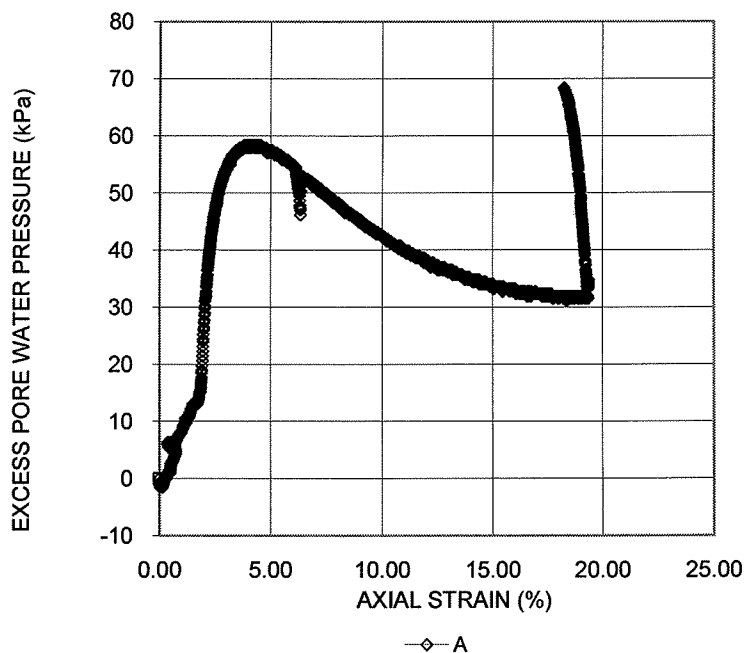
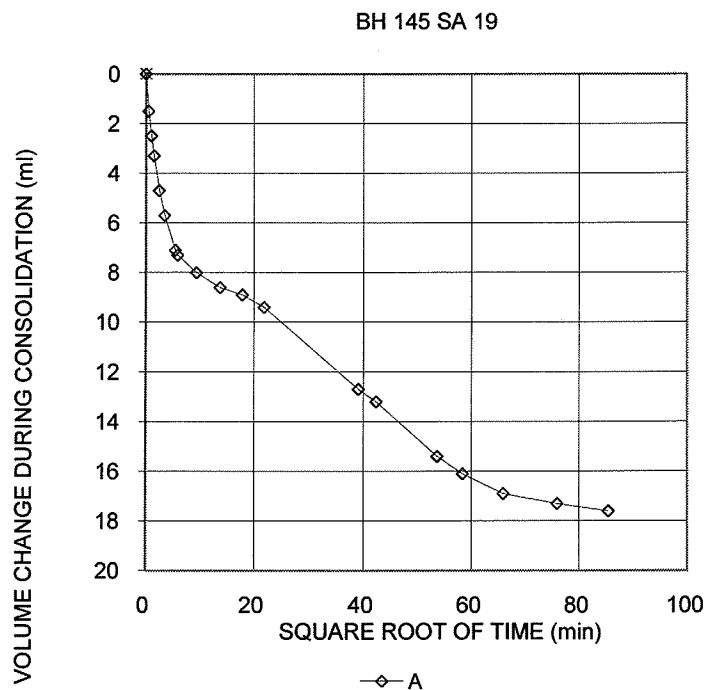
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 145 SA 19 CIUC D**



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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

**FIGURE BH 154 SA 4 CIUC A**

TEST STAGE	A
BOREHOLE NUMBER	154
SAMPLE	4

SPECIMEN DIAMETER, cm	4.97
SPECIMEN HEIGHT, cm	10.13

WATER CONTENT BEFORE CONSOLIDATION, %	23.5
CELL PRESSURE, $\sigma_3$ , kPa	431.0
BACK PRESSURE, kPa	415.0
PORE PRESSURE PARAMETER "B"	0.96
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	16.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.0
WATER CONTENT AFTER CONSOLIDATION, %	22.9
AVERAGE RATE OF STRAIN, %/hr	0.5
TIME TO FAILURE, DAYS	1
WATER CONTENT AFTER TEST, %	23.4

MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	59.7
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	14.7
MAX EFFECTIVE PRINCIPAL STRESS	
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	4.1
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	29.0
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	1.3
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.24
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.22

NATURAL WATER CONTENT, %	20.9
DRY DENSITY, $Mg/m^3$	1.76

FILTER DRAINS USED, y/n	y
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TEST NOTES:

CHANGED RATE OF STRAIN, %/hr	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-
FAILURE PLANE NUMBER	-
ANGLE OF FAILURE, DEGREES	-

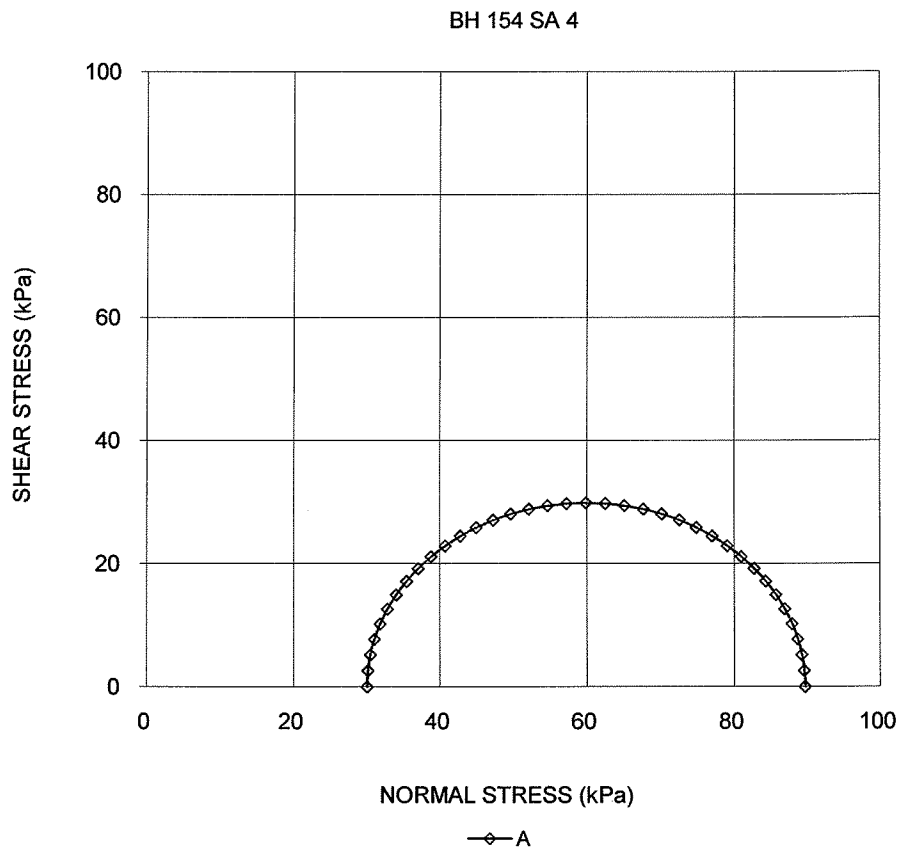
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 154 SA 4 CIUC B



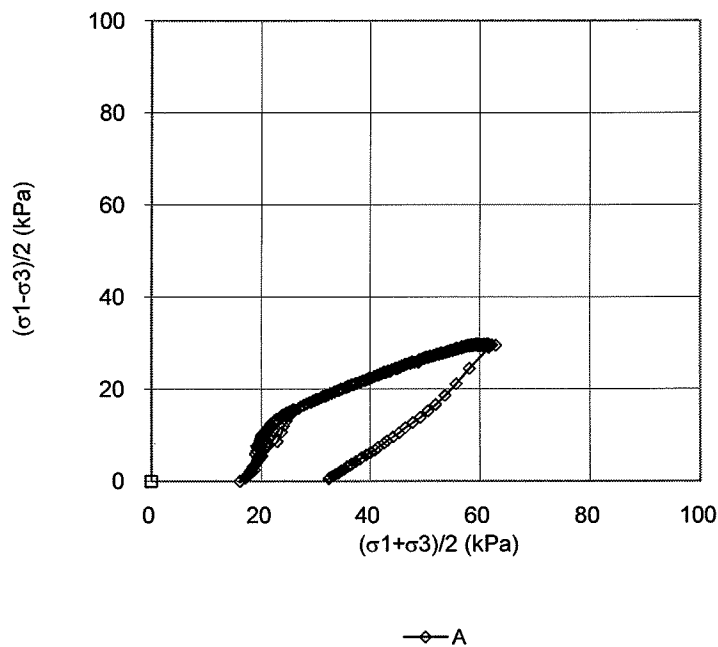
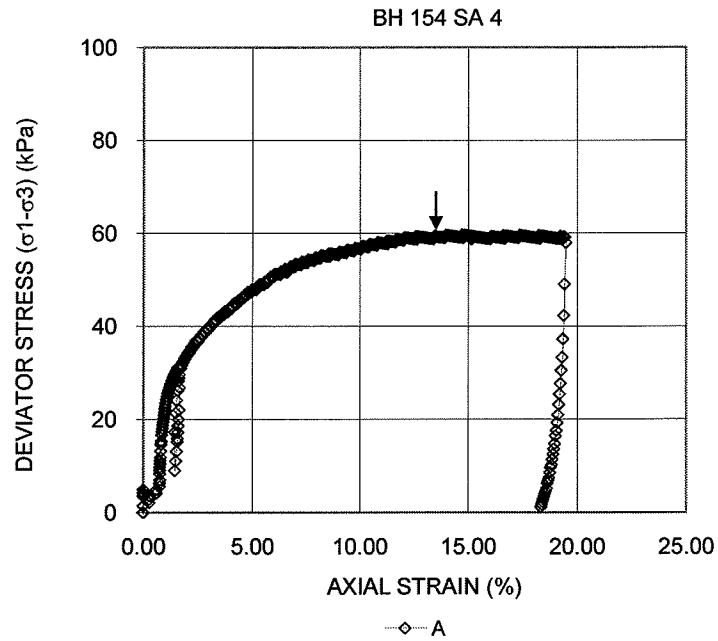
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 154 SA 4 CIUC C



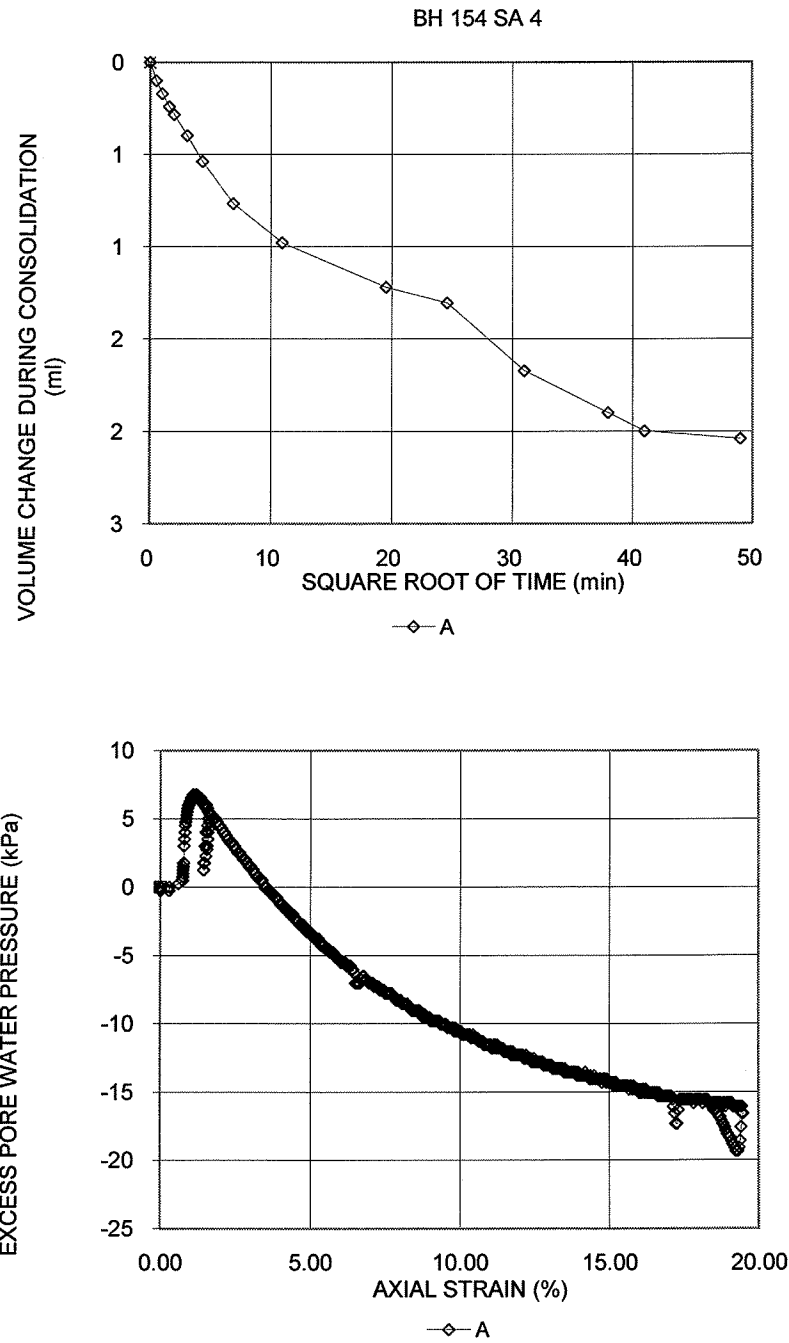
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 154 SA 4 CIUC D**



Date: 11/04/2008  
Project No. 07-1130-2070

**Golder Associates**

Prepared By: MM  
Checked By: RO

**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

**FIGURE BH 158 SA 8 CIUC A**

TEST STAGE	A
BOREHOLE NUMBER	158
SAMPLE	8
SPECIMEN DIAMETER, cm	4.99
SPECIMEN HEIGHT, cm	10.14
WATER CONTENT BEFORE CONSOLIDATION, %	30.7
CELL PRESSURE, $\sigma_3$ , kPa	321.0
BACK PRESSURE, kPa	275.0
PORE PRESSURE PARAMETER "B"	0.97
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	46.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	2.5
WATER CONTENT AFTER CONSOLIDATION, %	29.0
AVERAGE RATE OF STRAIN, %/hr	0.5
TIME TO FAILURE, DAYS	1
WATER CONTENT AFTER TEST, %	30.3
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	80.5
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	4.2
MAX EFFECTIVE PRINCIPAL STRESS	
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	3.6
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	76.3
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	3.7
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.18
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.22
NATURAL WATER CONTENT, %	29.0
DRY DENSITY, $Mg/m^3$	1.52
FILTER DRAINS USED, y/n	y
TEST NOTES:	
CHANGED RATE OF STRAIN, %/hr	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-
FAILURE PLANE NUMBER	1
ANGLE OF FAILURE, DEGREES	60

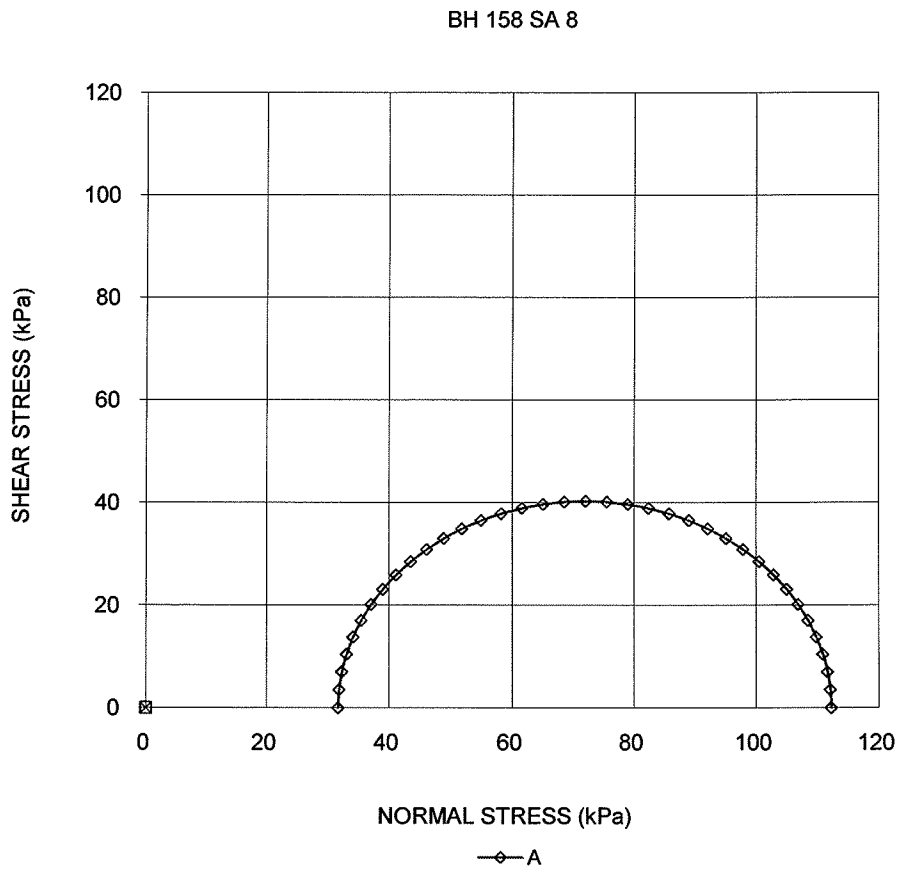
Date: 09/19/2008  
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**Golder Associates**

Prepared By: MM  
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 158 SA 8 CIUC B



Date: 09/19/2008  
Project No. 07-1130-2070

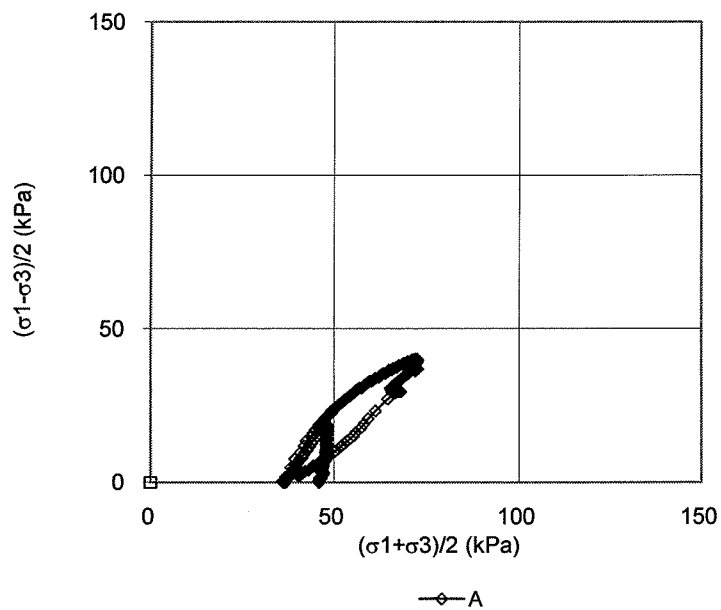
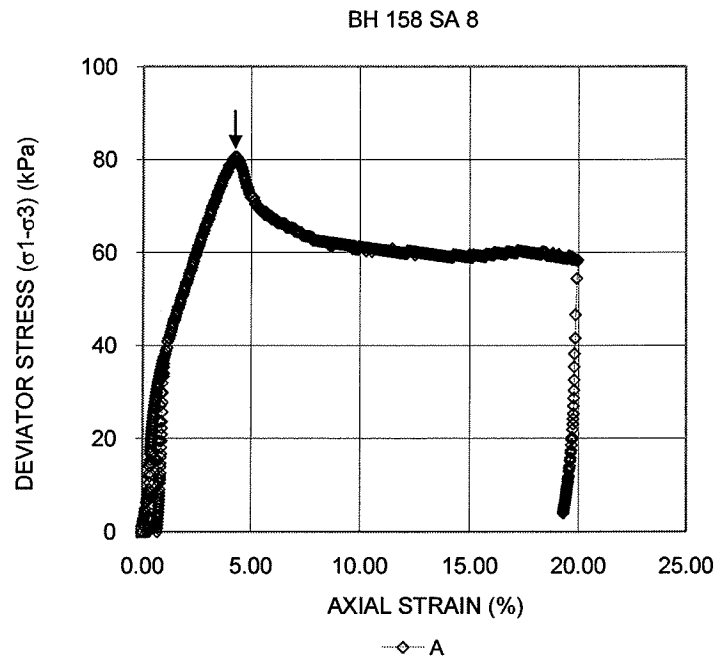
**Golder Associates**

Prepared By: MM  
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 158 SA 8 CIUC C



Date: 09/19/2008  
Project No. 07-1130-2070

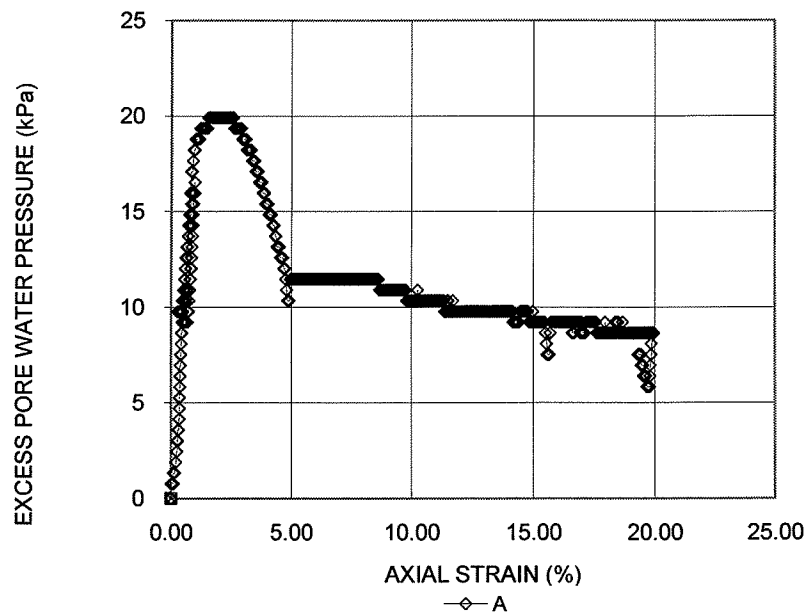
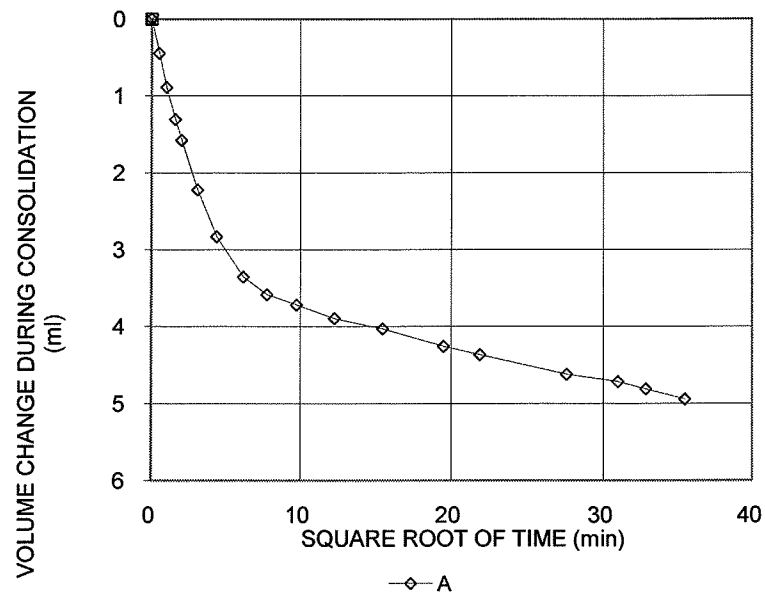
**Golder Associates**

Prepared By: MM  
Checked By: RO

**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 158 SA 8 CIUC D**

BH 158 SA 8



Date: 09/19/2008  
Project No. 07-1130-2070

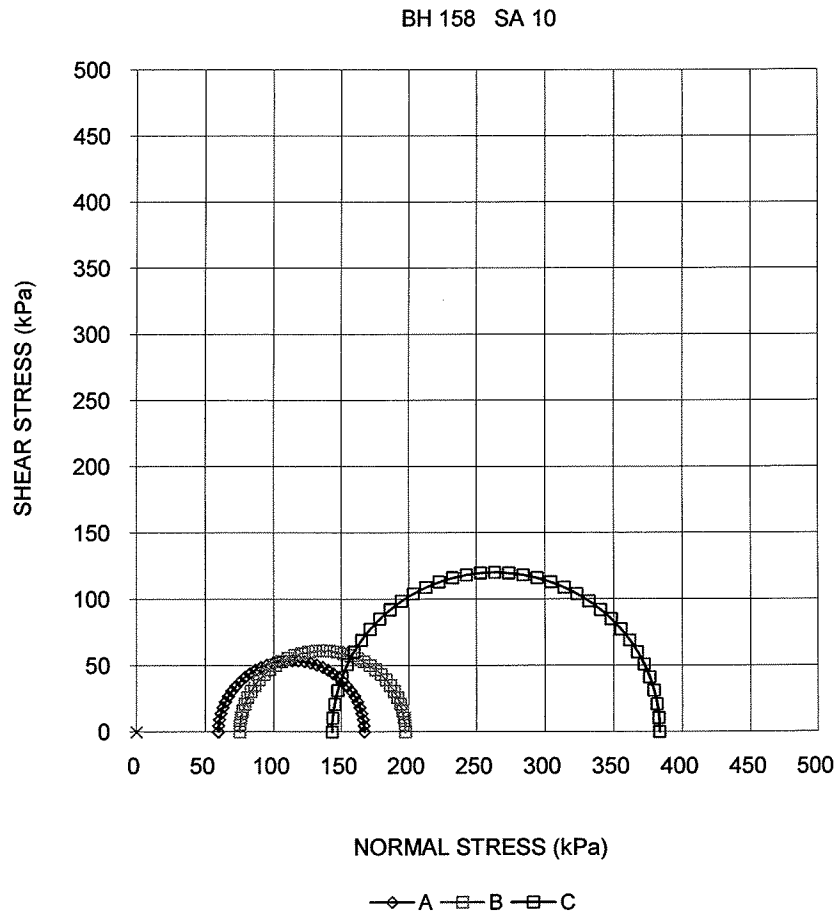
**Golder Associates**

Prepared By: MM  
Checked By: RO

CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS SHEET 1 OF 4		FIGURE BH 158 SA 10 CIUC A	
TEST STAGE	A	B	C
BOREHOLE NUMBER	158	158	158
SAMPLE	10	10	10
SPECIMEN DIAMETER, cm	4.97	5.03	5.06
SPECIMEN HEIGHT, cm	10.13	10.06	9.94
WATER CONTENT BEFORE CONSOLIDATION, %	27.0	25.8	27.4
CELL PRESSURE, $\sigma_3$ , kPa	503.0	380.0	695.0
BACK PRESSURE, kPa	415.0	205.0	345.0
PORE PRESSURE PARAMETER "B"	0.97	0.96	0.96
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	88.0	175.0	350.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.5	9.6	12.7
WATER CONTENT AFTER CONSOLIDATION, %	27.0	19.9	19.5
AVERAGE RATE OF STRAIN, %/hr	0.5	0.5	0.5
TIME TO FAILURE, DAYS	1	1	1
WATER CONTENT AFTER TEST, %	25.4	20.1	17.9
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	107.5	122.4	240.3
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	9.2	7.7	12.9
MAX EFFECTIVE PRINCIPAL STRESS			
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.9	2.6	2.7
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	103.6	122.2	236.5
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	6.1	7.9	10.4
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.26	0.82	0.86
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.32	0.82	0.89
NATURAL WATER CONTENT, %	26.9	25.0	25.5
DRY DENSITY, Mg/m <sup>3</sup>	1.60	1.62	1.61
FILTER DRAINS USED, y/n	y	y	y
TEST NOTES:			
CHANGED RATE OF STRAIN, %/hr	-	-	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	-	-
FAILURE PLANE NUMBER	-	1.0	1.0
ANGLE OF FAILURE, DEGREES	bulged	60.0	50.0
Date: 10/15/2008 Project No. 07-1130-2070			
Golder Associates			
Prepared By MM Checked By: MM			

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 158 SA 10 CIUC B



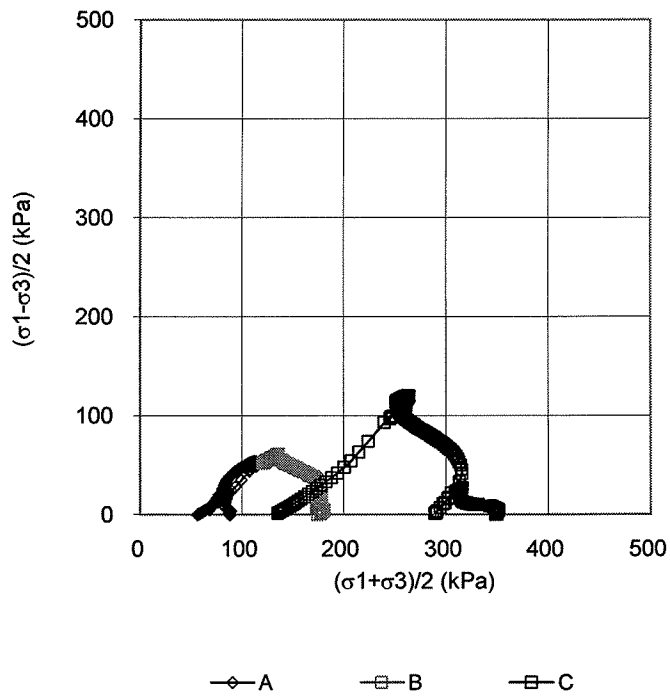
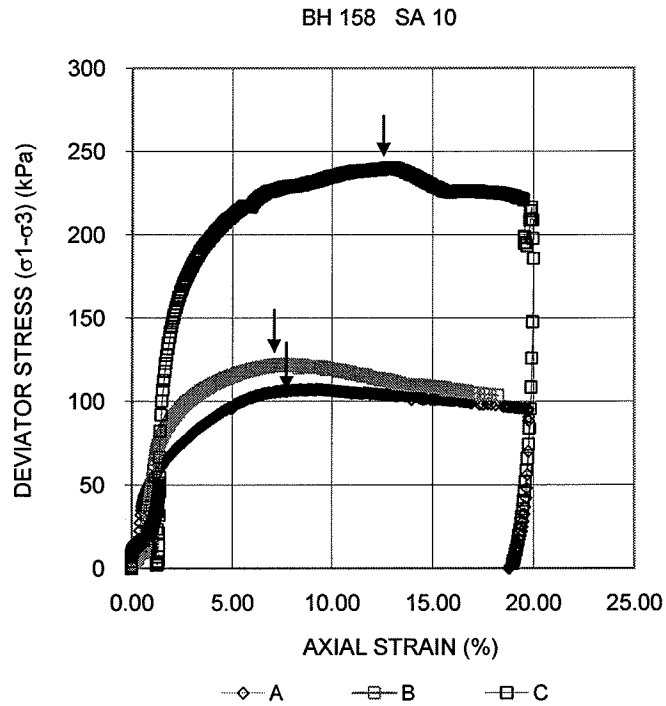
Date: 10/15/2008  
Project No. 07-1130-2070

**Golder Associates**

Prepared By MM  
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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 158 SA 10 CIUC C**



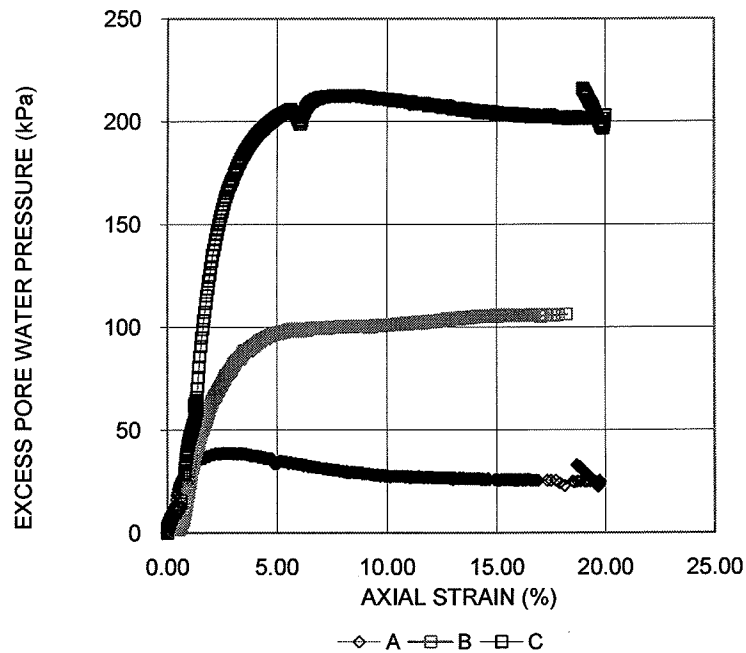
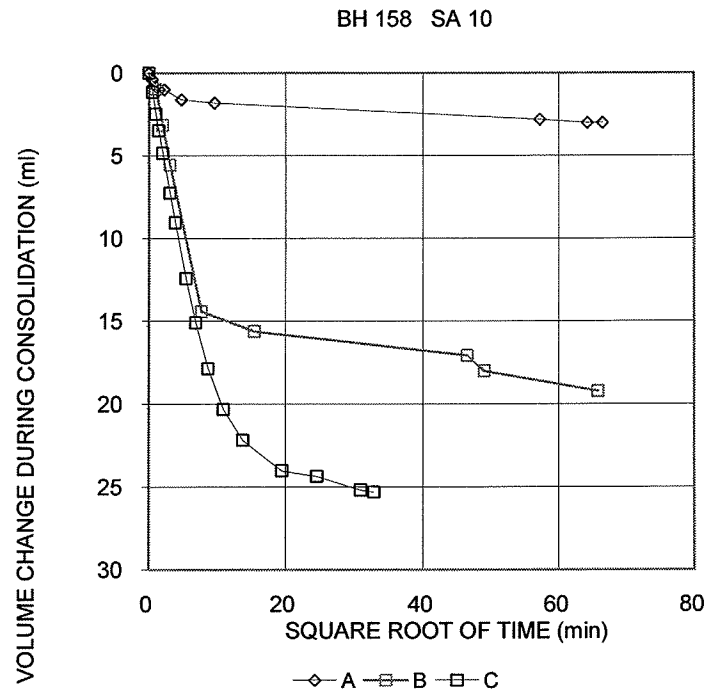
Date: 10/15/2008  
Project No. 07-1130-2070

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Checked By: MM

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4

FIGURE BH 158 SA 10 CIUC D



Date: 10/15/2008  
Project No. 07-1130-2070

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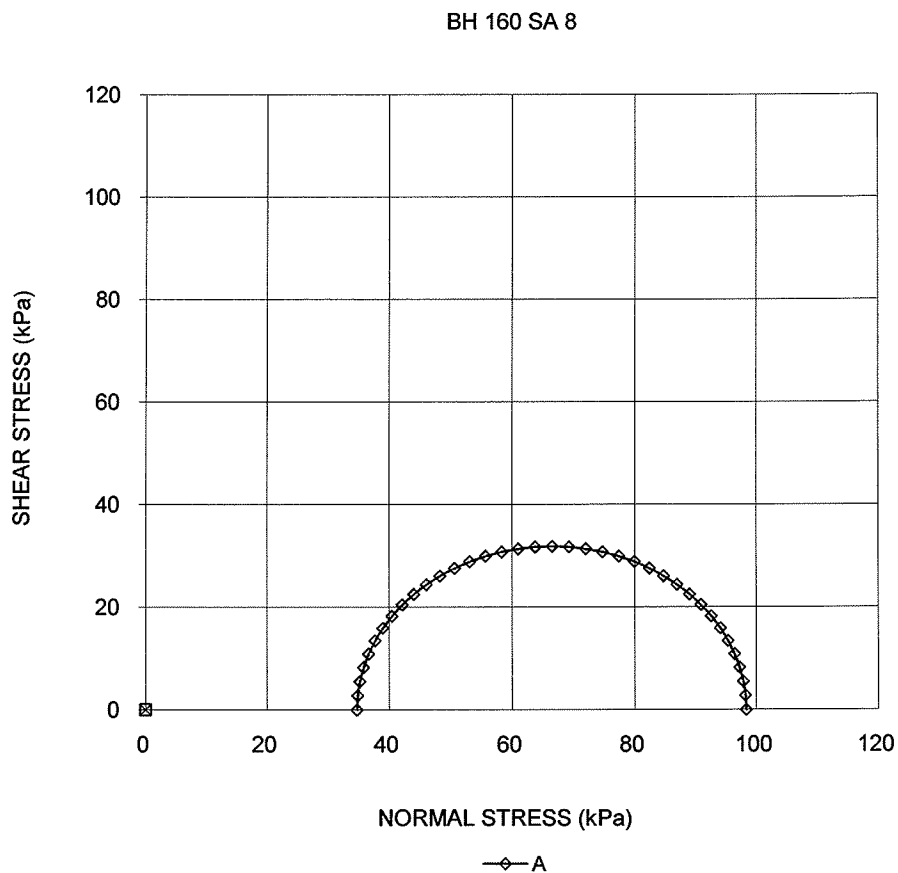
**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 1 OF 4**

**FIGURE BH 160 SA 8 CIUC A**

TEST STAGE	A
BOREHOLE NUMBER	160
SAMPLE	8
SPECIMEN DIAMETER, cm	5.06
SPECIMEN HEIGHT, cm	10.14
WATER CONTENT BEFORE CONSOLIDATION, %	31.9
CELL PRESSURE, $\sigma_3$ , kPa	322.0
BACK PRESSURE, kPa	275.0
PORE PRESSURE PARAMETER "B"	0.97
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	47.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	2.9
WATER CONTENT AFTER CONSOLIDATION, %	29.9
AVERAGE RATE OF STRAIN, %/hr	0.5
TIME TO FAILURE, DAYS	1
WATER CONTENT AFTER TEST, %	30.5
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	63.6
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	6.7
MAX EFFECTIVE PRINCIPAL STRESS	
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.8
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	63.2
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	6.4
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.19
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.20
NATURAL WATER CONTENT, %	31.2
DRY DENSITY, $Mg/m^3$	1.45
FILTER DRAINS USED, y/n	y
TEST NOTES:	
CHANGED RATE OF STRAIN, %/hr	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-
FAILURE PLANE NUMBER	1
ANGLE OF FAILURE, DEGREES	53
<div> <div>Date: 08/31/2008</div> <div>Project No. 07-1130-2070</div> </div> <div style="text-align: center;"> <b>Golder Associates</b> </div> <div> <div>Prepared By: MM</div> <div>Checked By: RO</div> </div>	

CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 160 SA 8 CIUC B



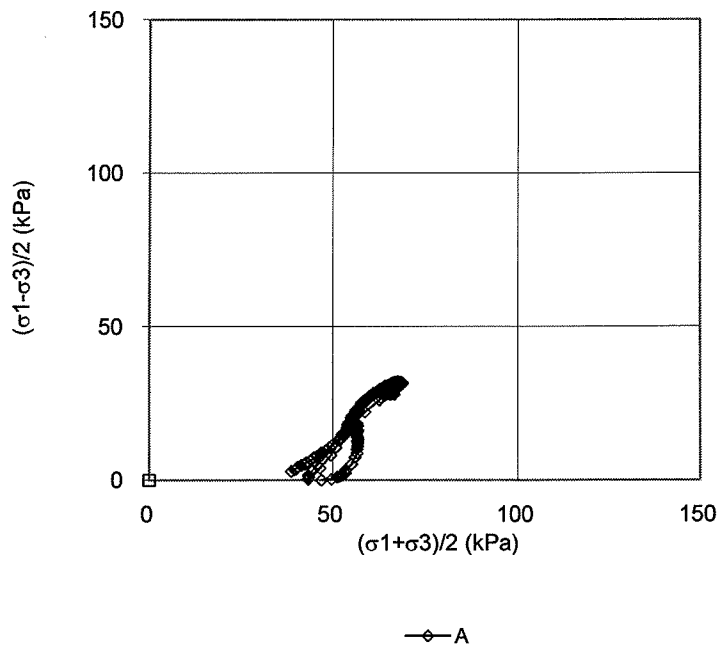
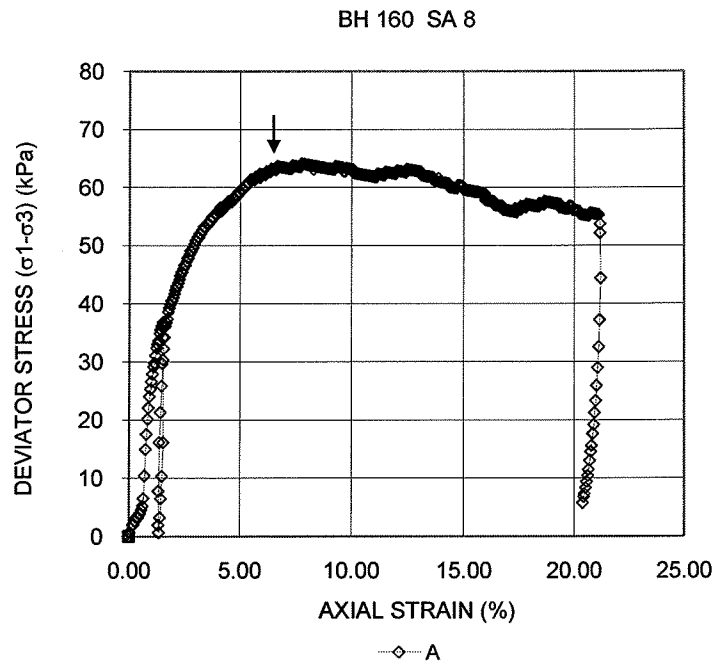
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Project No. 07-1130-2070

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Prepared By: MM  
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CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 160 SA 8 CIUC C



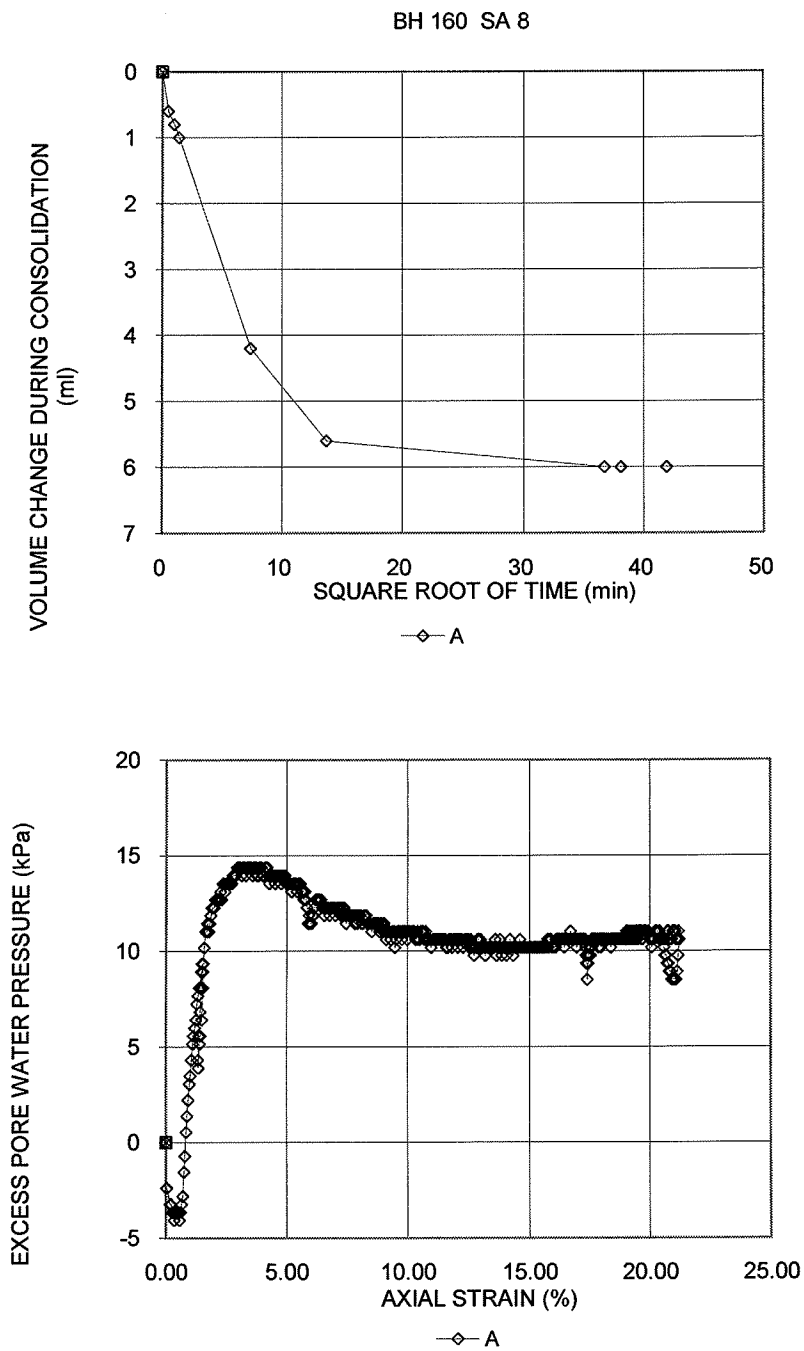
Date: 08/31/2008  
Project No. 07-1130-2070

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**CONSOLIDATED UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

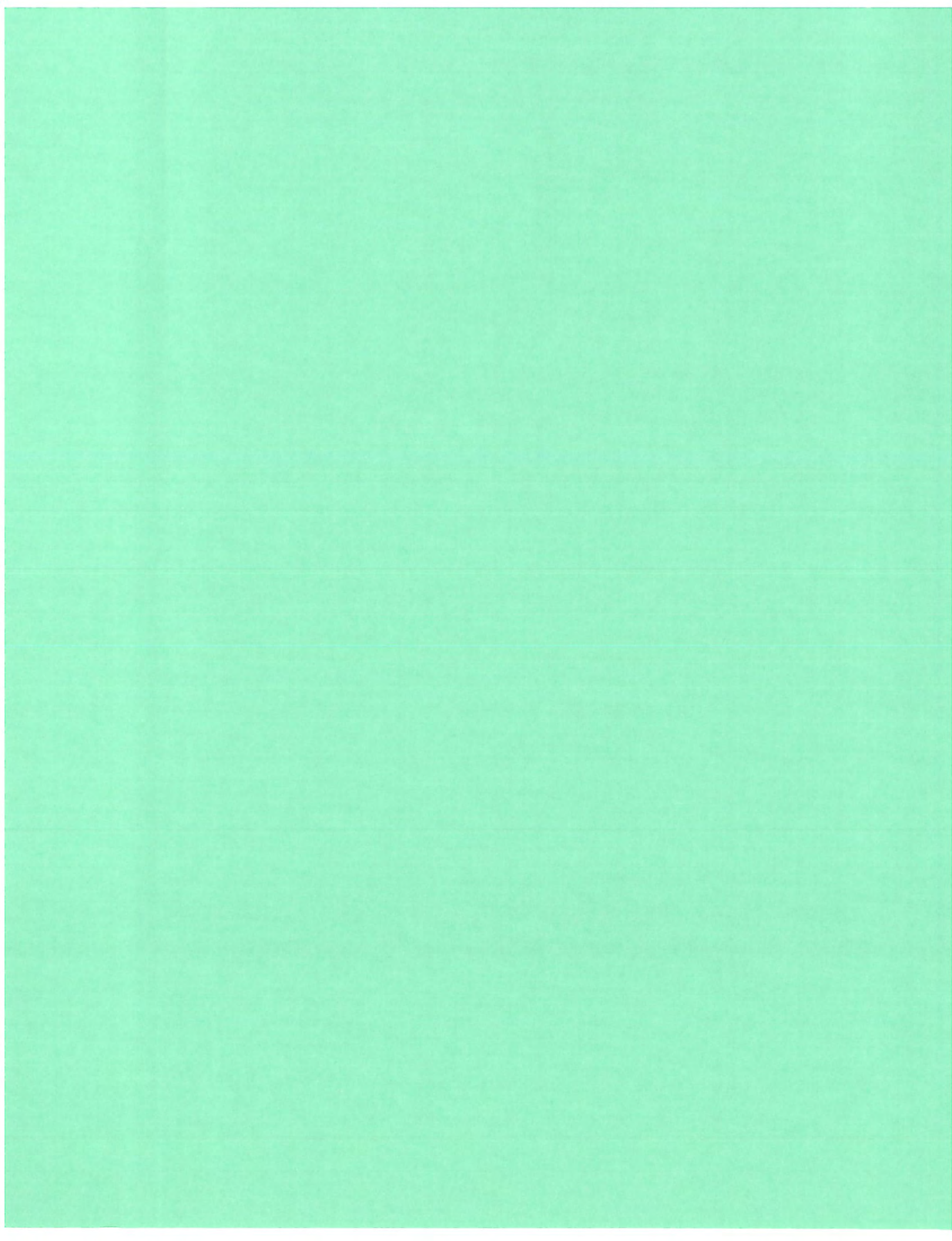
**FIGURE BH 160 SA 8 CIUC D**



Date: 08/31/2008  
Project No. 07-1130-2070

**Golder Associates**

Prepared By: MM  
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CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST WITH PORE PRESSURE MEASUREMENTS SHEET 1 OF 4		FIGURE BH 103A SA 3 CIUE A		
TEST STAGE	A	B	C	
BOREHOLE NUMBER	103A	103A	103A	
SAMPLE NUMBER	3	3	3	
SPECIMEN DIAMETER, cm	4.97	4.96	4.99	
SPECIMEN HEIGHT, cm	10.18	10.15	10.14	
WATER CONTENT BEFORE CONSOLIDATION, %	17.9	15.5	17.7	
CELL PRESSURE, $\sigma_r$ , kPa	500.0	306.0	547.0	
BACK PRESSURE, kPa	485.0	275.0	485.0	
PORE PRESSURE PARAMETER "B"	0.96	0.96	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	15.0	31.0	62.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.1	4.9	2.7	
WATER CONTENT AFTER CONSOLIDATION, %	17.4	13.0	16.2	
AVERAGE RATE OF STRAIN, %/hr	0.5	0.5	0.5	
TIME TO FAILURE, DAYS	1	1	1	
WATER CONTENT AFTER TEST, %	15.5	14.2	14.6	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-19.3	-63.0	-61.9	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	2.8	3.7	3.9	
MAX EFFECTIVE PRINCIPAL STRESS				
RATIO, $(\sigma_a / \sigma_r)_f$	0.4	0.1	0.4	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-18.7	-57.3	-57.3	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	2.7	2.4	2.7	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_a - \sigma_r)_f$	1.02	0.65	0.75	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_a / \sigma_r)_f$	0.99	0.55	0.64	
NATURAL WATER CONTENT, %	14.1	13.3	13.6	
DRY DENSITY, Mg/m <sup>3</sup>	1.91	1.95	1.95	
FILTER DRAINS USED, y/n	y	y	y	
TEST NOTES:				
CHANGED RATE OF STRAIN, %/hr	-	-	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	-	-	
FAILURE PLANE NUMBER	-	-	-	
ANGLE OF FAILURE, DEGREES	-	-	-	
Date: 01/05/2009 Project No. 07-1130-2070 Golder Associates Prepared By MM Checked By: RO				

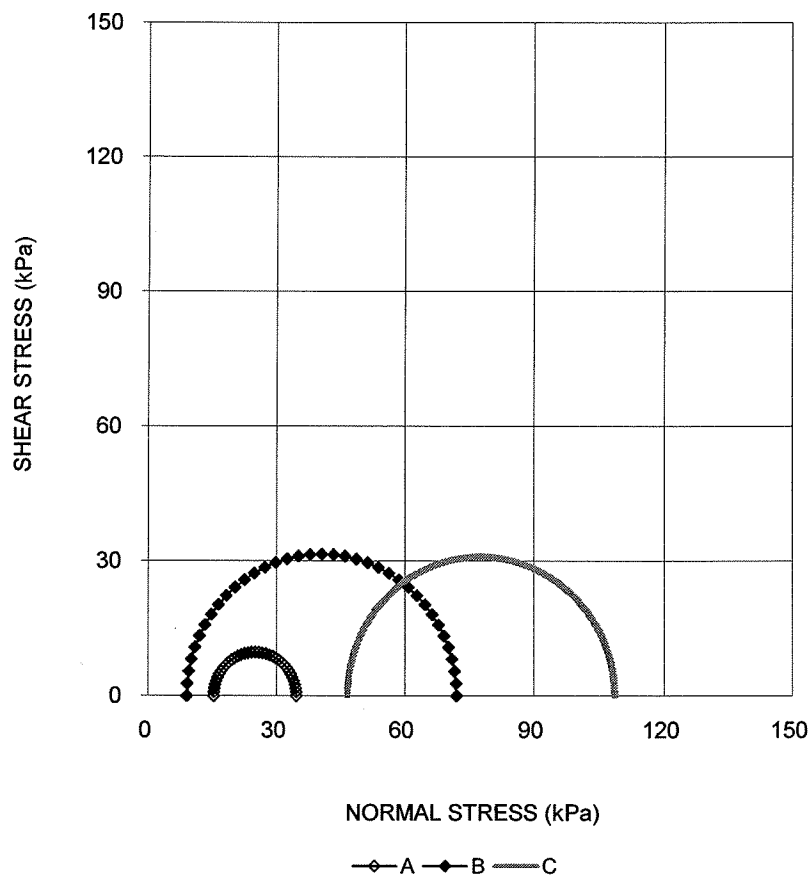


CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS

FIGURE BH 103A SA 3 CIUE B

SHEET 2 OF 4

BH 103A SA 3



Date: 01/05/2009  
Project No. 07-1130-2070

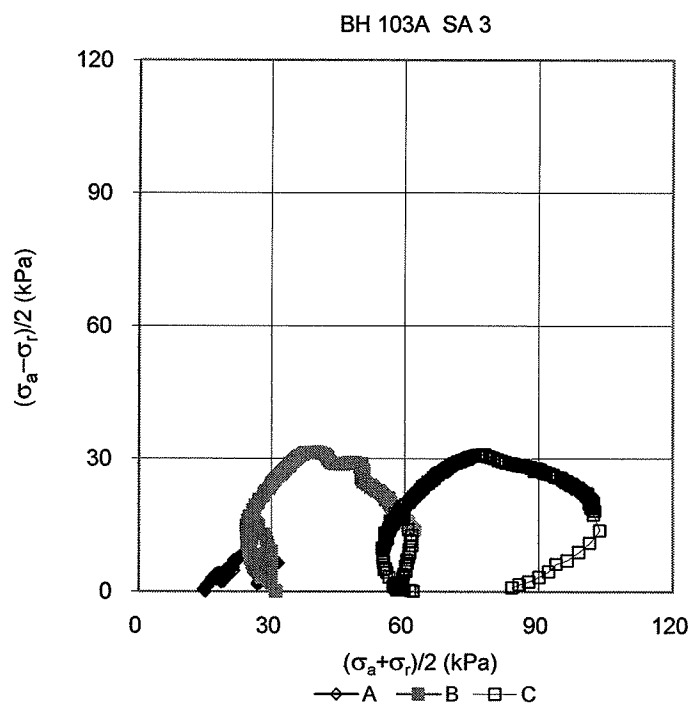
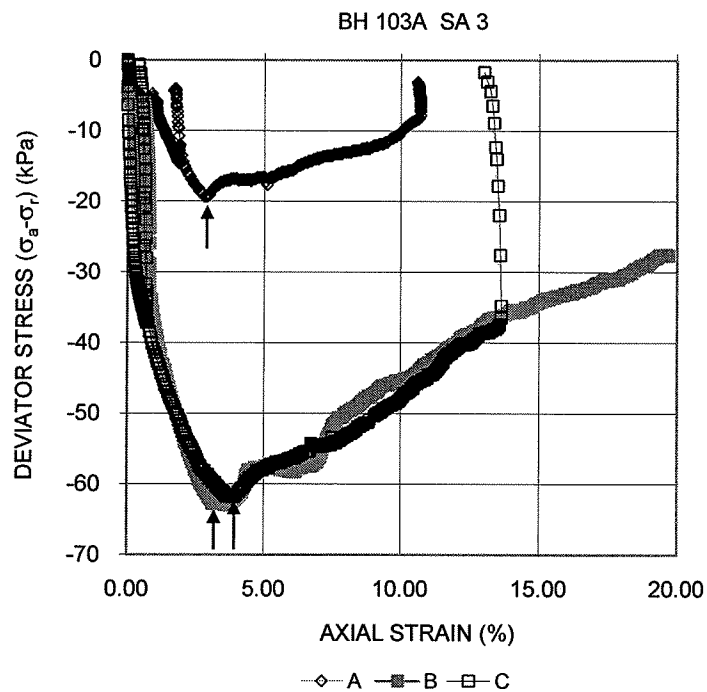
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 103A SA 3 CIUE C**

**SHEET 3 OF 4**



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Project No. 07-1130-2070

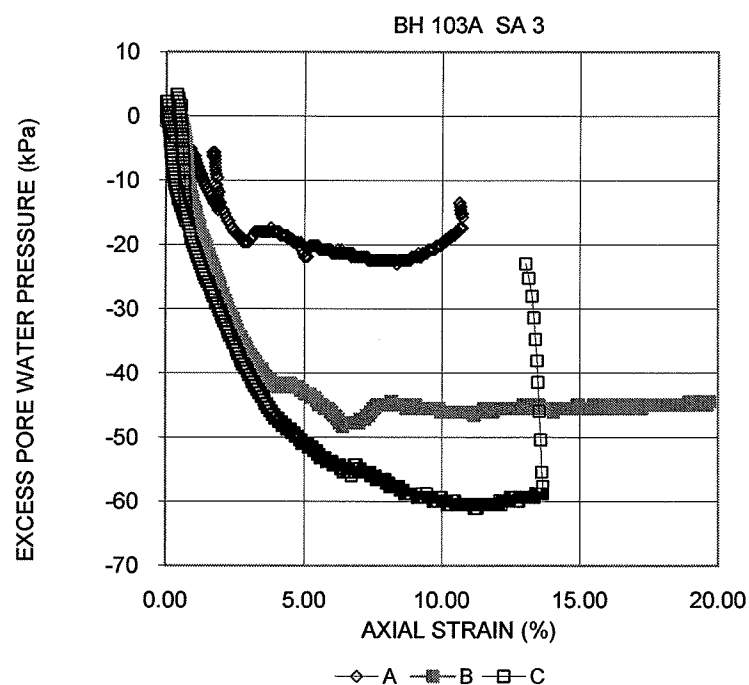
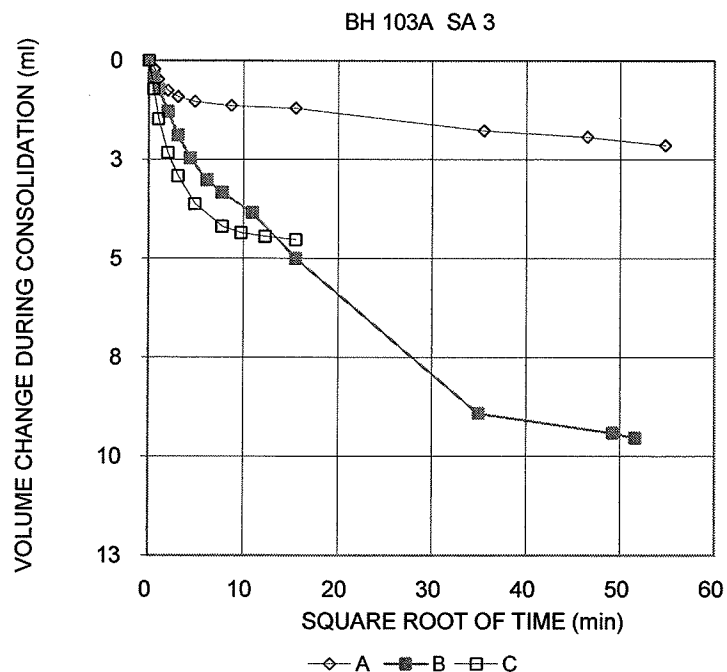
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 103A SA 3 CIUE D**

**SHEET 4 OF 4**



Date: 01/05/2009  
Project No. 07-1130-2070

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Prepared By MM  
Checked By: RO

<b>CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 105 SA 9 CIUE A</b>
TEST STAGE	A	
BOREHOLE NUMBER	105	
SAMPLE NUMBER	9	
SPECIMEN DIAMETER, cm	4.95	
SPECIMEN HEIGHT, cm	10.06	
WATER CONTENT BEFORE CONSOLIDATION, %	17.0	
CELL PRESSURE, $\sigma_r$ , kPa	450.0	
BACK PRESSURE, kPa	415.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	35.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.4	
WATER CONTENT AFTER CONSOLIDATION, %	16.3	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	16.2	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-53.2	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	6.4	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_a / \sigma_r)_f$	0.4	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-45.4	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	4.1	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a - \sigma_r)_f$	1.14	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a / \sigma_r)_f$	0.97	
NATURAL WATER CONTENT, %	15.9	
DRY DENSITY, Mg/m <sup>3</sup>	1.89	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div> <div> Date: May 26, 2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By MM  Checked By: RO </div> </div>		

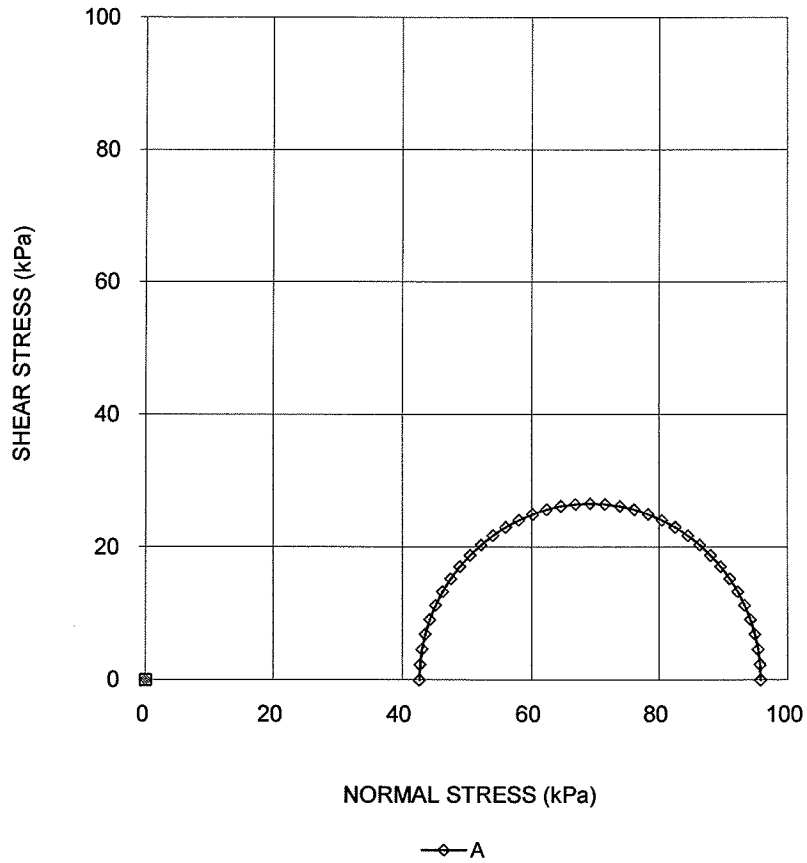
**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST**

**WITH PORE PRESSURE MEASUREMENTS**

**SHEET 2 OF 4**

**FIGURE BH 105 SA 9 CIUE B**

**BH 105 SA 9**



Date: May 26, 2008

Project No. 07-1130-2070

Prepared By MM

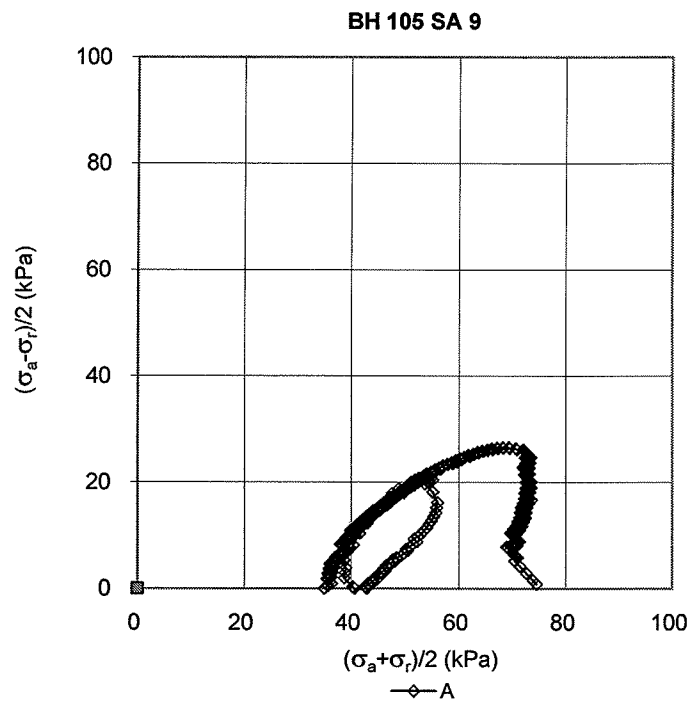
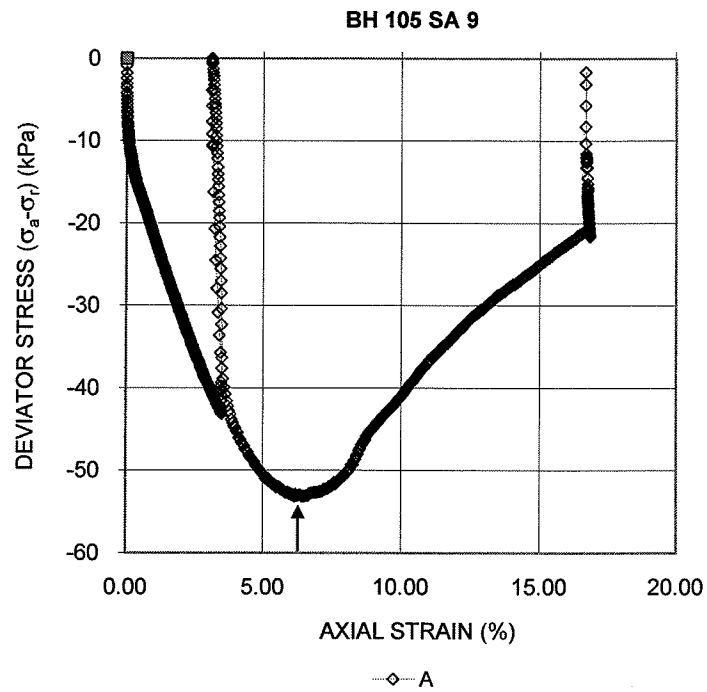
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 105 SA 9 CIUE C**

**SHEET 3 OF 4**



Date: May 26, 2008

Project No. 07-1130-207

**Golder Associates**

Prepared By MM

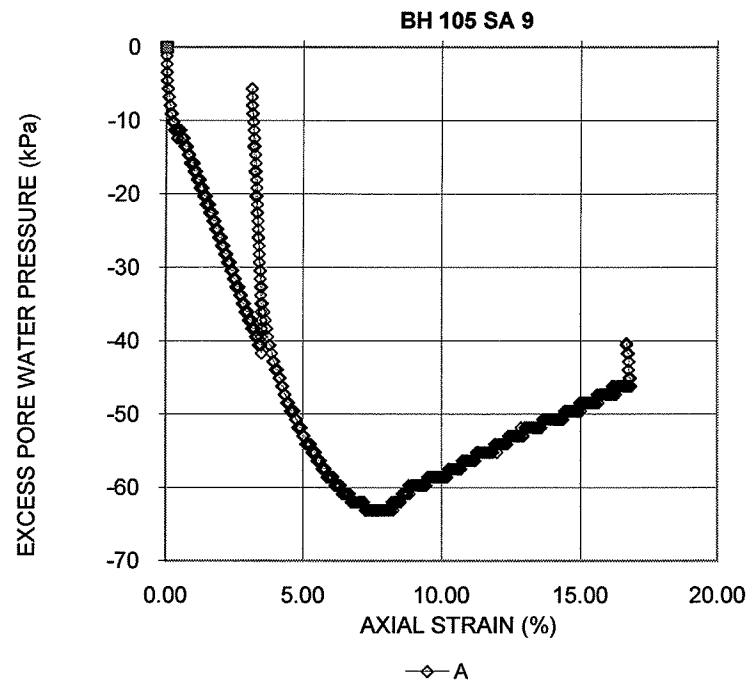
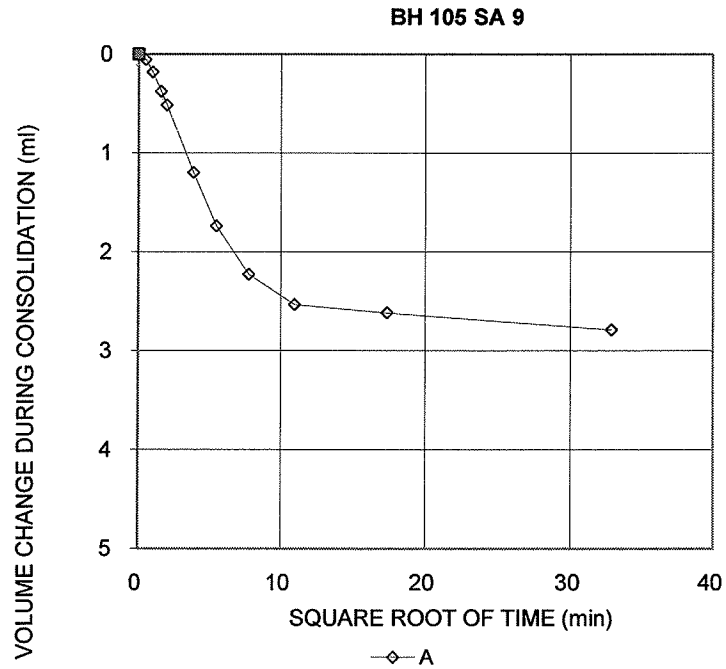
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 105 SA 9 CIUE D**

**SHEET 4 OF 4**



Date: May 26, 2008

Project No. 07-1130-207

**Golder Associates**

Prepared By MM

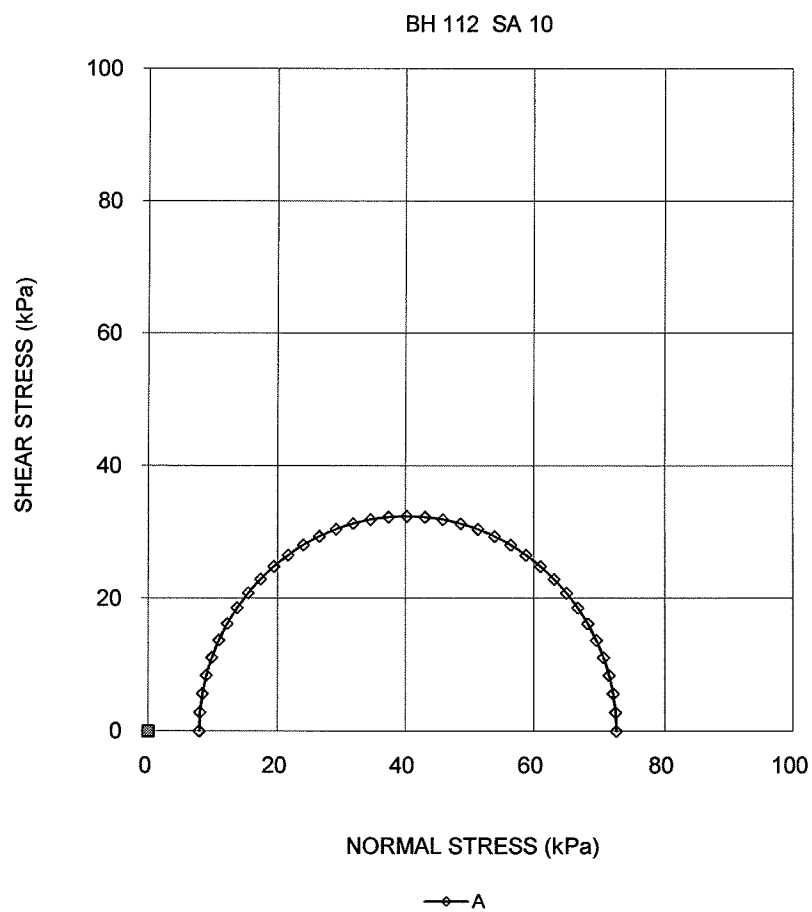
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<b>CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 112 SA 10 CIUE A</b>
TEST STAGE	A	
BOREHOLE NUMBER	112	
SAMPLE NUMBER	10	
SPECIMEN DIAMETER, cm	4.95	
SPECIMEN HEIGHT, cm	10.05	
WATER CONTENT BEFORE CONSOLIDATION, %	21.8	
CELL PRESSURE, $\sigma_r$ , kPa	185.0	
BACK PRESSURE, kPa	135.0	
PORE PRESSURE PARAMETER "B"	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	50.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	12.4	
WATER CONTENT AFTER CONSOLIDATION, %	15.3	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	16.0	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-64.8	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	4.2	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_a / \sigma_r)_f$	0.1	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-60.1	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	3.0	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a - \sigma_r)_f$	0.35	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a / \sigma_r)_f$	0.29	
NATURAL WATER CONTENT, %	16.2	
DRY DENSITY, Mg/m <sup>3</sup>	1.88	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div> <div> Date: March 30, 2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By AH  Checked By: RO </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS

FIGURE BH 112 SA 10 CIUE B

SHEET 2 OF 4



Date: March 30, 2008  
Project No. 07-1130-2070

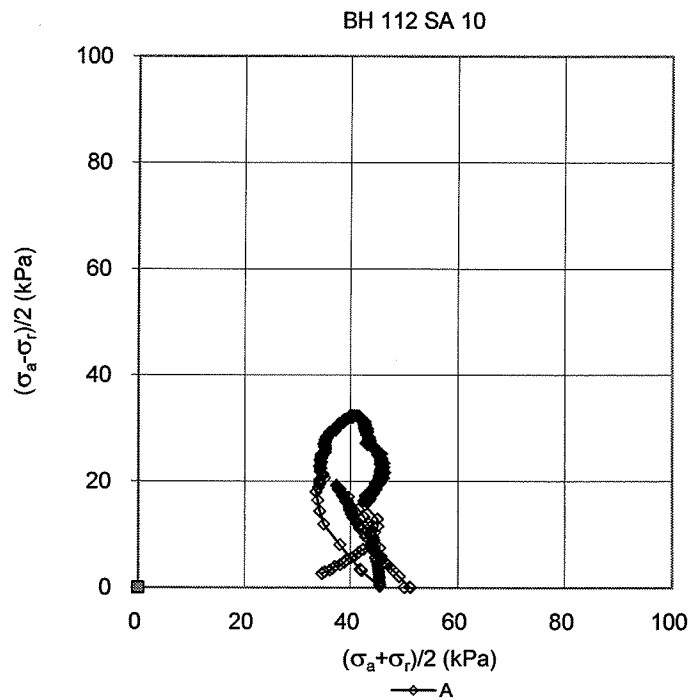
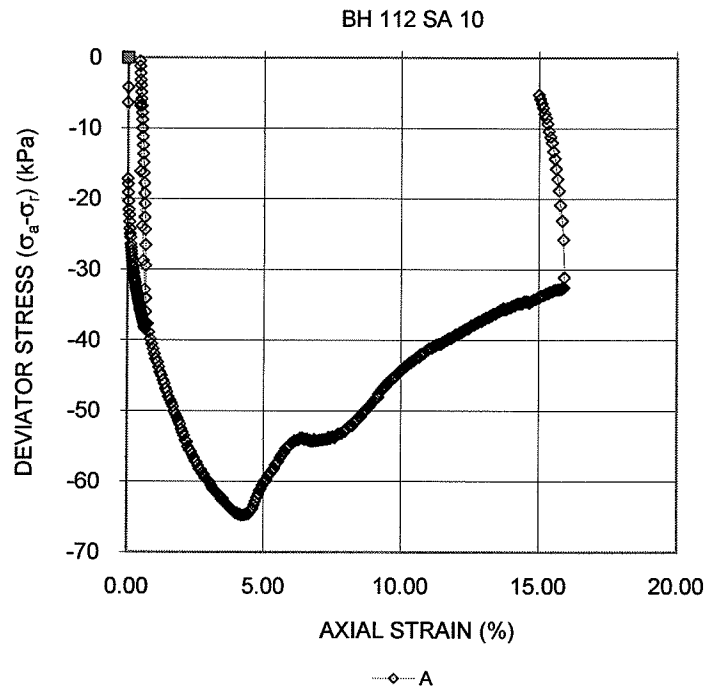
**Golder Associates**

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CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS

SHEET 3 OF 4

FIGURE BH 112 SA 10 CIUE C



Date: March 30, 2008  
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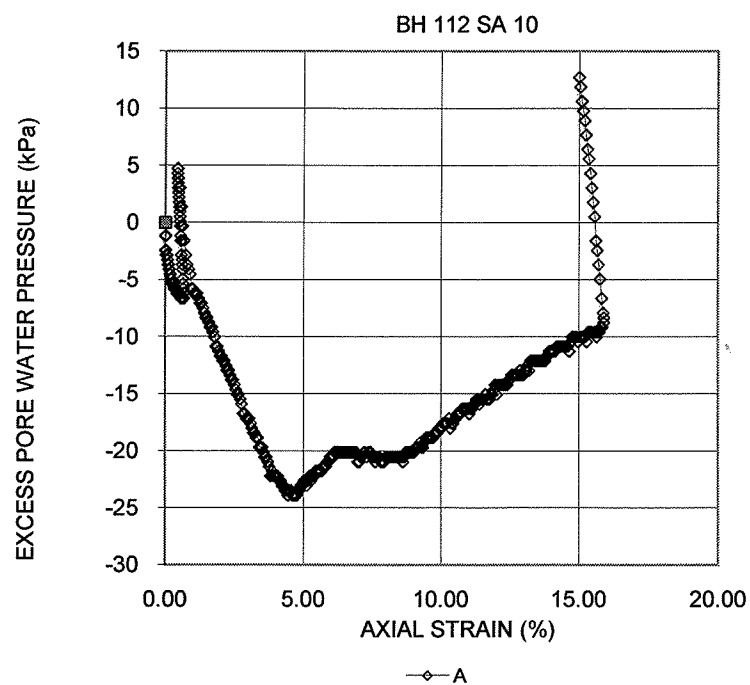
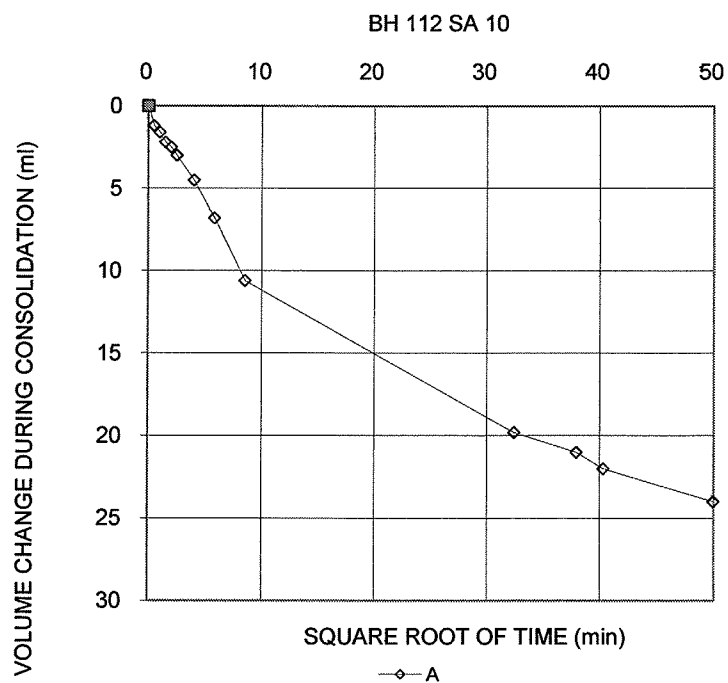
**Golder Associates**

Prepared By AH  
Checked By: RO

**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 112 SA 10 CIUE D**

**SHEET 4 OF 4**



Date: March 30, 2008

Project No. 07-1130-2070

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Prepared By AH

Checked By: RO

<b>CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 119 SA 9 CIUE A</b>
TEST STAGE	A	
BOREHOLE NUMBER	119	
SAMPLE NUMBER	9	
SPECIMEN DIAMETER, cm	4.95	
SPECIMEN HEIGHT, cm	10.03	
WATER CONTENT BEFORE CONSOLIDATION, %	18.0	
CELL PRESSURE, $\sigma_r$ , kPa	455.0	
BACK PRESSURE, kPa	415.0	
PORE PRESSURE PARAMETER "B"	0.96	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	40.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.7	
WATER CONTENT AFTER CONSOLIDATION, %	17.1	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	20.1	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-33.9	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	2.6	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_a / \sigma_r)_f$	0.4	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-33.1	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	2.3	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a - \sigma_r)_f$	0.48	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a / \sigma_r)_f$	0.44	
NATURAL WATER CONTENT, %	18.5	
DRY DENSITY, Mg/m <sup>3</sup>	1.79	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div> <div> Date: March 28, 2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By AH  Checked By: RO </div> </div>		

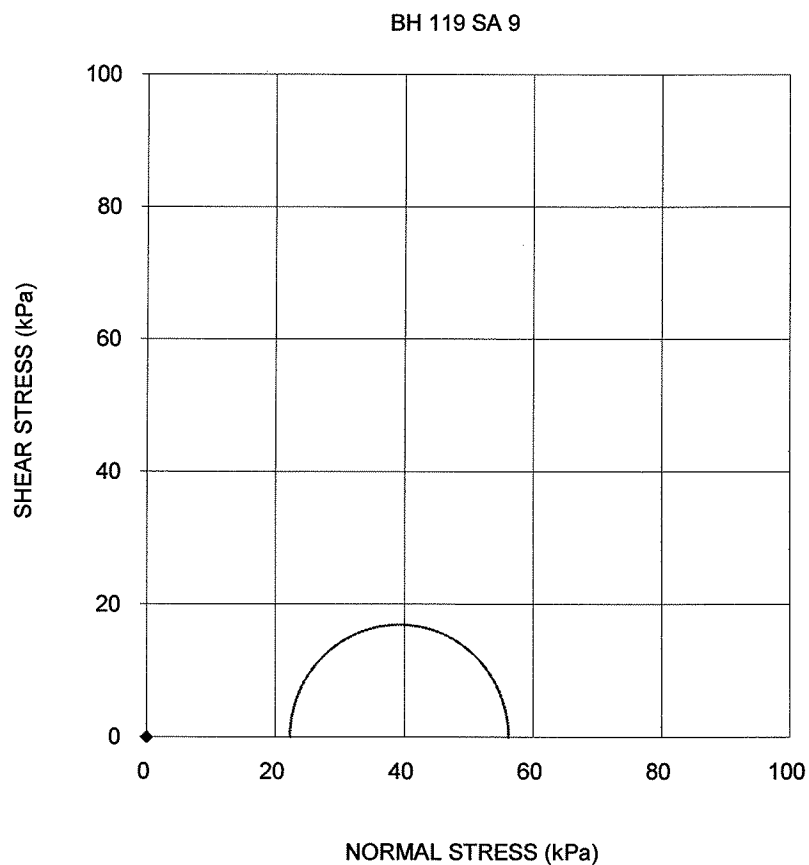


**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST**

**WITH PORE PRESSURE MEASUREMENTS**

**SHEET 2 OF 4**

**FIGURE BH 119 SA 9 CIUE B**



Date: March 28, 2008

Project No. 07-1130-2070

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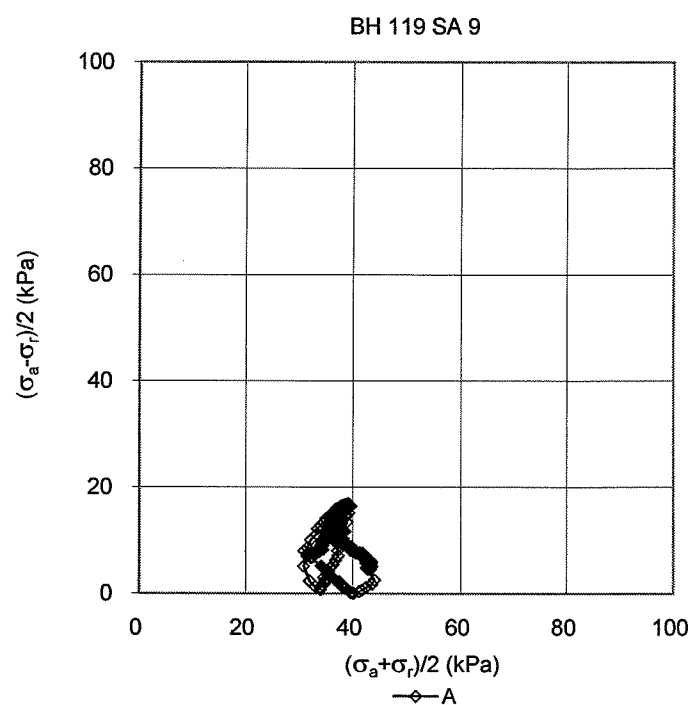
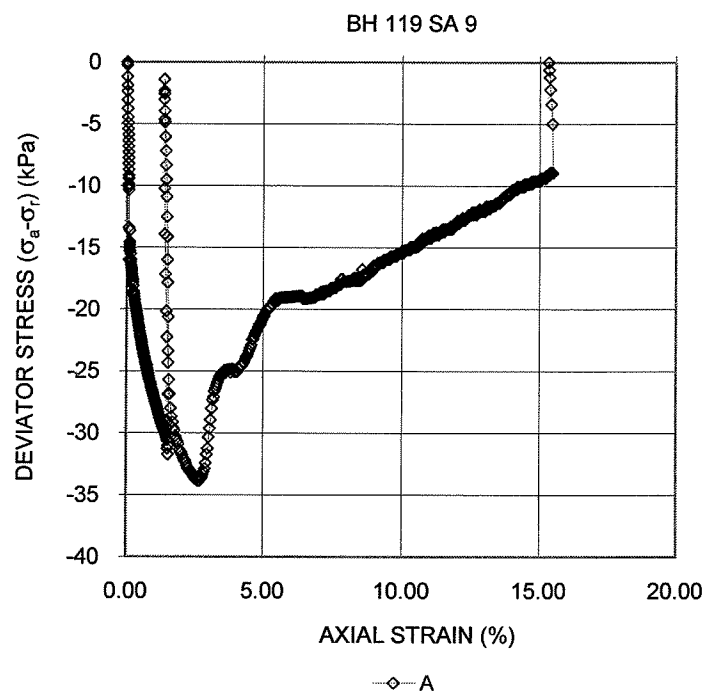
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CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS

FIGURE BH 119 SA 9 CIUE C

SHEET 3 OF 4



Date: March 28, 2008

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**Golder Associates**

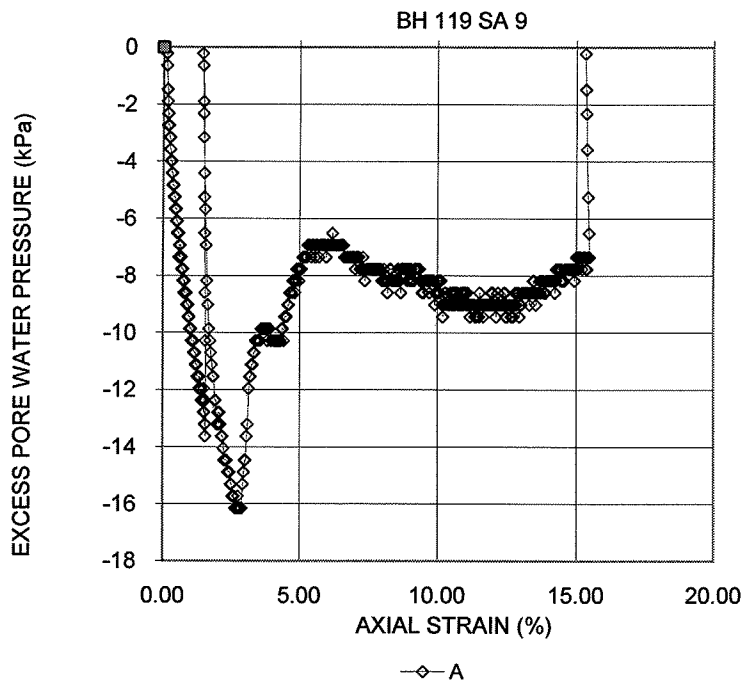
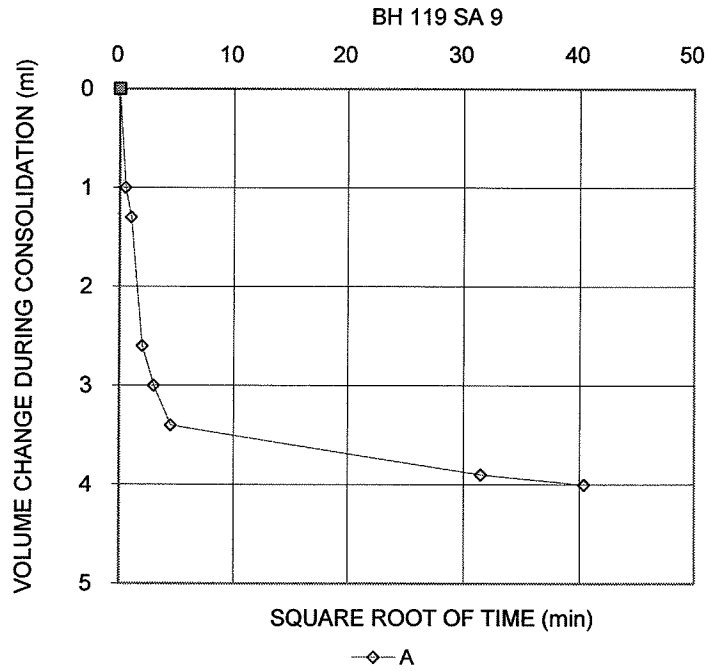
Prepared By AH

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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 119 SA 9 CIUE D**

**SHEET 4 OF 4**



Date: March 28, 2008

Project No. 07-1130-207

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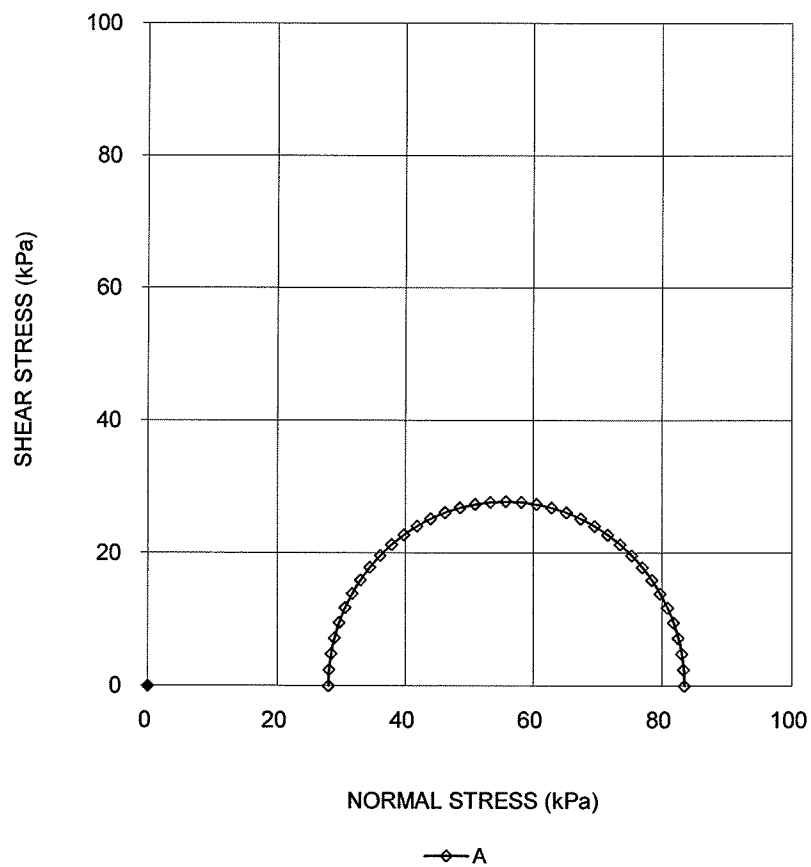
<b>CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 122 SA 10 CIUE A</b>
TEST STAGE	A	
BOREHOLE NUMBER	122	
SAMPLE NUMBER	10	
SPECIMEN DIAMETER, cm	5.00	
SPECIMEN HEIGHT, cm	10.05	
WATER CONTENT BEFORE CONSOLIDATION, %	22.2	
CELL PRESSURE, $\sigma_r$ , kPa	185.0	
BACK PRESSURE, kPa	135.0	
PORE PRESSURE PARAMETER "B"	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	50.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	3.7	
WATER CONTENT AFTER CONSOLIDATION, %	20.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	22.0	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-55.6	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	7.9	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_a / \sigma_r)_f$	0.3	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-53.2	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	6.7	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a - \sigma_r)_f$	0.60	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a / \sigma_r)_f$	0.53	
NATURAL WATER CONTENT, %	21.5	
DRY DENSITY, Mg/m <sup>3</sup>	1.68	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div> <div> Date: March 28, 2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By AH  Checked By: RO </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS

FIGURE BH 122 SA 10 CIUE B

SHEET 2 OF 4

BH 122 SA 10



Date: March 28, 2008

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Prepared By AH

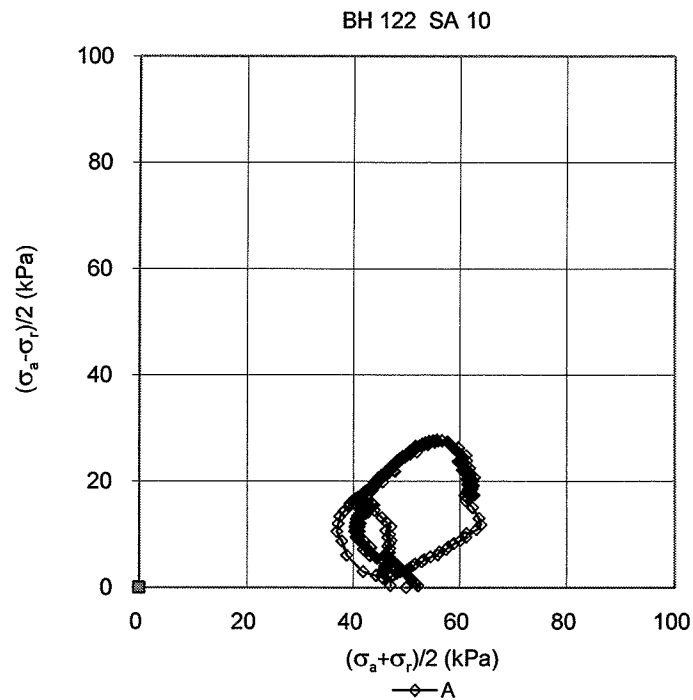
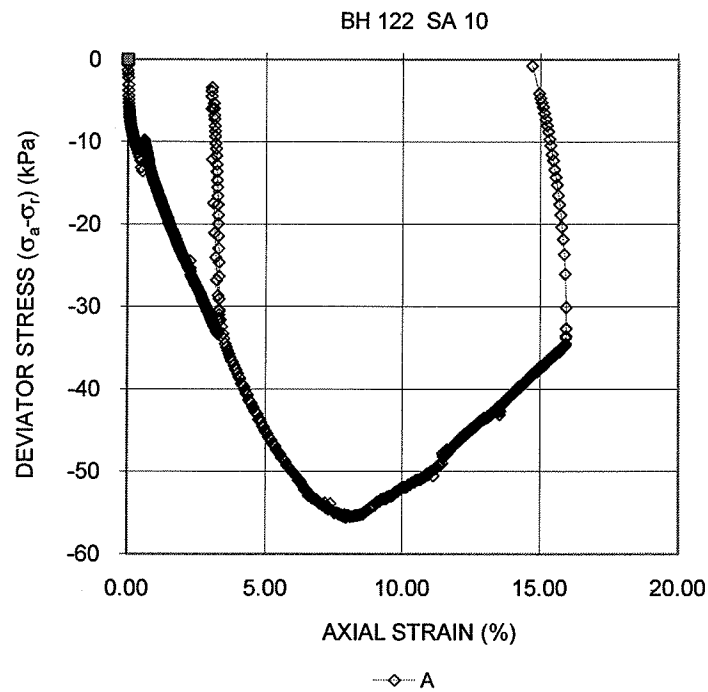
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 122 SA 10 CIUE C**

**SHEET 3 OF 4**



Date: March 28, 2008

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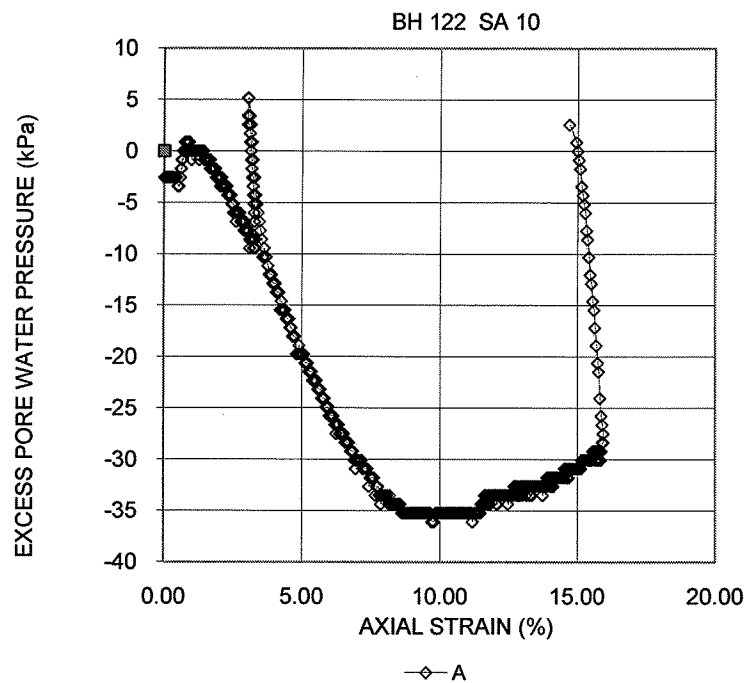
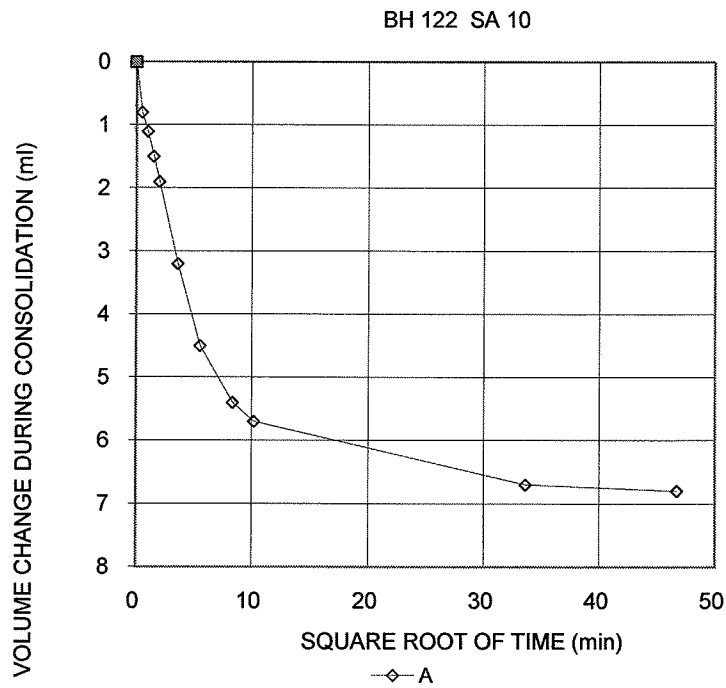
Prepared By AH

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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 122 SA 10 CIUE D**



Date: March 28, 2008

Project No. 07-1130-207

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Prepared By AH

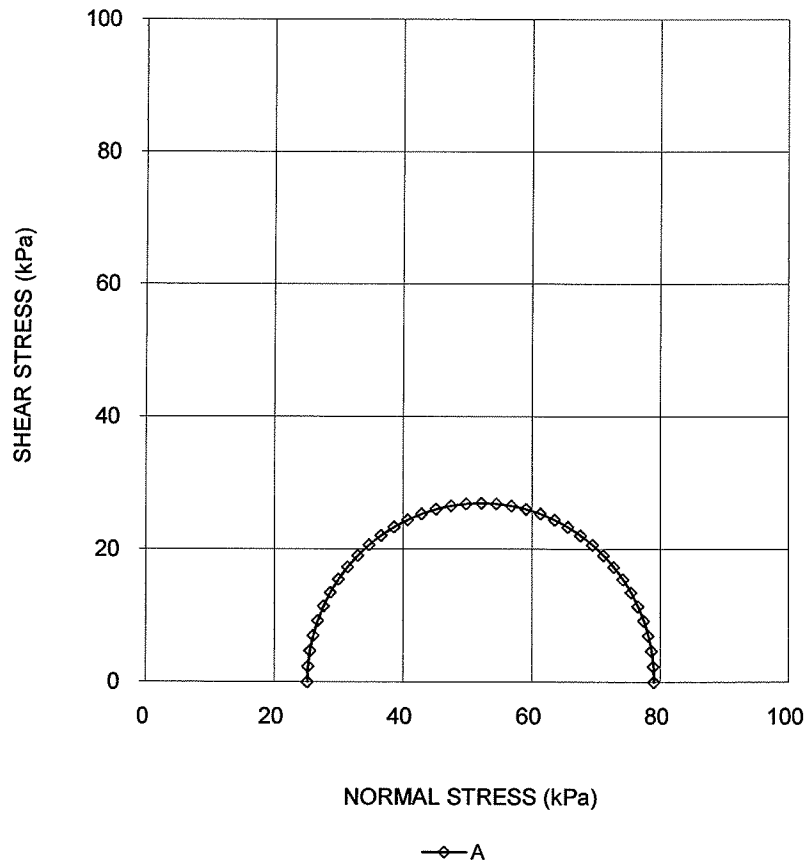
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<b>CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 132 SA 11 CIUE A</b>
TEST STAGE	A	
BOREHOLE NUMBER	132	
SAMPLE NUMBER	11	
SPECIMEN DIAMETER, cm	4.96	
SPECIMEN HEIGHT, cm	10.11	
WATER CONTENT BEFORE CONSOLIDATION, %	25.8	
CELL PRESSURE, $\sigma_r$ , kPa	285.0	
BACK PRESSURE, kPa	205.0	
PORE PRESSURE PARAMETER "B"	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	80.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	6.6	
WATER CONTENT AFTER CONSOLIDATION, %	22.2	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	25.4	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-53.9	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	4.8	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_a / \sigma_r)_f$	0.3	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-53.8	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	5.1	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a - \sigma_r)_f$	-0.02	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a / \sigma_r)_f$	-0.03	
NATURAL WATER CONTENT, %	25.0	
DRY DENSITY, Mg/m <sup>3</sup>	1.63	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div> Date: 12/28/2008 <div>Project No. 07-1130-2070</div> <div>Golder Associates</div> </div> <div> Prepared By AH <div>Checked By: RO</div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 132 SA 11 CIUE B

BH 122 SA 10



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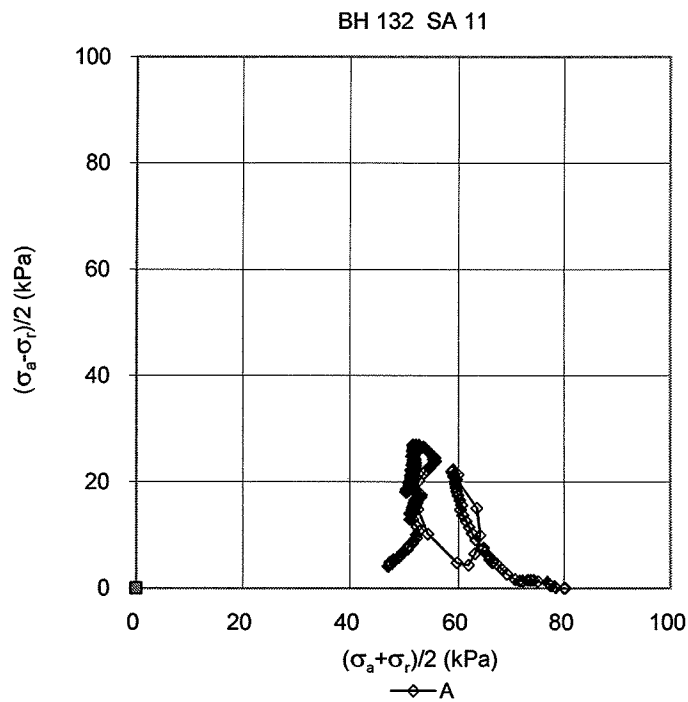
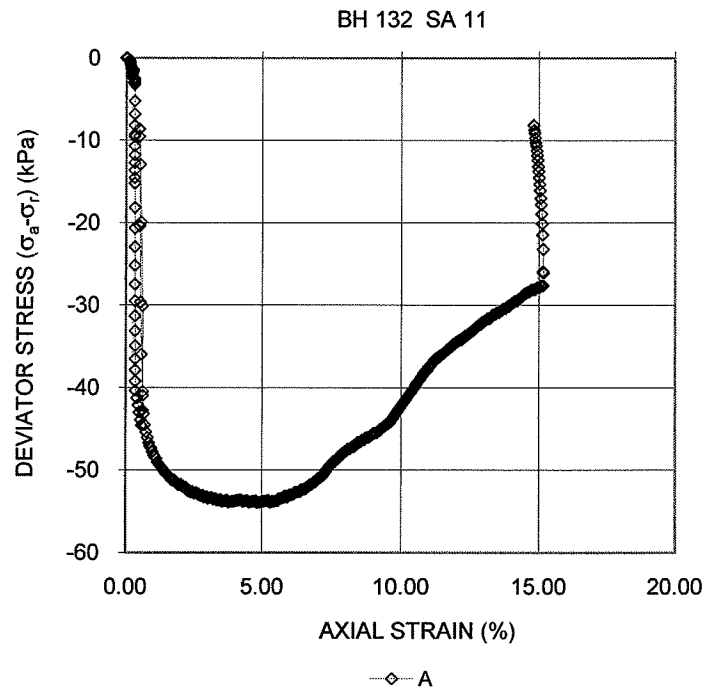
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 132 SA 11 CIUE C**

**SHEET 3 OF 4**



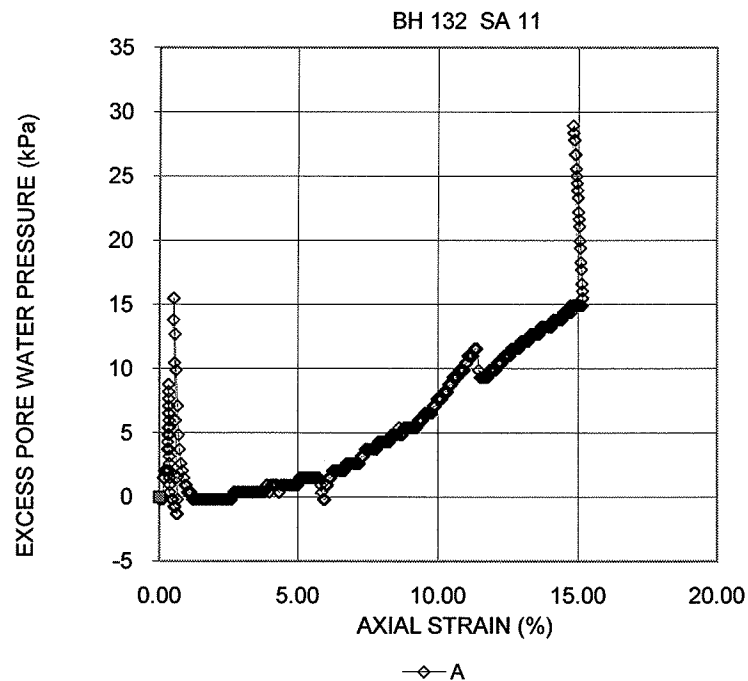
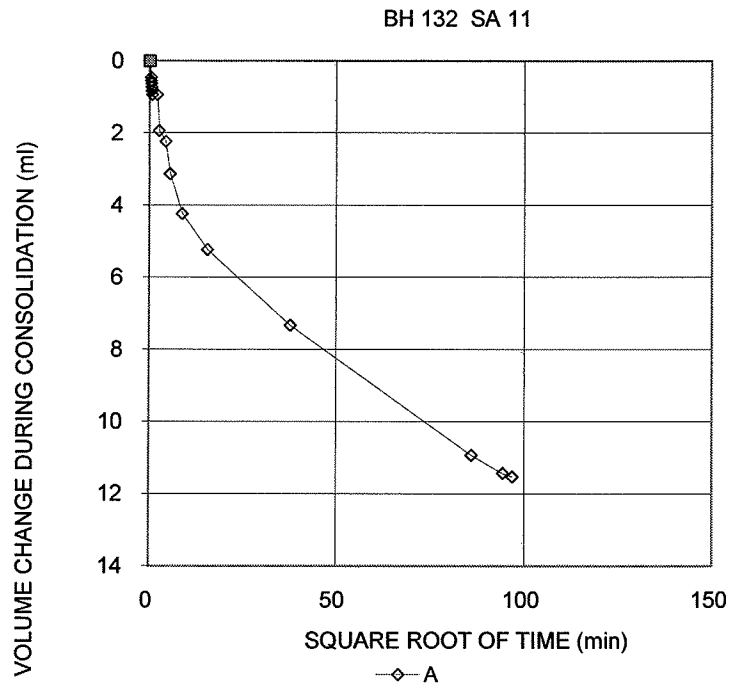
Date: 12/28/2008  
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 132 SA 11 CIUE D**



Date: 12/28/2008  
Project No. 07-1130-207

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Prepared By: AH  
Checked By: RO

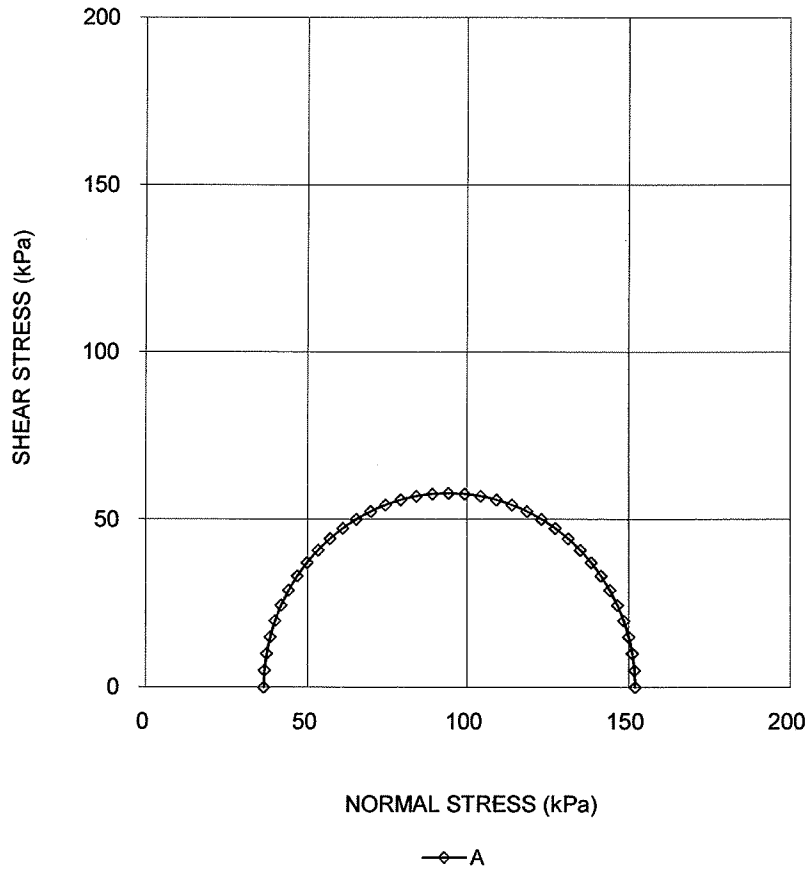
<b>CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 132 SA 12 CIUE A</b>
TEST STAGE	A	
BOREHOLE NUMBER	132	
SAMPLE NUMBER	12	
SPECIMEN DIAMETER, cm	4.98	
SPECIMEN HEIGHT, cm	10.16	
WATER CONTENT BEFORE CONSOLIDATION, %	26.9	
CELL PRESSURE, $\sigma_r$ , kPa	301.0	
BACK PRESSURE, kPa	135.0	
PORE PRESSURE PARAMETER "B"	0.99	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	166.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	16.2	
WATER CONTENT AFTER CONSOLIDATION, %	17.2	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	20.1	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-115.8	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	7.8	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_a / \sigma_r)_f$	0.2	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-114.7	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	6.2	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a - \sigma_r)_f$	-0.12	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a / \sigma_r)_f$	-0.14	
NATURAL WATER CONTENT, %	23.0	
DRY DENSITY, Mg/m <sup>3</sup>	1.67	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div> <div>Date: 11/16/2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <b>Golder Associates</b> </div> <div> <div>Prepared By MM</div> <div>Checked By: RO</div> </div>		



CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 132 SA 12 CIUE B

BH 132 SA 12



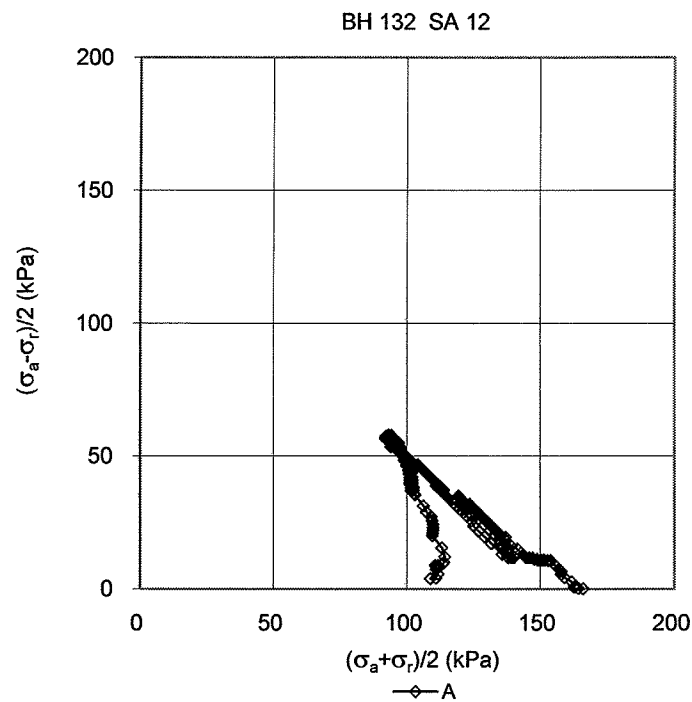
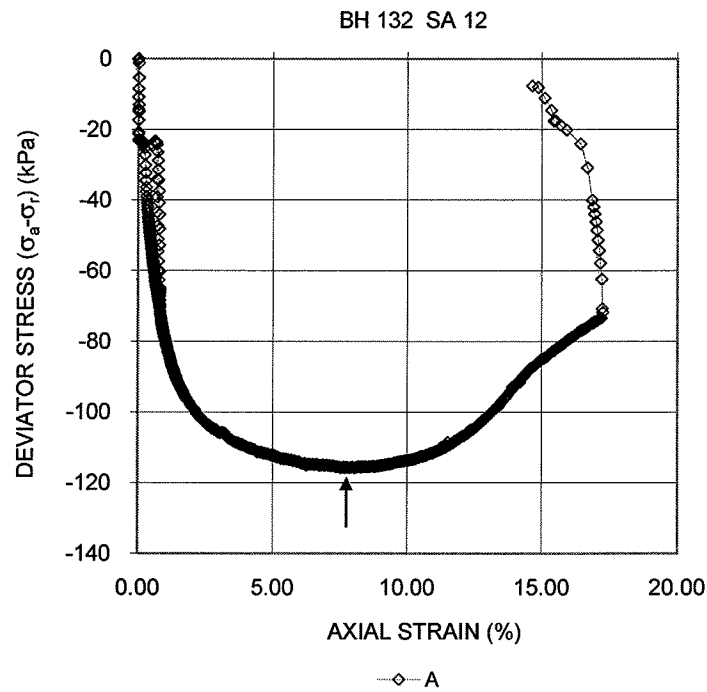
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 132 SA 12 CIUE C**



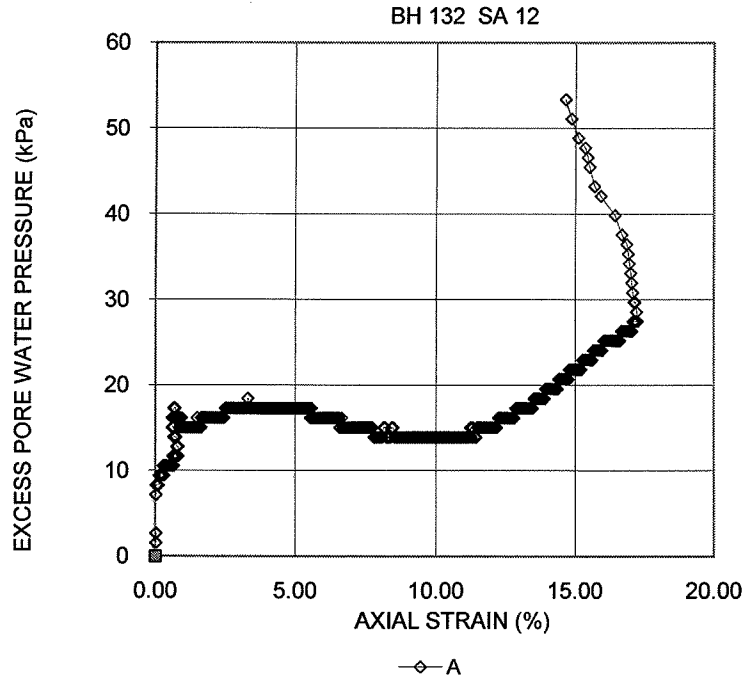
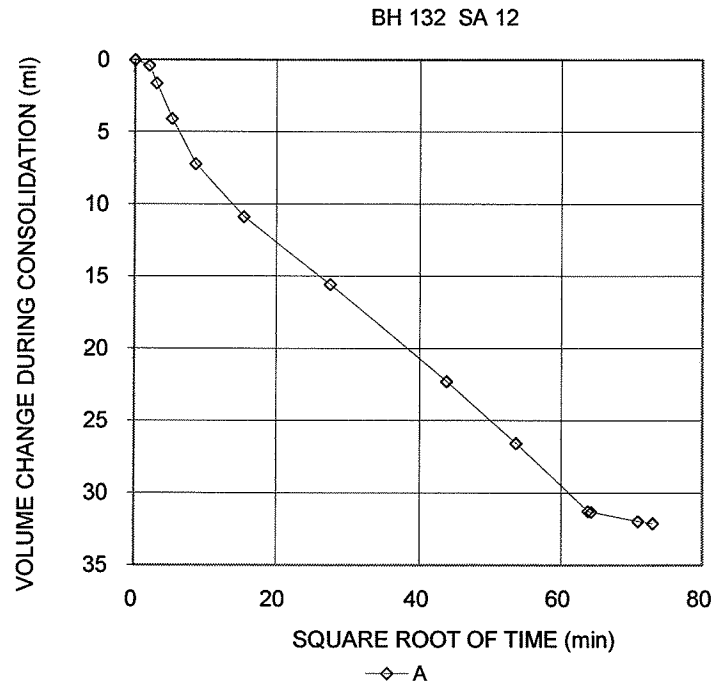
Date: 11/16/2008  
Project No. 07-1130-207

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Prepared By MM  
Checked By: RO

**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 132 SA 12 CIUE D**



Date: 11/16/2008  
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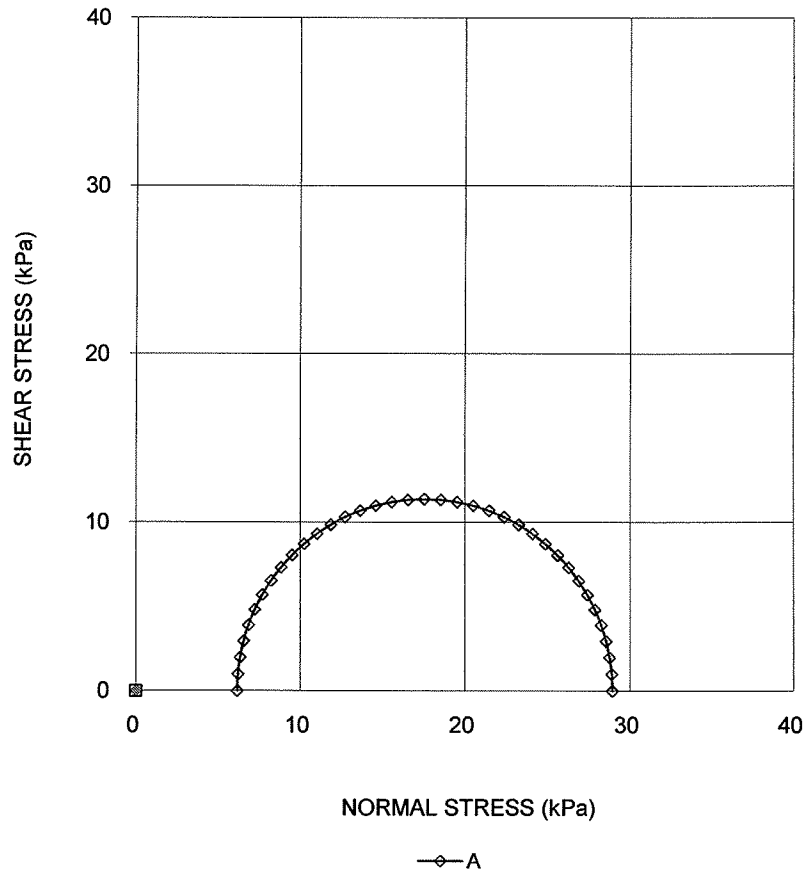
Prepared By MM  
Checked By: RO

<b>CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 154 SA 4 CIUE A</b>
TEST STAGE	A	
BOREHOLE NUMBER	154	
SAMPLE NUMBER	4	
SPECIMEN DIAMETER, cm	4.97	
SPECIMEN HEIGHT, cm	10.13	
WATER CONTENT BEFORE CONSOLIDATION, %	25.0	
CELL PRESSURE, $\sigma_r$ , kPa	291.0	
BACK PRESSURE, kPa	275.0	
PORE PRESSURE PARAMETER "B"	0.99	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	16.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	9.7	
WATER CONTENT AFTER CONSOLIDATION, %	19.4	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	23.2	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-22.9	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	7.6	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_a / \sigma_r)_f$	0.2	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-22.8	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	5.4	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a - \sigma_r)_f$	0.66	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a / \sigma_r)_f$	0.57	
NATURAL WATER CONTENT, %	21.9	
DRY DENSITY, Mg/m <sup>3</sup>	1.73	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div> <div> Date: December 2, 2008  Project No. 07-1130-2070 </div> <div> <b>Golder Associates</b> </div> <div> Prepared By MM  Checked By: RO </div> </div>		

CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 154 SA 4 CIUE B

BH 154 SA 4



Date: December 2, 2008  
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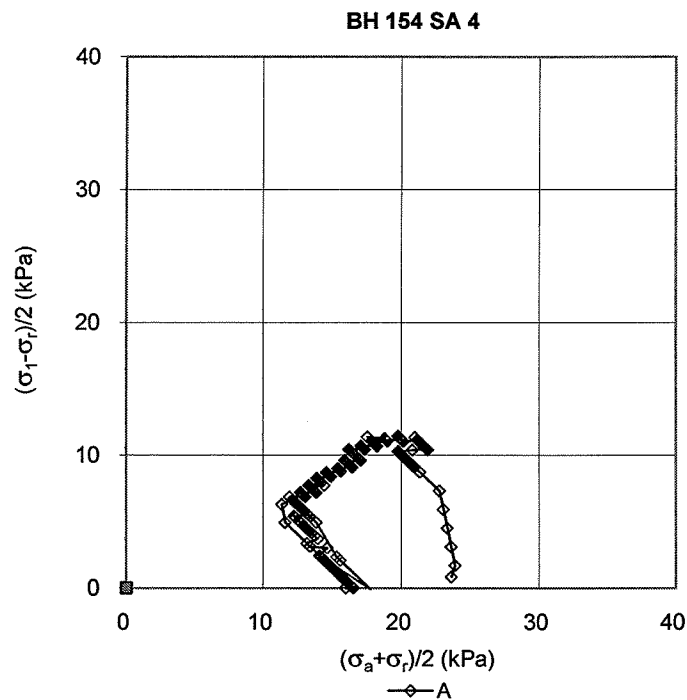
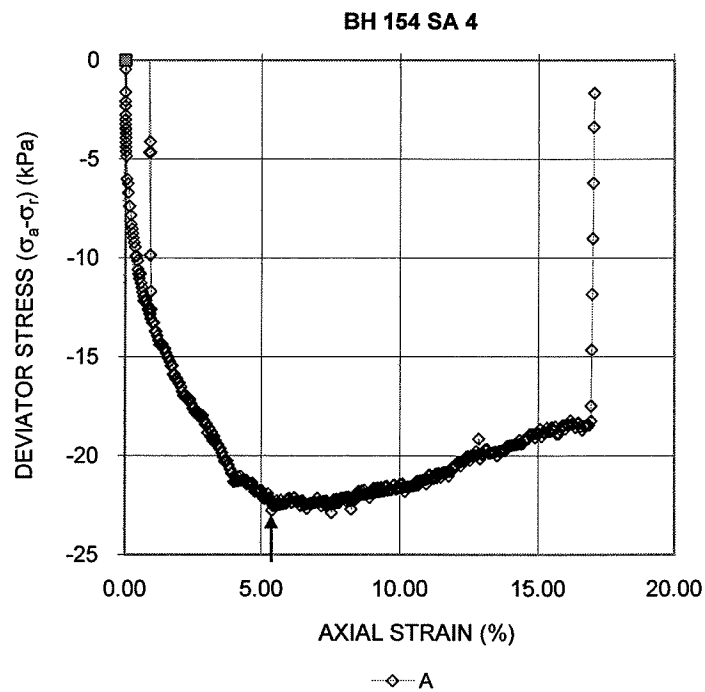
Prepared By MM  
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 154 SA 4 CIUE C**

**SHEET 3 OF 4**



Date: December 2, 2008

Project No. 07-1130-207

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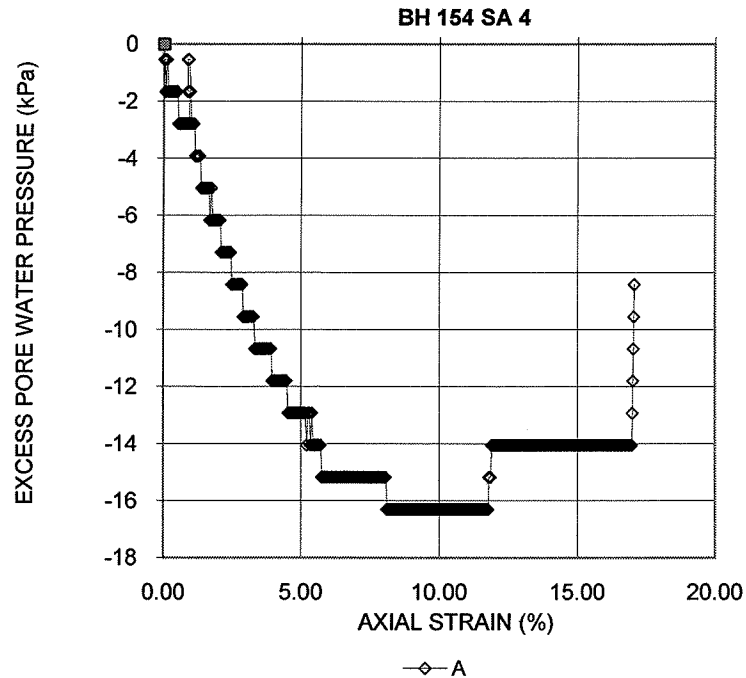
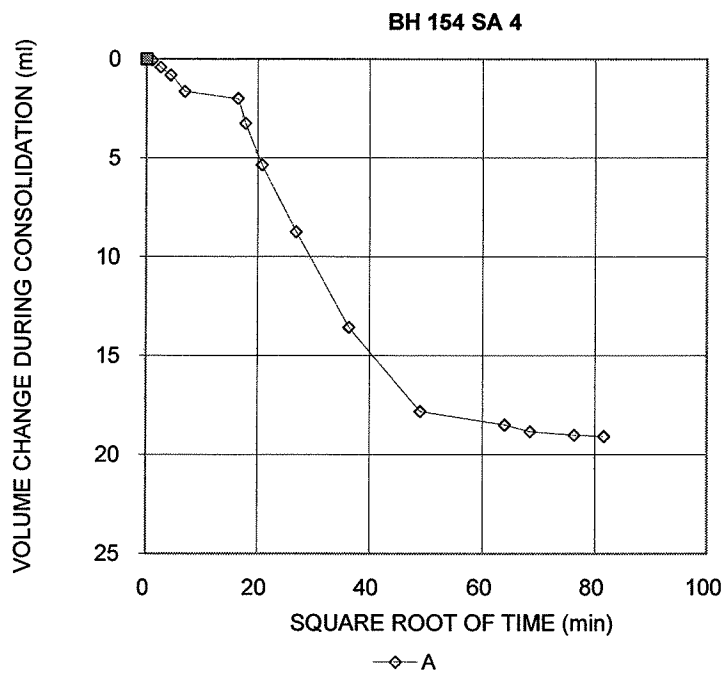
Prepared By MM

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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 154 SA 4 CIUE D**



Date: December 2, 2008

Project No. 07-1130-207

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Prepared By MM

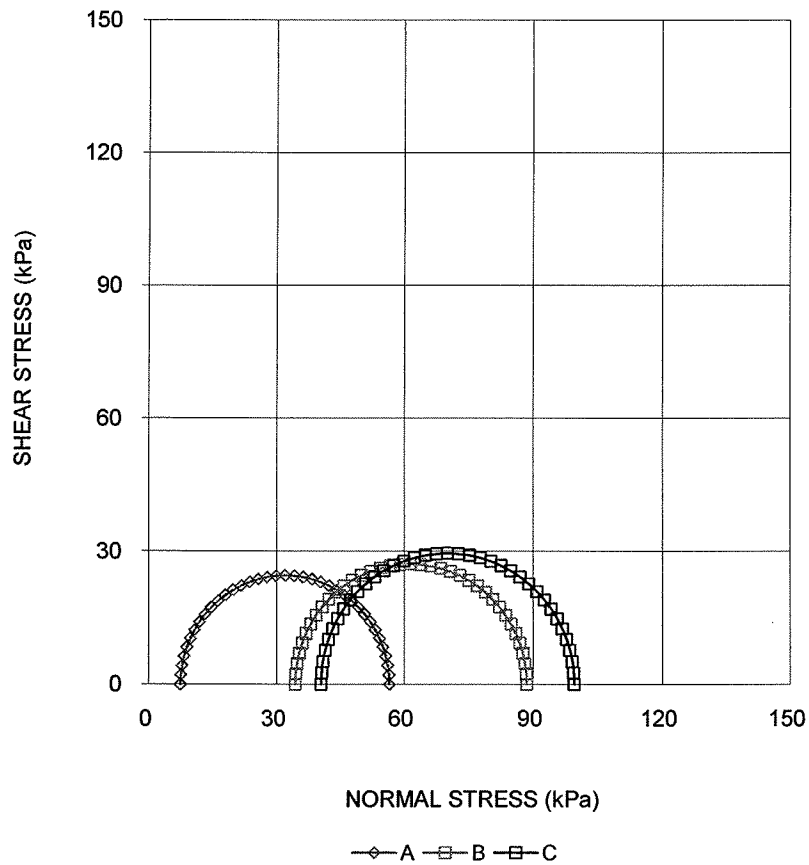
Checked By: RO

<b>CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 154 SA 6 CIUE A</b>		
TEST STAGE	A	B	C	
BOREHOLE NUMBER	154	154	154	
SAMPLE NUMBER	6	6	6	
SPECIMEN DIAMETER, cm	5.01	5.04	5.01	
SPECIMEN HEIGHT, cm	10.12	9.92	10.14	
WATER CONTENT BEFORE CONSOLIDATION, %	18.9	18.4	18.3	
CELL PRESSURE, $\sigma_r$ , kPa	447.0	479.0	146.0	
BACK PRESSURE, kPa	415.0	415.0	65.0	
PORE PRESSURE PARAMETER "B"	0.96	-	0.97	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	32.0	64.0	81.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	1.0	0.3	3.3	
WATER CONTENT AFTER CONSOLIDATION, %	18.4	18.2	16.5	
AVERAGE RATE OF STRAIN, %/hr	0.5	0.5	0.5	
TIME TO FAILURE, DAYS	0.2	1.0	1.0	
WATER CONTENT AFTER TEST, %	-	18.0	18.9	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-49.1	-54.1	-104.3	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	1.8	2.3	4.1	
MAX EFFECTIVE PRINCIPAL STRESS				
RATIO, $(\sigma_a / \sigma_r)_f$	0.1	0.4	0.6	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-37.8	-50.9	-24.1	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	0.4	1.0	0.5	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a - \sigma_r)_f$	0.50	0.45	0.09	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a / \sigma_r)_f$	0.23	0.34	-0.65	
NATURAL WATER CONTENT, %	18.8	-	17.7	
DRY DENSITY, Mg/m <sup>3</sup>	1.84	1.84	1.84	
FILTER DRAINS USED, y/n	y	y	y	
TEST NOTES:	Test stages A and B are performed on a same specimen.			
CHANGED RATE OF STRAIN, %/hr	-	-	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	-	-	
FAILURE PLANE NUMBER	-	-	-	
ANGLE OF FAILURE, DEGREES	-	-	-	
<div> <div>Date: 01/16/2009</div> <div>Project No. 07-1130-2070</div> </div> <div> <b>Golder Associates</b> </div> <div> <div>Prepared By MM</div> <div>Checked By: RO</div> </div>				

CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 154 SA 6 CIUE B

BH 154 SA 6



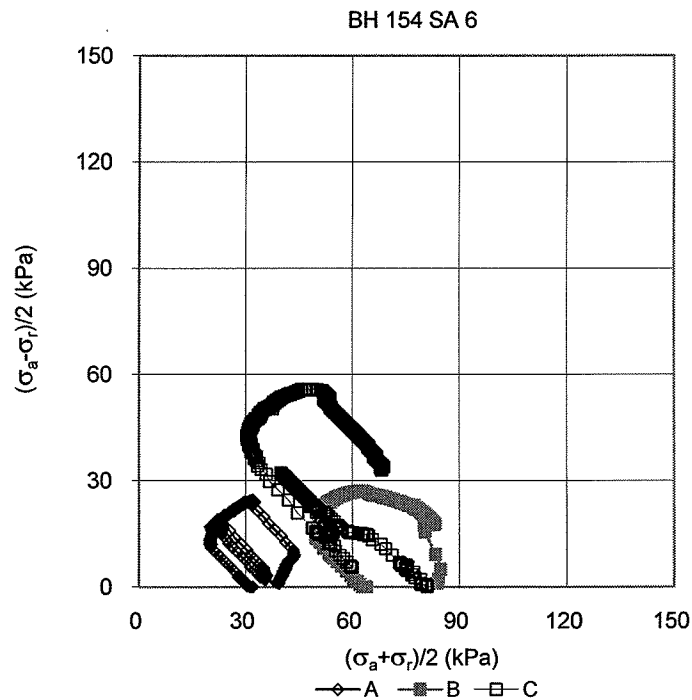
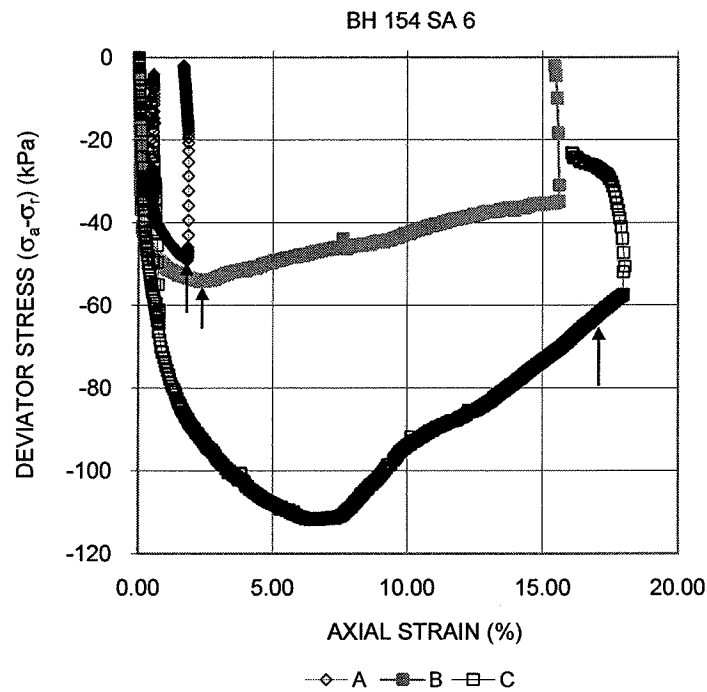
Date: 01/16/2009  
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 154 SA 6 CIUE C**



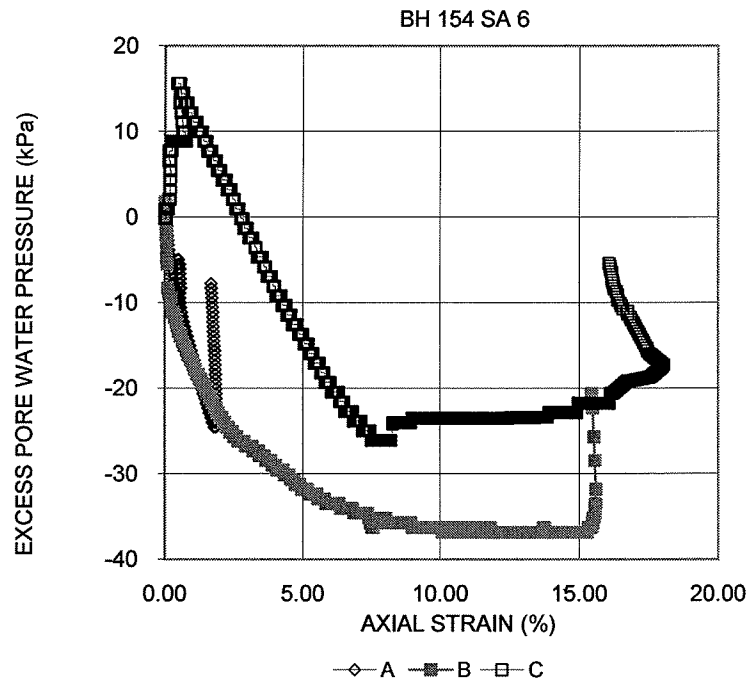
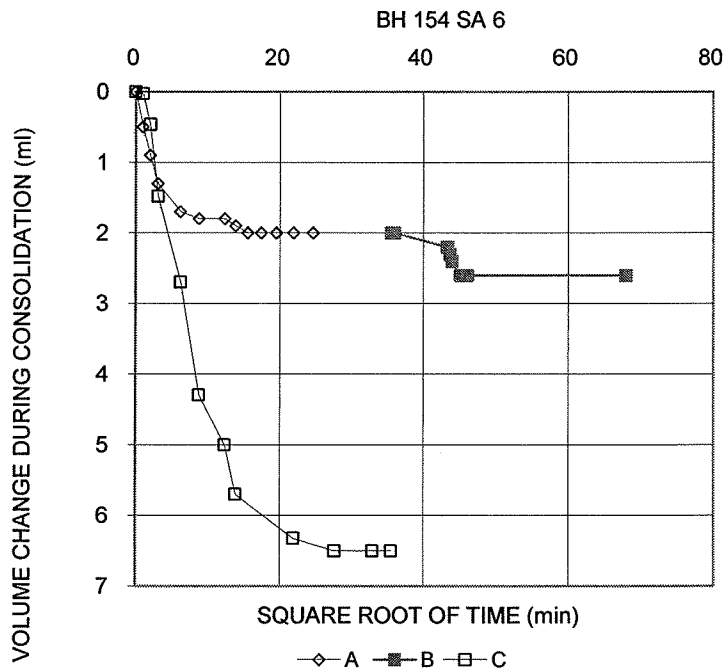
Date: 01/16/2009  
Project No. 07-1130-2070

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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 154 SA 6 CIUE D**



Date: 01/16/2009  
Project No. 07-1130-2070

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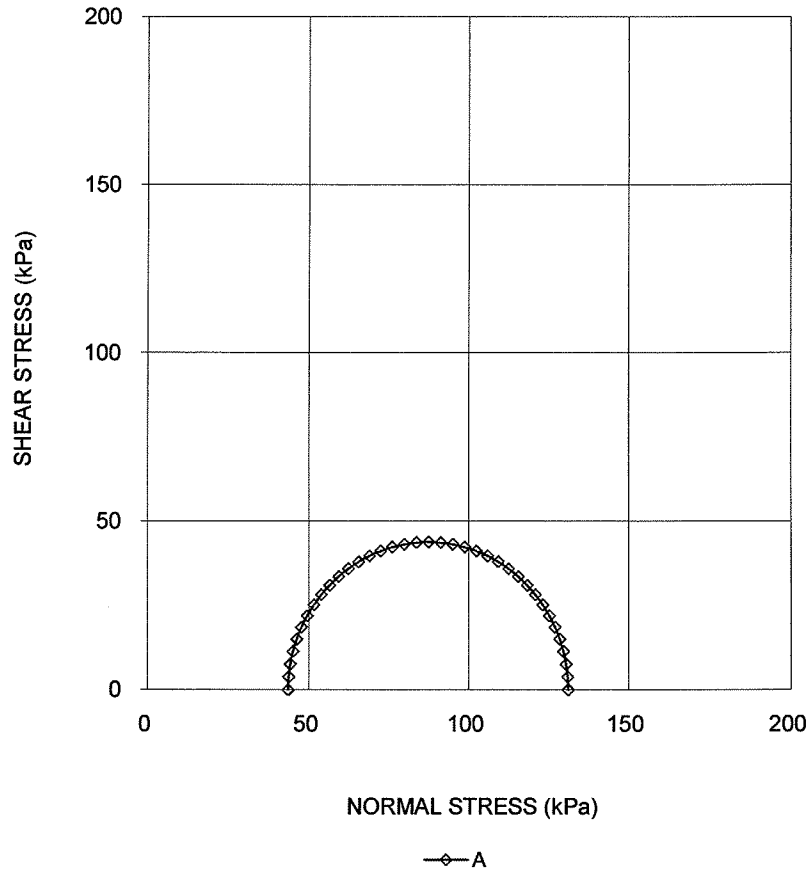
<b>CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 154 SA 8 CIUE A</b>
TEST STAGE	A	
BOREHOLE NUMBER	154	
SAMPLE NUMBER	8	
SPECIMEN DIAMETER, cm	4.95	
SPECIMEN HEIGHT, cm	10.13	
WATER CONTENT BEFORE CONSOLIDATION, %	26.5	
CELL PRESSURE, $\sigma_r$ , kPa	257.0	
BACK PRESSURE, kPa	135.0	
PORE PRESSURE PARAMETER "B"	0.99	
CONSOLIDATION PRESSURE, $\sigma_c$ , kPa	122.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	10.3	
WATER CONTENT AFTER CONSOLIDATION, %	20.2	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	23.8	
DEVIATOR STRESS, $(\sigma_a - \sigma_r)_f$ , kPa	-87.7	
AXIAL STRAIN AT $(\sigma_a - \sigma_r)_f$ , %	5.4	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_a / \sigma_r)_f$	0.3	
DEVIATOR STRESS AT $(\sigma_a / \sigma_r)_f$ , kPa	-86.5	
AXIAL STRAIN AT $(\sigma_a / \sigma_r)_f$ , %	3.2	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a - \sigma_r)_f$	0.11	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_a / \sigma_r)_f$	0.09	
NATURAL WATER CONTENT, %	23.4	
DRY DENSITY, Mg/m <sup>3</sup>	1.64	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div> <div>Date: November 3, 2008</div> <div>Project No. 07-1130-2070</div> </div> <div> <div>Golder Associates</div> </div> <div> <div>Prepared By MM</div> <div>Checked By: RO</div> </div>		



CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 154 SA 8 CIUE B

BH 154 SA 8



Date: December 2, 2008  
Project No. 07-1130-2070

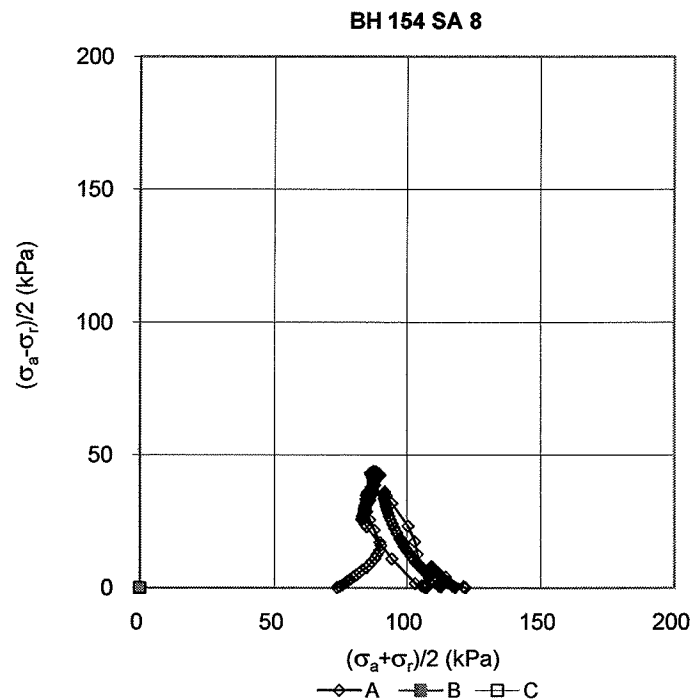
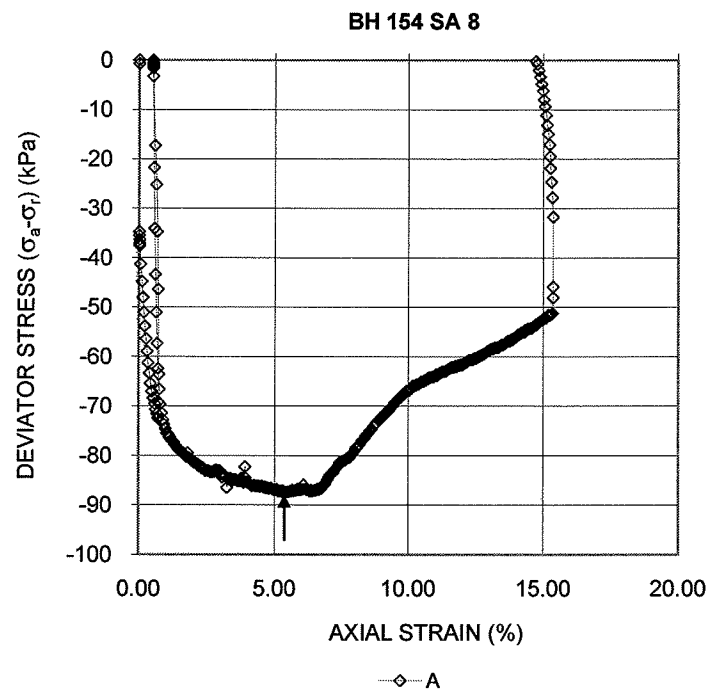
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS**

**SHEET 3 OF 4**

**FIGURE BH 154 SA 8 CIUE C**



Date: December 2, 2008

Project No. 07-1130-207

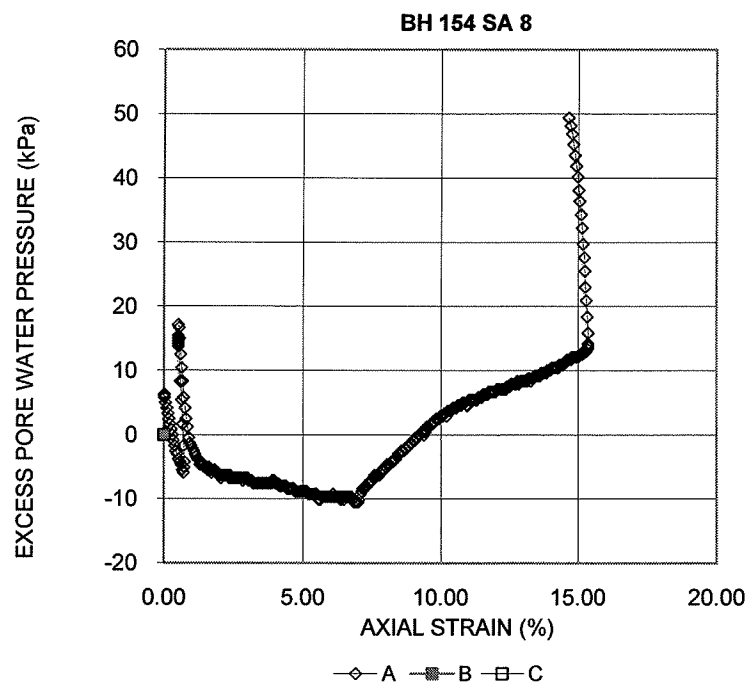
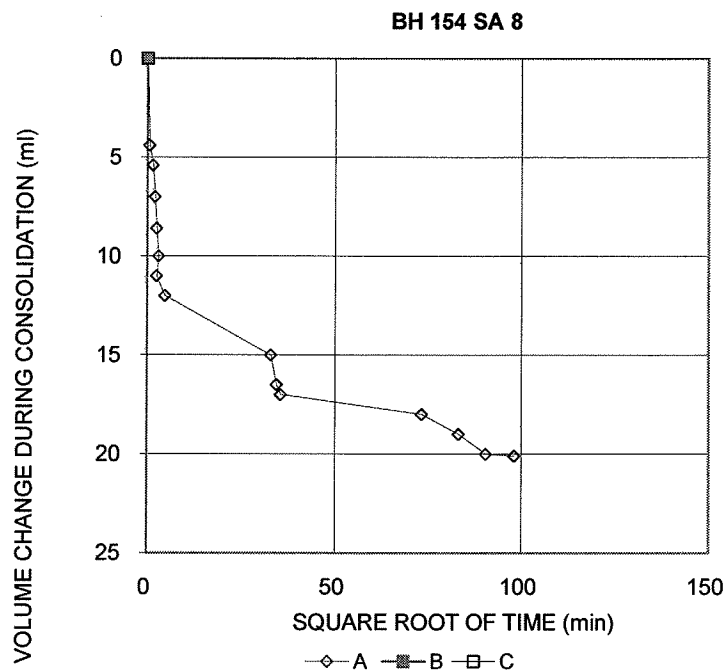
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**CONSOLIDATED UNDRAINED TRIAXIAL EXTENSION TEST  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 154 SA 8 CIUE D**



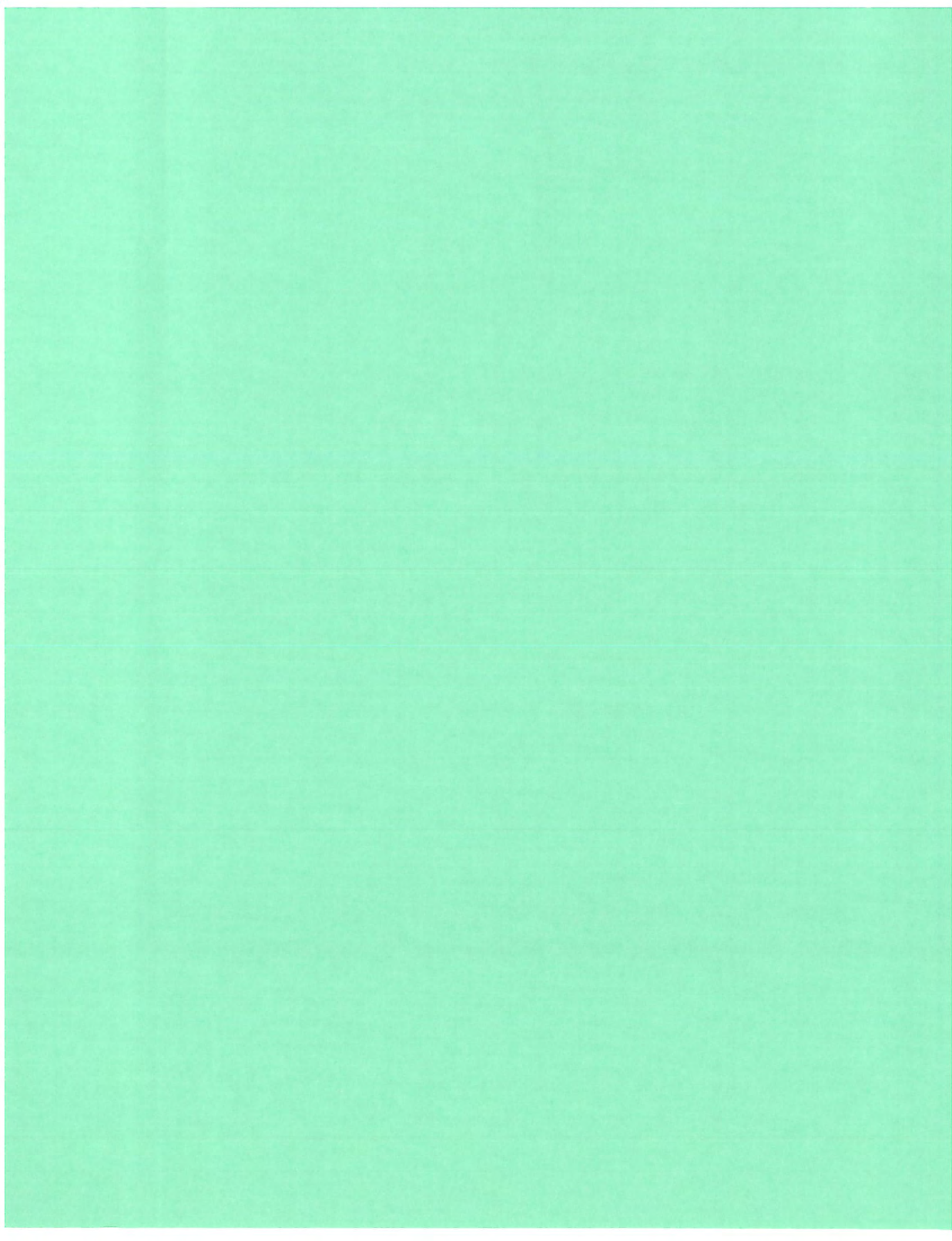
Date: December 2, 2008

Project No. 07-1130-207

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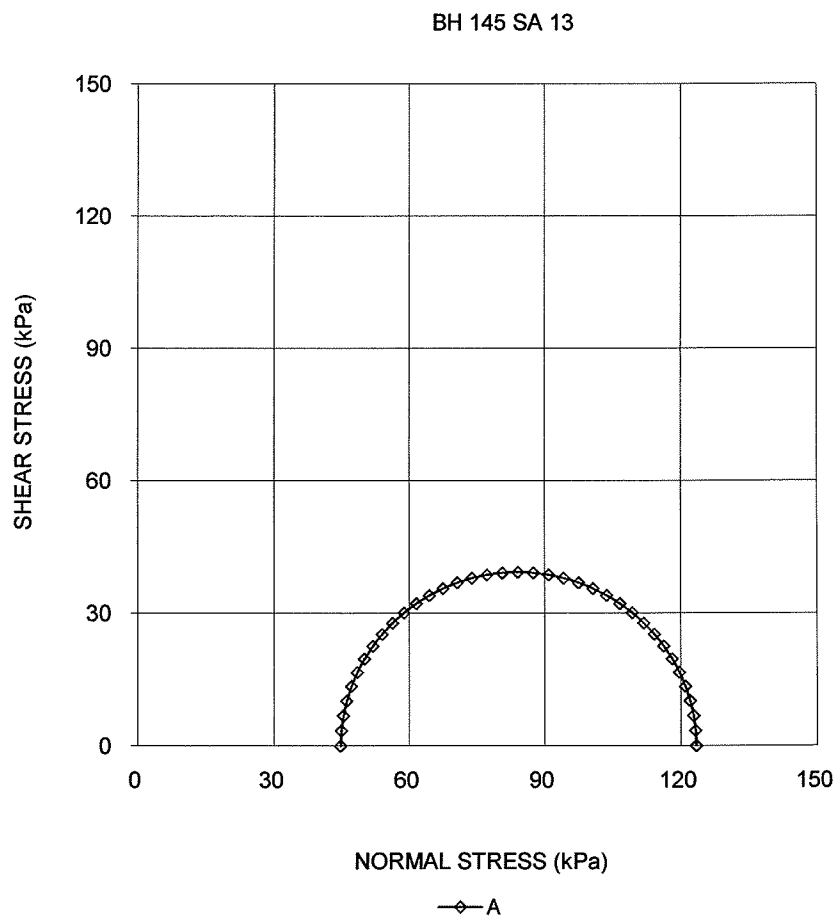
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<b>CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 145 SA 13 CAUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	145	
SAMPLE	13	
<b>SAMPLE DATA</b>		
SPECIMEN DIAMETER, cm	4.93	
SPECIMEN HEIGHT, cm	10.10	
NATURAL WATER CONTENT, %	17.9	
DRY DENSITY, Mg/m <sup>3</sup>	1.84	
<b>SATURATION</b>		
WATER CONTENT BEFORE CONSOLIDATION, %	19.9	
PORE PRESSURE PARAMETER "B"	0.96	
<b>CONSOLIDATION</b>		
CELL PRESSURE, $\sigma_3$ , kPa	246.0	
BACK PRESSURE, kPa	205.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	82.00	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	41.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	8.0	
WATER CONTENT AFTER CONSOLIDATION, %	14.4	
<b>SHEARING</b>		
CELL PRESSURE, $\sigma_3$ , kPa	246.0	
BACK PRESSURE, kPa	205.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	82.0	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	41.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	17.5	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	78.6	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	15.6	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.9	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	70.2	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	6.7	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	-0.05	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.05	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	bulged	
<div> Date: 10/29/2008 <div> Prepared By MM </div> </div> <div> Project No. 07-1130-2070 <div> Golder Associates </div> </div> <div> <div> Checked By: RO </div> </div>		

CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 145 SA 13 CAUC B



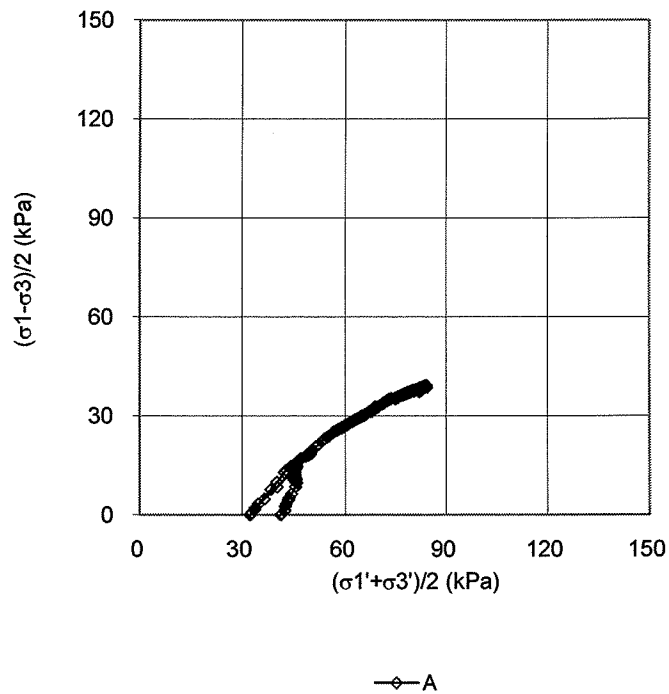
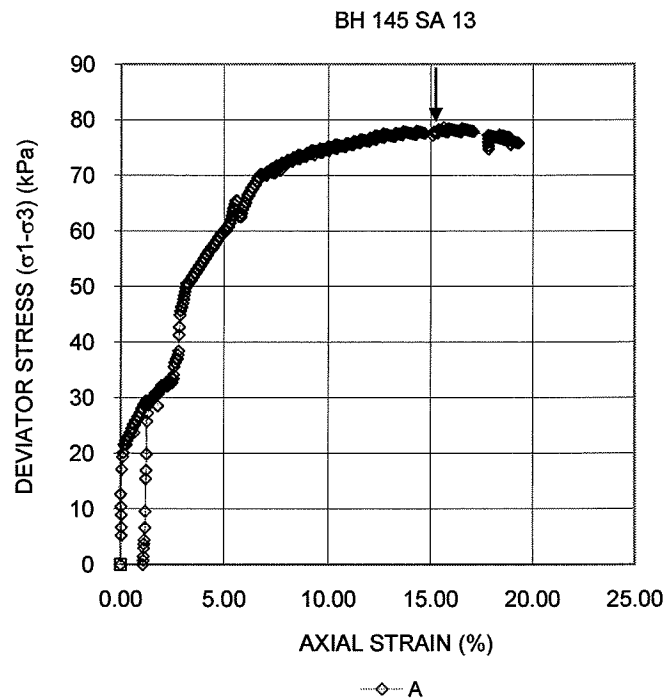
Date: 10/29/2008  
Project No. 07-1130-2070

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CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4

FIGURE BH 145 SA 13 CAUC C



Date: 10/29/2008  
Project No. 07-1130-2070

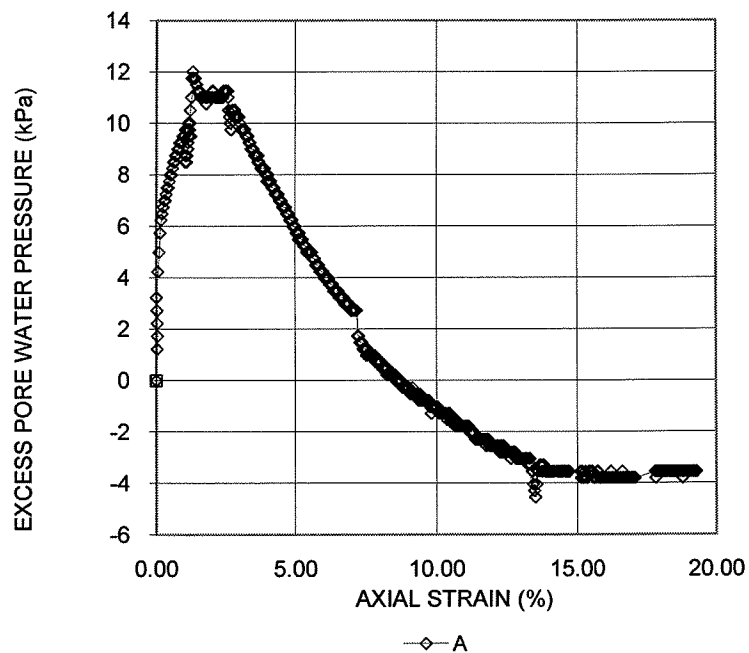
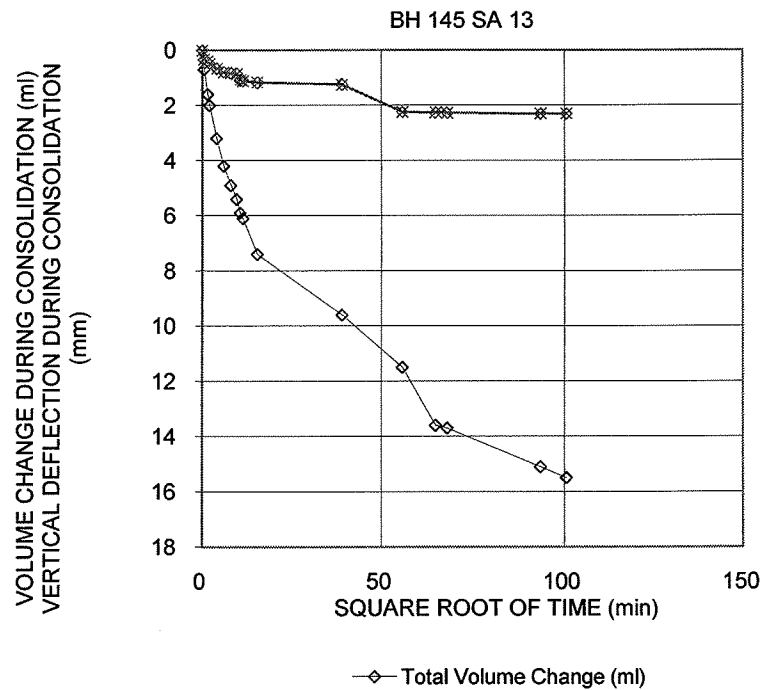
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**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 145 SA 13 CAUC D**



Date: 10/29/2008  
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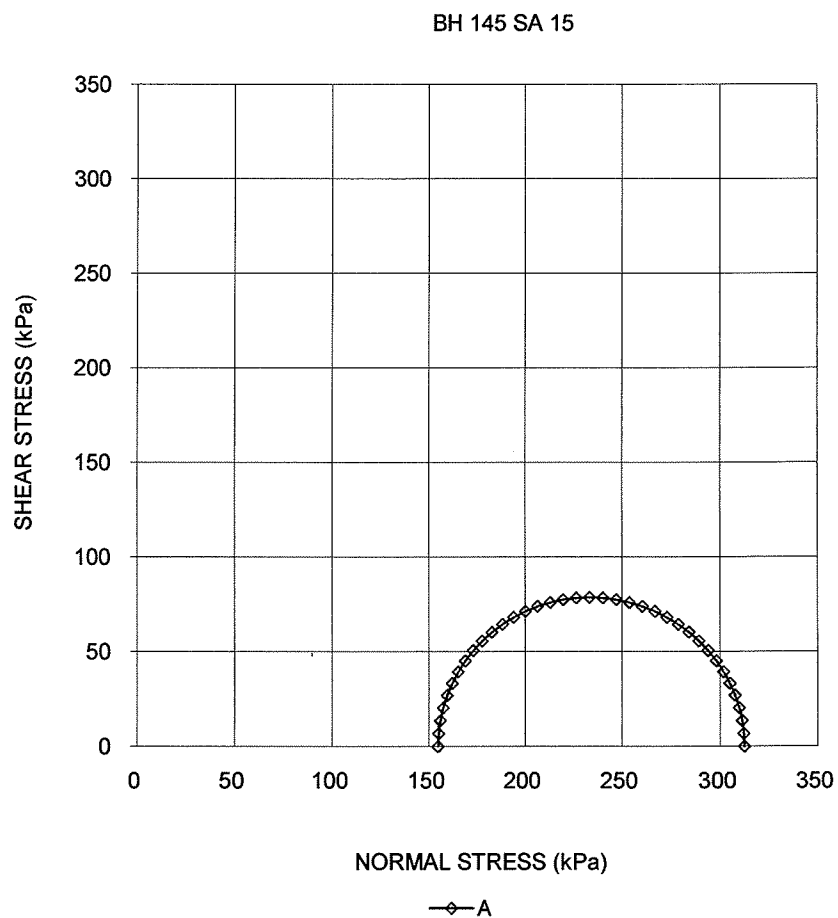
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Checked By: RO

<b>CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 145 SA 15b CAUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	145	
SAMPLE	15	
<b>SAMPLE DATA</b>		
SPECIMEN DIAMETER, cm	5.22	
SPECIMEN HEIGHT, cm	10.01	
NATURAL WATER CONTENT, %	19.8	
DRY DENSITY, Mg/m <sup>3</sup>	1.77	
<b>SATURATION</b>		
WATER CONTENT BEFORE CONSOLIDATION, %	23.8	
PORE PRESSURE PARAMETER "B"	0.96	
<b>CONSOLIDATION</b>		
CELL PRESSURE, $\sigma_3$ , kPa	311.0	
BACK PRESSURE, kPa	135.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	352.00	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	176.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	20.8	
WATER CONTENT AFTER CONSOLIDATION, %	12.0	
<b>SHEARING</b>		
CELL PRESSURE, $\sigma_3$ , kPa	311.0	
BACK PRESSURE, kPa	135.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	352.0	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	176.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	14.5	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	157.5	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	18.3	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.0	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	156.7	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	18.0	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.14	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.14	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	bulged	
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CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 145 SA 15b CAUC B



Date: 11/09/2008  
Project No. 07-1130-2070

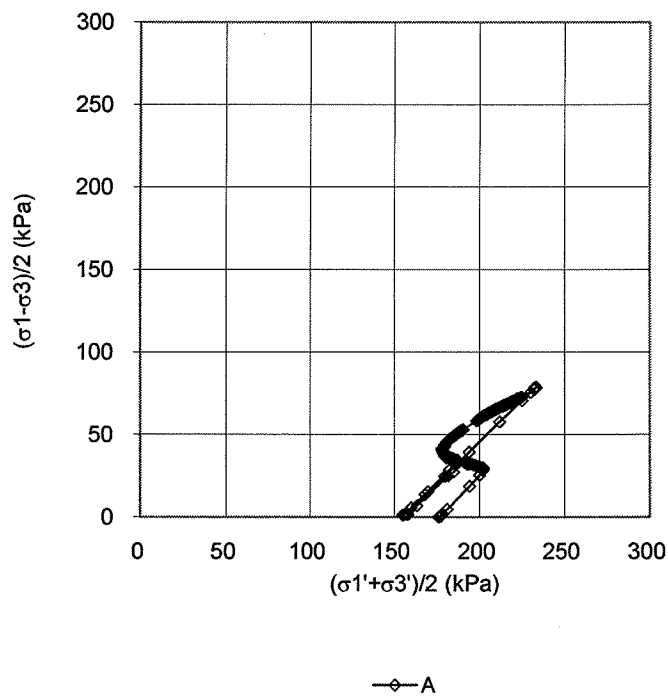
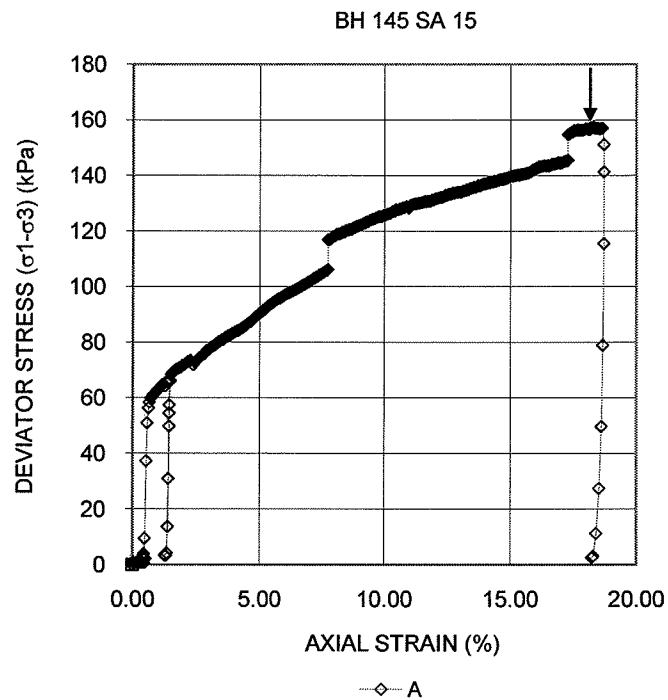
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CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS

SHEET 3 OF 4

FIGURE BH 145 SA 15b CAUC C



Date: 11/09/2008  
Project No. 07-1130-2070

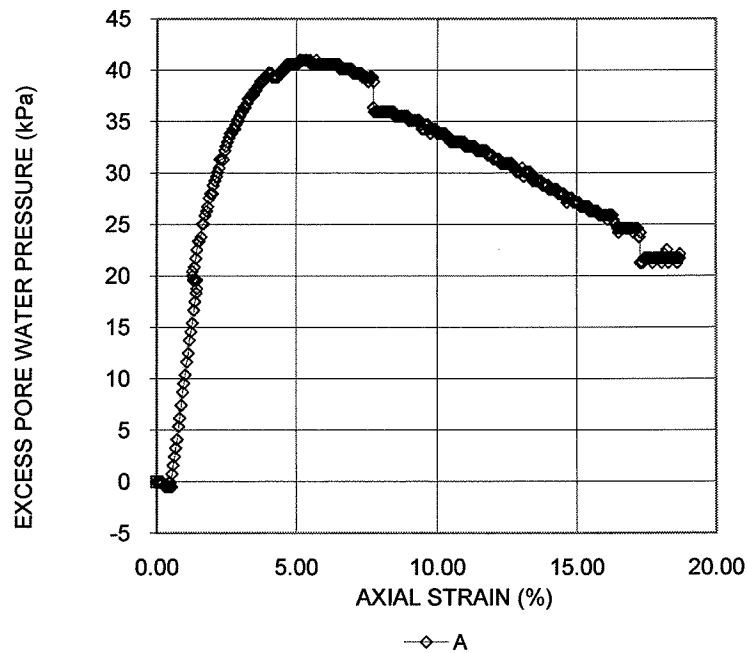
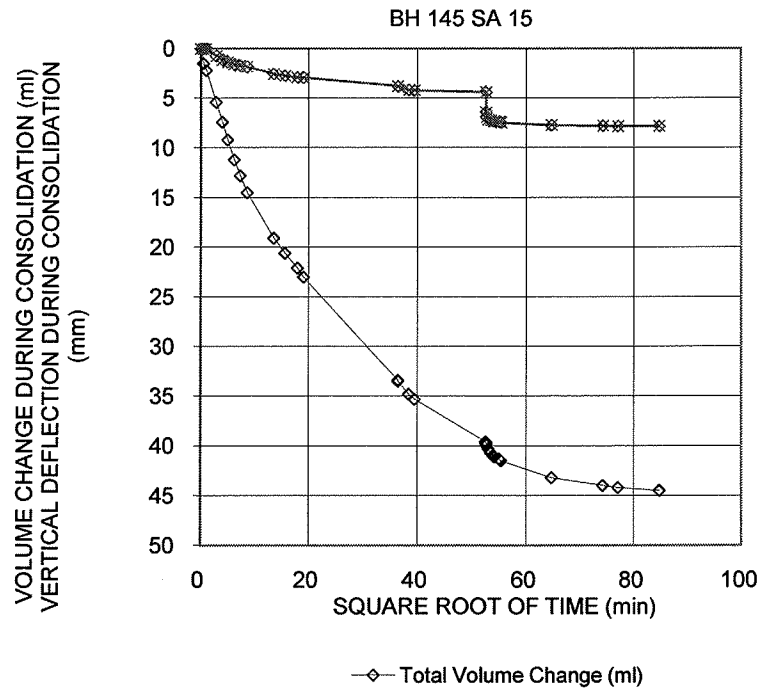
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CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS

FIGURE BH 145 SA 15b CAUC D

SHEET 4 OF 4



Date: 11/09/2008  
Project No. 07-1130-2070

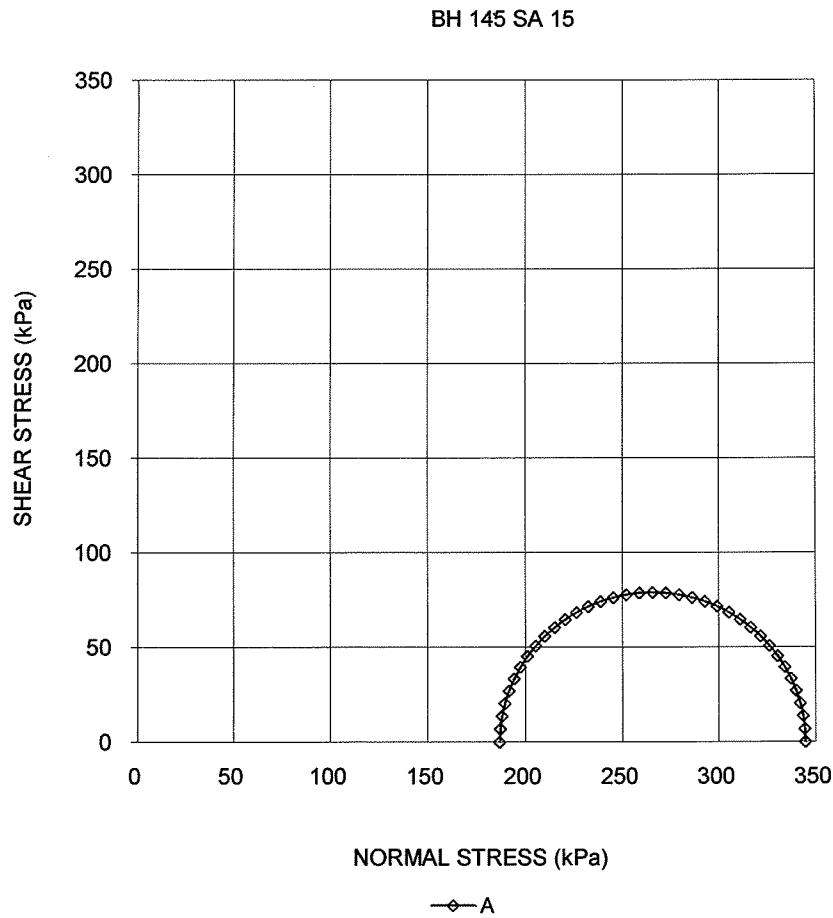
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<b>CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 145 SA 15c CAUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	145	
SAMPLE	15	
<b>SAMPLE DATA</b>		
SPECIMEN DIAMETER, cm	5.01	
SPECIMEN HEIGHT, cm	10.15	
NATURAL WATER CONTENT, %	17.7	
DRY DENSITY, Mg/m <sup>3</sup>	1.83	
<b>SATURATION</b>		
WATER CONTENT BEFORE CONSOLIDATION, %	19.4	
PORE PRESSURE PARAMETER "B"	0.97	
<b>CONSOLIDATION</b>		
CELL PRESSURE, $\sigma_3$ , kPa	525.0	
BACK PRESSURE, kPa	275.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	500.00	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	250.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	9.1	
WATER CONTENT AFTER CONSOLIDATION, %	14.4	
<b>SHEARING</b>		
CELL PRESSURE, $\sigma_3$ , kPa	525.0	
BACK PRESSURE, kPa	275.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	500.0	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	250.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	13.7	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	158.0	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	18.3	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	1.8	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	158.0	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	18.3	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.40	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.40	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	bulged	
<div> Date: 11/29/2008 <div>Project No. 07-1130-2070</div> <div>Golder Associates</div> </div> <div> Prepared By MM <div>Checked By: RO</div> </div>		

CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 145 SA 15c CAUC B



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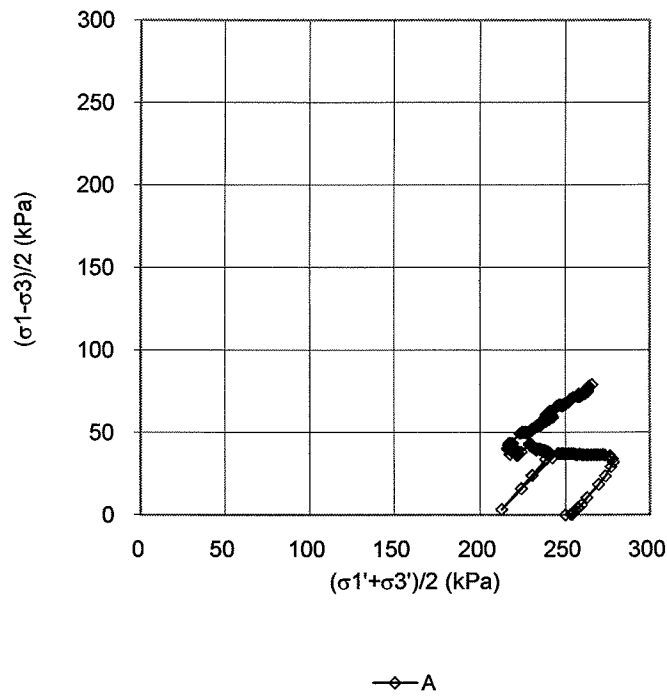
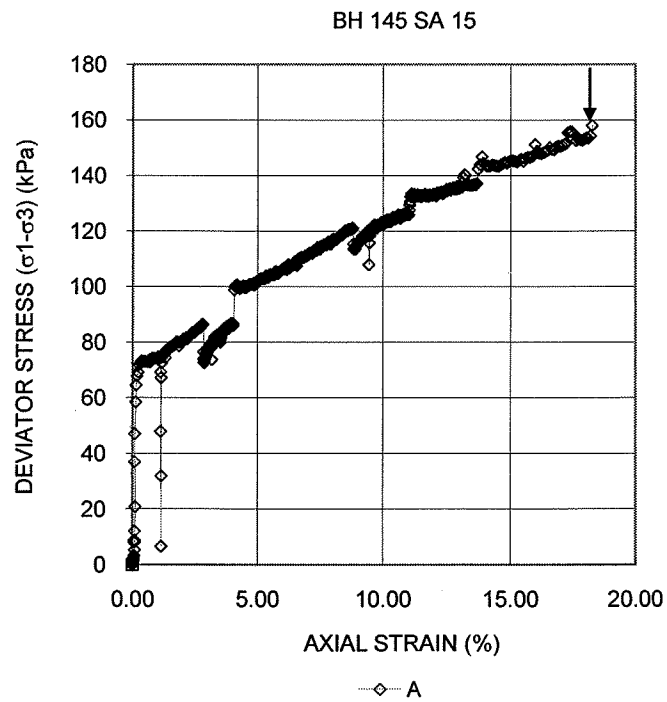
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**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 145 SA 15c CAUC C**



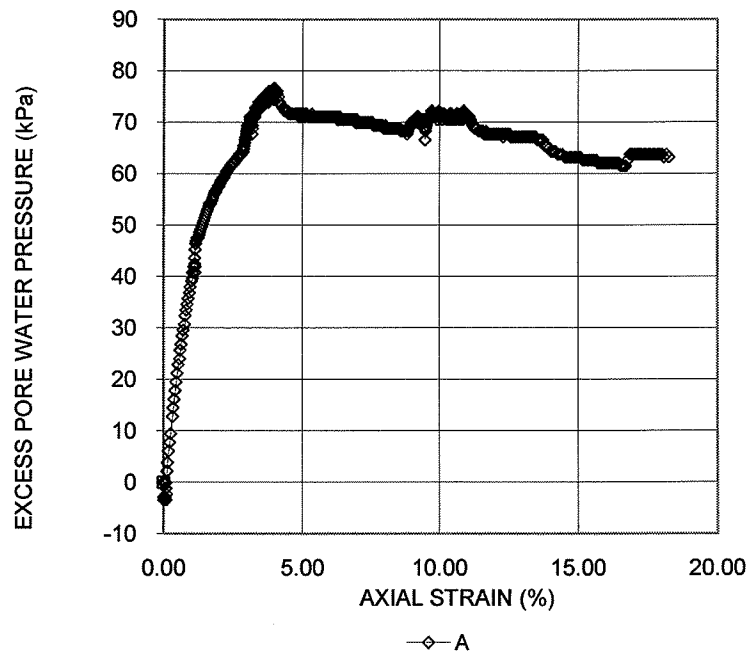
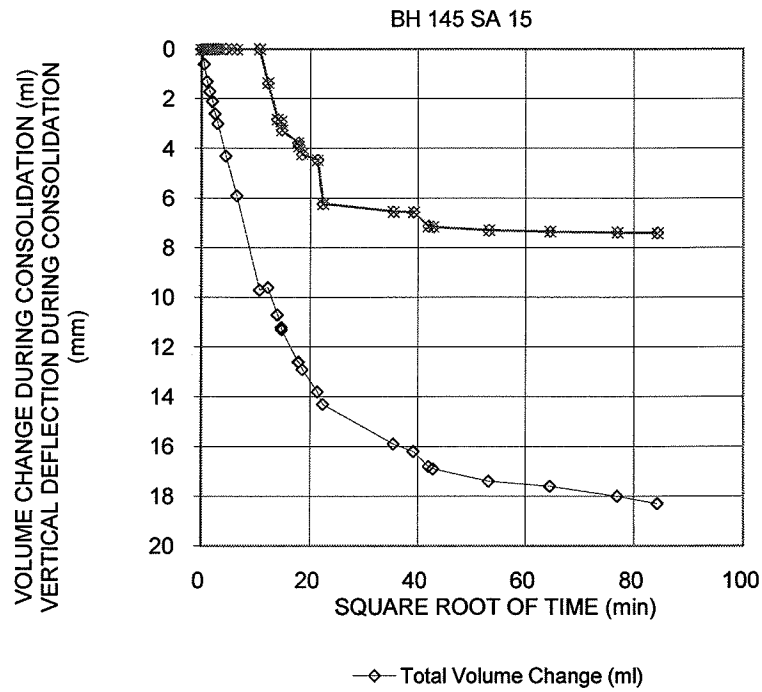
Date: 11/29/2008  
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**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 145 SA 15c CAUC D**



Date: 11/29/2008  
Project No. 07-1130-2070

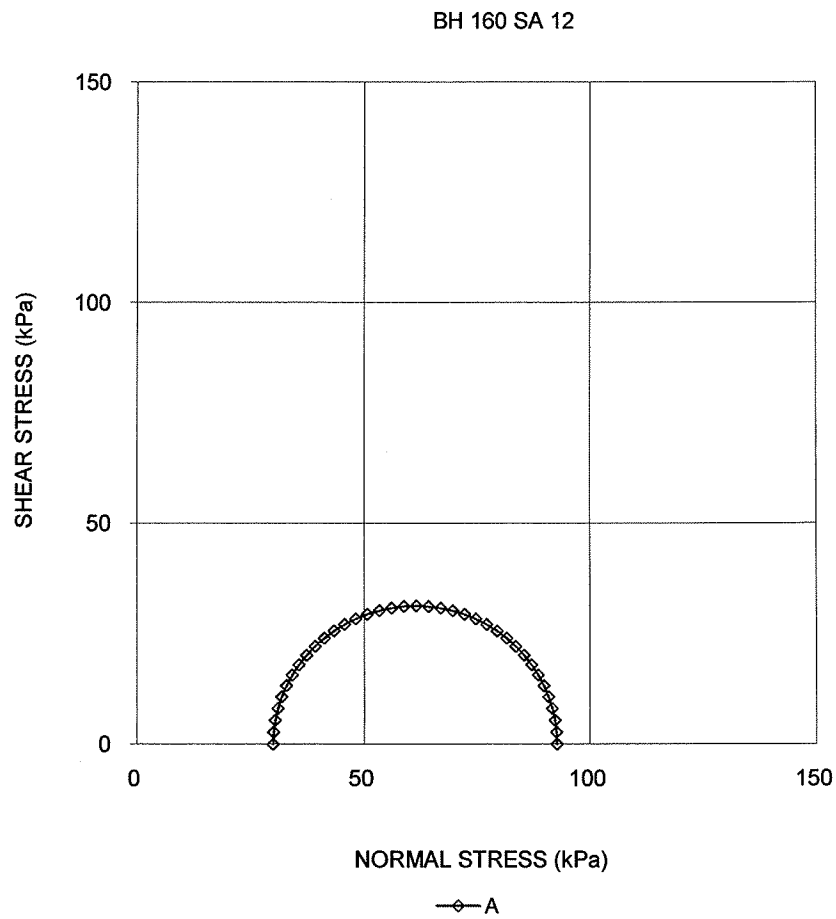
**Golder Associates**

Prepared By: MM  
Checked By: RO

<b>CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 160 SA 12a CAUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	160	
SAMPLE	12	
<b>SAMPLE DATA</b>		
SPECIMEN DIAMETER, cm	5.01	
SPECIMEN HEIGHT, cm	10.14	
NATURAL WATER CONTENT, %	37.9	
DRY DENSITY, Mg/m <sup>3</sup>	1.38	
<b>SATURATION</b>		
WATER CONTENT BEFORE CONSOLIDATION, %	41.2	
PORE PRESSURE PARAMETER "B"	0.96	
<b>CONSOLIDATION</b>		
CELL PRESSURE, $\sigma_3$ , kPa	425.0	
BACK PRESSURE, kPa	275.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	300.00	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	150.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	15.5	
WATER CONTENT AFTER CONSOLIDATION, %	29.4	
<b>SHEARING</b>		
CELL PRESSURE, $\sigma_3$ , kPa	313.0	
BACK PRESSURE, kPa	275.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	75.0	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	38.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	30.9	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	110.4	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	4.1	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	7.3	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	62.5	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	1.4	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	3.48	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.69	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
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CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 160 SA 12a CAUC B



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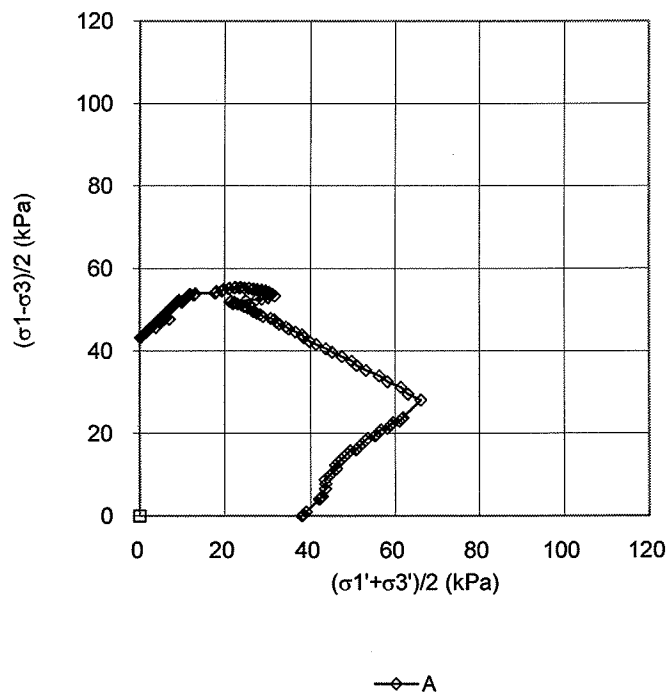
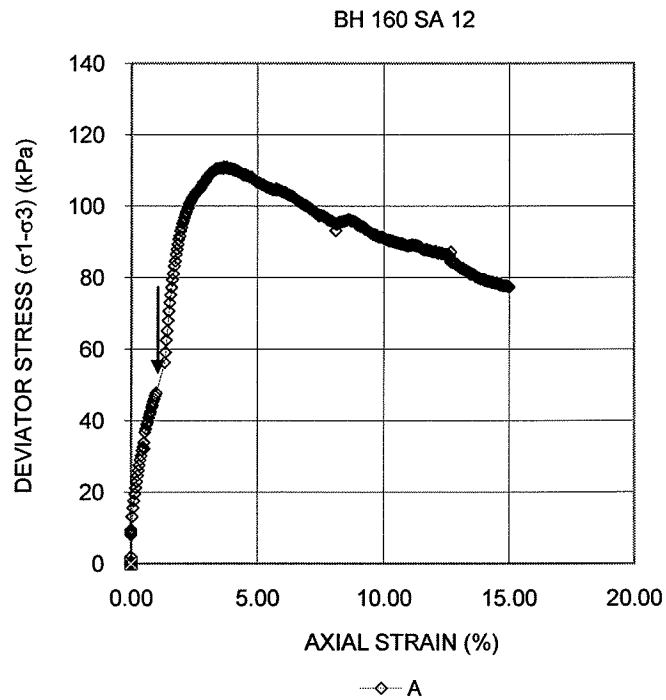
**Golder Associates**

Prepared By MM  
Checked By: RO

CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS

SHEET 3 OF 4

FIGURE BH 160 SA 12a CAUC C



Date: 10/09/2008  
Project No. 07-1130-2070

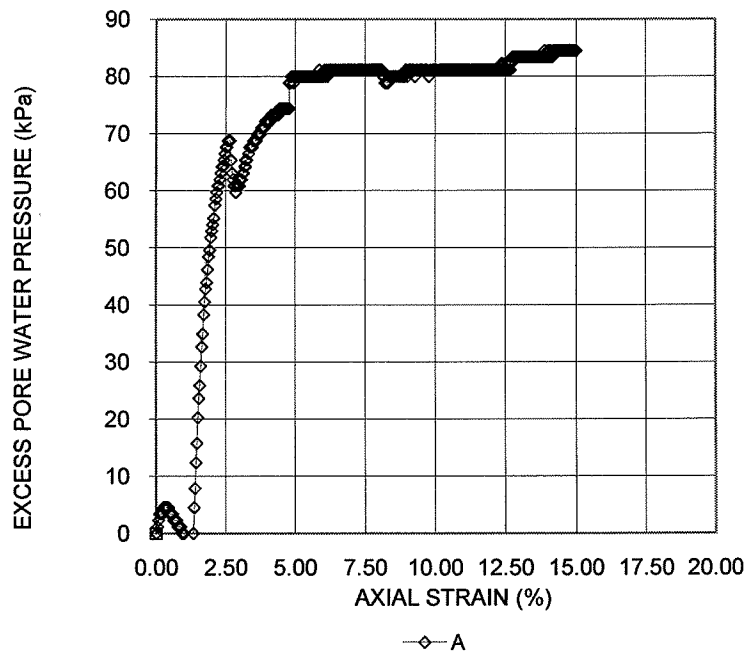
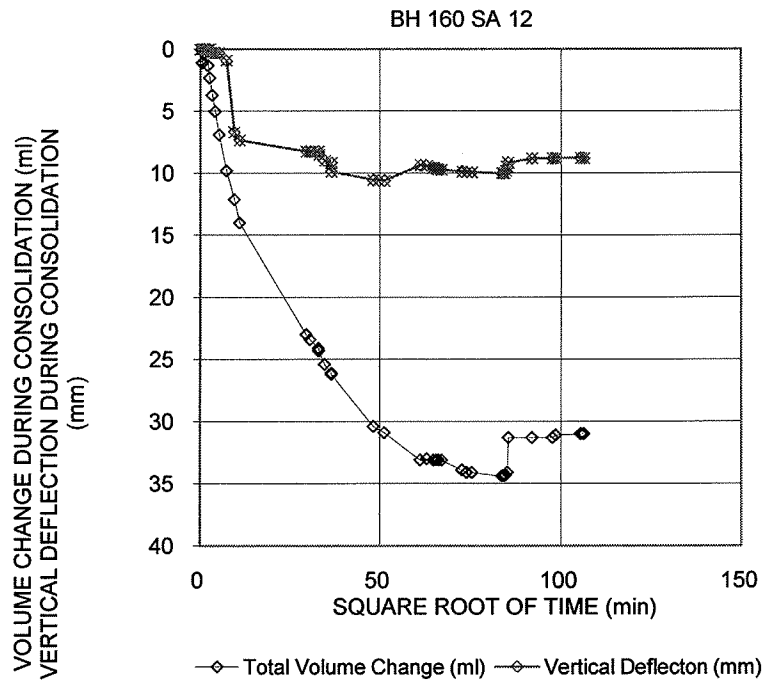
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Checked By: RO

**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS**

**FIGURE BH 160 SA 12a CAUC D**

**SHEET 4 OF 4**



Date: 10/09/2008  
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**Golder Associates**

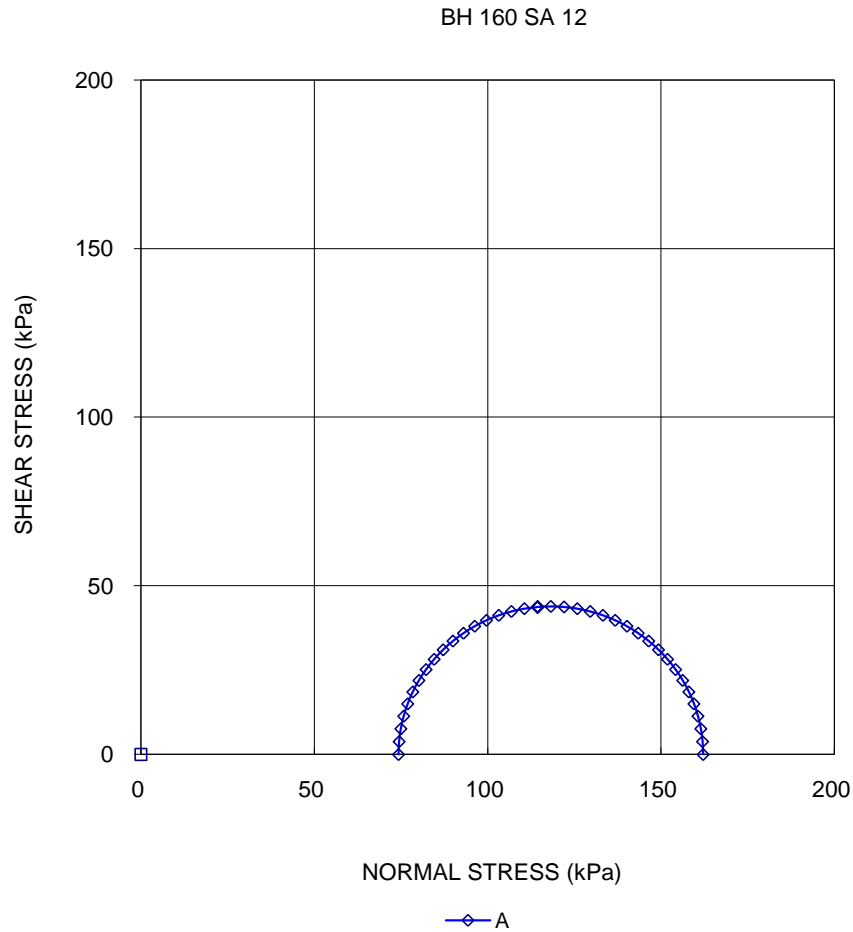
Prepared By MM  
Checked By: RO

<b>CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 160 SA 12b CAUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	160	
SAMPLE	12	
<b>SAMPLE DATA</b>		
SPECIMEN DIAMETER, cm	5.03	
SPECIMEN HEIGHT, cm	9.97	
NATURAL WATER CONTENT, %	25.6	
DRY DENSITY, Mg/m <sup>3</sup>	1.61	
<b>SATURATION</b>		
WATER CONTENT BEFORE CONSOLIDATION, %	26.9	
PORE PRESSURE PARAMETER "B"	0.96	
<b>CONSOLIDATION</b>		
CELL PRESSURE, $\sigma_3$ , kPa	425.0	
BACK PRESSURE, kPa	275.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	300.00	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	150.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	8.6	
WATER CONTENT AFTER CONSOLIDATION, %	21.6	
<b>SHEARING</b>		
CELL PRESSURE, $\sigma_3$ , kPa	350.0	
BACK PRESSURE, kPa	275.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	150.00	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	75.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	22.4	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	87.8	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	11.1	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	2.2	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	85.6	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	6.5	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.01	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.02	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div style="display: flex; justify-content: space-between; align-items: flex-end; padding-top: 20px;"> <div> Date: 09/09/2008  Project No. 07-1130-2070 </div> <div style="text-align: center;"> <b>Golder Associates</b> </div> <div style="text-align: right;"> Prepared By MM  Checked By: RO </div> </div>		



**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4**

**FIGURE BH 160 SA 12b CAUC B**



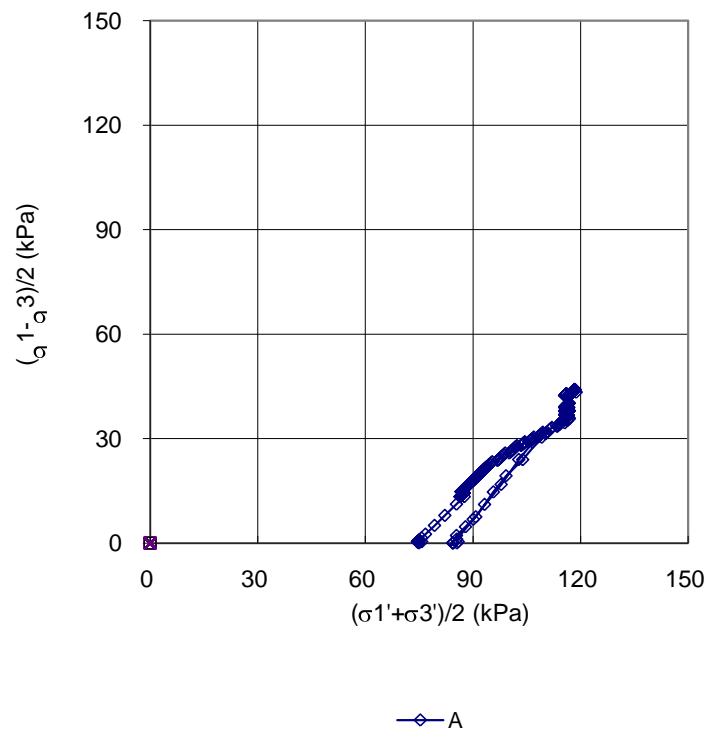
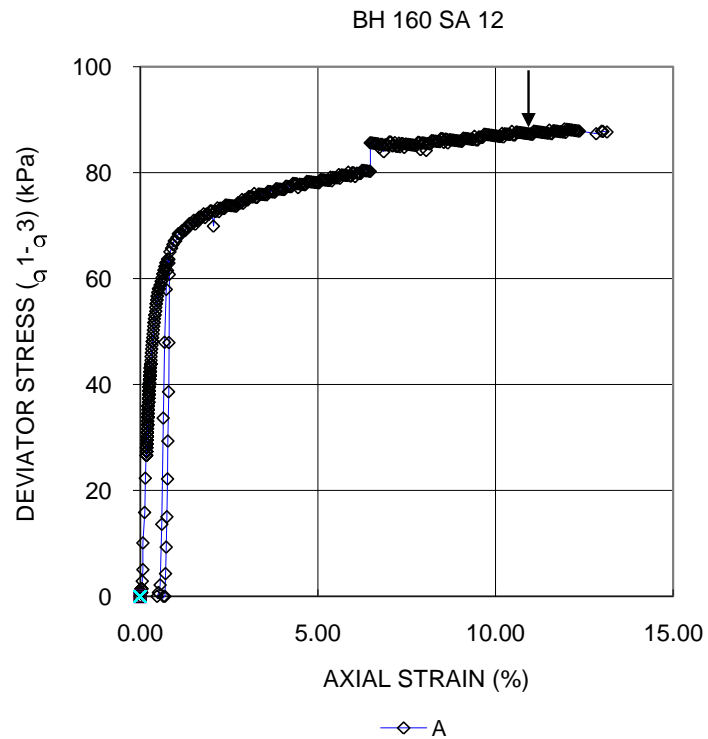
Date: 09/27/2008  
Project No. 07-1130-2070

**Golder Associates**

Prepared By MM  
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**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 160 SA 12b CAUC C**



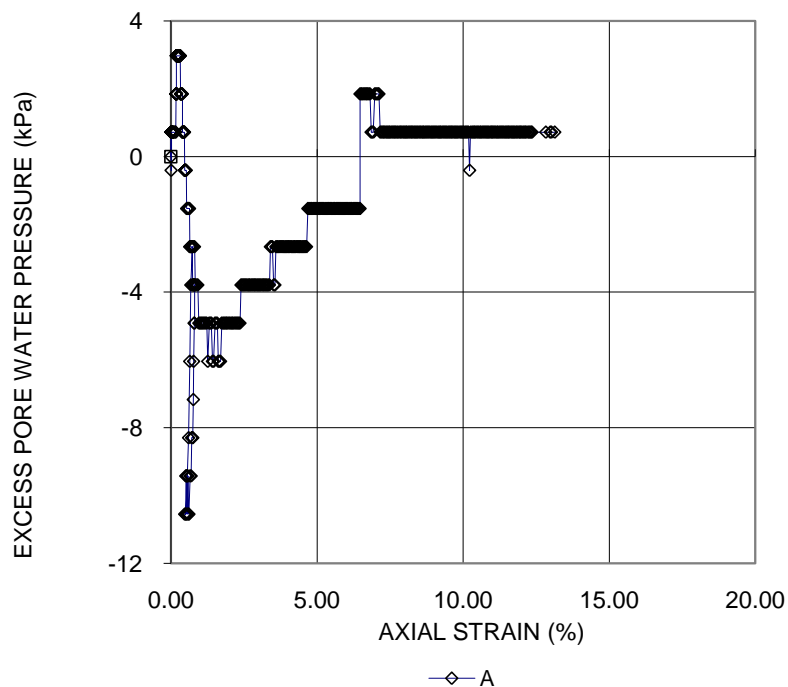
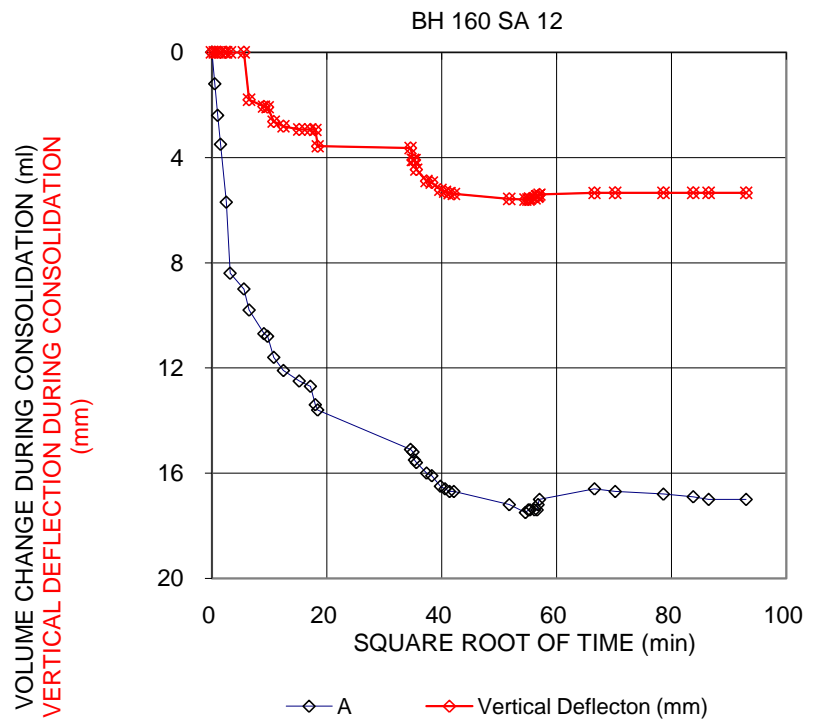
Date: 09/27/2008  
Project No. 07-1130-2070

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Prepared By: MM  
Checked By: RO

**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

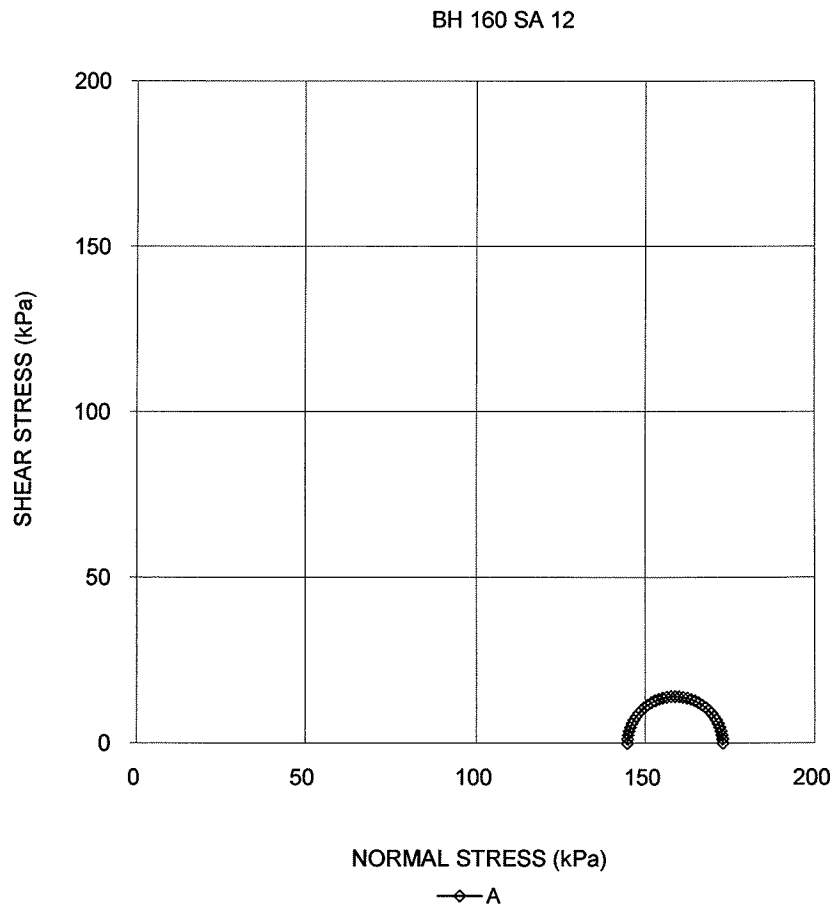
**FIGURE BH 160 SA 12b CAUC D**



<b>CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 160 SA 12c CAUC A</b>
TEST STAGE	A	
BOREHOLE NUMBER	160	
SAMPLE	12	
<b>SAMPLE DATA</b>		
SPECIMEN DIAMETER, cm	4.96	
SPECIMEN HEIGHT, cm	10.05	
NATURAL WATER CONTENT, %	38.5	
DRY DENSITY, Mg/m <sup>3</sup>	1.33	
<b>SATURATION</b>		
WATER CONTENT BEFORE CONSOLIDATION, %	40.8	
PORE PRESSURE PARAMETER "B"	0.96	
<b>CONSOLIDATION</b>		
CELL PRESSURE, $\sigma_3$ , kPa	285.0	
BACK PRESSURE, kPa	135.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	300.00	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	150.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	15.0	
WATER CONTENT AFTER CONSOLIDATION, %	29.5	
<b>SHEARING</b>		
CELL PRESSURE, $\sigma_3$ , kPa	285.0	
BACK PRESSURE, kPa	135.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	300.00	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	150.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	28.4	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	28.2	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	0.1	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	1.2	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	28.2	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	0.3	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.19	
PORE PRESSURE PARAMETER, $A_f$ , AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.23	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div style="display: flex; justify-content: space-between; align-items: flex-end; padding-top: 20px;"> <div> Date: 09/27/2008  Project No. 07-1130-2070 </div> <div style="text-align: center;"> <b>Golder Associates</b> </div> <div style="text-align: right;"> Prepared By MM  Checked By: RO </div> </div>		

**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4**

**FIGURE BH 160 SA 12c CAUC B**



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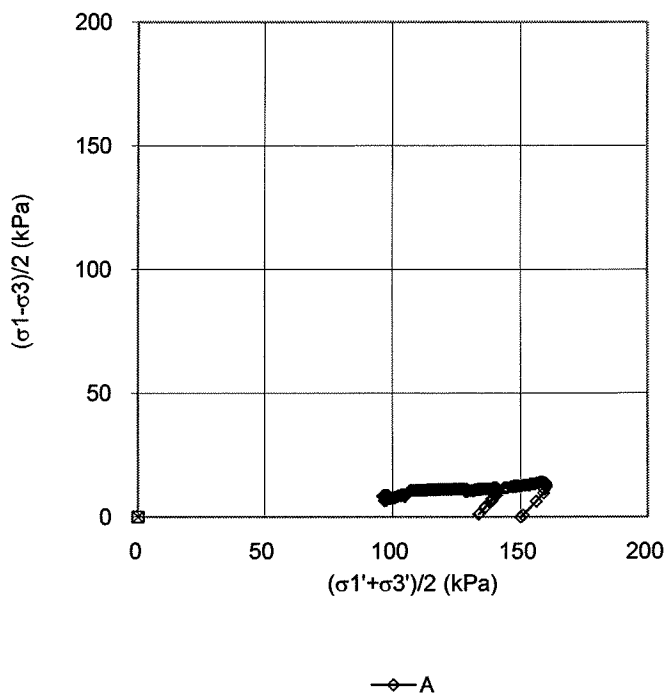
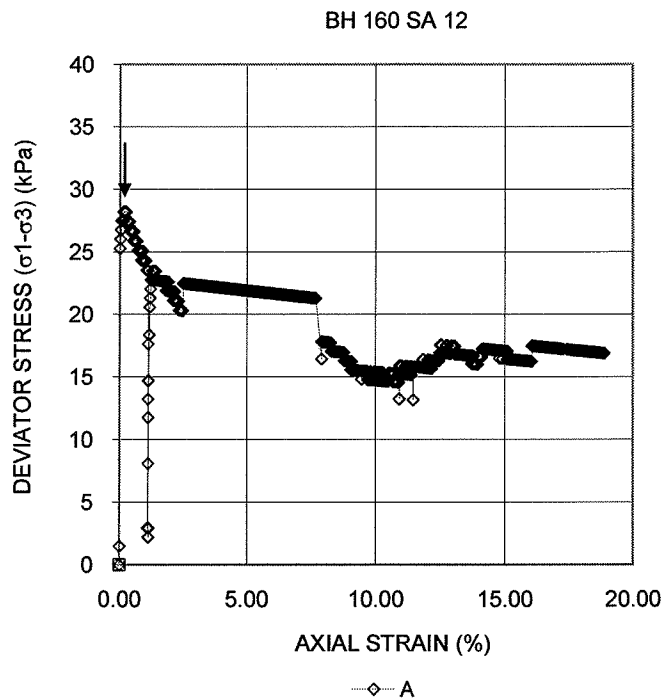
**Golder Associates**

Prepared By MM  
Checked By: RO

CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS

FIGURE BH 160 SA 12c CAUC C

SHEET 3 OF 4



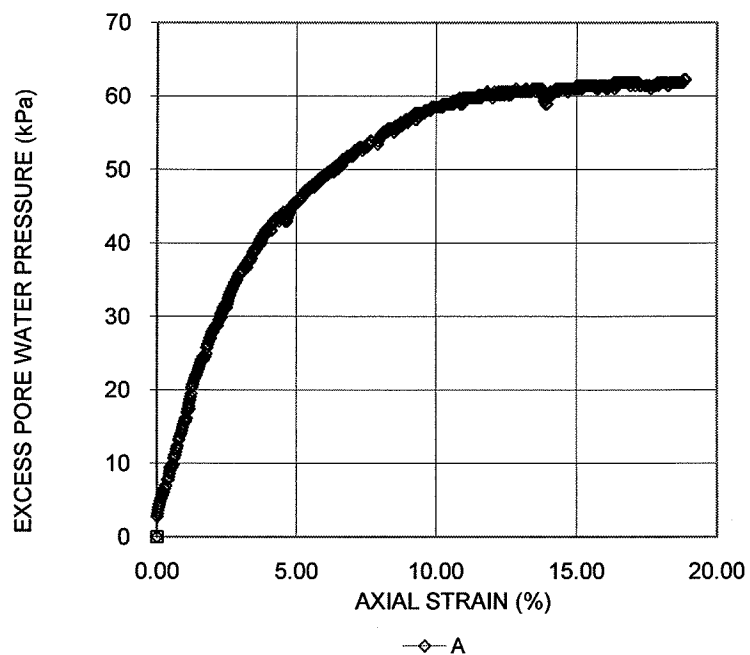
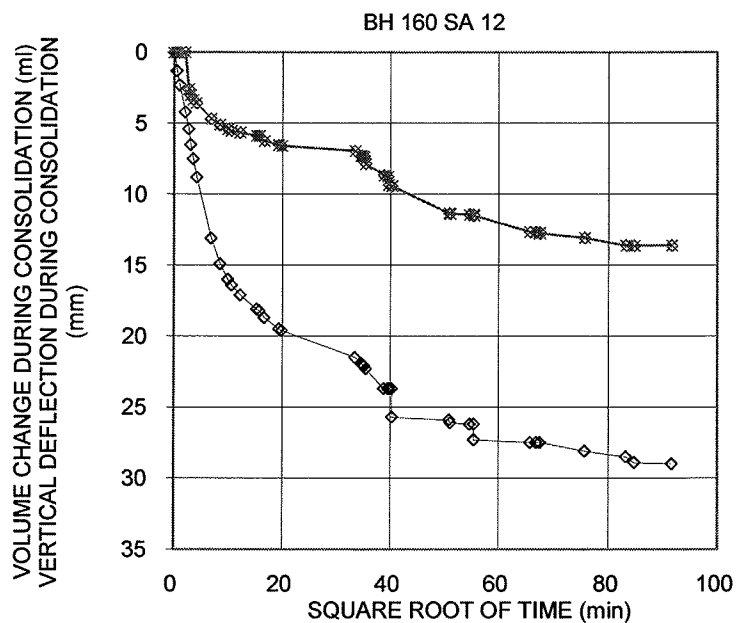
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**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 160 SA 12c CAUC D**

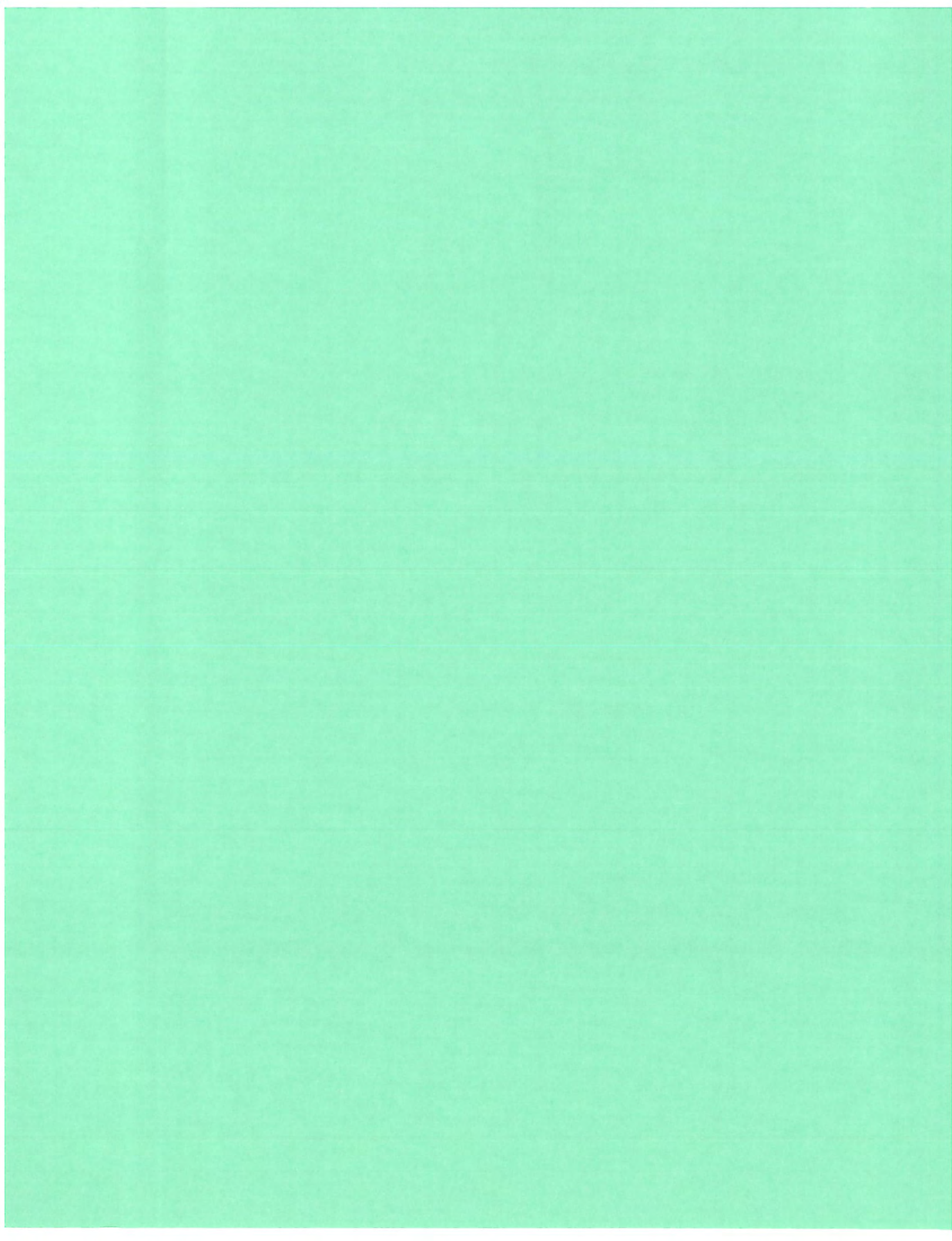


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Project No. 07-1130-2070

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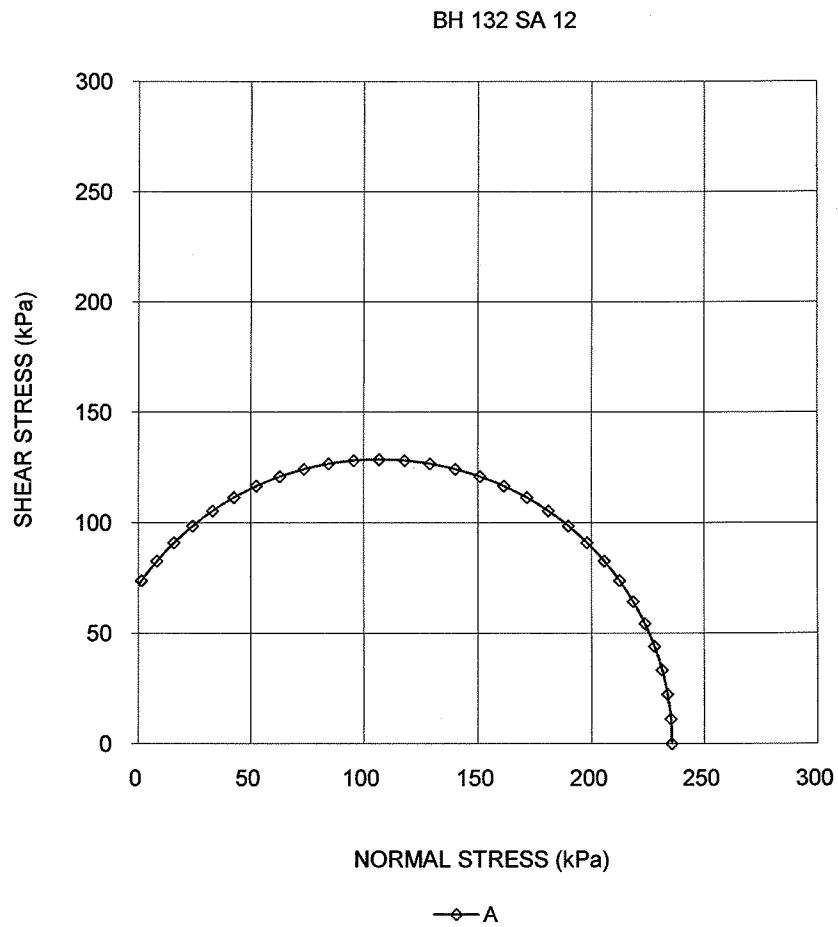




<b>CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL</b> <b>WITH PORE PRESSURE MEASUREMENTS</b> <b>SHEET 1 OF 4</b>		<b>FIGURE BH 132 SA 12 CAUE A</b>
TEST STAGE	A	
BOREHOLE NUMBER	132	
SAMPLE	12	
<b>SAMPLE DATA</b>		
SPECIMEN DIAMETER, cm	5.01	
SPECIMEN HEIGHT, cm	10.14	
NATURAL WATER CONTENT, %	25.5	
DRY DENSITY, Mg/m <sup>3</sup>	1.59	
<b>SATURATION</b>		
WATER CONTENT BEFORE CONSOLIDATION, %	26.4	
PORE PRESSURE PARAMETER "B"	0.99	
<b>CONSOLIDATION</b>		
CELL PRESSURE, $\sigma_3$ , kPa	441.0	
BACK PRESSURE, kPa	275.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	333.00	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	166.0	
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	2.6	
WATER CONTENT AFTER CONSOLIDATION, %	24.7	
<b>SHEARING</b>		
CELL PRESSURE, $\sigma_3$ , kPa	441.0	
BACK PRESSURE, kPa	275.0	
VERTICAL EFFECTIVE PRESSURE, $\sigma_v$ , kPa	333.0	
HORIZONTAL EFFECTIVE PRESSURE, $\sigma_h$ , kPa	166.0	
AVERAGE RATE OF STRAIN, %/hr	0.5	
TIME TO FAILURE, DAYS	1	
WATER CONTENT AFTER TEST, %	23.1	
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$ , kPa	-290.3	
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	6.7	
MAX EFFECTIVE PRINCIPAL STRESS		
RATIO, $(\sigma_1 / \sigma_3)$ MAXIMUM	-0.2	
DEVIATOR STRESS AT $(\sigma_1 / \sigma_3)$ MAXIMUM, kPa	-264.3	
AXIAL STRAIN AT $(\sigma_1 / \sigma_3)$ MAXIMUM, %	3.4	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.29	
PORE PRESSURE PARAMETER, Af, AT $(\sigma_1 / \sigma_3)$ MAXIMUM	0.21	
FILTER DRAINS USED, y/n	y	
TEST NOTES:		
CHANGED RATE OF STRAIN, %/hr	-	
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	
FAILURE PLANE NUMBER	-	
ANGLE OF FAILURE, DEGREES	-	
<div> <div>Date: 01/29/2009</div> <div>Project No. 07-1130-2070</div> </div> <div style="text-align: center;"> <b>Golder Associates</b> </div> <div> <div>Prepared By MM</div> <div>Checked By: RO</div> </div>		

CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 2 OF 4

FIGURE BH 132 SA 12 CAUE B



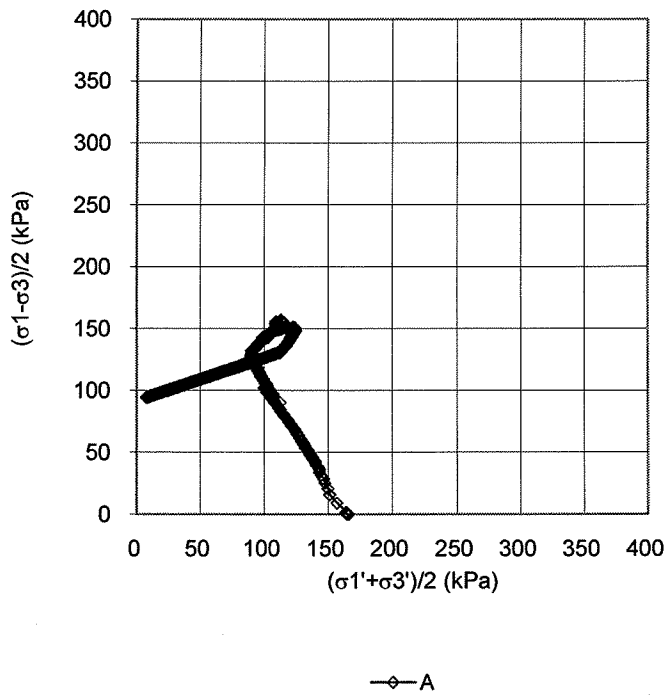
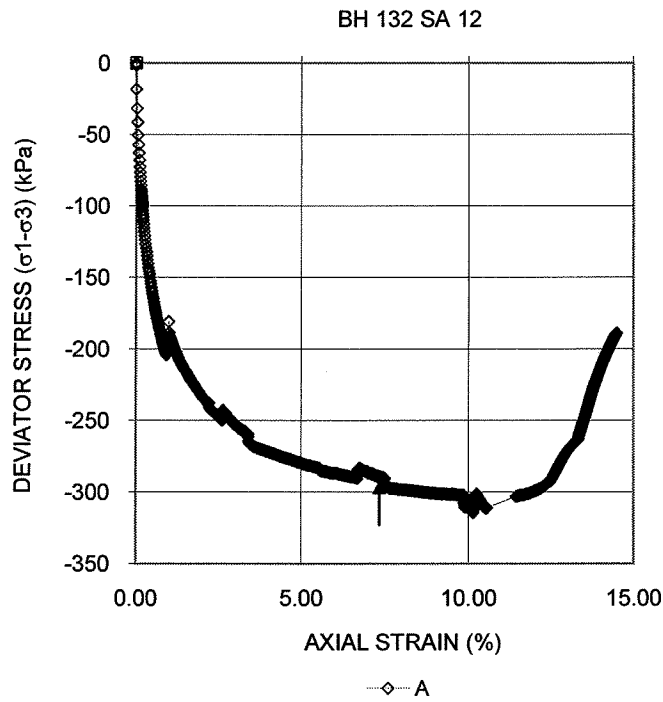
Date: 01/29/2009  
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**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 3 OF 4**

**FIGURE BH 132 SA 12 CAUE C**



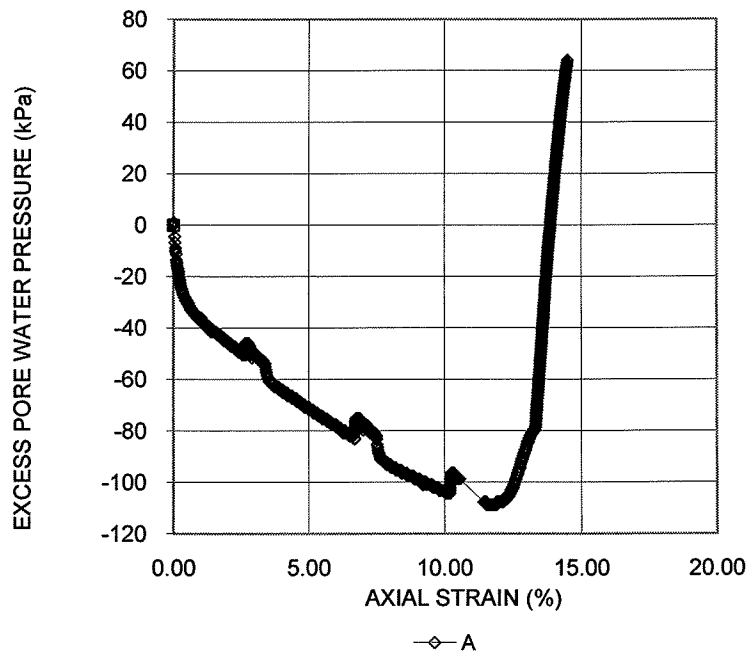
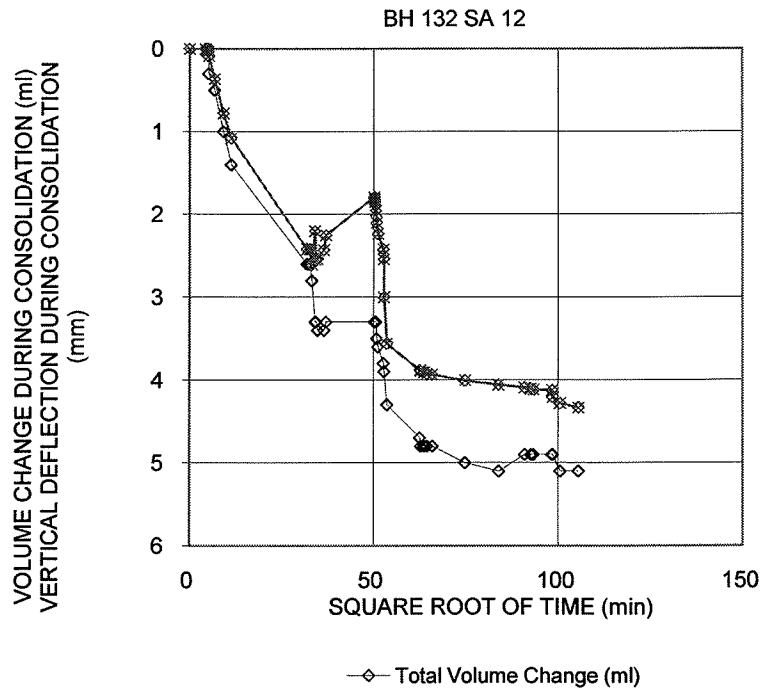
Date: 01/29/2009  
Project No. 07-1130-2070

**Golder Associates**

Prepared By MM  
Checked By: RO

**CONSOLIDATED ANISOTROPIC UNDRAINED TRIAXIAL  
WITH PORE PRESSURE MEASUREMENTS  
SHEET 4 OF 4**

**FIGURE BH 132 SA 12 CAUE D**

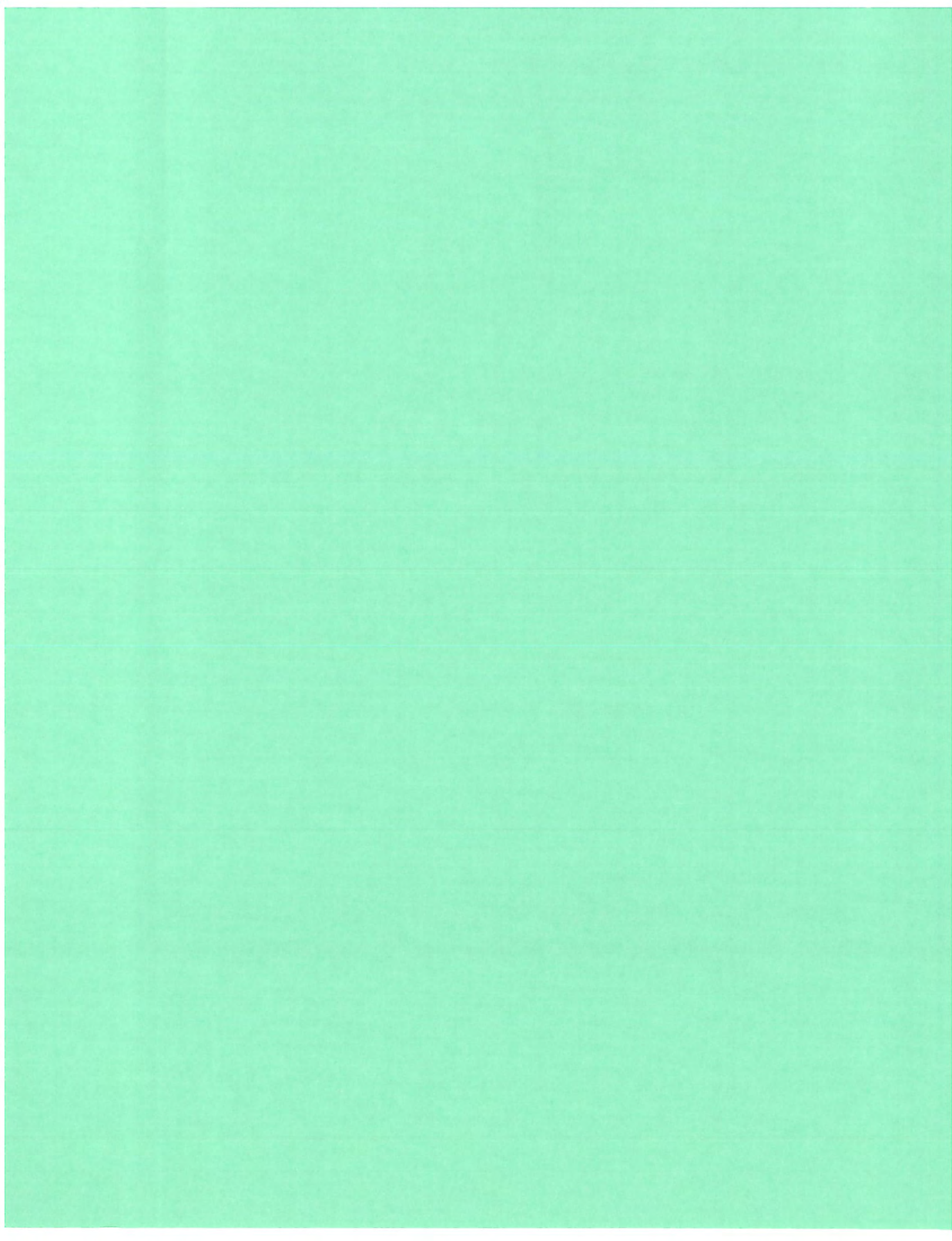


Date: 01/29/2009  
Project No. 07-1130-2070

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Checked By: RO





<b>GEOTECHNICAL RESEARCH CENTRE</b> <b>Triaxial Test</b>  <b>THE UNIVERSITY OF WESTERN ONTARIO</b>	MACHINE NO	GDS - 1	
	TEST NO.	UWO-1	
	LOCATION	Windsor	
	B.H. NO.	145	SA NO. 17
	DEPTH	52.5'-54.0'	
	DATE	02/Jan./2009	TEST BY G.Qu
Test Type		CIU	
Mode of Loading		Compression	
Specimen Diameter, cm		5	
Specimen Height, cm		10	
Water Content (Before Consolidation)		17.2%	
Back Pressure, kPa		200	
Cell Pressure, kPa		600	
Effective Radial Consolidation Stress kPa		400	
Effective Axial Consolidation Stress, kPa		400	
Consolidation Duration, hrs		24	
Strain Rate		0.5%/hr - 0.005%/hr	
Notes: 1. The sample failed by reaching a constant stress ratio. 2. The strain-rate was step changed during the test to measure the rate sensitivity.			

#### Moisture Content

Container No.		Before Test			After Test
		C2	C1	C3	Not Measured
WT. container + wet soil	(g)	23.19	30.55	36.96	
WT. container + dry soil	(g)	20.06	26.30	31.58	
WT. water	(g)	3.13	4.25	5.38	
WT. container	(g)	1.30	1.30	1.30	
WT. dry soil	(g)	18.76	25.00	30.28	
Moisture content	(%)	16.68	17.00	17.77	
Moisture content (avg.)	(%)	17.15			



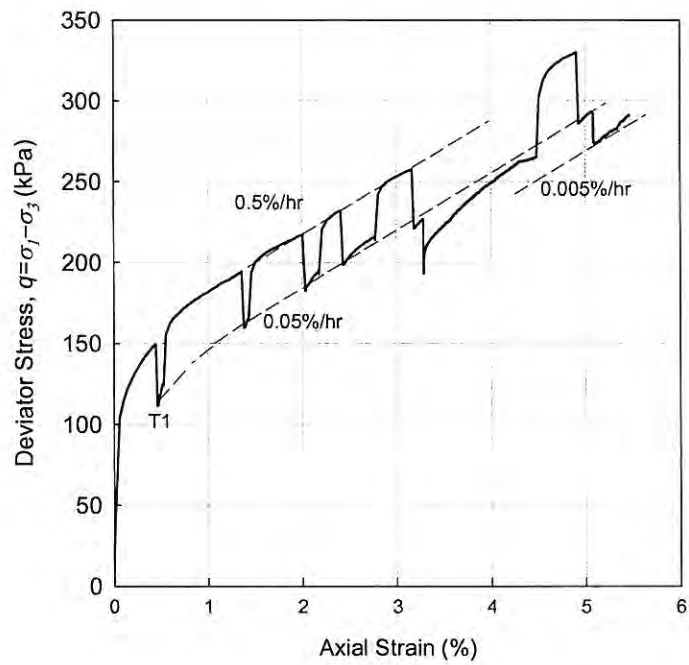


Fig. UWO-1a  
Deviator stress versus axial strain

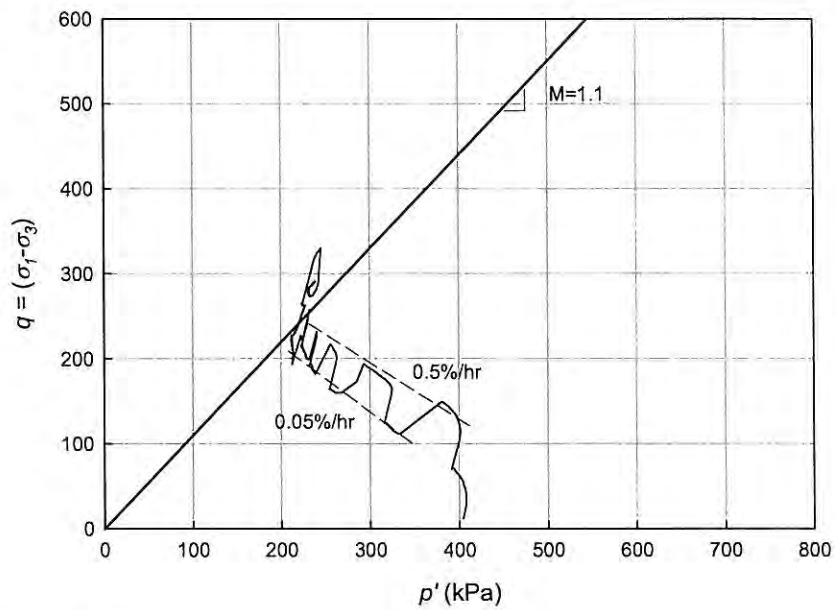


Fig. UWO-1b  
Stress path in  $p$ - $q$  stress space

<b>GEOTECHNICAL RESEARCH CENTRE</b> <b>Triaxial Test</b>  <b>THE UNIVERSITY OF WESTERN ONTARIO</b>	MACHINE NO	GDS - 1		
	TEST NO.	UWO-2		
	LOCATION	Windsor		
	B.H. NO.	145	SA NO.	17
	DEPTH	52.5'-54.0'		
	DATE	02/Jan./2009	TEST BY	G.Qu
Test Type	CAU			
Mode of Loading	Extension			
Specimen Diameter, cm	5			
Specimen Height, cm	10			
Water Content (Before Consolidation)	17.2%			
Back Pressure, kPa	200			
Cell Pressure, kPa	550			
Effectifve Radial Consolidation Stress kPa	350			
Effective Axial Consolidation Stress, kPa	410			
Consolidation Duration, hrs	24			
Strain Rate	0.5%/hr - 0.005%/hr			
Notes:	1. The moisture content was based on trimmings from UWO-1 2. The sample failed by reaching a constant stress ratio. 3. The strain-rate was step changed during the test to measure the rate sensivity.			

#### Moisture Content

Container No.		Before Test			After Test
		C2	C1	C3	Not Measured
WT. container + wet soil	(g)	23.19	30.55	36.96	
WT. container + dry soil	(g)	20.06	26.30	31.58	
WT. water	(g)	3.13	4.25	5.38	
WT. container	(g)	1.30	1.30	1.30	
WT. dry soil	(g)	18.76	25.00	30.28	
Moisture content	(%)	16.68	17.00	17.77	
Moisture content (avg.)	(%)	17.15			

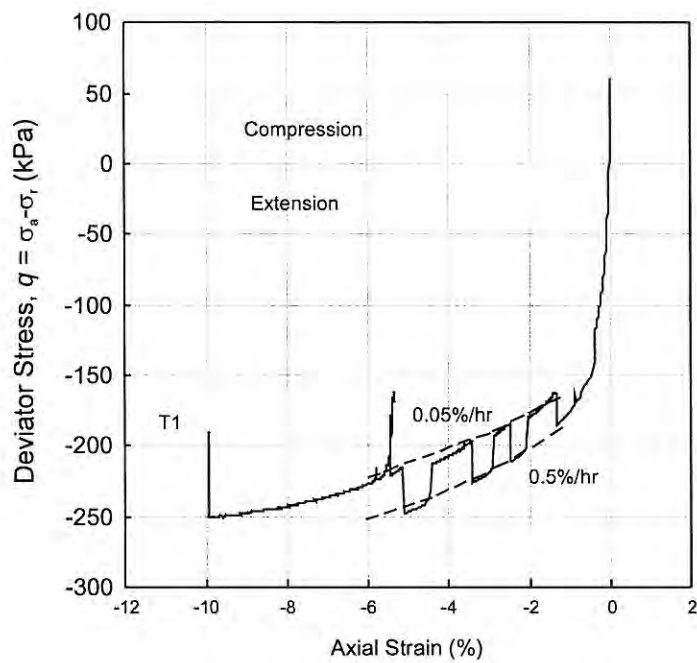


Fig. UWO-2a  
Deviator stress vs axial strain

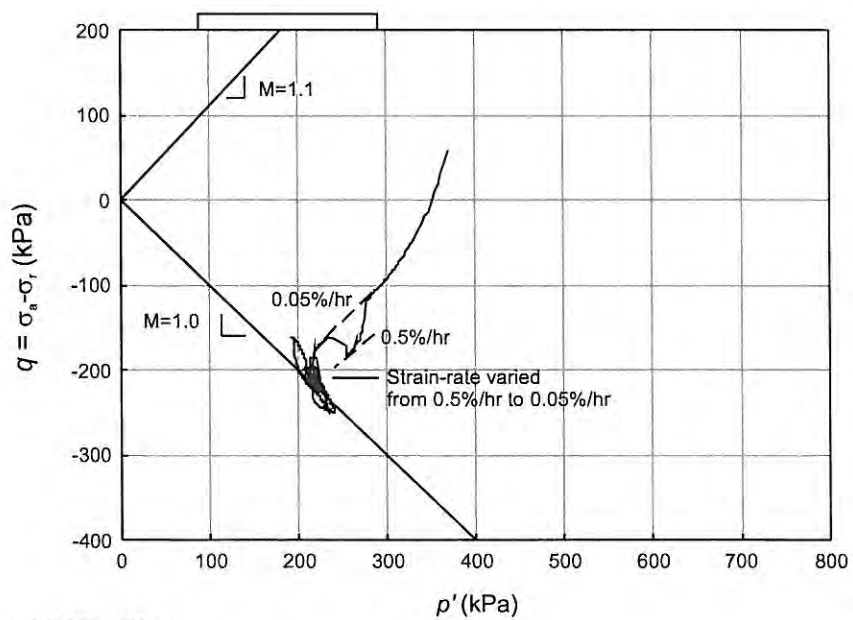


Fig. UWO-2b  
Stress path in p-q stress space

<b>GEOTECHNICAL RESEARCH CENTRE</b> <b>Triaxial Test</b>  <b>THE UNIVERSITY OF WESTERN ONTARIO</b>	MACHINE NO	GDS - 1	
	TEST NO.	UWO-3	
	LOCATION	Windsor	
	B.H. NO.	145	SA NO. 17
	DEPTH	52.5'-54.0'	
	DATE	02/Jan./2009	TEST BY G.Qu
Test Type	CAU		
Mode of Loading	Extension		
Specimen Diameter, cm	5		
Specimen Height, cm	10		
Water Content (Before Consolidation)	17.2%		
Back Pressure, kPa	200		
Cell Pressure, kPa	550		
Effective Radial Consolidation Stress kPa	350		
Effective Axial Consolidation Stress, kPa	410		
Consolidation Duration, hrs	24		
Strain Rate	0.5%/hr - 0.005%/hr		
Notes:	1. The moisture content was based on trimmings from UWO-1 2. The sample failed by reaching a constant stress ratio. 3. The strain-rate was step changed during the test to measure the rate sensitivity.		

#### Moisture Content

Container No.		Before Test			After Test
		C2	C1	C3	Not Measured
WT. container + wet soil	(g)	23.19	30.55	36.96	
WT. container + dry soil	(g)	20.06	26.30	31.58	
WT. water	(g)	3.13	4.25	5.38	
WT. container	(g)	1.30	1.30	1.30	
WT. dry soil	(g)	18.76	25.00	30.28	
Moisture content	(%)	16.68	17.00	17.77	
Moisture content (avg.)	(%)	17.15			

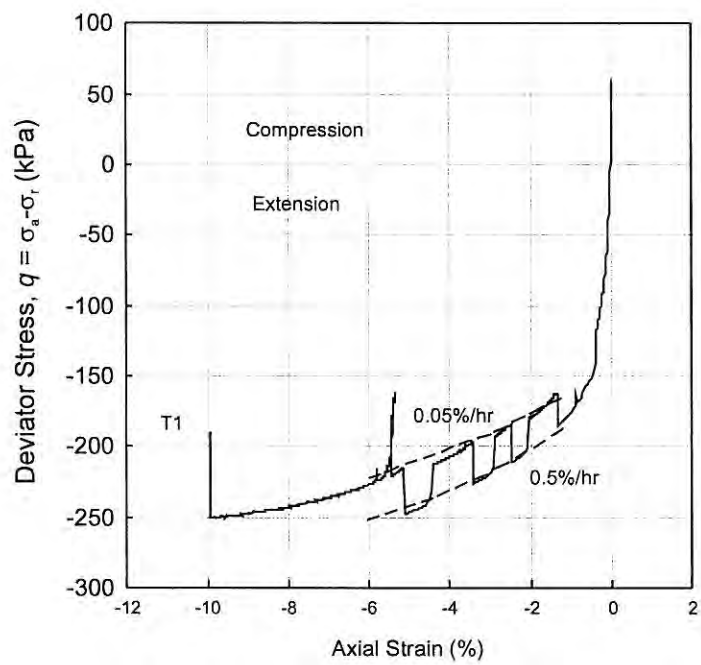


Fig. UWO-3a  
Deviator stress vs axial strain

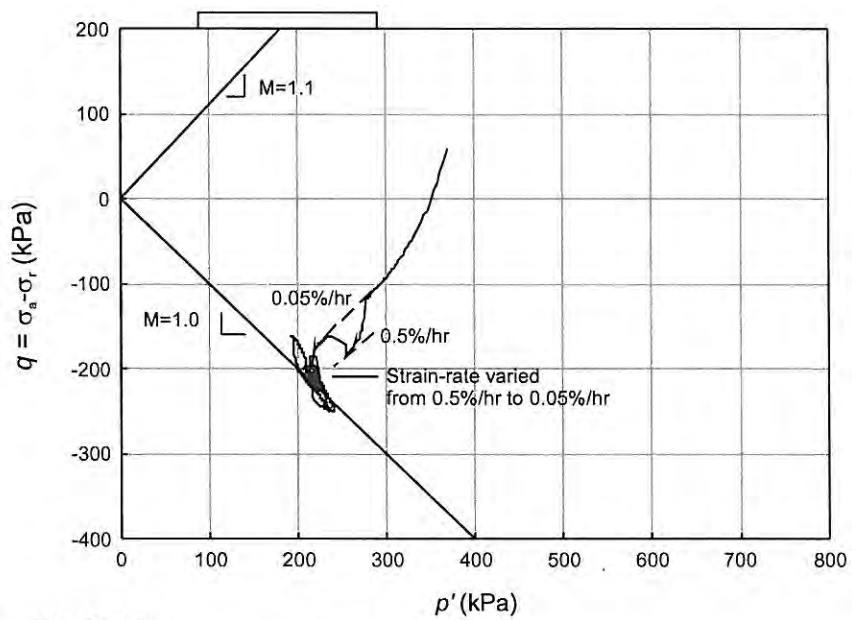


Fig. UWO-3b  
Stress path in p-q stress space

<b>GEOTECHNICAL RESEARCH CENTRE</b> <b>Triaxial Test</b>  <b>THE UNIVERSITY OF WESTERN ONTARIO</b>	MACHINE NO	GDS - 1		
	TEST NO.	UWO-4		
	LOCATION	Windsor		
	B.H. NO.	145	SA NO.	17
	DEPTH	52.5'-54.0'		
	DATE	02/Jan./2009	TEST BY	G.Qu
Test Type	CIU			
Mode of Loading	Compression			
Specimen Diameter, cm	5			
Specimen Height, cm	10			
Water Content (Before Consolidation)	17.2%			
Back Pressure, kPa	200			
Cell Pressure, kPa	800			
Effective Radial Consolidation Stress kPa	600			
Effective Axial Consolidation Stress, kPa	600			
Consolidation Duration, hrs	24			
Strain Rate	0.5%/hr - 0.05%/hr			
Notes:	1. The moisture content was based on trimmings from UWO-1 2. The sample failed by reaching a constant stress ratio. 3. The strain-rate was step changed during the test to measure the rate sensitivity.			

#### Moisture Content

		Before Test			After Test
		C2	C1	C3	Not Measured
Container No.					
WT. container + wet soil	(g)	23.19	30.55	36.96	
WT. container + dry soil	(g)	20.06	26.30	31.58	
WT. water	(g)	3.13	4.25	5.38	
WT. container	(g)	1.30	1.30	1.30	
WT. dry soil	(g)	18.76	25.00	30.28	
Moisture content	(%)	16.68	17.00	17.77	
Moisture content (avg.)	(%)	17.15			



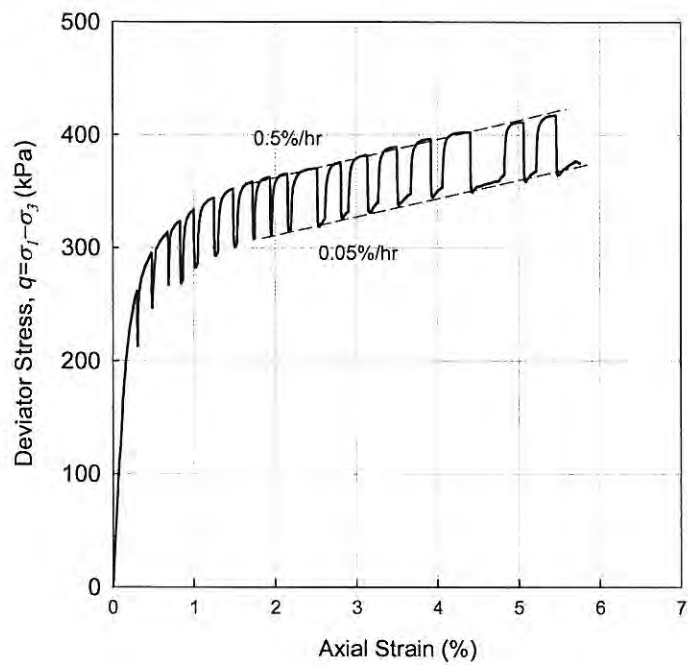


Fig. UWO-4a  
Deviator stress versus axial strain

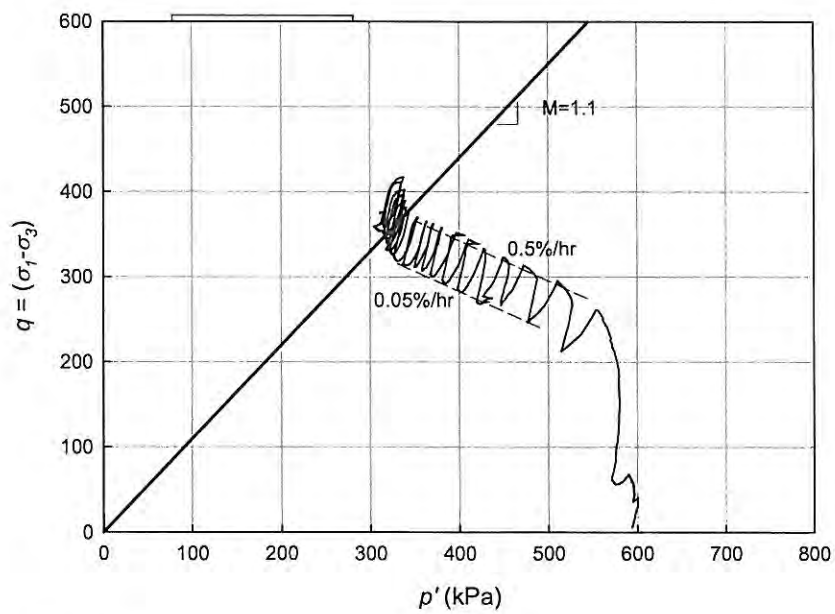
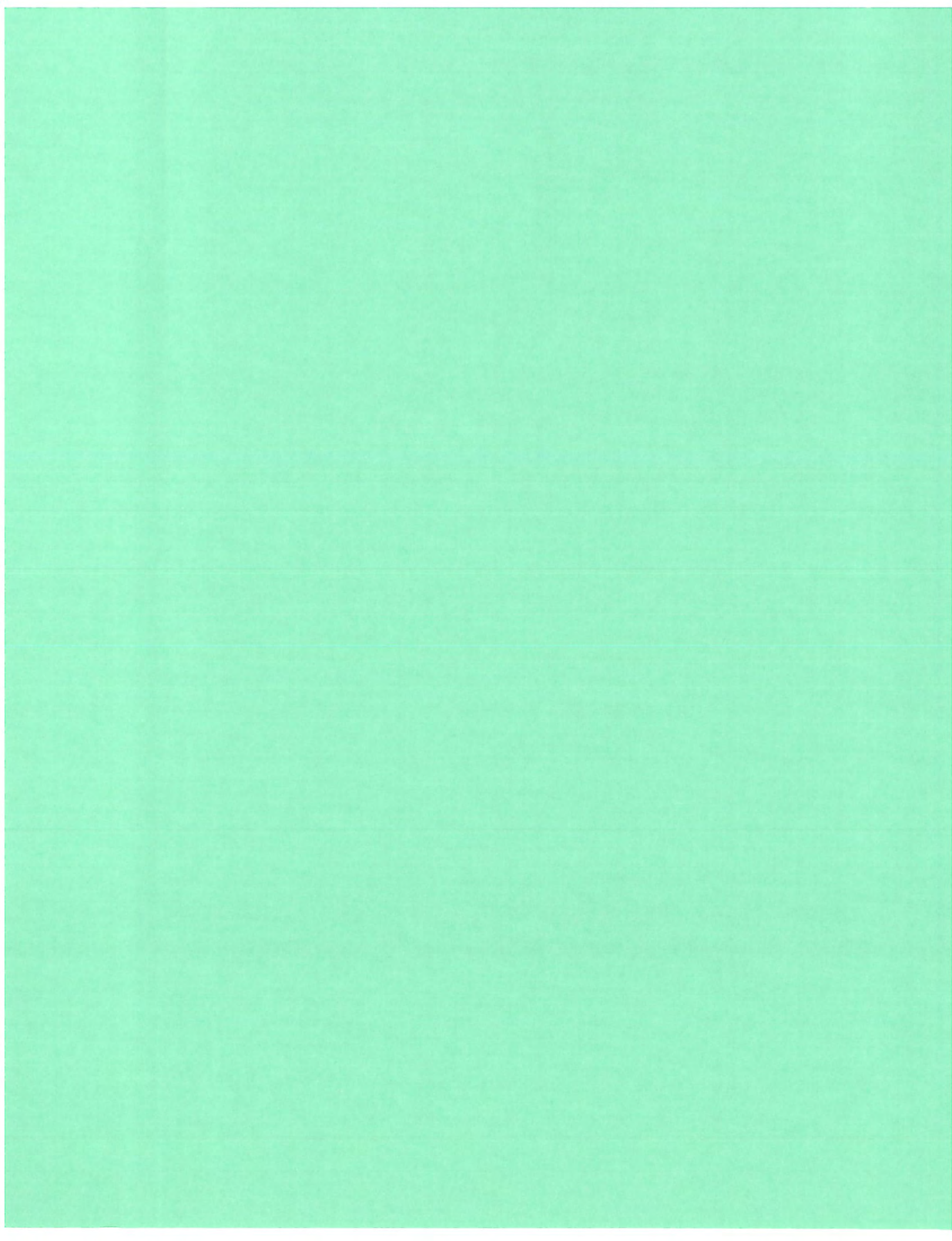


Fig. UWO-4b  
Stress path in  $p$ - $q$  stress space





# HYDRAULIC CONDUCTIVITY TEST

## ASTM D 5084 (CONSTANT HEAD)

### SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE	8
PROJECT TITLE	URS / Dric Approach GBR / Windsor	SAMPLE DEPTH, m	20.0-21.0
BOREHOLE NUMBER	105	DATE	05/14/2008

### SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)

SAMPLE HEIGHT, cm	8.29	UNIT WEIGHT, kN/m <sup>3</sup>	21.09
SAMPLE DIAMETER, cm	6.76	DRY UNIT WEIGHT, kN/m <sup>3</sup>	18.13
SAMPLE AREA, cm <sup>2</sup>	35.89	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	297.53	VOLUME OF SOLIDS, cm <sup>3</sup>	203.75
TOTAL MASS, g	639.80	VOLUME OF VOIDS, cm <sup>3</sup>	93.78
DRY MASS, g	550.13	VOID RATIO	0.46
WATER CONTENT, %	16.30		

### SATURATION STAGE

CELL PRESSURE, kPa	140	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	5
HEAD PRESSURE, kPa	135	DURATION, min	3,180
BACK PRESSURE, kPa	135	B COEFFICIENT	0.98

### CONSOLIDATION STAGE

CELL PRESSURE, kPa	165	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	30
HEAD PRESSURE, kPa	135	DURATION, min	2,400
BACK PRESSURE, kPa	135	VOLUME CHANGE, cm <sup>3</sup>	2.6
		DRAINAGE	Top and Bottom

### HYDRAULIC CONDUCTIVITY TEST

CELL PRESSURE, kPa	181	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	30
HEAD PRESSURE, kPa	151	DURATION, min	10020
BACK PRESSURE, kPa	135	HYDRAULIC GRADIENT, <i>i</i>	20

### SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)

SAMPLE HEIGHT, cm	8.27	UNIT WEIGHT, kN/m <sup>3</sup>	20.87
SAMPLE DIAMETER, cm	6.74	DRY UNIT WEIGHT, kN/m <sup>3</sup>	18.29
SAMPLE AREA, cm <sup>2</sup>	35.68	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	294.94	VOLUME OF SOLIDS, cm <sup>3</sup>	203.75
TOTAL MASS, g	627.80	VOLUME OF VOIDS, cm <sup>3</sup>	91.19
DRY MASS, g	550.13	VOID RATIO	0.45
WATER CONTENT, %	14.12		

### TEST RESULTS

ELAPSED TIME TO STEADY STATE FLOW (min)	3600
DURATION OF STEADY STATE FLOW (min)	6420
INFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	6.5
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	6.7
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)	2.36E-08
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)	2.45E-08
<b>HYDRAULIC CONDUCTIVITY, K, cm/s</b>	<b>2.40E-08</b>

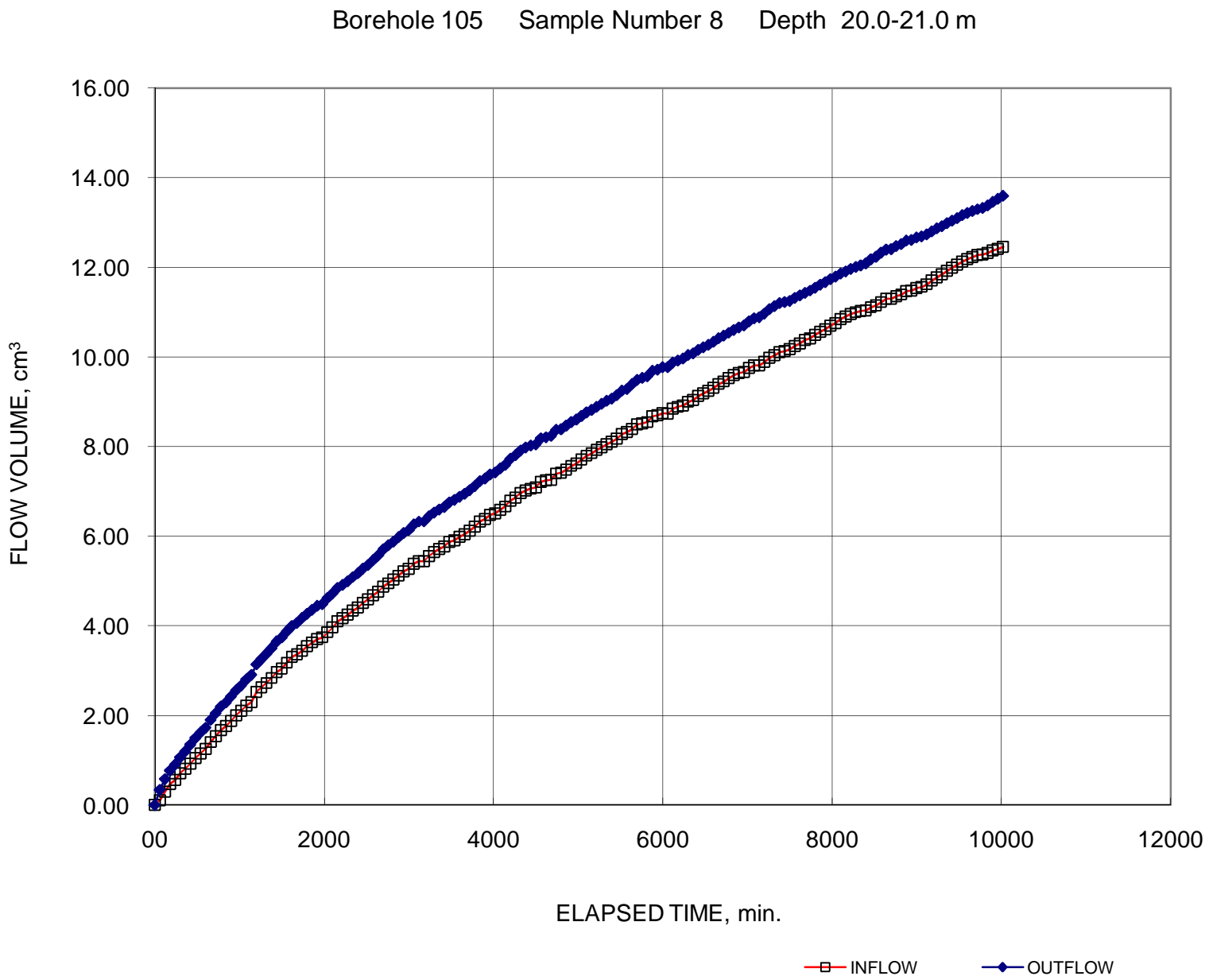
### NOTES:

MIXING FLUID

PERMEANT FLUID tap water

# HYDRAULIC CONDUCTIVITY TEST

FIGURE BH 105 SA 8 K



# HYDRAULIC CONDUCTIVITY TEST

## ASTM D 5084 (CONSTANT HEAD)

SAMPLE IDENTIFICATION			
PROJECT NUMBER	07-1130-2070	SAMPLE	11
PROJECT TITLE	URS / Dric Approach GBR / Windsor	SAMPLE DEPTH, m	10.7-11.3
BOREHOLE NUMBER	105	DATE	05/04/08

SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)			
SAMPLE HEIGHT, cm	7.48	UNIT WEIGHT, kN/m <sup>3</sup>	21.38
SAMPLE DIAMETER, cm	6.94	DRY UNIT WEIGHT, kN/m <sup>3</sup>	18.24
SAMPLE AREA, cm <sup>2</sup>	37.83	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	283.03	VOLUME OF SOLIDS, cm <sup>3</sup>	195.01
TOTAL MASS, g	617.10	VOLUME OF VOIDS, cm <sup>3</sup>	88.01
DRY MASS, g	526.54	VOID RATIO	0.45
WATER CONTENT, %	17.20		

SATURATION STAGE			
CELL PRESSURE, kPa	140	EFFECTIVE CONFINING STRESS, kPa	5
HEAD PRESSURE, kPa	135	DURATION, min	1,140
BACK PRESSURE, kPa	135	B COEFFICIENT	0.96

CONSOLIDATION STAGE			
CELL PRESSURE, kPa	180	EFFECTIVE CONFINING STRESS, kPa	45
HEAD PRESSURE, kPa	135	DURATION, min	1,260
BACK PRESSURE, kPa	135	VOLUME CHANGE, cm <sup>3</sup>	0.1
		DRAINAGE	Top and Bottom

HYDRAULIC CONDUCTIVITY TEST			
CELL PRESSURE, kPa	195	EFFECTIVE CONFINING STRESS, kPa	45
HEAD PRESSURE, kPa	150	DURATION, min	4320
BACK PRESSURE, kPa	135	HYDRAULIC GRADIENT, <i>i</i>	20

SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)			
SAMPLE HEIGHT, cm	7.48	UNIT WEIGHT, kN/m <sup>3</sup>	21.33
SAMPLE DIAMETER, cm	6.94	DRY UNIT WEIGHT, kN/m <sup>3</sup>	18.25
SAMPLE AREA, cm <sup>2</sup>	37.82	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	282.93	VOLUME OF SOLIDS, cm <sup>3</sup>	195.01
TOTAL MASS, g	615.30	VOLUME OF VOIDS, cm <sup>3</sup>	87.91
DRY MASS, g	526.54	VOID RATIO	0.45
WATER CONTENT, %	16.86		

TEST RESULTS	
ELAPSED TIME TO STEADY STATE FLOW (min)	3300
DURATION OF STEADY STATE FLOW (min)	1020
INFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	0.9
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	1.1
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)	1.90E-08
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)	2.47E-08
HYDRAULIC CONDUCTIVITY, K, cm/s	2.19E-08

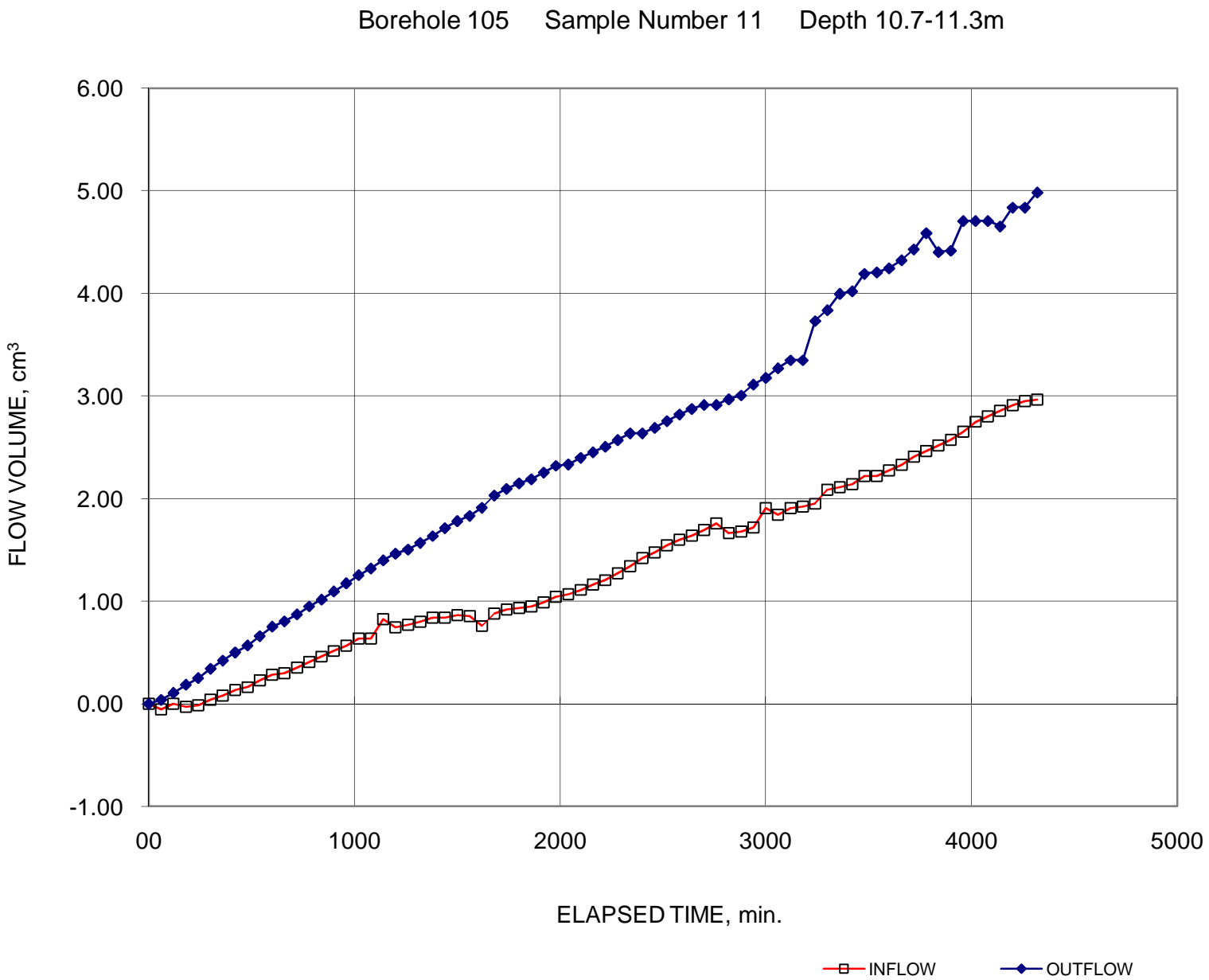
### NOTES:

MIXING FLUID

PERMEANT FLUID tap water

# HYDRAULIC CONDUCTIVITY TEST

FIGURE BH 105 SA 11 K



Project No. 07-1130-2070

Prepared By: AH

**Golder Associates**

Checked By: MM

# HYDRAULIC CONDUCTIVITY TEST

## ASTM D 5084 (CONSTANT HEAD)

SAMPLE IDENTIFICATION			
PROJECT NUMBER	07-1130-2070	SAMPLE	7
PROJECT TITLE	URS / Dric Approach GBR / Windsor	SAMPLE DEPTH, m	5.3
BOREHOLE NUMBER	112	DATE	03/15/2008

### SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)

SAMPLE HEIGHT, cm	8.75	UNIT WEIGHT, kN/m <sup>3</sup>	21.83
SAMPLE DIAMETER, cm	6.97	DRY UNIT WEIGHT, kN/m <sup>3</sup>	19.11
SAMPLE AREA, cm <sup>2</sup>	38.19	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	334.07	VOLUME OF SOLIDS, cm <sup>3</sup>	241.13
TOTAL MASS, g	743.50	VOLUME OF VOIDS, cm <sup>3</sup>	92.94
DRY MASS, g	651.05	VOID RATIO	0.39
WATER CONTENT, %	14.20		

### SATURATION STAGE

CELL PRESSURE, kPa	140	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	5
HEAD PRESSURE, kPa	135	DURATION, min	1,322
BACK PRESSURE, kPa	135	B COEFFICIENT	0.99

### CONSOLIDATION STAGE

CELL PRESSURE, kPa	170	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	35
HEAD PRESSURE, kPa	135	DURATION, min	4,080
BACK PRESSURE, kPa	135	VOLUME CHANGE, cm <sup>3</sup>	20.0
		DRAINAGE	Top and Bottom

### HYDRAULIC CONDUCTIVITY TEST

CELL PRESSURE, kPa	187	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	35
HEAD PRESSURE, kPa	152	DURATION, min	7260
BACK PRESSURE, kPa	135	HYDRAULIC GRADIENT, <i>i</i>	20

### SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)

SAMPLE HEIGHT, cm	8.57	UNIT WEIGHT, kN/m <sup>3</sup>	23.27
SAMPLE DIAMETER, cm	6.83	DRY UNIT WEIGHT, kN/m <sup>3</sup>	20.31
SAMPLE AREA, cm <sup>2</sup>	36.66	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	314.34	VOLUME OF SOLIDS, cm <sup>3</sup>	241.13
TOTAL MASS, g	746.00	VOLUME OF VOIDS, cm <sup>3</sup>	73.21
DRY MASS, g	651.05	VOID RATIO	0.30
WATER CONTENT, %	14.58		

### TEST RESULTS

ELAPSED TIME TO STEADY STATE FLOW (min)	00
DURATION OF STEADY STATE FLOW (min)	7260
INFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	2.4
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	3.2
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)	7.59E-09
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)	1.01E-08
HYDRAULIC CONDUCTIVITY, K, cm/s	8.86E-09

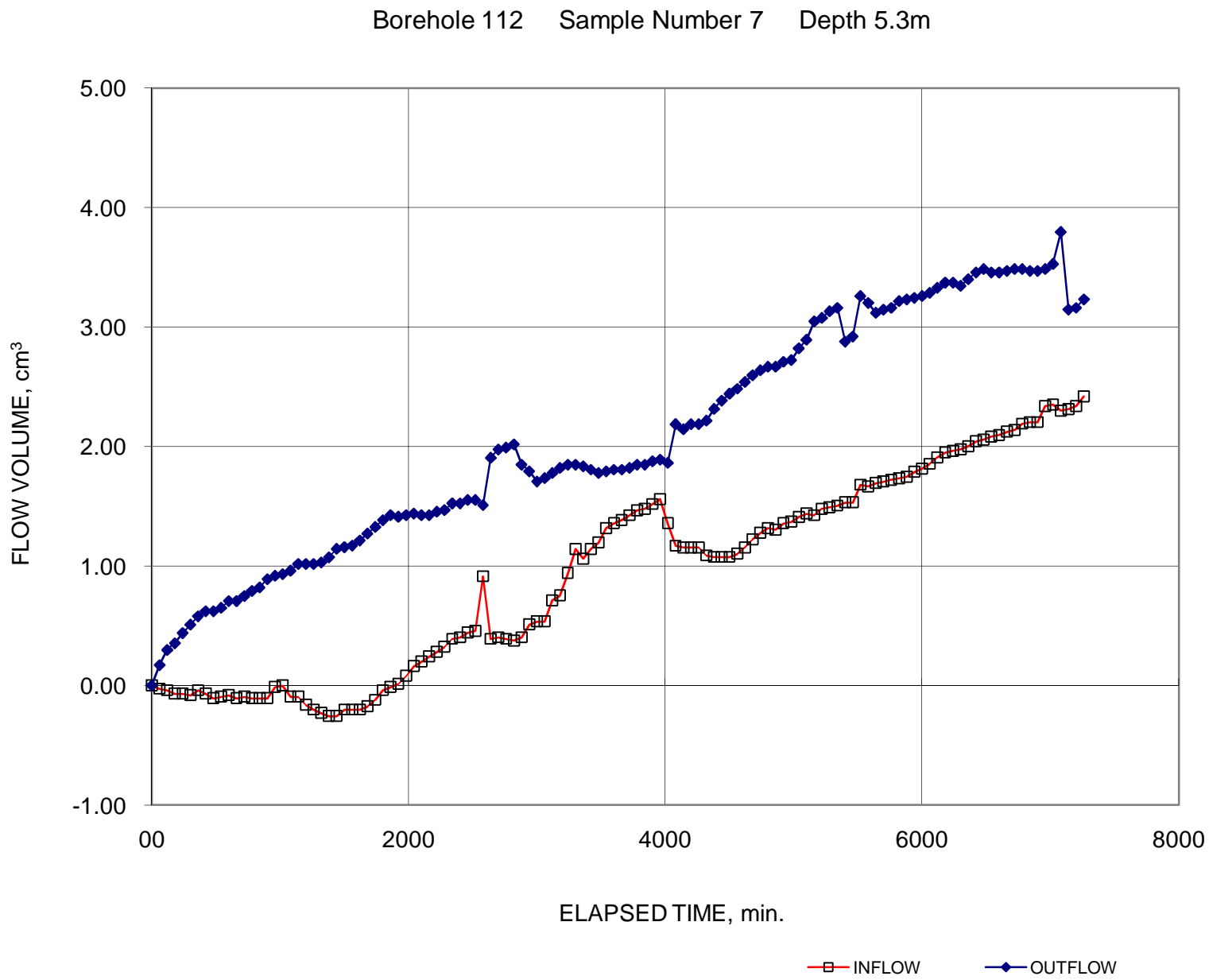
#### NOTES:

MIXING FLUID

PERMEANT FLUID tap water

# HYDRAULIC CONDUCTIVITY TEST

FIGURE BH 112 SA 7 K





# HYDRAULIC CONDUCTIVITY TEST

## ASTM D 5084 (CONSTANT HEAD)

SAMPLE IDENTIFICATION			
PROJECT NUMBER	07-1130-2070	SAMPLE	20
PROJECT TITLE	URS / Dric Approach GBR / Windsor	SAMPLE DEPTH, m	30.8
BOREHOLE NUMBER	112	DATE	03/20/2008

### SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)

SAMPLE HEIGHT, cm	7.75	UNIT WEIGHT, kN/m <sup>3</sup>	21.92
SAMPLE DIAMETER, cm	6.79	DRY UNIT WEIGHT, kN/m <sup>3</sup>	18.06
SAMPLE AREA, cm <sup>2</sup>	36.21	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	280.63	VOLUME OF SOLIDS, cm <sup>3</sup>	191.41
TOTAL MASS, g	627.40	VOLUME OF VOIDS, cm <sup>3</sup>	89.22
DRY MASS, g	516.80	VOID RATIO	0.47
WATER CONTENT, %	21.40		

### SATURATION STAGE

CELL PRESSURE, kPa	350	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	5
HEAD PRESSURE, kPa	345	DURATION, min	3,900
BACK PRESSURE, kPa	345	B COEFFICIENT	0.96

### CONSOLIDATION STAGE

CELL PRESSURE, kPa	450	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	105
HEAD PRESSURE, kPa	345	DURATION, min	4,080
BACK PRESSURE, kPa	345	VOLUME CHANGE, cm <sup>3</sup>	10.1
		DRAINAGE	Top and Bottom

### HYDRAULIC CONDUCTIVITY TEST

CELL PRESSURE, kPa	465	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	105
HEAD PRESSURE, kPa	360	DURATION, min	6300
BACK PRESSURE, kPa	345	HYDRAULIC GRADIENT, <i>i</i>	20

### SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)

SAMPLE HEIGHT, cm	7.66	UNIT WEIGHT, kN/m <sup>3</sup>	22.67
SAMPLE DIAMETER, cm	6.71	DRY UNIT WEIGHT, kN/m <sup>3</sup>	18.73
SAMPLE AREA, cm <sup>2</sup>	35.34	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	270.57	VOLUME OF SOLIDS, cm <sup>3</sup>	191.41
TOTAL MASS, g	625.60	VOLUME OF VOIDS, cm <sup>3</sup>	79.16
DRY MASS, g	516.80	VOID RATIO	0.41
WATER CONTENT, %	21.05		

### TEST RESULTS

ELAPSED TIME TO STEADY STATE FLOW (min)	1680
DURATION OF STEADY STATE FLOW (min)	4620
INFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	13.5
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	12.4
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)	6.90E-08
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)	6.35E-08
<b>HYDRAULIC CONDUCTIVITY, K, cm/s</b>	<b>6.62E-08</b>

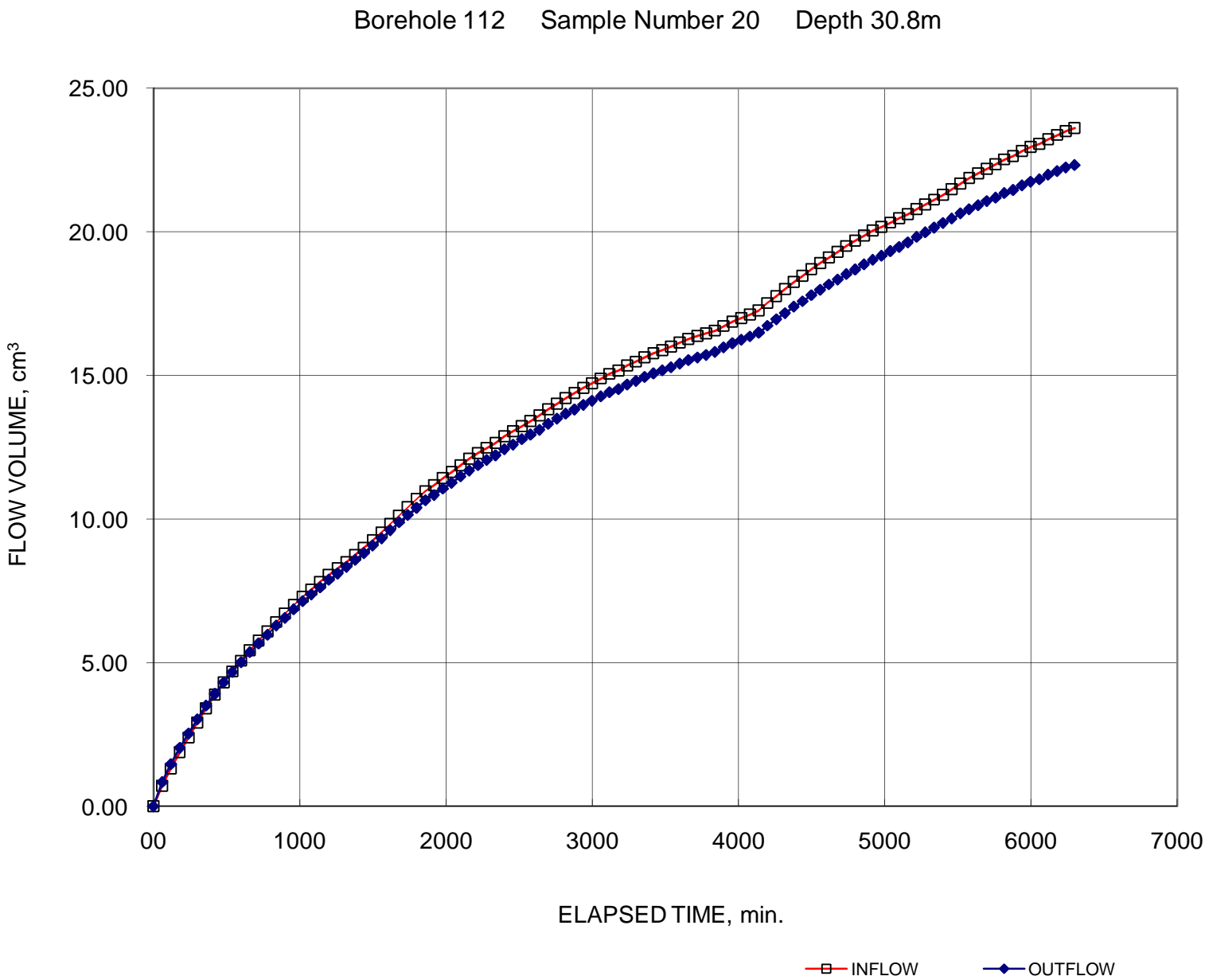
#### NOTES:

MIXING FLUID

PERMEANT FLUID tap water

# HYDRAULIC CONDUCTIVITY TEST

FIGURE BH 112 SA 20 K



# HYDRAULIC CONDUCTIVITY TEST

## ASTM D 5084 (CONSTANT HEAD)

### SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE	9
PROJECT TITLE	URS / Dric Approach GBR / Windsor	SAMPLE DEPTH, m	7.9
BOREHOLE NUMBER	119	DATE	03/15/2008

### SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)

SAMPLE HEIGHT, cm	8.44	UNIT WEIGHT, kN/m <sup>3</sup>	21.07
SAMPLE DIAMETER, cm	6.94	DRY UNIT WEIGHT, kN/m <sup>3</sup>	17.78
SAMPLE AREA, cm <sup>2</sup>	37.83	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	319.11	VOLUME OF SOLIDS, cm <sup>3</sup>	214.28
TOTAL MASS, g	685.60	VOLUME OF VOIDS, cm <sup>3</sup>	104.83
DRY MASS, g	578.57	VOID RATIO	0.49
WATER CONTENT, %	18.50		

### SATURATION STAGE

CELL PRESSURE, kPa	140	EFFECTIVE CONFINING STRESS, kPa	5
HEAD PRESSURE, kPa	135	DURATION, min	2,580
BACK PRESSURE, kPa	135	B COEFFICIENT	0.99

### CONSOLIDATION STAGE

CELL PRESSURE, kPa	175	EFFECTIVE CONFINING STRESS, kPa	40
HEAD PRESSURE, kPa	135	DURATION, min	4,320
BACK PRESSURE, kPa	135	VOLUME CHANGE, cm <sup>3</sup>	7.9
		DRAINAGE	Top and Bottom

### HYDRAULIC CONDUCTIVITY TEST

CELL PRESSURE, kPa	191	EFFECTIVE CONFINING STRESS, kPa	40
HEAD PRESSURE, kPa	151	DURATION, min	7260
BACK PRESSURE, kPa	135	HYDRAULIC GRADIENT, <i>i</i>	20

### SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)

SAMPLE HEIGHT, cm	8.37	UNIT WEIGHT, kN/m <sup>3</sup>	21.56
SAMPLE DIAMETER, cm	6.88	DRY UNIT WEIGHT, kN/m <sup>3</sup>	18.23
SAMPLE AREA, cm <sup>2</sup>	37.20	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	311.26	VOLUME OF SOLIDS, cm <sup>3</sup>	214.28
TOTAL MASS, g	684.40	VOLUME OF VOIDS, cm <sup>3</sup>	96.97
DRY MASS, g	578.57	VOID RATIO	0.45
WATER CONTENT, %	18.29		

### TEST RESULTS

ELAPSED TIME TO STEADY STATE FLOW (min)	4320
DURATION OF STEADY STATE FLOW (min)	2940
INFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	2.1
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	2.4
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)	1.60E-08
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)	1.82E-08
HYDRAULIC CONDUCTIVITY, K, cm/s	1.71E-08

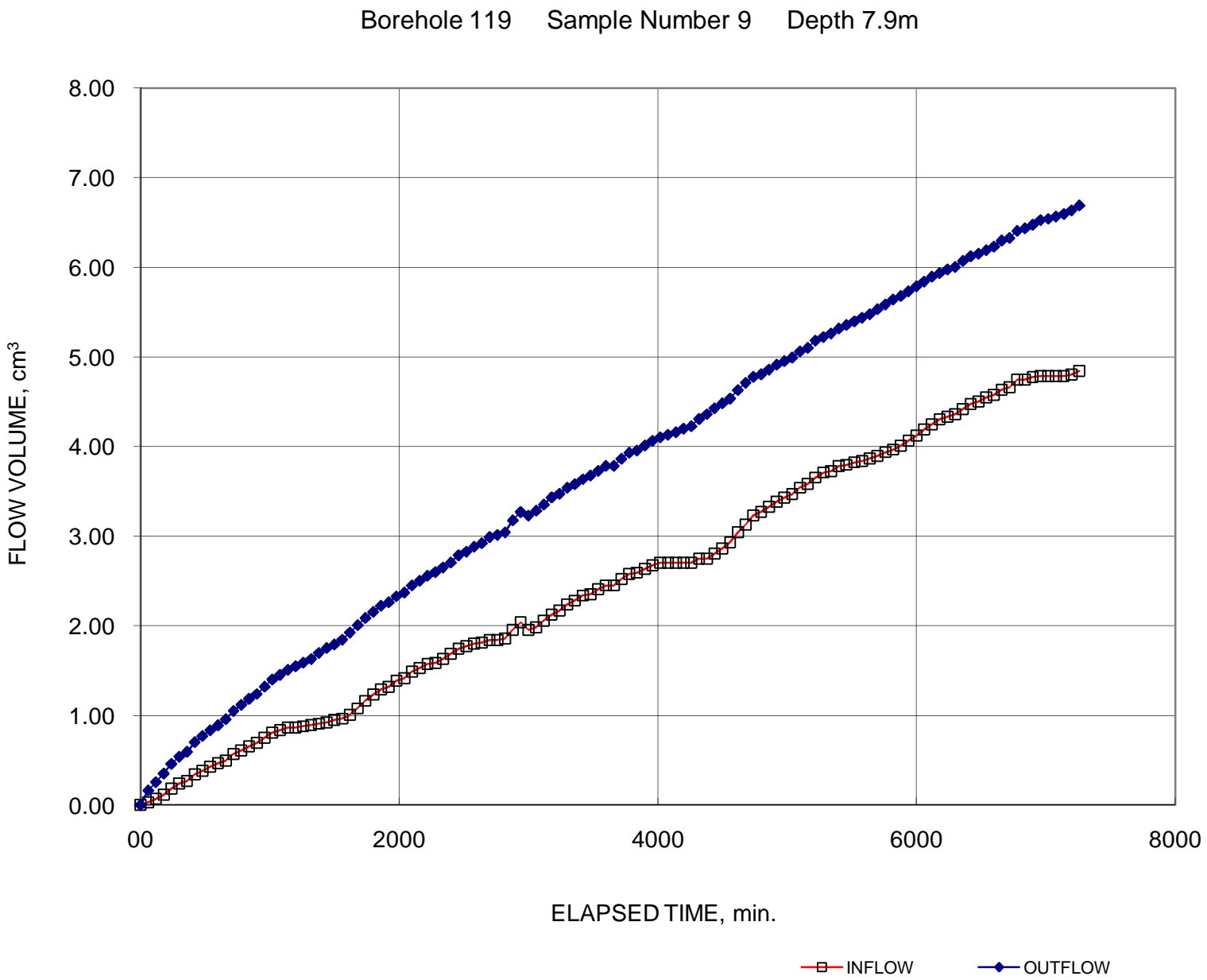
### NOTES:

MIXING FLUID

PERMEANT FLUID tap water

# HYDRAULIC CONDUCTIVITY TEST

FIGURE BH 119 SA 9 K



# HYDRAULIC CONDUCTIVITY TEST

## ASTM D 5084 (CONSTANT HEAD)

### SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE	24
PROJECT TITLE	URS / Dric Approach GBR / Windsor	SAMPLE DEPTH, m	30.8
BOREHOLE NUMBER	119	DATE	03/05/2008

### SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)

SAMPLE HEIGHT, cm	8.32	UNIT WEIGHT, kN/m <sup>3</sup>	18.64
SAMPLE DIAMETER, cm	6.92	DRY UNIT WEIGHT, kN/m <sup>3</sup>	13.89
SAMPLE AREA, cm <sup>2</sup>	37.61	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	312.91	VOLUME OF SOLIDS, cm <sup>3</sup>	164.16
TOTAL MASS, g	594.80	VOLUME OF VOIDS, cm <sup>3</sup>	148.76
DRY MASS, g	443.22	VOID RATIO	0.91
WATER CONTENT, %	34.20		

### SATURATION STAGE

CELL PRESSURE, kPa	350	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	5
HEAD PRESSURE, kPa	345	DURATION, min	5,760
BACK PRESSURE, kPa	345	B COEFFICIENT	0.96

### CONSOLIDATION STAGE

CELL PRESSURE, kPa	460	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	115
HEAD PRESSURE, kPa	345	DURATION, min	2,520
BACK PRESSURE, kPa	345	VOLUME CHANGE, cm <sup>3</sup>	21.6
		DRAINAGE	Top and Bottom

### HYDRAULIC CONDUCTIVITY TEST

CELL PRESSURE, kPa	476	EFFECTIVE CONFINING STRESS, kPa <sub>e</sub>	115
HEAD PRESSURE, kPa	361	DURATION, min	4314
BACK PRESSURE, kPa	345	HYDRAULIC GRADIENT, <i>i</i>	20

### SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)

SAMPLE HEIGHT, cm	8.13	UNIT WEIGHT, kN/m <sup>3</sup>	20.11
SAMPLE DIAMETER, cm	6.76	DRY UNIT WEIGHT, kN/m <sup>3</sup>	14.90
SAMPLE AREA, cm <sup>2</sup>	35.88	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	291.65	VOLUME OF SOLIDS, cm <sup>3</sup>	164.16
TOTAL MASS, g	598.20	VOLUME OF VOIDS, cm <sup>3</sup>	127.49
DRY MASS, g	443.22	VOID RATIO	0.78
WATER CONTENT, %	34.97		

### TEST RESULTS

ELAPSED TIME TO STEADY STATE FLOW (min)	00
DURATION OF STEADY STATE FLOW (min)	4314
INFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	2.9
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	2.8
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)	1.54E-08
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)	1.51E-08
HYDRAULIC CONDUCTIVITY, K, cm/s	1.53E-08

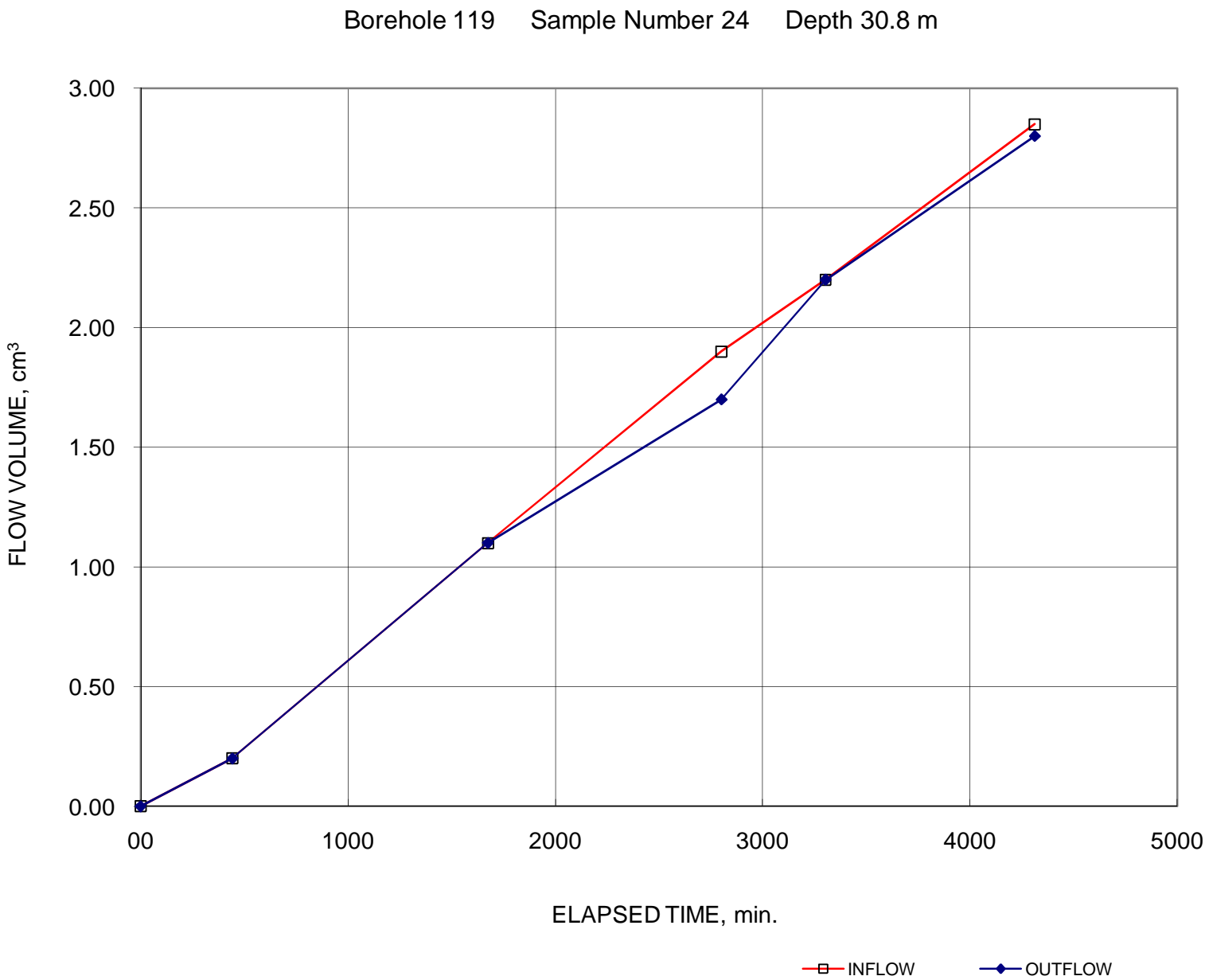
### NOTES:

MIXING FLUID

PERMEANT FLUID tap water

# HYDRAULIC CONDUCTIVITY TEST

FIGURE BH 119 SA 24 K



# HYDRAULIC CONDUCTIVITY TEST

## ASTM D 5084 (CONSTANT HEAD)

### SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE	6
PROJECT TITLE	URS / Dric Approach GBR / Windsor	SAMPLE DEPTH, m	5.2
BOREHOLE NUMBER	122	DATE	02/20/2008

### SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)

SAMPLE HEIGHT, cm	7.66	UNIT WEIGHT, kN/m <sup>3</sup>	21.30
SAMPLE DIAMETER, cm	7.05	DRY UNIT WEIGHT, kN/m <sup>3</sup>	17.95
SAMPLE AREA, cm <sup>2</sup>	39.06	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	299.07	VOLUME OF SOLIDS, cm <sup>3</sup>	202.74
TOTAL MASS, g	649.70	VOLUME OF VOIDS, cm <sup>3</sup>	96.33
DRY MASS, g	547.39	VOID RATIO	0.48
WATER CONTENT, %	18.69		

### SATURATION STAGE

CELL PRESSURE, kPa	210	EFFECTIVE CONFINING STRESS, kPa	5
HEAD PRESSURE, kPa	205	DURATION, min	1,380
BACK PRESSURE, kPa	205	B COEFFICIENT	0.96

### CONSOLIDATION STAGE

CELL PRESSURE, kPa	235	EFFECTIVE CONFINING STRESS, kPa	30
HEAD PRESSURE, kPa	205	DURATION, min	960
BACK PRESSURE, kPa	205	VOLUME CHANGE, cm <sup>3</sup>	2.3
		DRAINAGE	Top and Bottom

### HYDRAULIC CONDUCTIVITY TEST

CELL PRESSURE, kPa	250	EFFECTIVE CONFINING STRESS, kPa	30
HEAD PRESSURE, kPa	220	DURATION, min	12540
BACK PRESSURE, kPa	205	HYDRAULIC GRADIENT, <i>i</i>	20

### SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)

SAMPLE HEIGHT, cm	7.64	UNIT WEIGHT, kN/m <sup>3</sup>	21.63
SAMPLE DIAMETER, cm	7.03	DRY UNIT WEIGHT, kN/m <sup>3</sup>	18.09
SAMPLE AREA, cm <sup>2</sup>	38.86	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	296.76	VOLUME OF SOLIDS, cm <sup>3</sup>	202.74
TOTAL MASS, g	654.40	VOLUME OF VOIDS, cm <sup>3</sup>	94.02
DRY MASS, g	547.39	VOID RATIO	0.46
WATER CONTENT, %	19.55		

### TEST RESULTS

ELAPSED TIME TO STEADY STATE FLOW (min)	8640
DURATION OF STEADY STATE FLOW (min)	3900
INFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	1.8
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	1.4
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)	1.00E-08
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)	7.76E-09
HYDRAULIC CONDUCTIVITY, K, cm/s	8.90E-09

### NOTES:

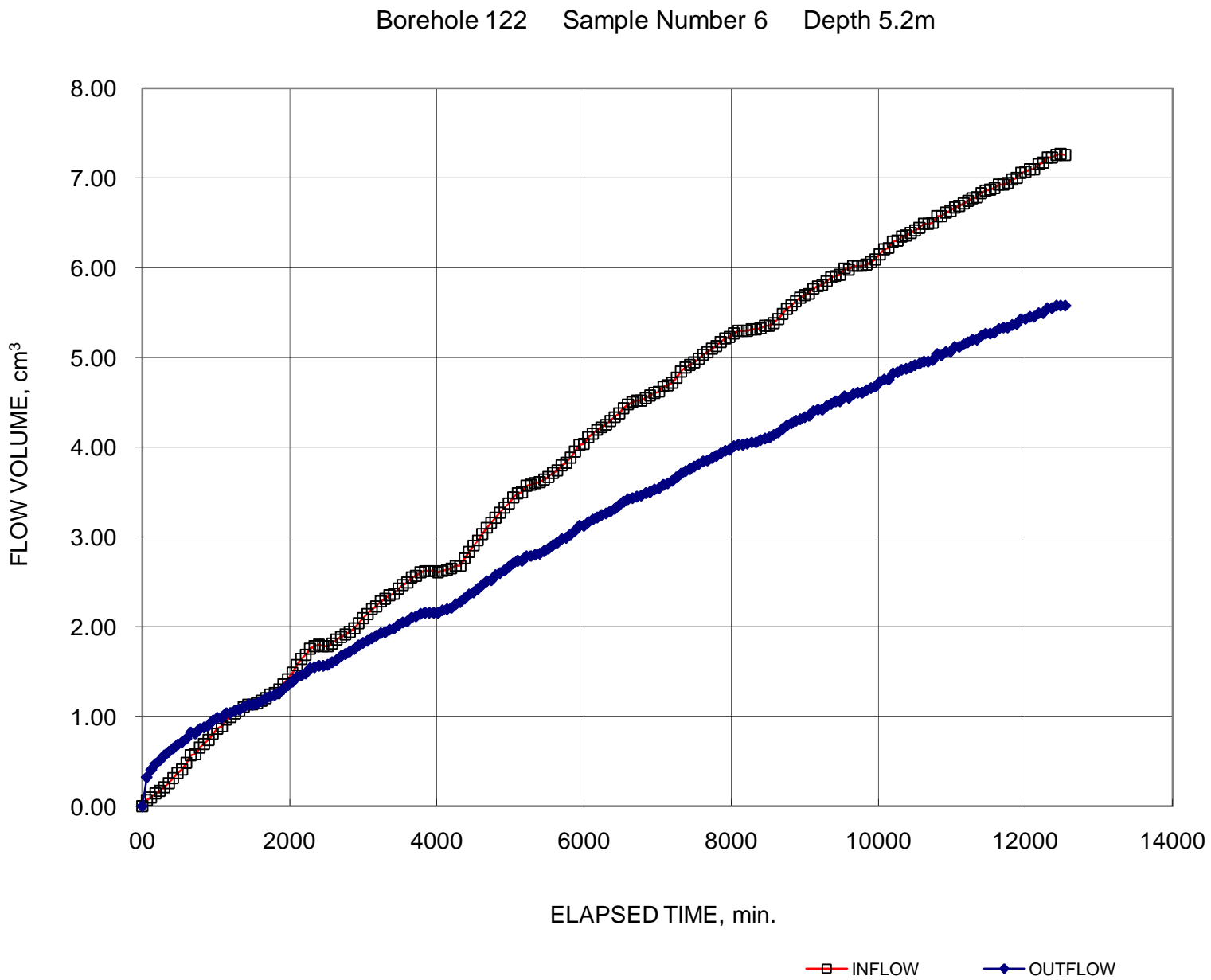
MIXING FLUID

PERMEANT FLUID tap water



# HYDRAULIC CONDUCTIVITY TEST

FIGURE BH 122 SA 6 K



# HYDRAULIC CONDUCTIVITY TEST

## ASTM D 5084 (CONSTANT HEAD)

SAMPLE IDENTIFICATION			
PROJECT NUMBER	07-1130-2070	SAMPLE	22
PROJECT TITLE	URS / Dric Approach GBR / Windsor	SAMPLE DEPTH, m	29.3
BOREHOLE NUMBER	122	DATE	02/20/2008

SPECIMEN PROPERTIES AND DIMENSIONS (INITIAL)			
SAMPLE HEIGHT, cm	7.63	UNIT WEIGHT, kN/m <sup>3</sup>	20.69
SAMPLE DIAMETER, cm	7.02	DRY UNIT WEIGHT, kN/m <sup>3</sup>	17.67
SAMPLE AREA, cm <sup>2</sup>	38.75	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	295.54	VOLUME OF SOLIDS, cm <sup>3</sup>	197.22
TOTAL MASS, g	623.60	VOLUME OF VOIDS, cm <sup>3</sup>	98.32
DRY MASS, g	532.49	VOID RATIO	0.50
WATER CONTENT, %	17.11		

SATURATION STAGE			
CELL PRESSURE, kPa	420	EFFECTIVE CONFINING STRESS, kPa	5
HEAD PRESSURE, kPa	415	DURATION, min	2,940
BACK PRESSURE, kPa	415	B COEFFICIENT	0.96

CONSOLIDATION STAGE			
CELL PRESSURE, kPa	525	EFFECTIVE CONFINING STRESS, kPa	110
HEAD PRESSURE, kPa	415	DURATION, min	2,640
BACK PRESSURE, kPa	415	VOLUME CHANGE, cm <sup>3</sup>	4.2
		DRAINAGE	Top and Bottom

HYDRAULIC CONDUCTIVITY TEST			
CELL PRESSURE, kPa	540	EFFECTIVE CONFINING STRESS, kPa	110
HEAD PRESSURE, kPa	430	DURATION, min	9000
BACK PRESSURE, kPa	415	HYDRAULIC GRADIENT, <i>i</i>	20

SPECIMEN PROPERTIES AND DIMENSIONS (FINAL)			
SAMPLE HEIGHT, cm	7.59	UNIT WEIGHT, kN/m <sup>3</sup>	21.03
SAMPLE DIAMETER, cm	6.99	DRY UNIT WEIGHT, kN/m <sup>3</sup>	17.92
SAMPLE AREA, cm <sup>2</sup>	38.38	SPECIFIC GRAVITY, assumed	2.70
SAMPLE VOLUME, cm <sup>3</sup>	291.33	VOLUME OF SOLIDS, cm <sup>3</sup>	197.22
TOTAL MASS, g	624.60	VOLUME OF VOIDS, cm <sup>3</sup>	94.11
DRY MASS, g	532.49	VOID RATIO	0.48
WATER CONTENT, %	17.30		

TEST RESULTS	
ELAPSED TIME TO STEADY STATE FLOW (min)	00
DURATION OF STEADY STATE FLOW (min)	9000
INFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	88.3
OUTFLOW VOLUME UNDER STEADY STATE FLOW (cm <sup>3</sup> )	83.6
HYDRAULIC CONDUCTIVITY (INFLOW) (cm/s)	2.13E-07
HYDRAULIC CONDUCTIVITY (OUTFLOW) (cm/s)	2.01E-07
HYDRAULIC CONDUCTIVITY, <i>K</i> , cm/s	2.07E-07

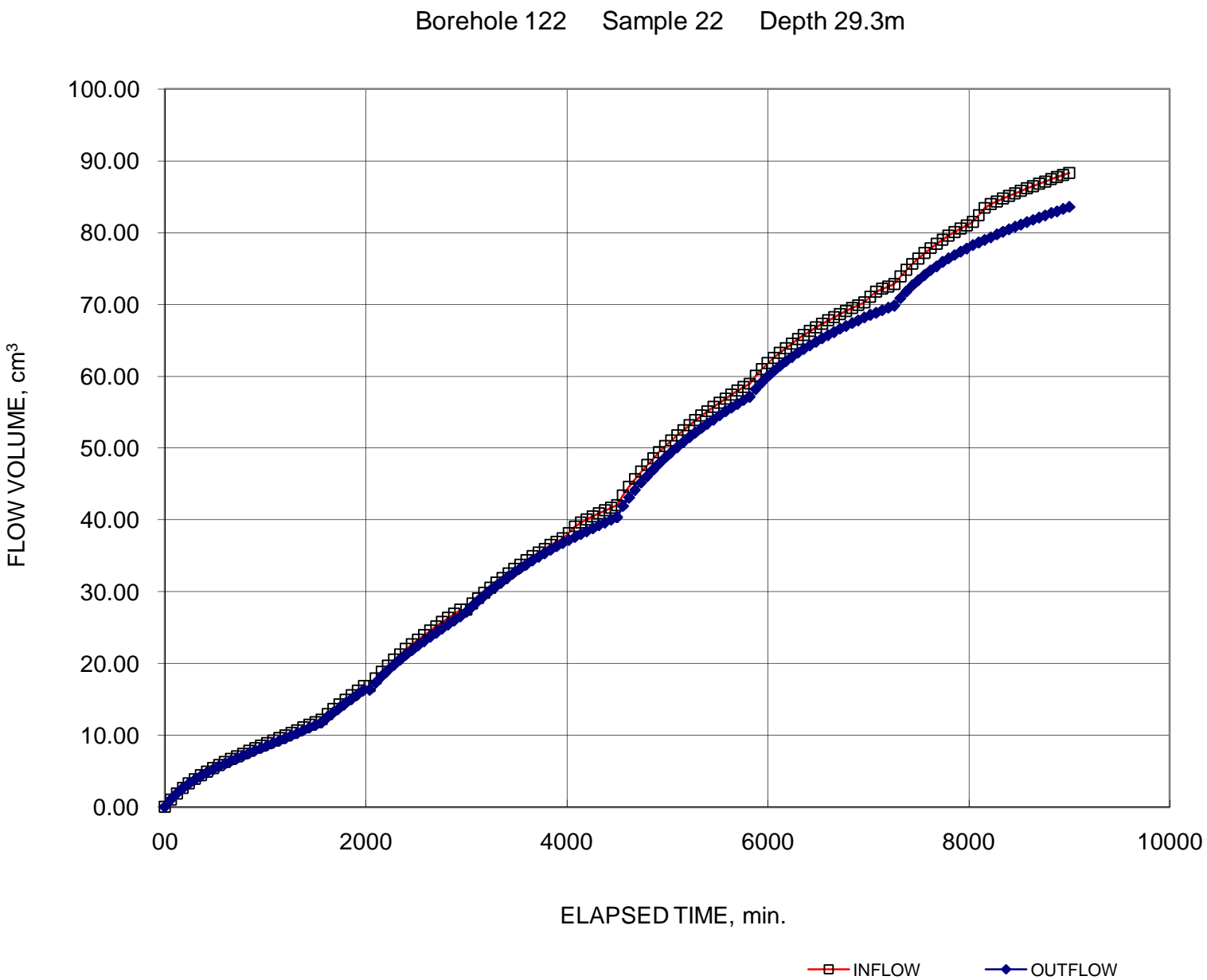
### NOTES:

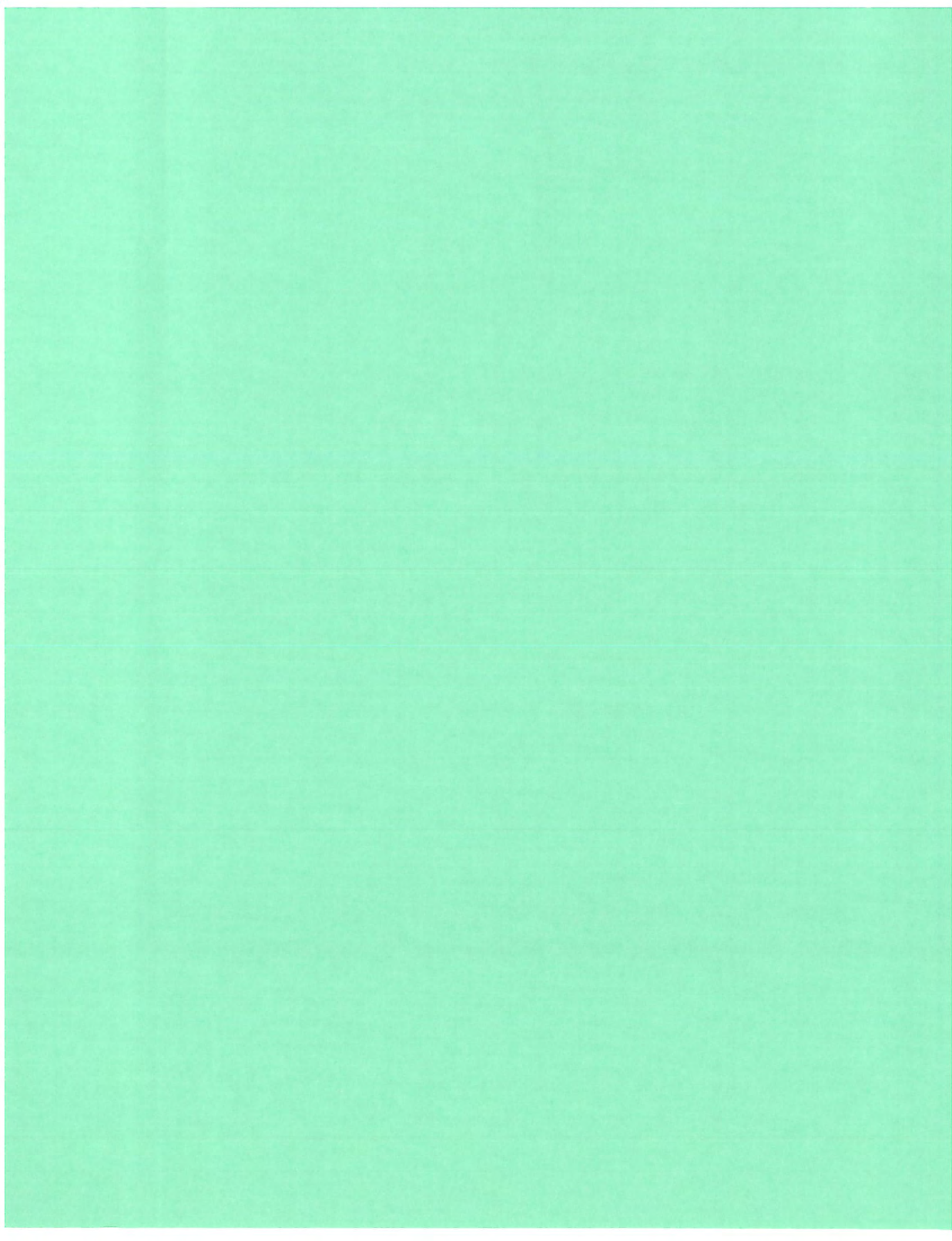
MIXING FLUID

PERMEANT FLUID tap water

# HYDRAULIC CONDUCTIVITY TEST

FIGURE BH 122 SA 22 K





## CARBONATE TEST DETERMINATION

Borehole Number	7	7	7	
Sample Number	7	11	20	
Depth, m	8.5-8.9	14.6-15.0	25.9-26.5	
<b>TEST DATA ENTRY</b>				
Sample Weight, g (A)	1.70	1.73	1.73	
First Reading, ml (B)	48.00	39.00	50.20	
Second Reading, ml (C)	109.00	102.00	117.00	
Room Temperature, °C (D)	23.40	24.00	24.20	
Flask Temperature, °C (E)	24.90	25.20	25.20	
Barometer, kPa (F)	101.07	101.07	101.07	
Flask Temp. / Barometer Correction (G)	1.02608	1.02608	1.02608	
<b>TEST CALCULATIONS</b>				
CORRECTED READINGS				
First Reading, BxG	49.25	40.02	51.51	
Second Reading, CxG	111.84	104.66	120.05	
Dolomite, CxG-BxG (E)	62.59	64.64	68.54	
Calcite, (BxG)-0.04((CxG)-(BxG)) (F)	46.75	37.43	48.77	
<b>CARBONATE PERCENTAGES FROM TABLES</b>				
Dolomite, % (H)	14.40	14.90	15.80	
Calcite, % (I)	10.90	8.60	11.30	
Total, % (H+I)	25.30	23.50	27.10	
Ratio (I/H)	0.76	0.58	0.72	
<b>PROJECT INFORMATION</b>				
Project Number	04-1111-060	Tested By	Angela	
Date of Testing	1/18/2007	Entered By	LG	
Remarks	Checked By		SB	

**Golder Associates**



## CARBONATE TEST DETERMINATION

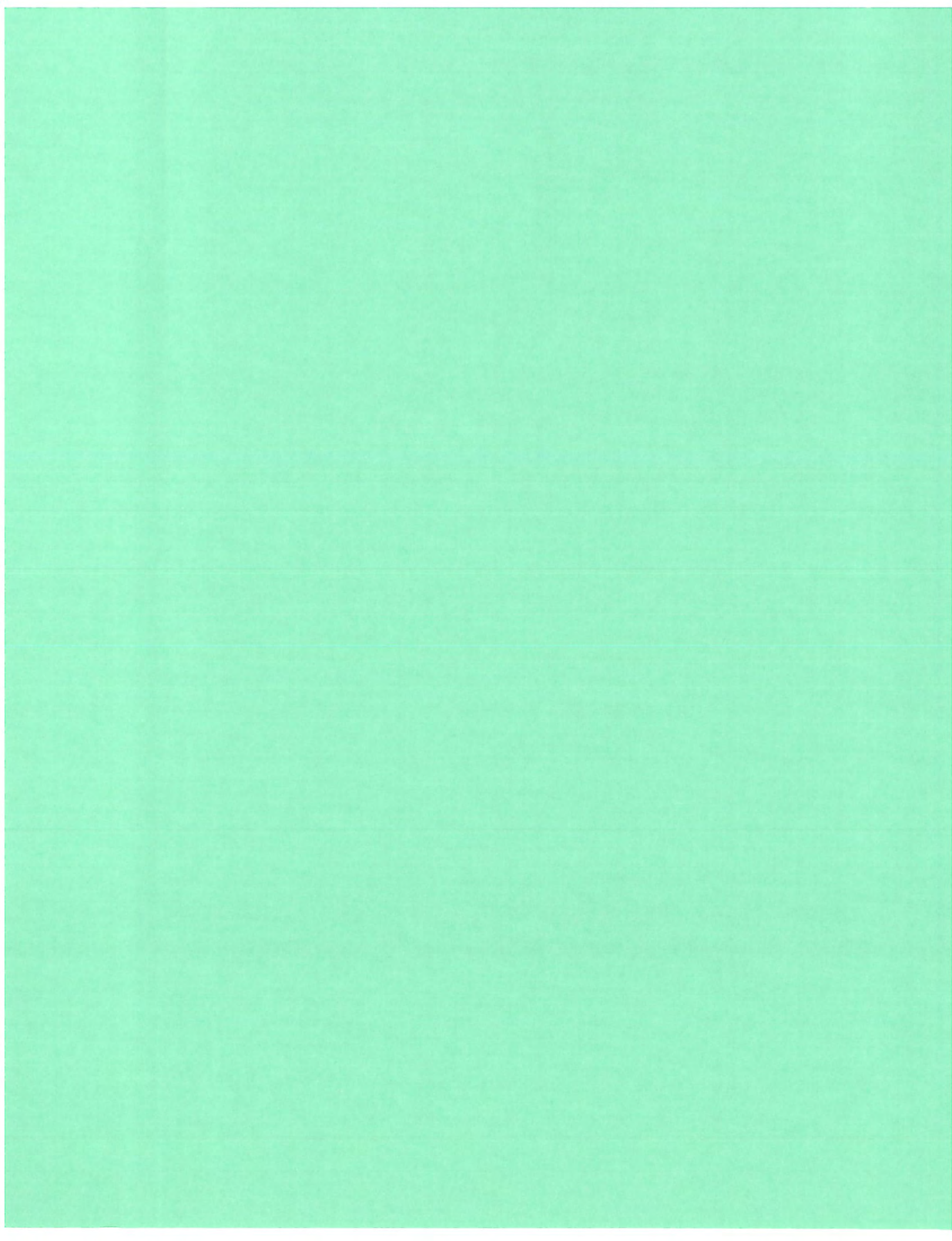
Borehole Number	14	14	14	
Sample Number	9	11	16	
Depth, m	10.1-10.5	13.1-13.6	18.6-19.2	
<b>TEST DATA ENTRY</b>				
Sample Weight, g (A)	1.71	1.72	1.70	
First Reading, ml (B)	49.00	50.40	59.00	
Second Reading, ml (C)	101.00	100.00	137.00	
Room Temperature, °C (D)	23.60	24.30	23.30	
Flask Temperature, °C (E)	25.20	25.00	25.00	
Barometer, kPa (F)	101.07	101.07	101.07	
Flask Temp. / Barometer Correction (G)	1.02608	1.02608	1.02608	
<b>TEST CALCULATIONS</b>				
<b>CORRECTED READINGS</b>				
First Reading, BxG	50.28	51.71	60.54	
Second Reading, CxG	103.63	102.61	140.57	
Dolomite, CxG-BxG (E)	53.36	50.89	80.03	
Calcite, (BxG)-0.04((CxG)-(BxG)) (F)	48.14	49.68	57.34	
<b>CARBONATE PERCENTAGES FROM TABLES</b>				
Dolomite, % (H)	12.30	11.80	18.30	
Calcite, % (I)	11.20	11.50	13.30	
Total, % (H+I)	23.50	23.30	31.60	
Ratio (I/H)	0.91	0.97	0.73	
Project Number	04-1111-060	Tested By		Angela
Date of Testing	1/18/2007	Entered By		LG
Remarks	Checked By		SJB	

## CARBONATE TEST DETERMINATION

Borehole Number	23	23	23	23 (repeat)
Sample Number	7	13	15	15
Depth, m	8.5-9.0	16.8-17.2	19.2-19.7	19.2-19.7
<b>TEST DATA ENTRY</b>				
Sample Weight, g (A)	1.71	1.72	1.71	1.74
First Reading, ml (B)	39.00	50.00	44.50	50.00
Second Reading, ml (C)	84.00	115.00	104.00	106.00
Room Temperature, °C (D)	22.80	24.10	22.80	23.00
Flask Temperature, °C (E)	25.20	25.10	24.80	24.80
Barometer, kPa (F)	101.07	101.07	101.07	101.07
Flask Temp. / Barometer Correction (G)	1.02608	1.02608	1.02608	1.02608
<b>TEST CALCULATIONS</b>				
CORRECTED READINGS				
First Reading, BxG	40.02	51.30	45.66	51.30
Second Reading, CxG	86.19	118.00	106.71	108.76
Dolomite, CxG-BxG (E)	46.17	66.70	61.05	57.46
Calcite, (BxG)-0.04((CxG)-(BxG)) (F)	38.17	48.64	43.22	49.01
<b>CARBONATE PERCENTAGES FROM TABLES</b>				
Dolomite, % (H)	10.70	15.30	14.10	13.20
Calcite, % (I)	8.80	11.30	10.00	11.40
Total, % (H+I)	19.50	26.60	24.10	24.60
Ratio (I/H)	0.82	0.74	0.71	0.86
Project Number 04-1111-060	Tested By Angela			
Date of Testing 1/18/2007	Entered By LG			
Remarks	Checked By <i>SSB</i>			

**Golder Associates**





# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	101	SAMPLE DEPTH, m	36.4-36.5

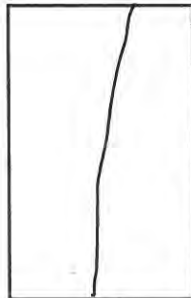
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.34	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.35	L/D	2.19

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	9.82	WATER CONTENT, (specimen) %	0.32
SAMPLE DIAMETER, cm	4.48	UNIT WEIGHT, kN/m <sup>3</sup>	23.84
SAMPLE AREA, cm <sup>2</sup>	15.78	DRY UNIT WT., kN/m <sup>3</sup>	23.77
SAMPLE VOLUME, cm <sup>3</sup>	154.85	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	376.61	VOID RATIO	0.11
DRY WEIGHT, g	375.41		

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	3.5	COMPRESSIVE STRESS, kPa	19,581
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REMARKS: *SB*

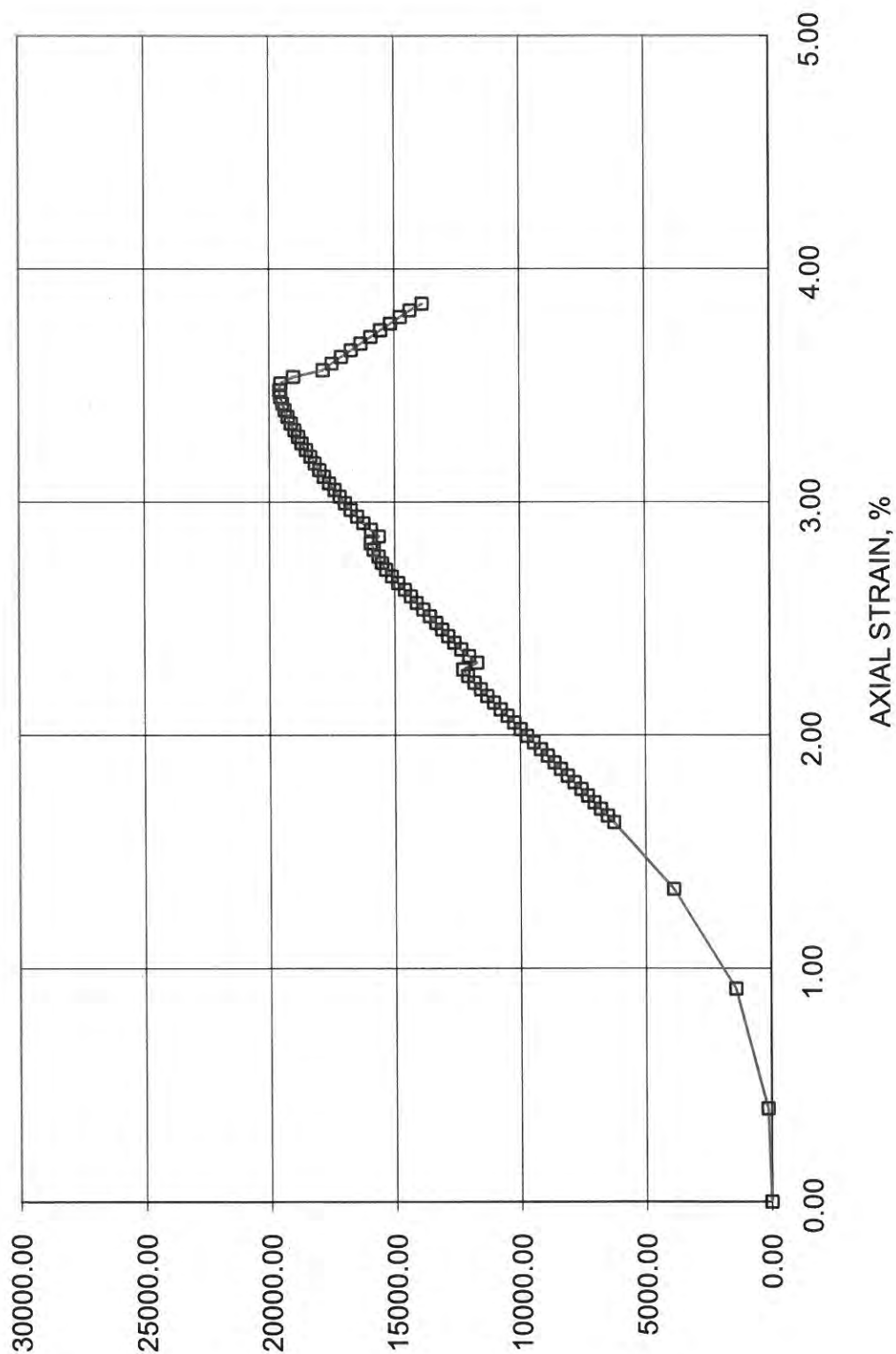
DATE:

July 18, 2008

# UNCONFINED COMPRESSION TEST (UC)

FIGURE BH 101 UC B

Borehole 101



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	102	SAMPLE DEPTH, m	34.2-34.3

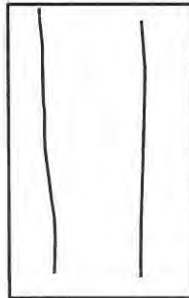
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.24	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.23	L/D	2.36

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.64	WATER CONTENT, (specimen) %	0.03
SAMPLE DIAMETER, cm	4.51	UNIT WEIGHT, kN/m <sup>3</sup>	23.69
SAMPLE AREA, cm <sup>2</sup>	16.00	DRY UNIT WT., kN/m <sup>3</sup>	23.68
SAMPLE VOLUME, cm <sup>3</sup>	170.15	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	411.24	VOID RATIO	0.12
DRY WEIGHT, g	411.10		

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	N/A	COMPRESSIVE STRESS, kPa	43,102
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REMARKS: *43*

DATE:

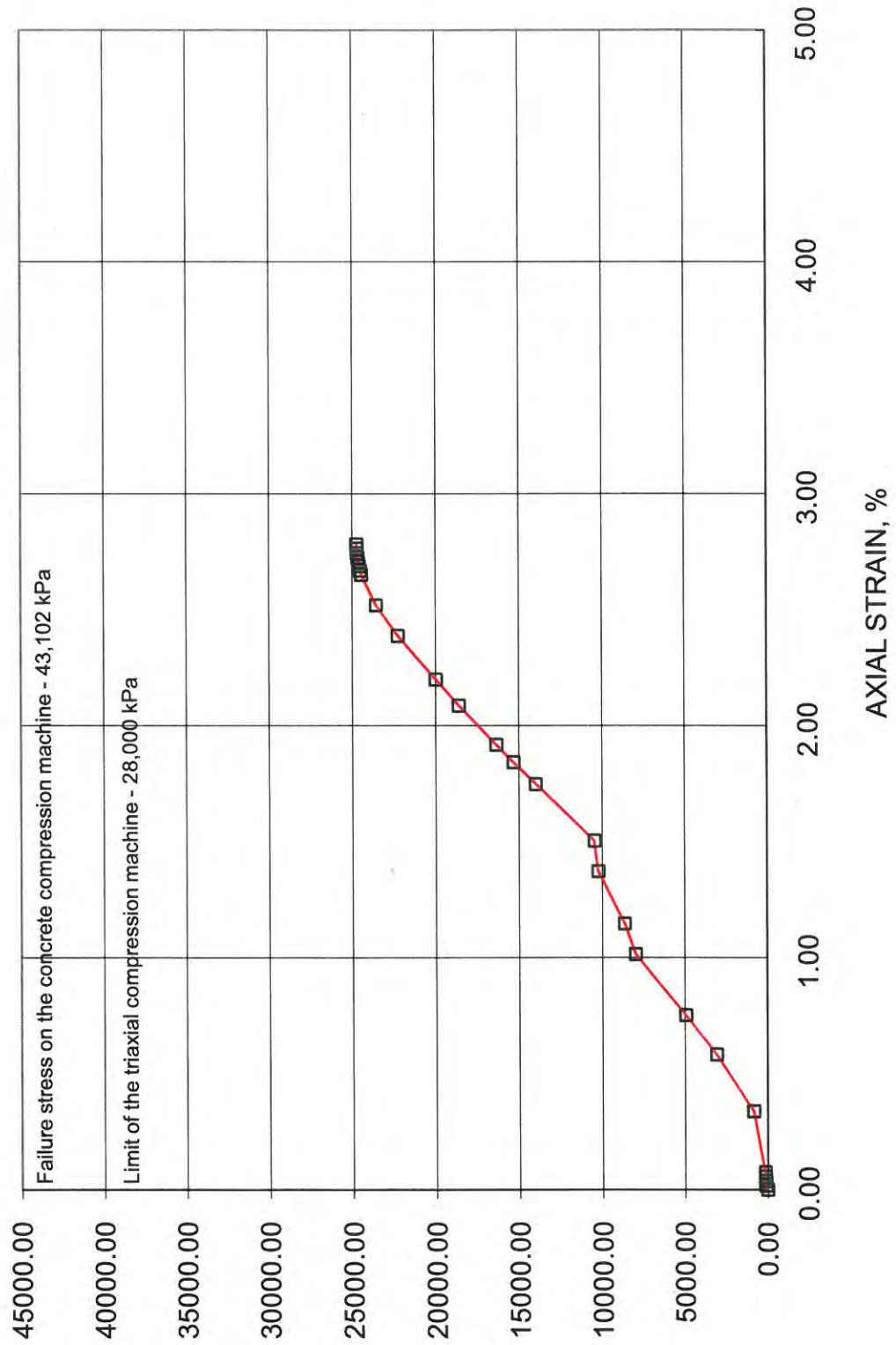
July 18, 2008



# UNCONFINED COMPRESSION TEST (UC)

FIGURE BH 102 UC B

## Borehole 102



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	104	SAMPLE DEPTH, m	32.9-33.1

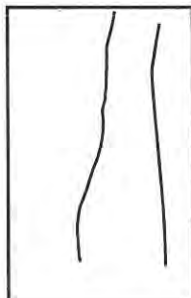
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.24	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.24	L/D	2.19

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	9.92	WATER CONTENT, (specimen) %	0.07
SAMPLE DIAMETER, cm	4.53	UNIT WEIGHT, kN/m <sup>3</sup>	22.90
SAMPLE AREA, cm <sup>2</sup>	16.08	DRY UNIT WT., kN/m <sup>3</sup>	22.89
SAMPLE VOLUME, cm <sup>3</sup>	159.53	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	372.70	VOID RATIO	0.16
DRY WEIGHT, g	372.43		

## FAILURE SKETCH



## TEST RESULTS

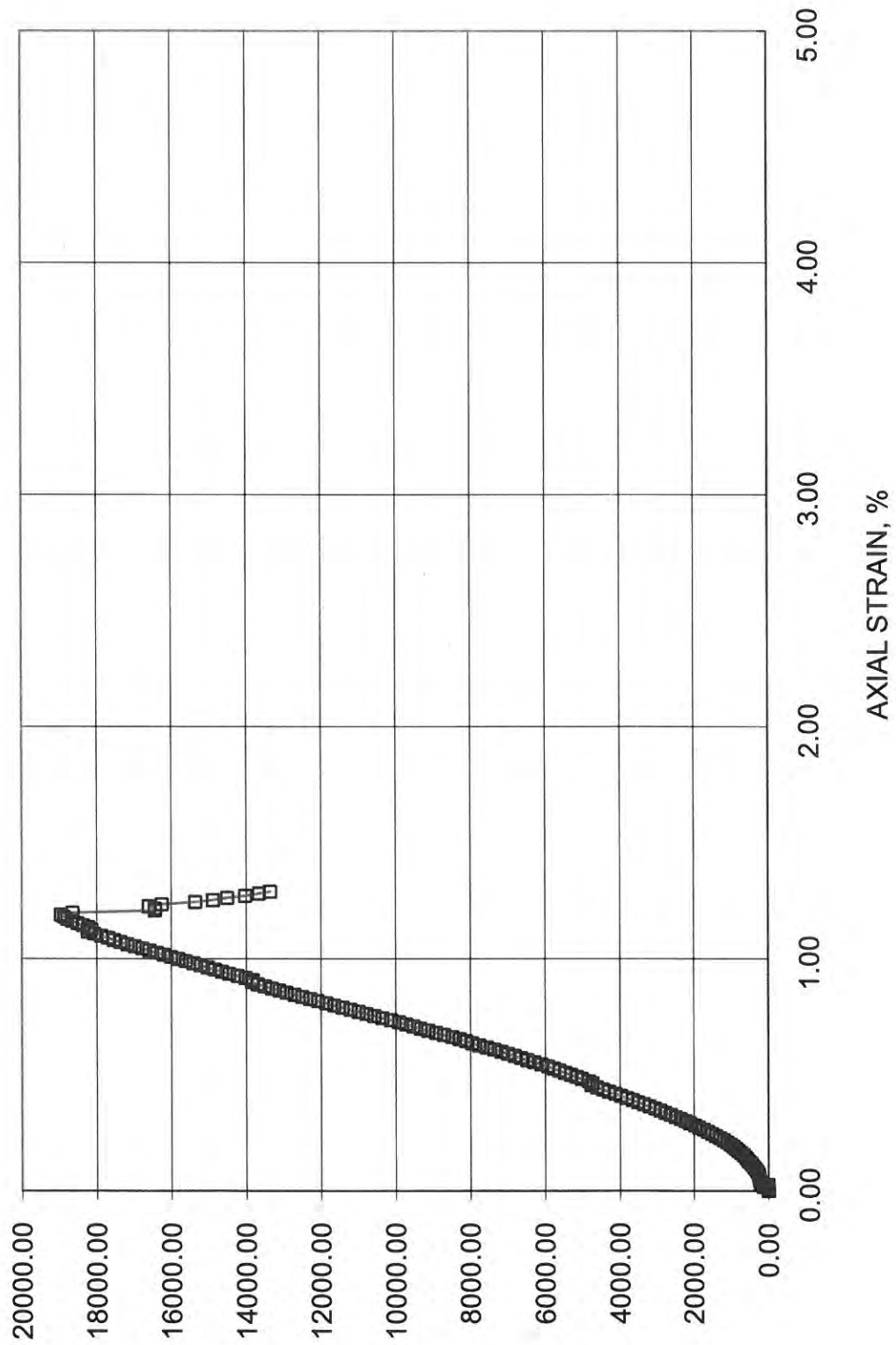
STRAIN AT FAILURE, %	1.2	COMPRESSIVE STRESS, kPa	18,954
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REMARKS: 428

DATE:

July 24, 2008

Borehole 104





# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	105	SAMPLE DEPTH, m	32.8-32.9

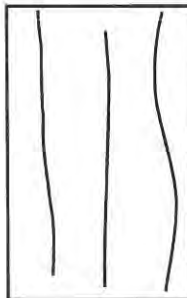
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.24	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.25	L/D	2.14

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	9.57	WATER CONTENT, (specimen) %	0.37
SAMPLE DIAMETER, cm	4.46	UNIT WEIGHT, kN/m <sup>3</sup>	22.00
SAMPLE AREA, cm <sup>2</sup>	15.65	DRY UNIT WT., kN/m <sup>3</sup>	21.92
SAMPLE VOLUME, cm <sup>3</sup>	149.72	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	335.99	VOID RATIO	0.21
DRY WEIGHT, g	334.75		

## FAILURE SKETCH



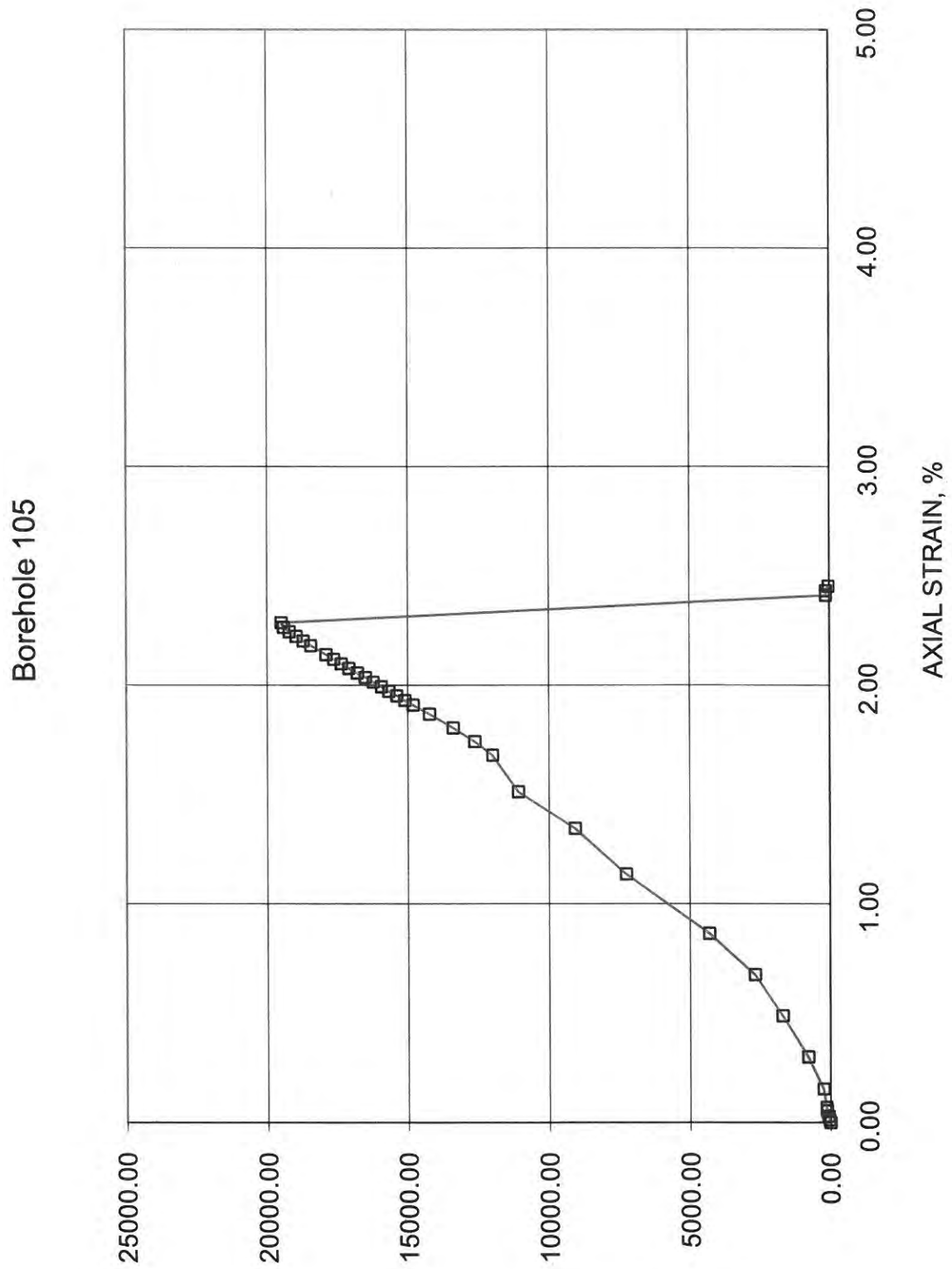
## TEST RESULTS

STRAIN AT FAILURE, %	2.3	COMPRESSIVE STRESS, kPa	19,497
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REMARKS: *5/27*

DATE:

July 18, 2008



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	107	SAMPLE DEPTH, m	33.8-34.0

## TEST CONDITIONS

MACHINE SPEED, mm/min	0.24	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.24	L/D	2.21

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.00	WATER CONTENT, (specimen) %	0.01
SAMPLE DIAMETER, cm	4.53	UNIT WEIGHT, kN/m <sup>3</sup>	23.23
SAMPLE AREA, cm <sup>2</sup>	16.15	DRY UNIT WT., kN/m <sup>3</sup>	23.22
SAMPLE VOLUME, cm <sup>3</sup>	161.46	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	382.57	VOID RATIO	0.14
DRY WEIGHT, g	382.52		

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	N/A	COMPRESSIVE STRESS, kPa	44,081
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REMARKS: 458

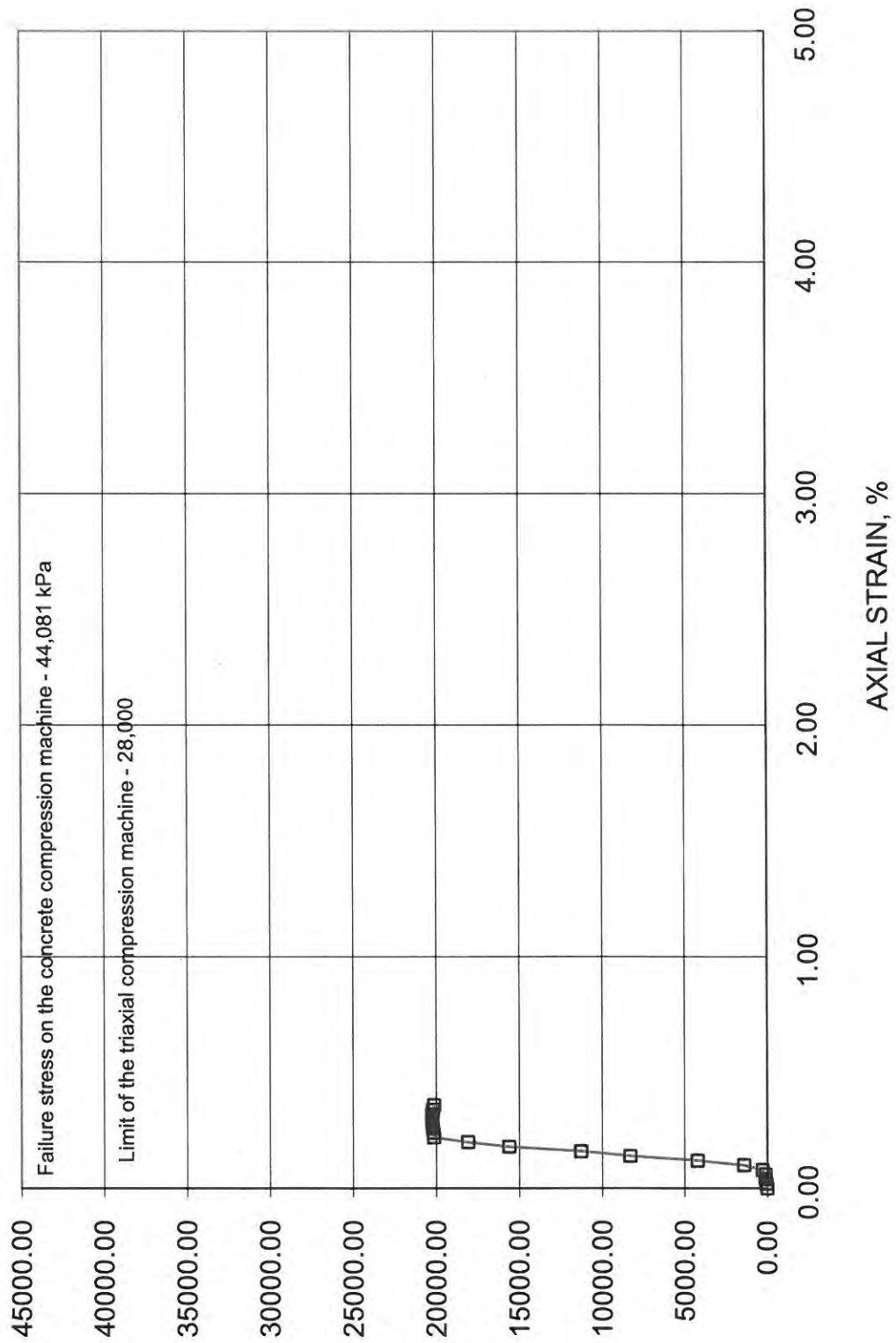
DATE:

July 18, 2008

# UNCONFINED COMPRESSION TEST (UC)

FIGURE BH 107 UC B

## Borehole 107



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	109	SAMPLE DEPTH, m	40.0-40.1

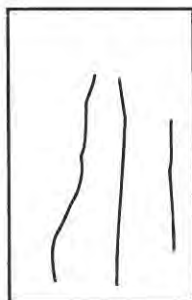
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.24	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.24	L/D	2.22

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.03	WATER CONTENT, (specimen) %	0.07
SAMPLE DIAMETER, cm	4.52	UNIT WEIGHT, kN/m <sup>3</sup>	24.42
SAMPLE AREA, cm <sup>2</sup>	16.02	DRY UNIT WT., kN/m <sup>3</sup>	24.40
SAMPLE VOLUME, cm <sup>3</sup>	160.76	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	400.45	VOID RATIO	0.08
DRY WEIGHT, g	400.17		

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	1.0	COMPRESSIVE STRESS, kPa	25,398
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REMARKS: *sjb*

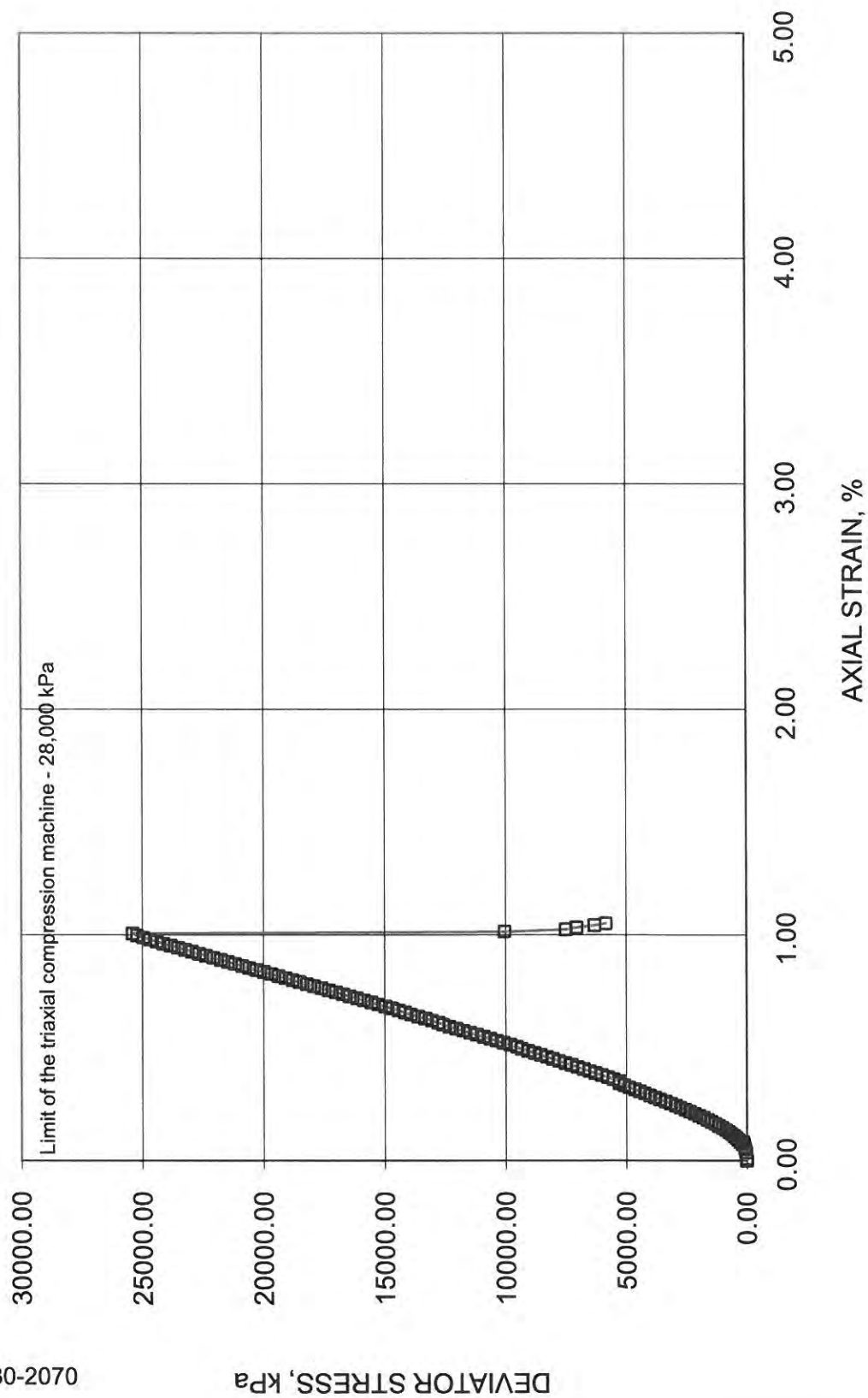
DATE:

July 18, 2008

# UNCONFINED COMPRESSION TEST (UC)

FIGURE BH 109 UC B

Borehole 109



Project No. 07-1130-2070

DEVIATOR STRESS, kPa

AXIAL STRAIN, %

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	112	SAMPLE DEPTH, m	33.5-33.6

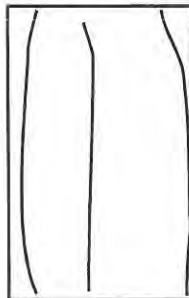
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.34	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.34	L/D	2.17

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	9.87	WATER CONTENT, (specimen) %	0.00
SAMPLE DIAMETER, cm	4.55	UNIT WEIGHT, kN/m <sup>3</sup>	24.48
SAMPLE AREA, cm <sup>2</sup>	16.27	DRY UNIT WT., kN/m <sup>3</sup>	24.48
SAMPLE VOLUME, cm <sup>3</sup>	160.49	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	400.82	VOID RATIO	0.08
DRY WEIGHT, g	400.81		

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	N/A	COMPRESSIVE STRESS, kPa	30,080
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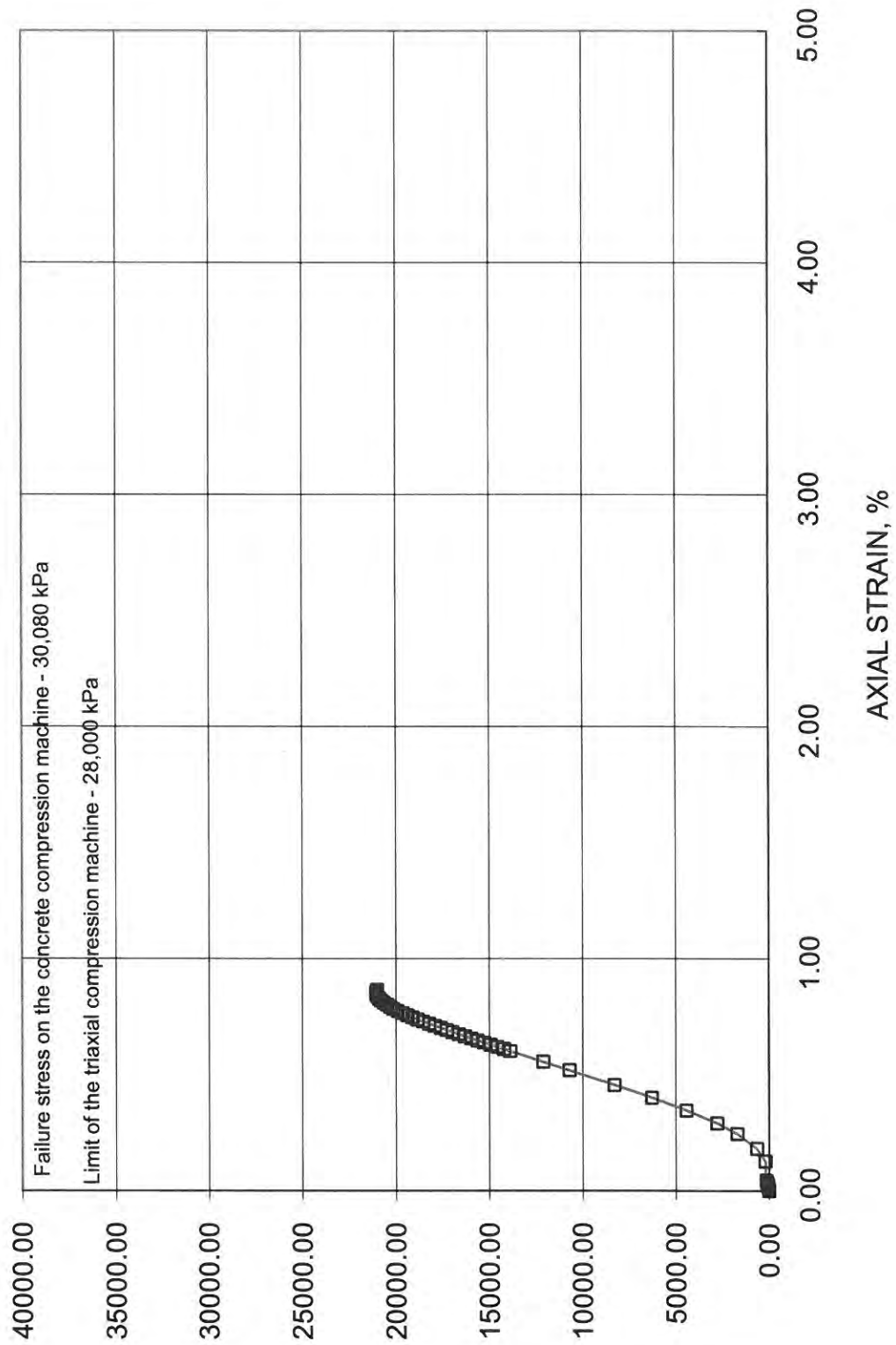
REMARKS: *SP*

DATE:

July 18, 2008



## Borehole 112



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	113	SAMPLE DEPTH, m	34.9-35.1

## TEST CONDITIONS

MACHINE SPEED, mm/min	0.34	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.34	L/D	2.19

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	9.94	WATER CONTENT, (specimen) %	0.08
SAMPLE DIAMETER, cm	4.55	UNIT WEIGHT, kN/m <sup>3</sup>	24.26
SAMPLE AREA, cm <sup>2</sup>	16.25	DRY UNIT WT., kN/m <sup>3</sup>	24.24
SAMPLE VOLUME, cm <sup>3</sup>	161.62	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	399.94	VOID RATIO	0.09
DRY WEIGHT, g	399.63		

## FAILURE SKETCH



no visible cracks

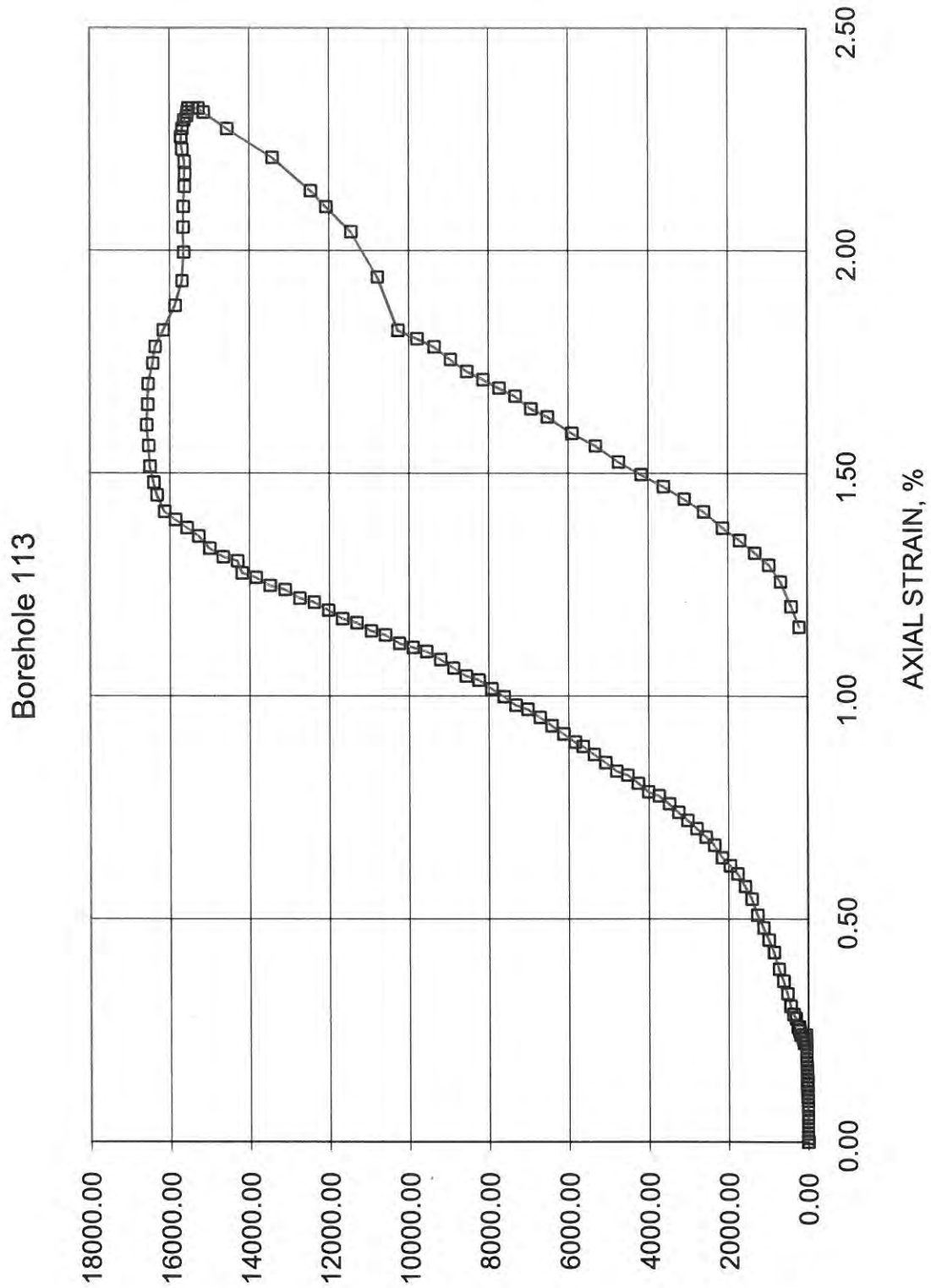
## TEST RESULTS

STRAIN AT FAILURE, %	1.6	COMPRESSIVE STRESS, kPa	16,582
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REMARKS: *SSB*

DATE:

August 5, 2008



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	115	SAMPLE DEPTH, m	37.5-37.6

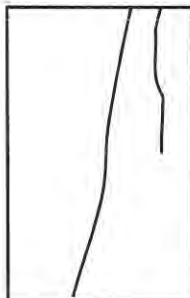
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.34	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.36	L/D	2.08

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	9.47	WATER CONTENT, (specimen) %	0.02
SAMPLE DIAMETER, cm	4.56	UNIT WEIGHT, kN/m <sup>3</sup>	24.37
SAMPLE AREA, cm <sup>2</sup>	16.31	DRY UNIT WT., kN/m <sup>3</sup>	24.36
SAMPLE VOLUME, cm <sup>3</sup>	154.42	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	383.86	VOID RATIO	0.09
DRY WEIGHT, g	383.77		

## FAILURE SKETCH



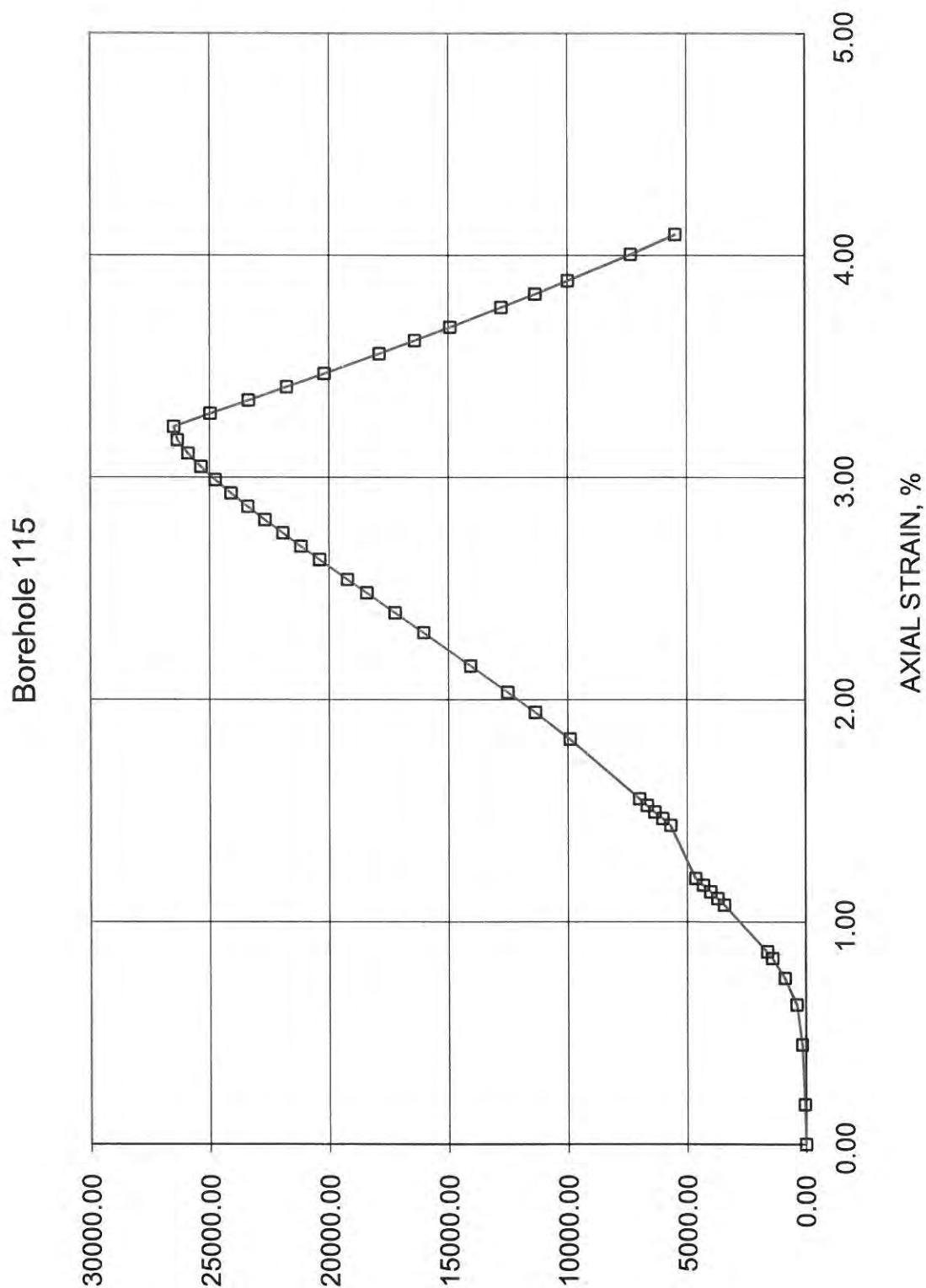
## TEST RESULTS

STRAIN AT FAILURE, %	3.2	COMPRESSIVE STRESS, kPa	26,499
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REMARKS: 5B

DATE:

July 18, 2008



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	116	SAMPLE DEPTH, m	33.0-33.1

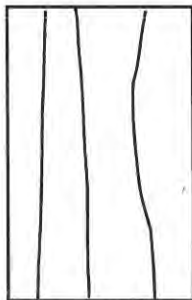
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.24	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.28	L/D	1.91

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	8.69	WATER CONTENT, (specimen) %	0.10
SAMPLE DIAMETER, cm	4.54	UNIT WEIGHT, kN/m <sup>3</sup>	24.16
SAMPLE AREA, cm <sup>2</sup>	16.17	DRY UNIT WT., kN/m <sup>3</sup>	24.14
SAMPLE VOLUME, cm <sup>3</sup>	140.49	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	346.23	VOID RATIO	0.10
DRY WEIGHT, g	345.90		

## FAILURE SKETCH



## TEST RESULTS

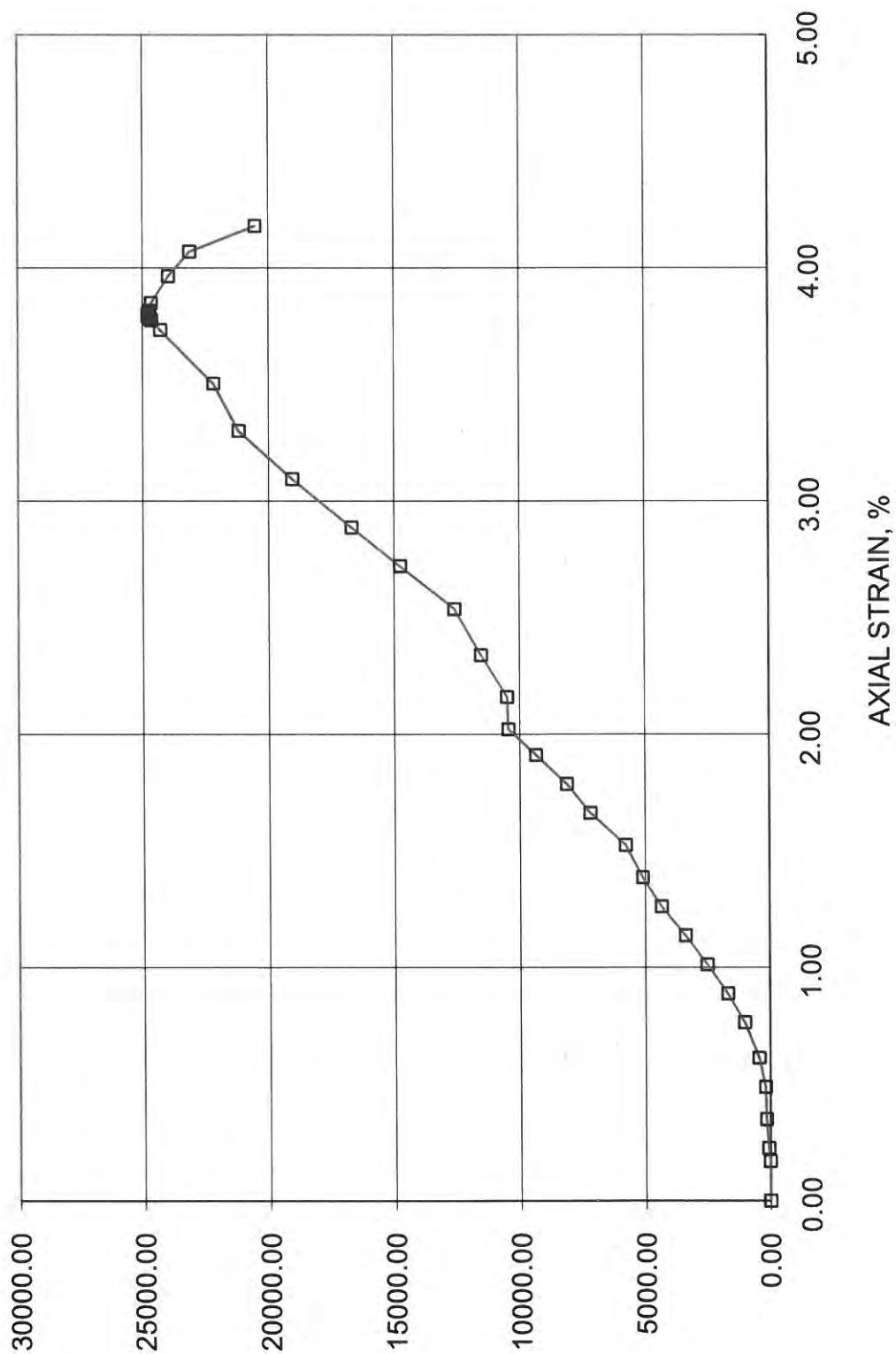
STRAIN AT FAILURE, %	3.8	COMPRESSIVE STRESS, kPa	24,789
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REMARKS: SB

DATE:

July 18, 2008

Borehole 116





# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	118	SAMPLE DEPTH, m	32.6-32.8

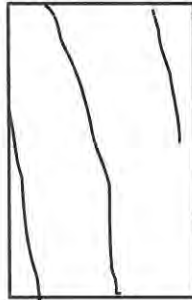
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.34	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.31	L/D	2.46

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.91	WATER CONTENT, (specimen) %	0.02
SAMPLE DIAMETER, cm	4.44	UNIT WEIGHT, kN/m <sup>3</sup>	24.79
SAMPLE AREA, cm <sup>2</sup>	15.48	DRY UNIT WT., kN/m <sup>3</sup>	24.79
SAMPLE VOLUME, cm <sup>3</sup>	168.88	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	427.06	VOID RATIO	0.07
DRY WEIGHT, g	426.97		

## FAILURE SKETCH



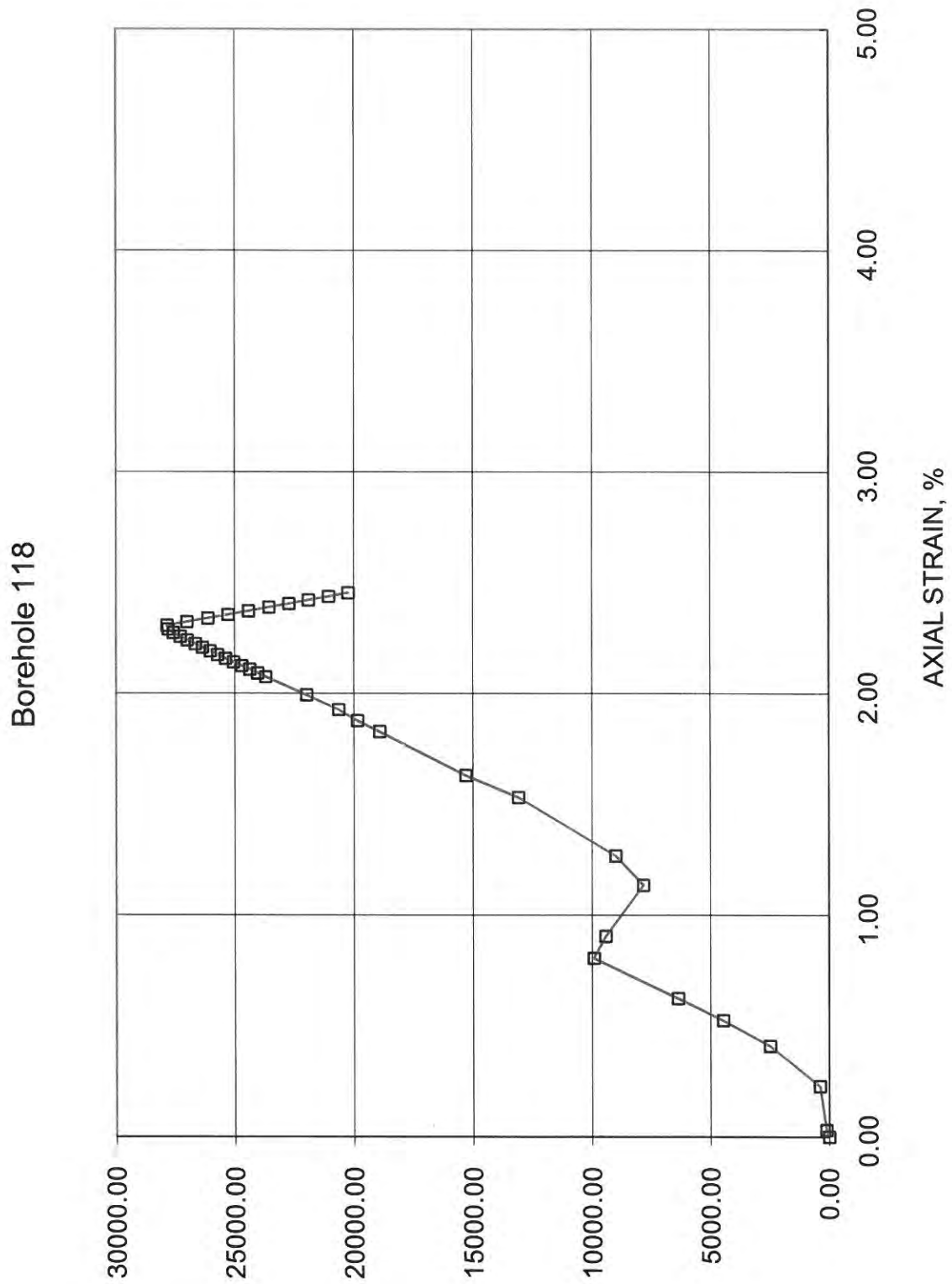
## TEST RESULTS

STRAIN AT FAILURE, %	N/A	COMPRESSIVE STRESS, kPa	27,850
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REMARKS: 43B

DATE:

July 18, 2008



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	119	SAMPLE DEPTH, m	33.0-33.1

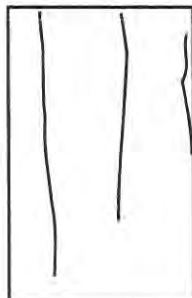
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.05	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.06	L/D	1.90

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	8.61	WATER CONTENT, (specimen) %	0.04
SAMPLE DIAMETER, cm	4.52	UNIT WEIGHT, kN/m <sup>3</sup>	22.73
SAMPLE AREA, cm <sup>2</sup>	16.07	DRY UNIT WT., kN/m <sup>3</sup>	22.73
SAMPLE VOLUME, cm <sup>3</sup>	138.29	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	320.70	VOID RATIO	0.16
DRY WEIGHT, g	320.59		

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	N/A	COMPRESSIVE STRESS, kPa	38,759
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REMARKS: *50B*

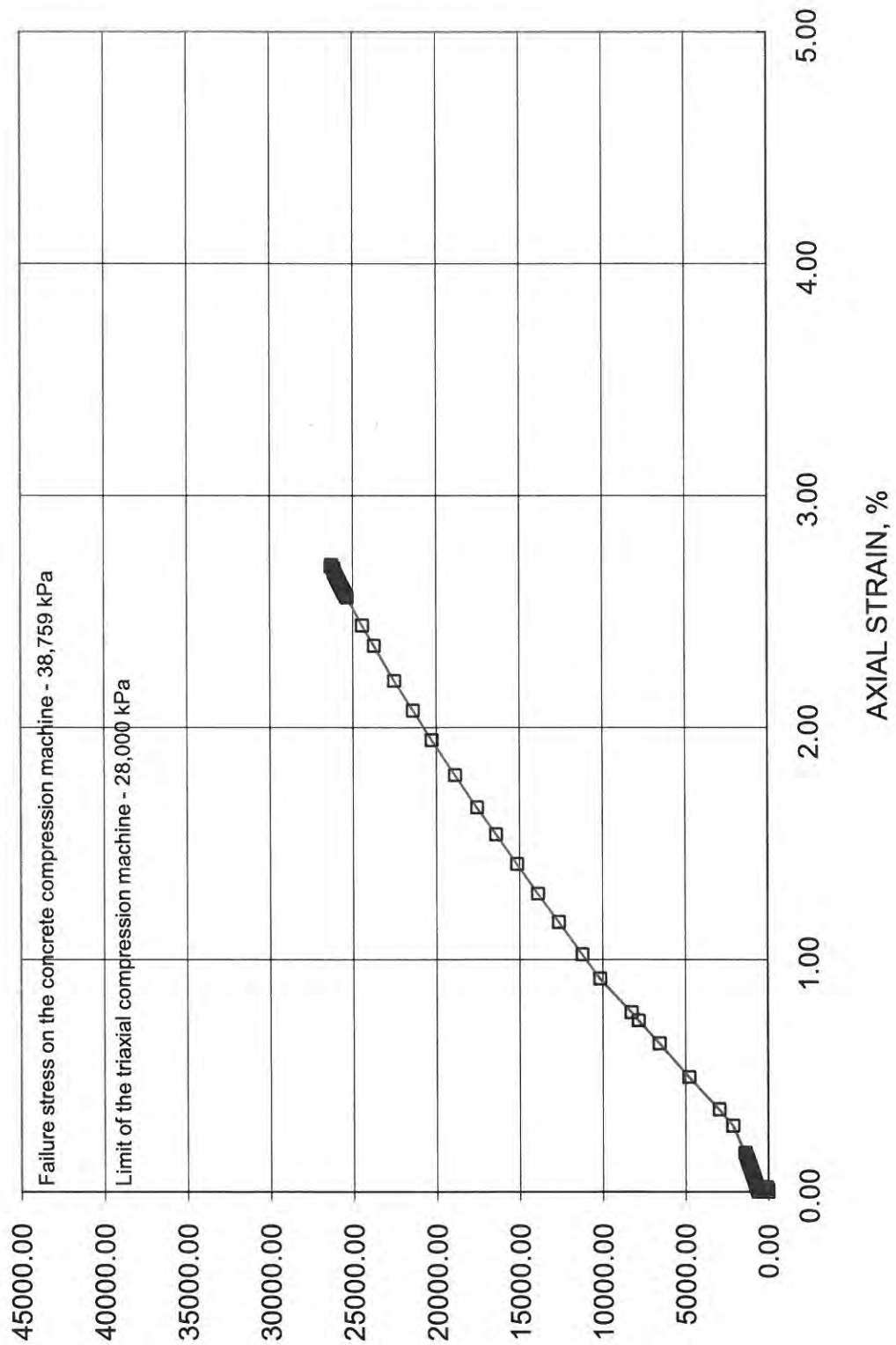
DATE:

July 18, 2008

# UNCONFINED COMPRESSION TEST (UC)

FIGURE BH 119 UC B

Borehole 119



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	122	SAMPLE DEPTH, m	39.5-39.6

## TEST CONDITIONS

MACHINE SPEED, mm/min	0.24	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.25	L/D	2.10

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	9.56	WATER CONTENT, (specimen) %	0.41
SAMPLE DIAMETER, cm	4.56	UNIT WEIGHT, kN/m <sup>3</sup>	19.93
SAMPLE AREA, cm <sup>2</sup>	16.36	DRY UNIT WT., kN/m <sup>3</sup>	19.84
SAMPLE VOLUME, cm <sup>3</sup>	156.47	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	318.04	VOID RATIO	0.33
DRY WEIGHT, g	316.74		

## FAILURE SKETCH



no visible cracks

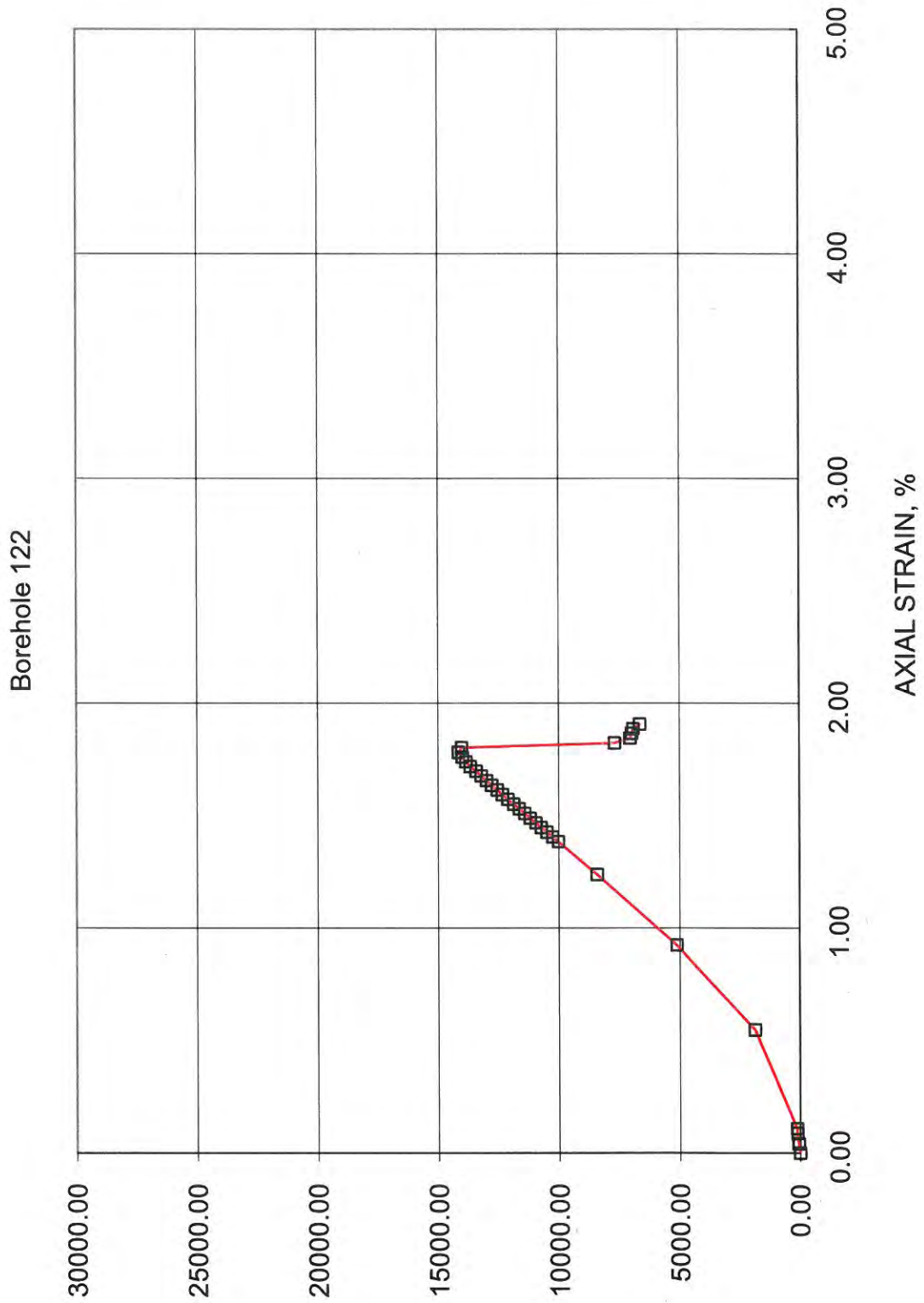
## TEST RESULTS

STRAIN AT FAILURE, %	1.8	COMPRESSIVE STRESS, kPa	14,151
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REMARKS: *SP*

DATE:

July 18, 2008



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	127	SAMPLE DEPTH, m	36.0-36.1

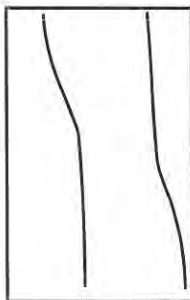
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.24	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.25	L/D	2.11

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	9.67	WATER CONTENT, (specimen) %	0.03
SAMPLE DIAMETER, cm	4.58	UNIT WEIGHT, kN/m <sup>3</sup>	24.28
SAMPLE AREA, cm <sup>2</sup>	16.47	DRY UNIT WT., kN/m <sup>3</sup>	24.27
SAMPLE VOLUME, cm <sup>3</sup>	159.26	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	394.49	VOID RATIO	0.09
DRY WEIGHT, g	394.36		

## FAILURE SKETCH



no visible cracks

## TEST RESULTS

STRAIN AT FAILURE, %	N/A	COMPRESSIVE STRESS, kPa	83,700
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REMARKS: *SB*

DATE:

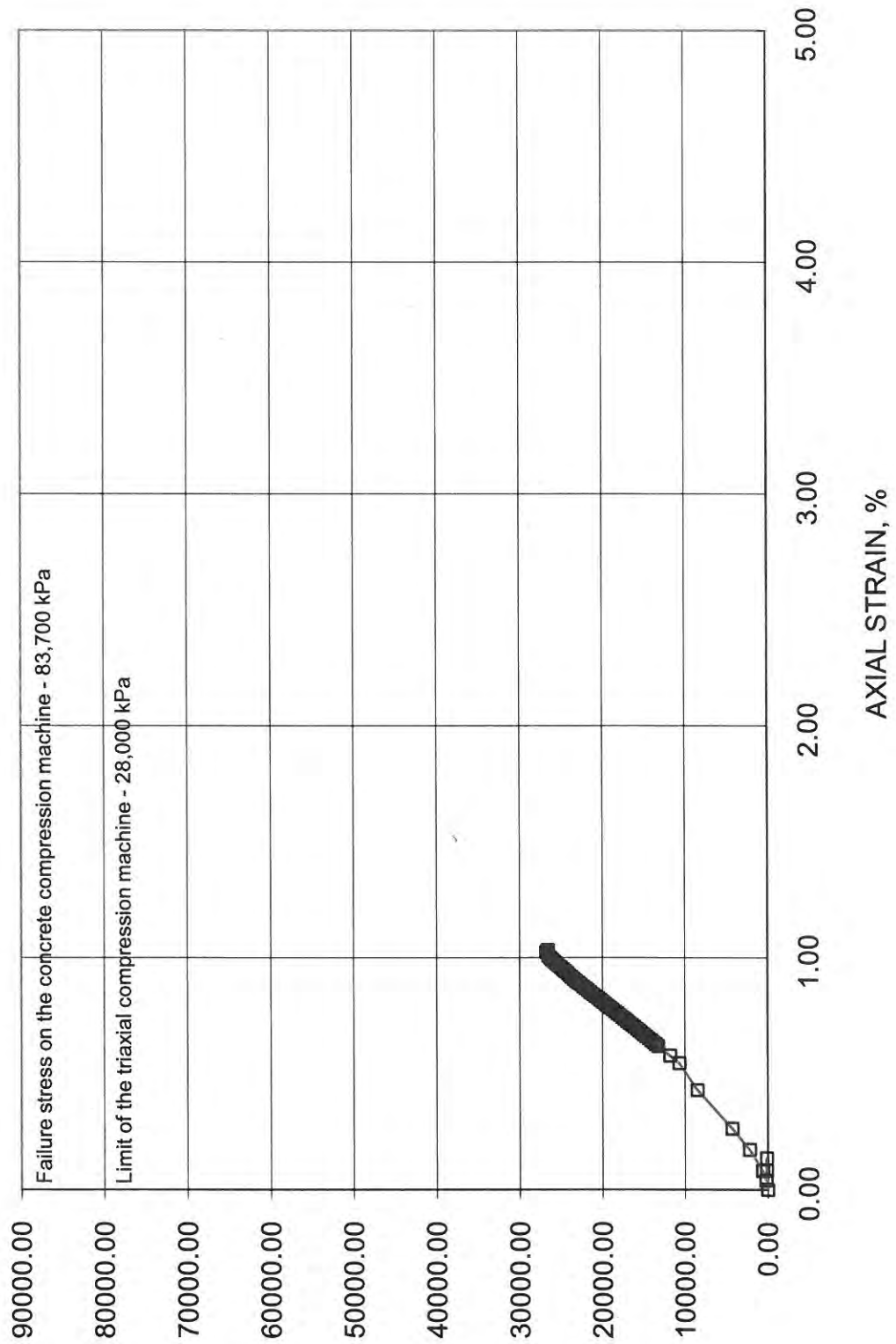
July 18, 2008



# UNCONFINED COMPRESSION TEST (UC)

FIGURE BH 127 UC B

Borehole 127



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 2166-00e1

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	129	SAMPLE DEPTH, m	35.07-35.20

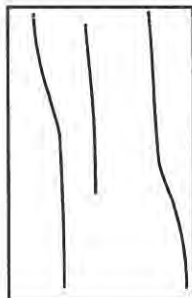
## TEST CONDITIONS

MACHINE SPEED, mm/min	0.24	TYPE OF SPECIMEN	Rock Core
RATE OF AXIAL STRAIN, %/min	0.24	L/D	2.21

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.04	WATER CONTENT, (specimen) %	0.05
SAMPLE DIAMETER, cm	4.54	UNIT WEIGHT, kN/m <sup>3</sup>	24.52
SAMPLE AREA, cm <sup>2</sup>	16.22	DRY UNIT WT., kN/m <sup>3</sup>	24.51
SAMPLE VOLUME, cm <sup>3</sup>	162.85	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	407.36	VOID RATIO	0.08
DRY WEIGHT, g	407.17		

## FAILURE SKETCH



no visible cracks

## TEST RESULTS

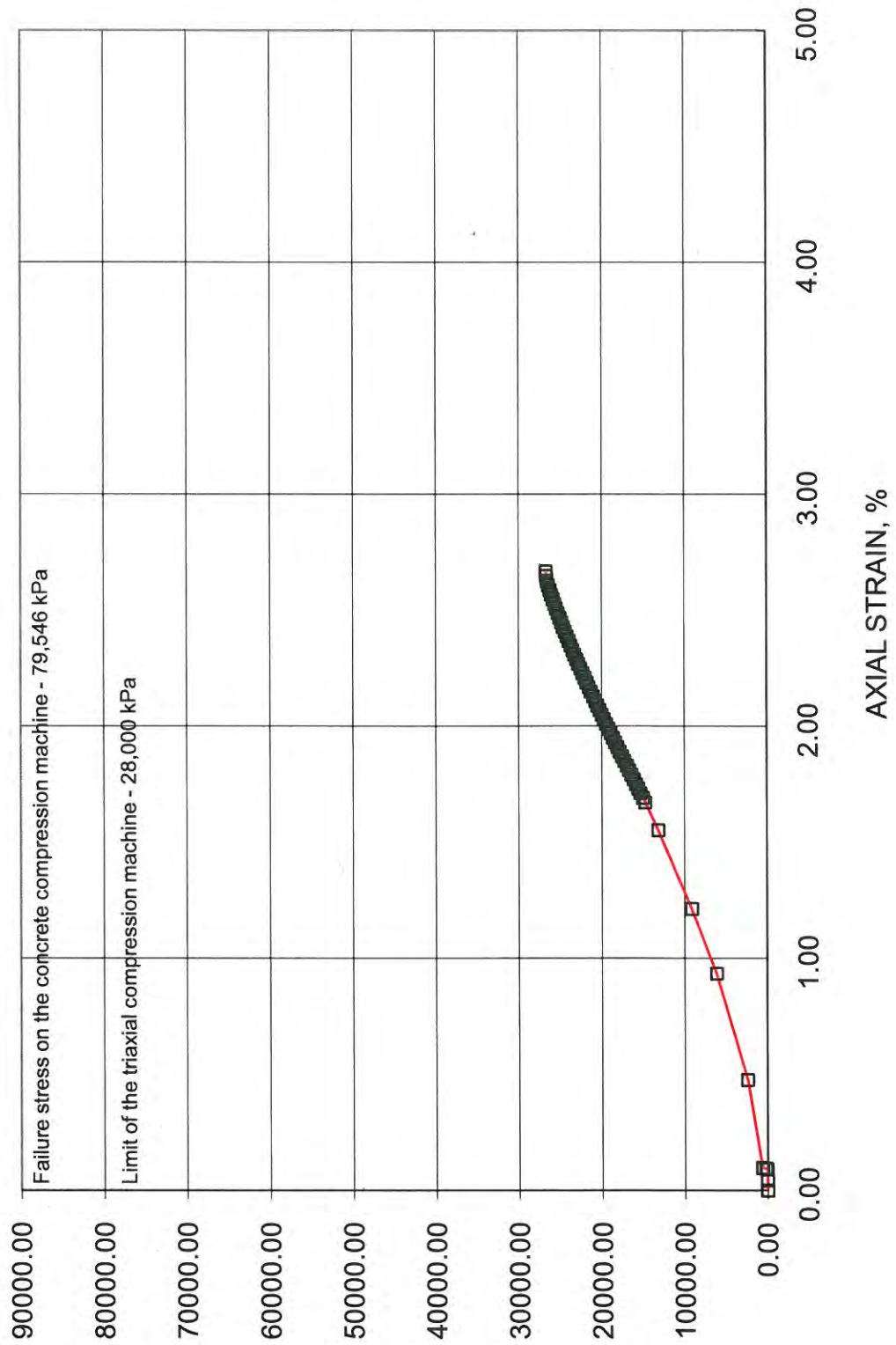
STRAIN AT FAILURE, %	N/A	COMPRESSIVE STRESS, kPa	79,546
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REMARKS: *SJB*

DATE:

July 18, 2008

## Borehole 129



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	131	SAMPLE DEPTH, m	35.02-35.15

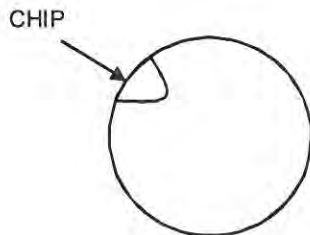
## TEST CONDITIONS

MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.49

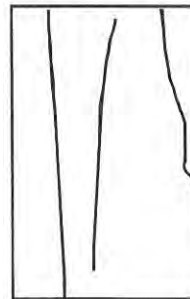
## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	11.15	WATER CONTENT, (specimen) %	0.12
SAMPLE DIAMETER, cm	4.47	UNIT WEIGHT, kN/m <sup>3</sup>	24.41
SAMPLE AREA, cm <sup>2</sup>	15.69	DRY UNIT WT., kN/m <sup>3</sup>	24.39
SAMPLE VOLUME, cm <sup>3</sup>	174.98	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	435.78	VOID RATIO	0.09
DRY WEIGHT, g	435.26		

## VISUAL INSPECTION



## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	79.4
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REMARKS: *SJB*

DATE:

2/2/2009

Checked By:

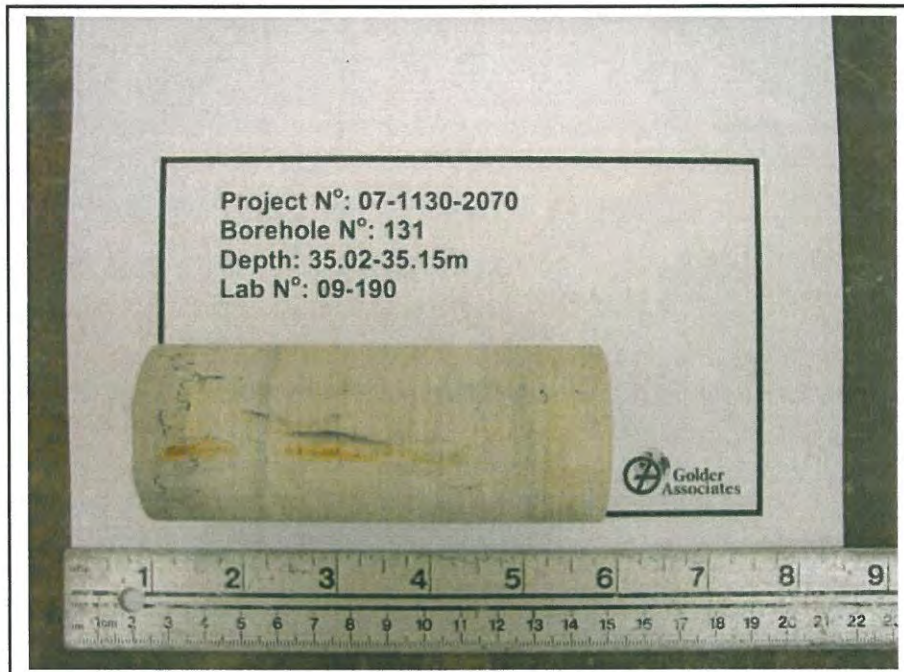
**Golder Associates**



# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 131 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	132	SAMPLE DEPTH, m	35.65-35.78

## TEST CONDITIONS

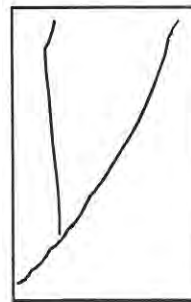
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.46

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	11.05	WATER CONTENT, (specimen) %	3.55
SAMPLE DIAMETER, cm	4.50	UNIT WEIGHT, kN/m <sup>3</sup>	21.76
SAMPLE AREA, cm <sup>2</sup>	15.90	DRY UNIT WT., kN/m <sup>3</sup>	21.01
SAMPLE VOLUME, cm <sup>3</sup>	175.74	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	390.05	VOID RATIO	0.26
DRY WEIGHT, g	376.68		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	39.2
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REMARKS:

DATE:

2/2/2009

Checked By: *SJB*

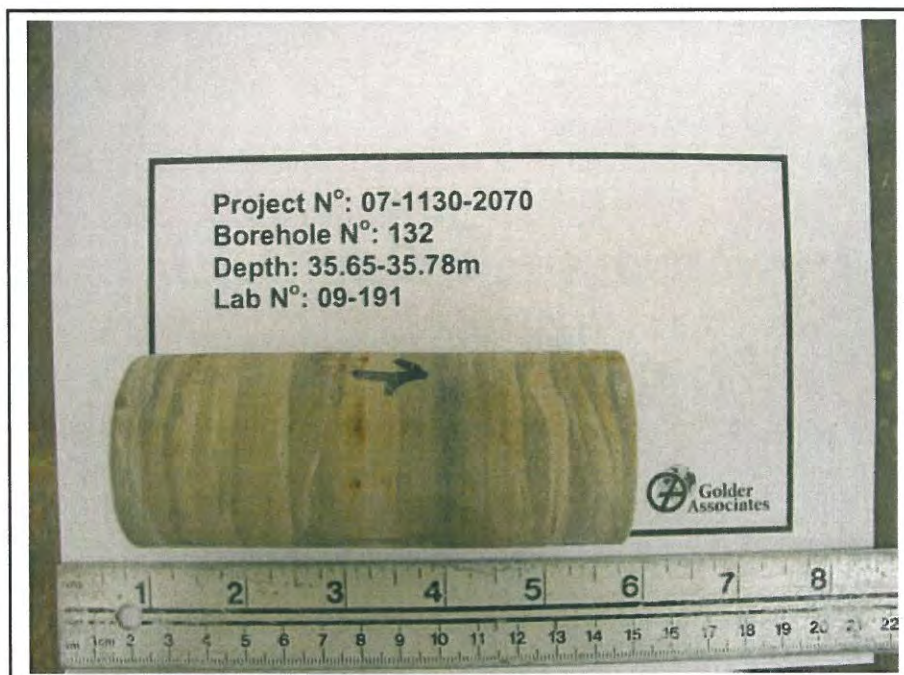
**Golder Associates**



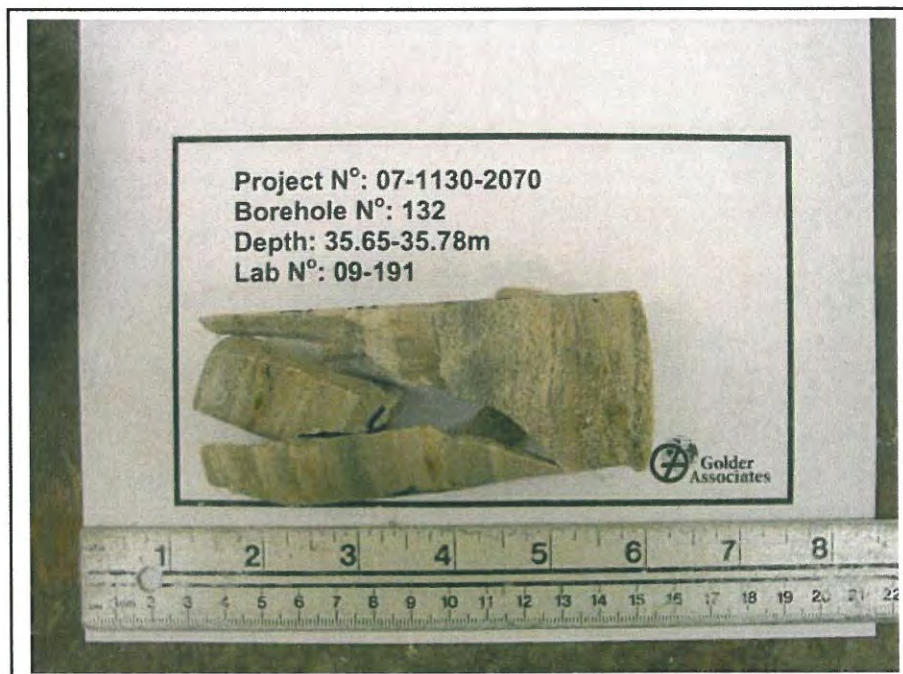
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 132 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB



# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	135	SAMPLE DEPTH, m	39.60-39.76

## TEST CONDITIONS

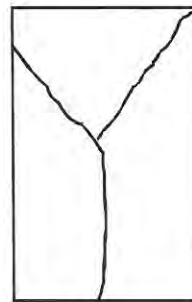
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.38

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.61	WATER CONTENT, (specimen) %	6.46
SAMPLE DIAMETER, cm	4.45	UNIT WEIGHT, kN/m <sup>3</sup>	21.26
SAMPLE AREA, cm <sup>2</sup>	15.55	DRY UNIT WT., kN/m <sup>3</sup>	19.97
SAMPLE VOLUME, cm <sup>3</sup>	165.02	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	357.81	VOID RATIO	0.33
DRY WEIGHT, g	336.10		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	22.9
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REMARKS:

DATE:

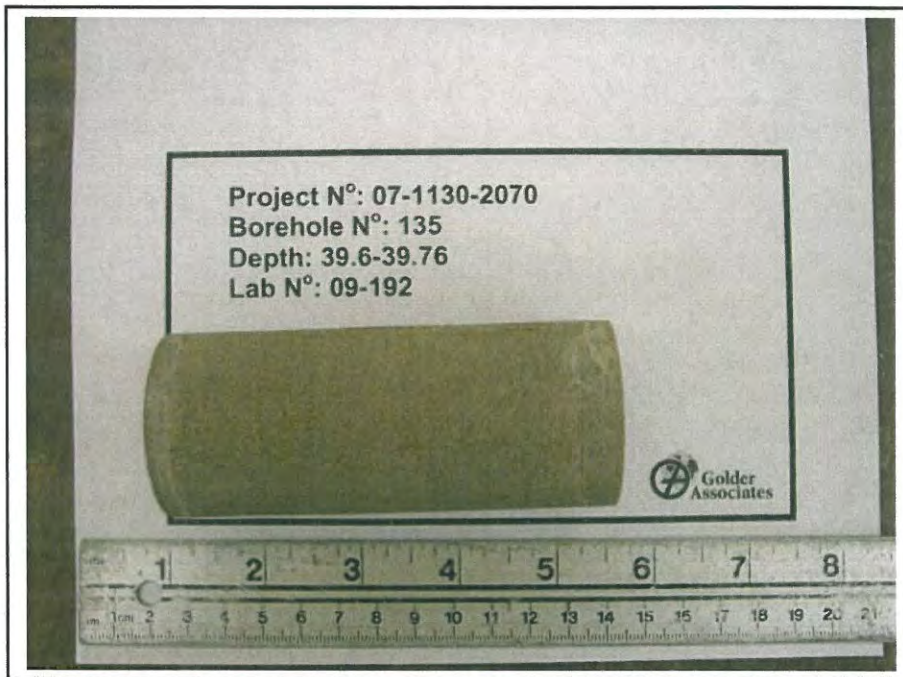
2/2/2009

Checked By: *SJB*

**Golder Associates**

**UNCONFINED COMPRESSION TEST**  
ASTM D2166-98A

FIGURE BH 135 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	136	SAMPLE DEPTH, m	35.97-36.12

## TEST CONDITIONS

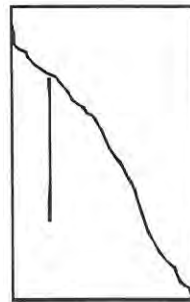
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.51

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	11.30	WATER CONTENT, (specimen) %	0.24
SAMPLE DIAMETER, cm	4.50	UNIT WEIGHT, kN/m <sup>3</sup>	24.82
SAMPLE AREA, cm <sup>2</sup>	15.90	DRY UNIT WT., kN/m <sup>3</sup>	24.76
SAMPLE VOLUME, cm <sup>3</sup>	179.72	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	454.98	VOID RATIO	0.07
DRY WEIGHT, g	453.89		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	95.1
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REMARKS:

DATE:

2/2/2009

Checked By: SJB

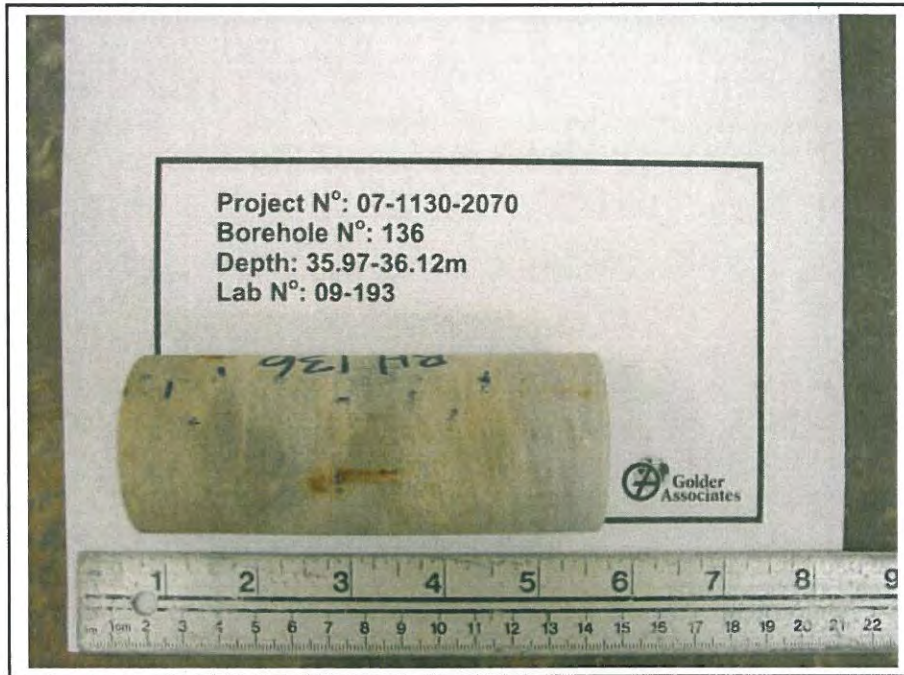
Golder Associates



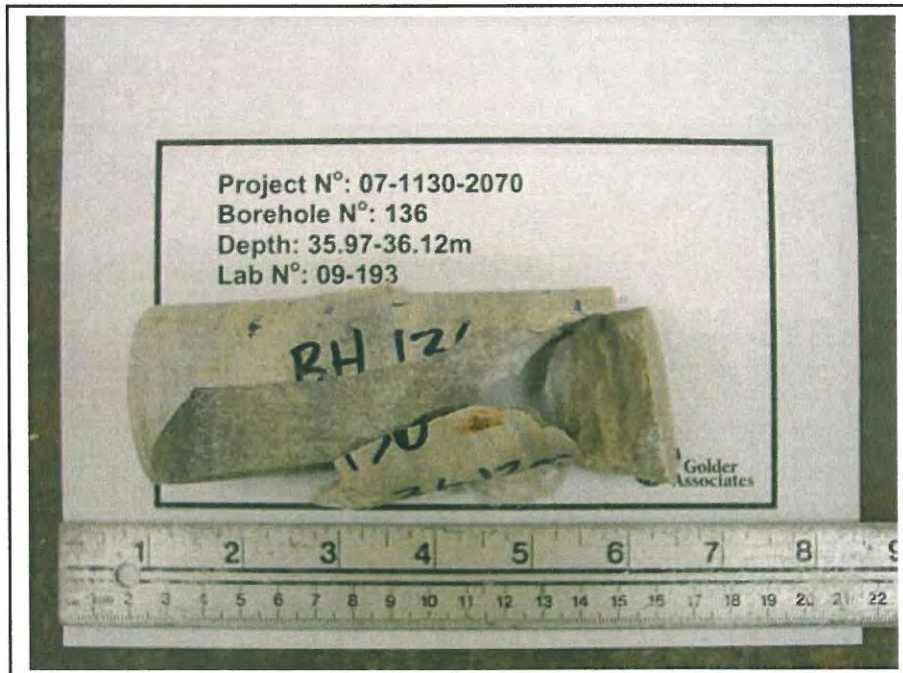
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 136 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SB

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	139	SAMPLE DEPTH, m	37.74-39.94

## TEST CONDITIONS

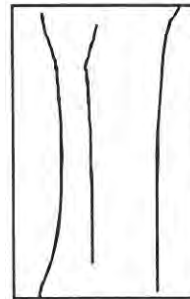
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.44

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	11.00	WATER CONTENT, (specimen) %	0.24
SAMPLE DIAMETER, cm	4.50	UNIT WEIGHT, kN/m <sup>3</sup>	24.24
SAMPLE AREA, cm <sup>2</sup>	15.90	DRY UNIT WT., kN/m <sup>3</sup>	24.18
SAMPLE VOLUME, cm <sup>3</sup>	174.95	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	432.54	VOID RATIO	0.09
DRY WEIGHT, g	431.50		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	78.3
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REMARKS:

DATE:

2/2/2009

Checked By: *SSB*

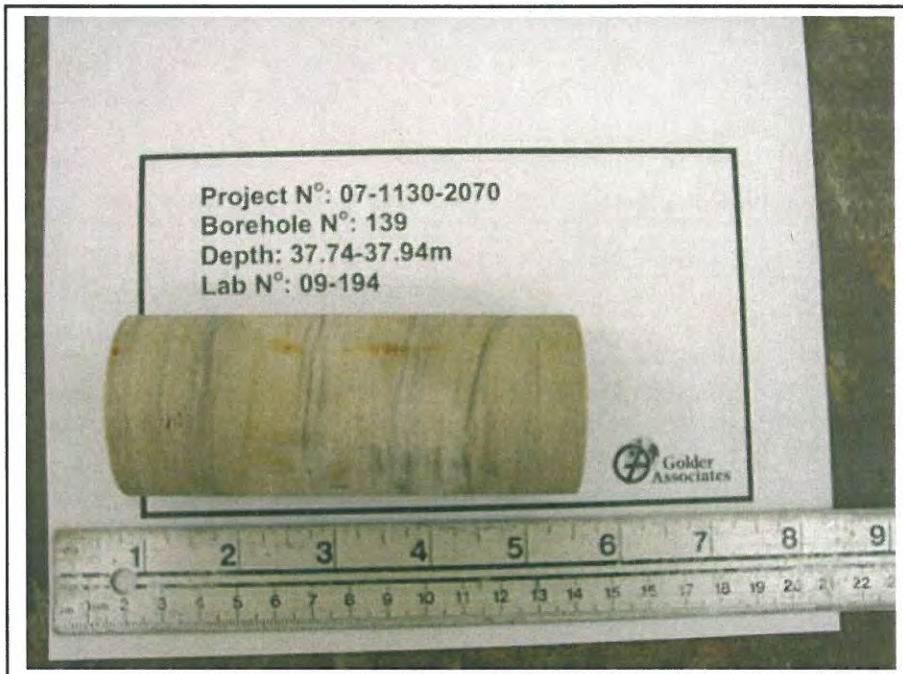
**Golder Associates**



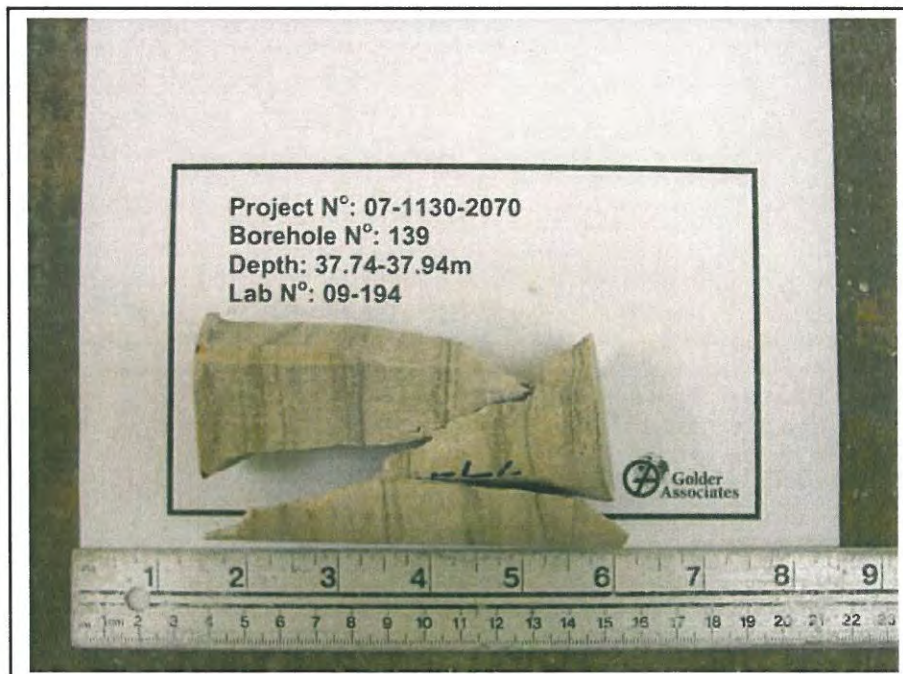
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 139 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	140	SAMPLE DEPTH, m	36.62-36.84

## TEST CONDITIONS

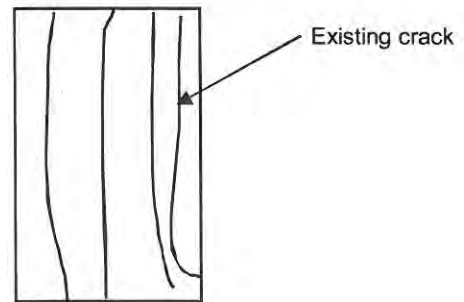
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.46

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	11.08	WATER CONTENT, (specimen) %	0.51
SAMPLE DIAMETER, cm	4.50	UNIT WEIGHT, kN/m <sup>3</sup>	23.74
SAMPLE AREA, cm <sup>2</sup>	15.90	DRY UNIT WT., kN/m <sup>3</sup>	23.62
SAMPLE VOLUME, cm <sup>3</sup>	176.22	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	426.81	VOID RATIO	0.12
DRY WEIGHT, g	424.64		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	78.3
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REMARKS:

DATE:

2/2/2009

Checked By: *SJB*

**Golder Associates**



**UNCONFINED COMPRESSION TEST**  
ASTM D2166-98A

FIGURE BH 140 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SAB

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	141	SAMPLE DEPTH, m	33.63-33.75

## TEST CONDITIONS

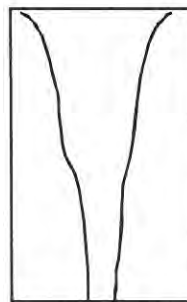
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.24

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.10	WATER CONTENT, (specimen) %	0.66
SAMPLE DIAMETER, cm	4.50	UNIT WEIGHT, kN/m <sup>3</sup>	23.33
SAMPLE AREA, cm <sup>2</sup>	15.90	DRY UNIT WT., kN/m <sup>3</sup>	23.17
SAMPLE VOLUME, cm <sup>3</sup>	160.63	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	382.21	VOID RATIO	0.14
DRY WEIGHT, g	379.70		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	92.3
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REMARKS:

DATE:

2/2/2009

Checked By: *SJB*

**Golder Associates**



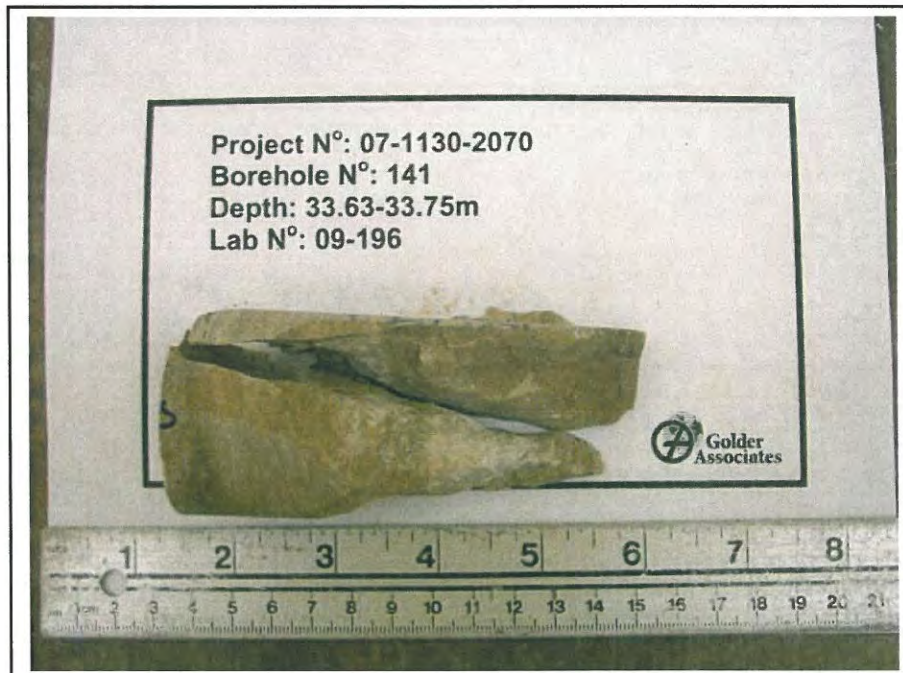
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 141 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	142	SAMPLE DEPTH, m	35.91-36.04

## TEST CONDITIONS

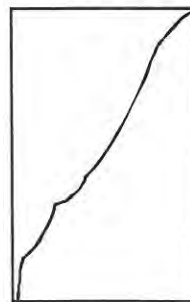
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.27

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.20	WATER CONTENT, (specimen) %	1.50
SAMPLE DIAMETER, cm	4.49	UNIT WEIGHT, kN/m <sup>3</sup>	22.84
SAMPLE AREA, cm <sup>2</sup>	15.83	DRY UNIT WT., kN/m <sup>3</sup>	22.51
SAMPLE VOLUME, cm <sup>3</sup>	161.50	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	376.35	VOID RATIO	0.18
DRY WEIGHT, g	370.79		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	47.8
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REMARKS:

DATE:

2/2/2009

Checked By: *SJB*

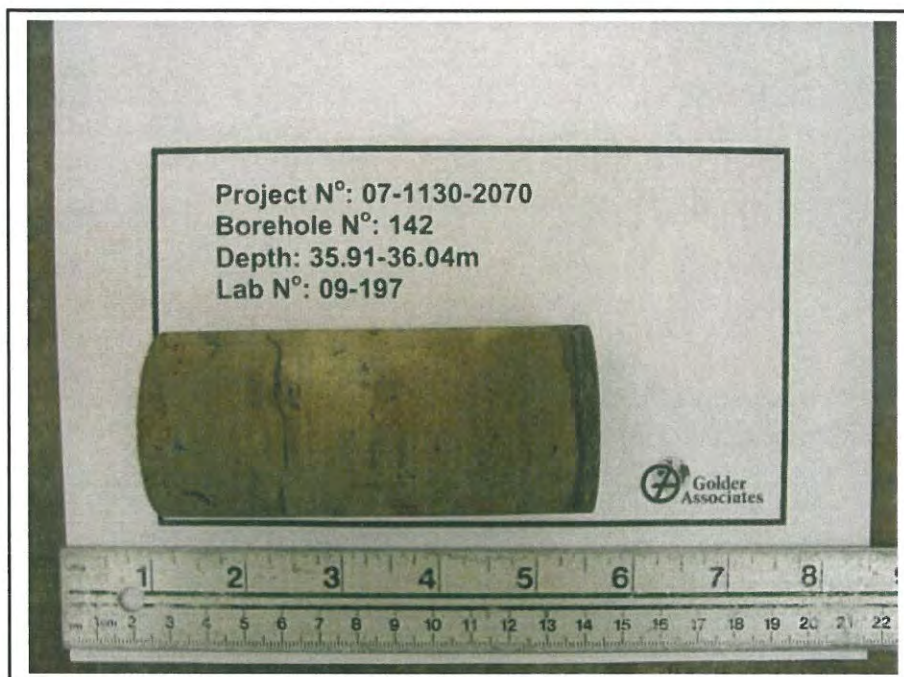
**Golder Associates**



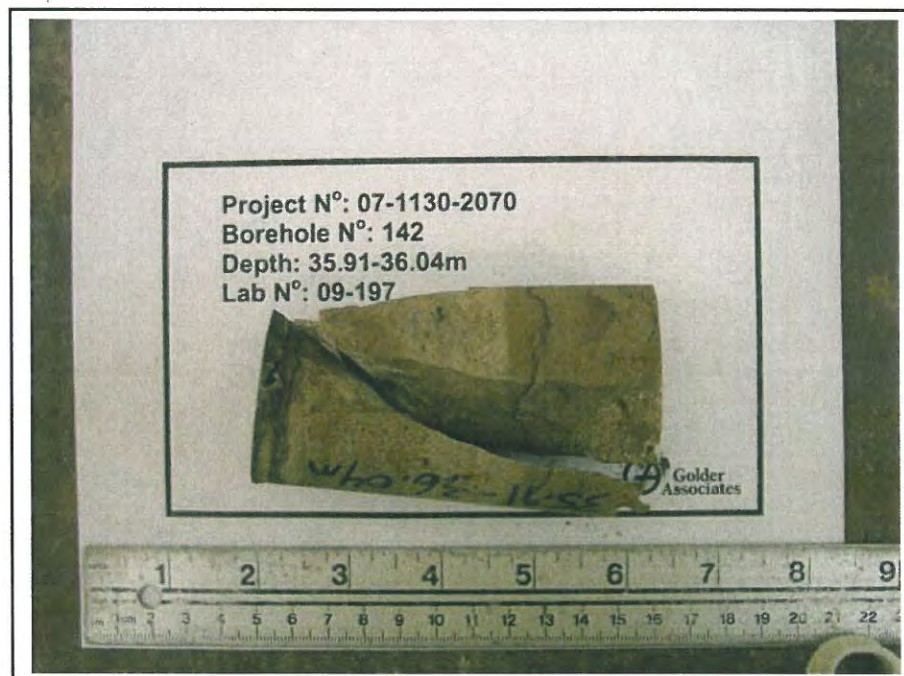
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 142 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	145	SAMPLE DEPTH, m	34.72-34.88

## TEST CONDITIONS

MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.36

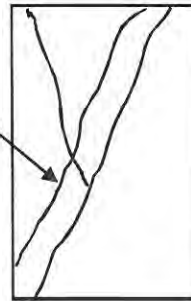
## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	11.11	WATER CONTENT, (specimen) %	0.21
SAMPLE DIAMETER, cm	4.71	UNIT WEIGHT, kN/m <sup>3</sup>	25.65
SAMPLE AREA, cm <sup>2</sup>	17.42	DRY UNIT WT., kN/m <sup>3</sup>	25.60
SAMPLE VOLUME, cm <sup>3</sup>	193.57	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	506.59	VOID RATIO	0.03
DRY WEIGHT, g	505.53		

## VISUAL INSPECTION

## FAILURE SKETCH

Existing crack



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	66.4
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REMARKS:

DATE:

2/2/2009

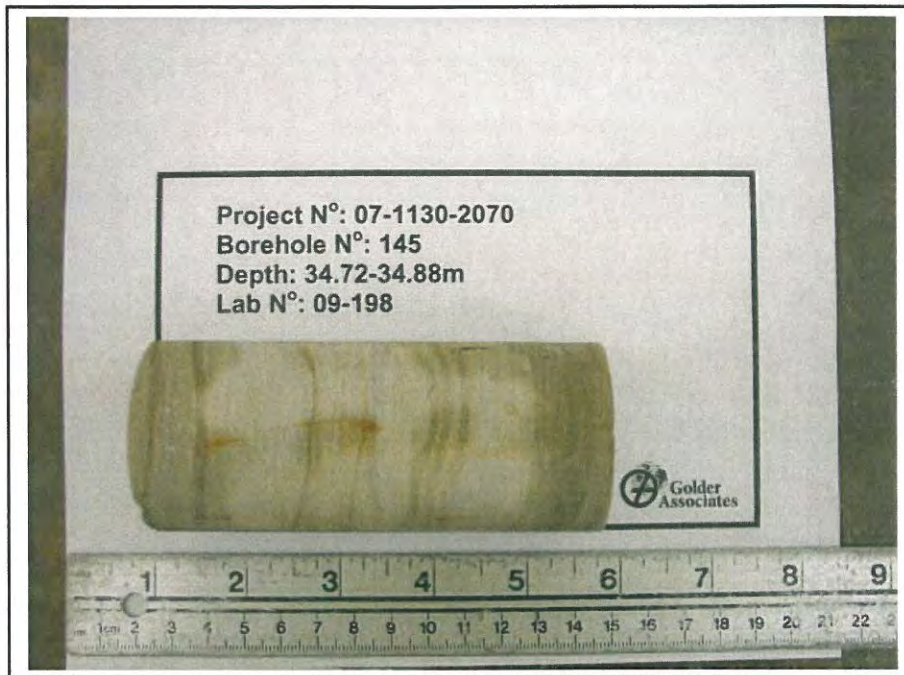
Checked By: *SJB*

**Golder Associates**

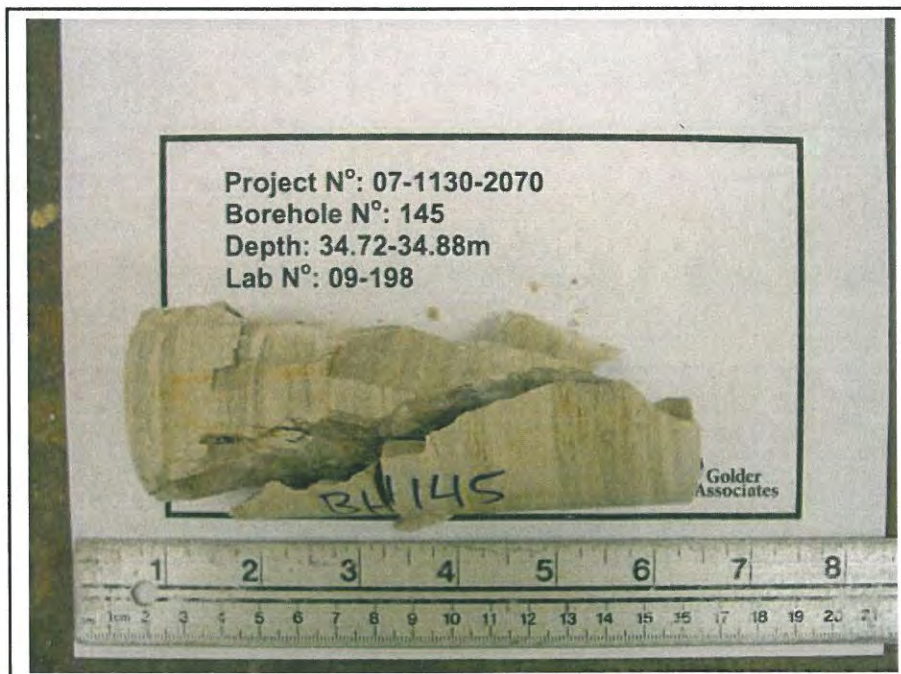


**UNCONFINED COMPRESSION TEST**  
ASTM D2166-98A

FIGURE BH 145 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB



# UNCONFINED COMPRESSION TEST (UC)

## ASTM D 7012-04

### SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	149	SAMPLE DEPTH, m	34.14-34.29

### TEST CONDITIONS

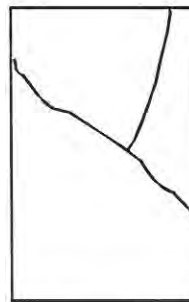
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.24

### SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.10	WATER CONTENT, (specimen) %	0.34
SAMPLE DIAMETER, cm	4.50	UNIT WEIGHT, kN/m <sup>3</sup>	24.92
SAMPLE AREA, cm <sup>2</sup>	15.90	DRY UNIT WT., kN/m <sup>3</sup>	24.84
SAMPLE VOLUME, cm <sup>3</sup>	160.63	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	408.38	VOID RATIO	0.07
DRY WEIGHT, g	407.00		

### VISUAL INSPECTION

### FAILURE SKETCH



### TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	78.3
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REMARKS:

DATE:

2/2/2009

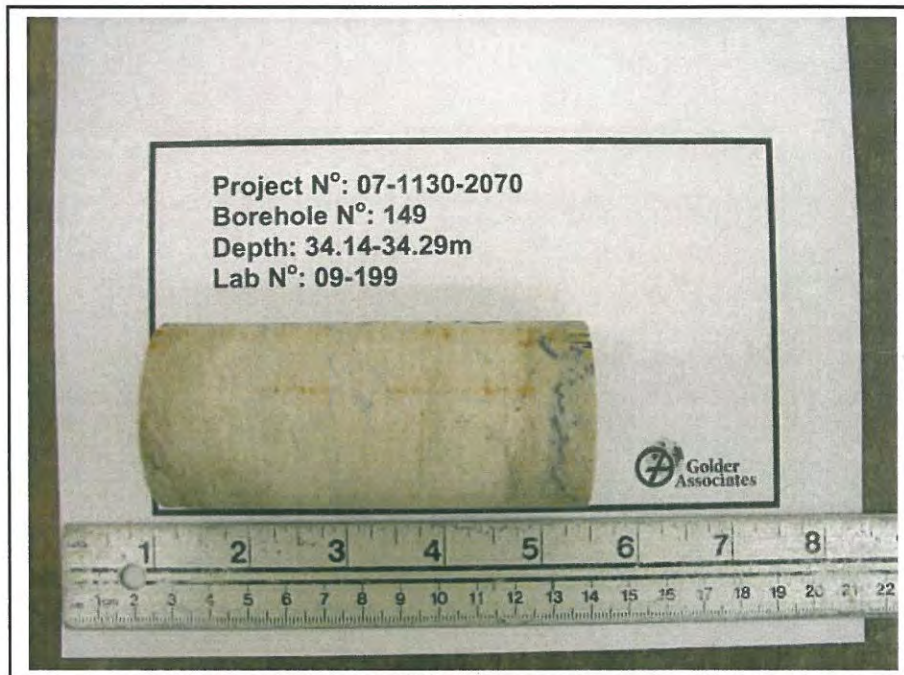
Checked By: *SJB*

**Golder Associates**

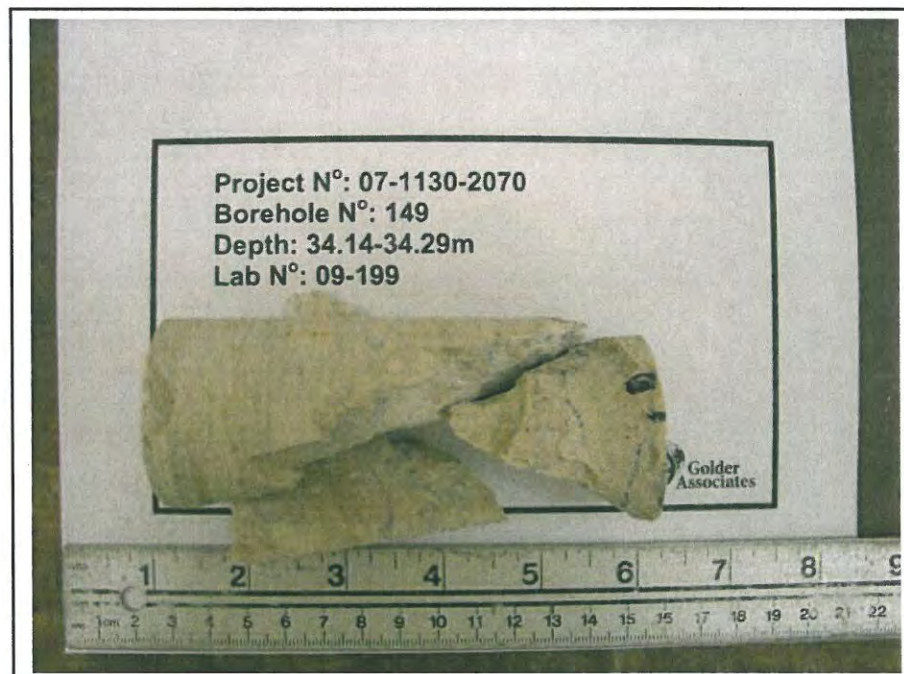
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 149 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. *SJB*

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	152	SAMPLE DEPTH, m	34.89-35.08

## TEST CONDITIONS

MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.29

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.80	WATER CONTENT, (specimen) %	1.93
SAMPLE DIAMETER, cm	4.71	UNIT WEIGHT, kN/m <sup>3</sup>	23.55
SAMPLE AREA, cm <sup>2</sup>	17.42	DRY UNIT WT., kN/m <sup>3</sup>	23.11
SAMPLE VOLUME, cm <sup>3</sup>	188.17	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	452.10	VOID RATIO	0.15
DRY WEIGHT, g	443.54		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	66.4
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REMARKS:

DATE:

2/2/2009

Checked By: *SSB*

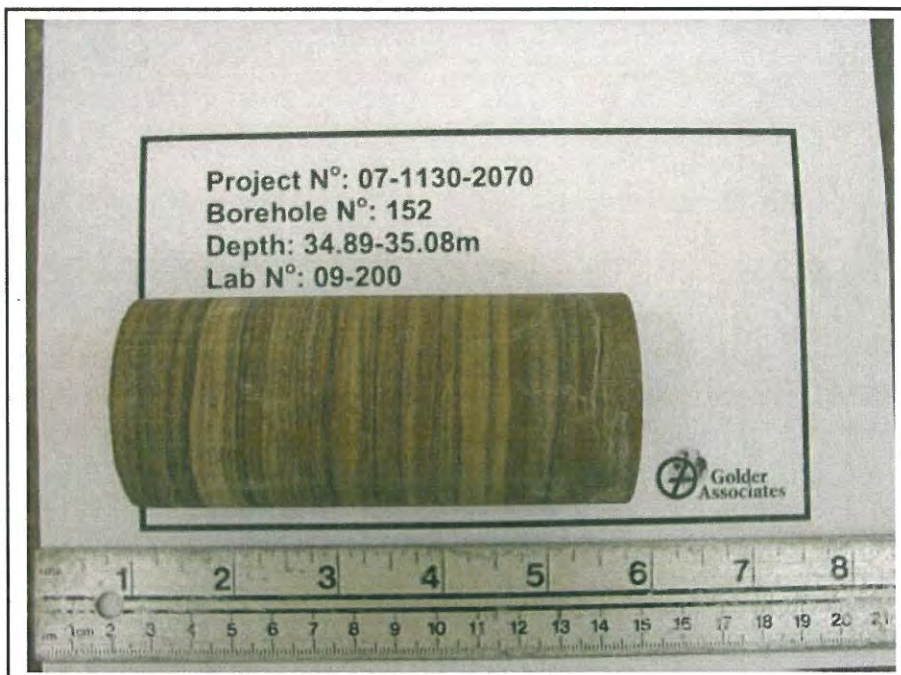
**Golder Associates**



# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 152 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB

# UNCONFINED COMPRESSION TEST (UC)

## ASTM D 7012-04

### SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	154	SAMPLE DEPTH, m	36.29-36.40

### TEST CONDITIONS

MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.37

### SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	11.15	WATER CONTENT, (specimen) %	2.31
SAMPLE DIAMETER, cm	4.71	UNIT WEIGHT, kN/m <sup>3</sup>	22.26
SAMPLE AREA, cm <sup>2</sup>	17.42	DRY UNIT WT., kN/m <sup>3</sup>	21.76
SAMPLE VOLUME, cm <sup>3</sup>	194.27	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	441.23	VOID RATIO	0.22
DRY WEIGHT, g	431.27		

### VISUAL INSPECTION

### FAILURE SKETCH



### TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	51.1
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REMARKS:

DATE:

2/2/2009

Checked By: *SB*

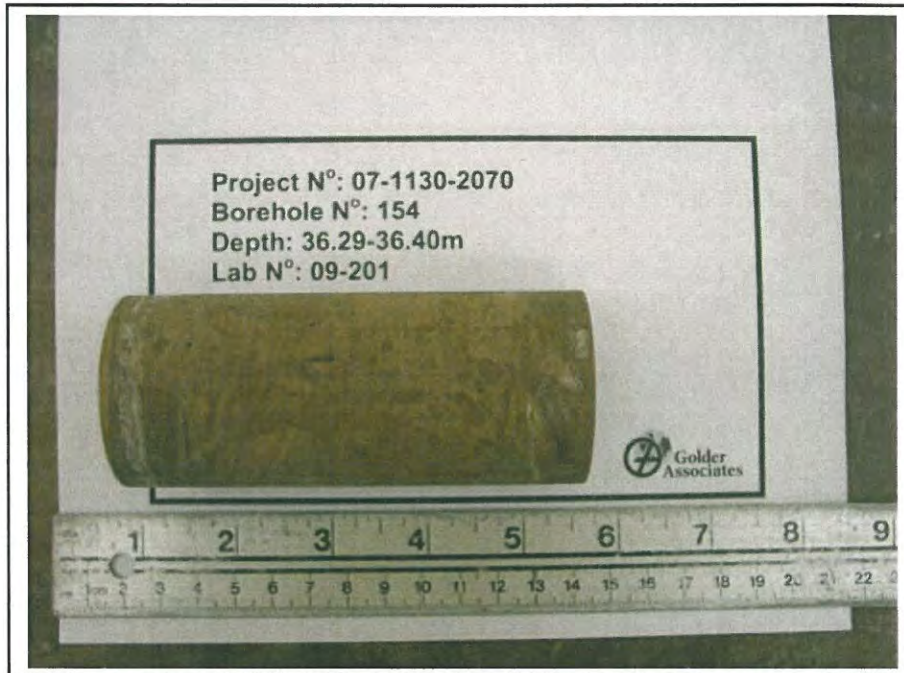
**Golder Associates**



# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 154 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	158	SAMPLE DEPTH, m	29.06-29.20

## TEST CONDITIONS

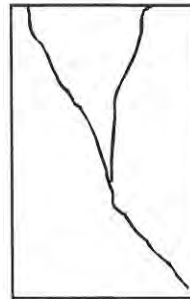
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	1.79

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	8.40	WATER CONTENT, (specimen) %	0.32
SAMPLE DIAMETER, cm	4.70	UNIT WEIGHT, kN/m <sup>3</sup>	24.83
SAMPLE AREA, cm <sup>2</sup>	17.35	DRY UNIT WT., kN/m <sup>3</sup>	24.75
SAMPLE VOLUME, cm <sup>3</sup>	145.74	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	369.11	VOID RATIO	0.07
DRY WEIGHT, g	367.93		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	41.0
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REMARKS: Not 2:2.5 sample too small.

DATE: 2/2/2009

Checked By: *SJB*

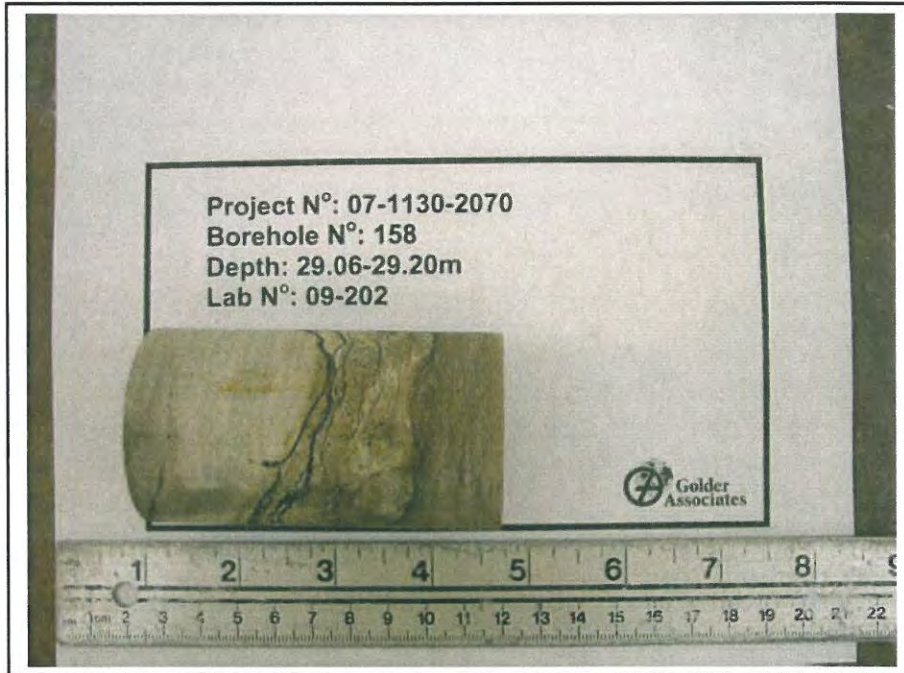
**Golder Associates**



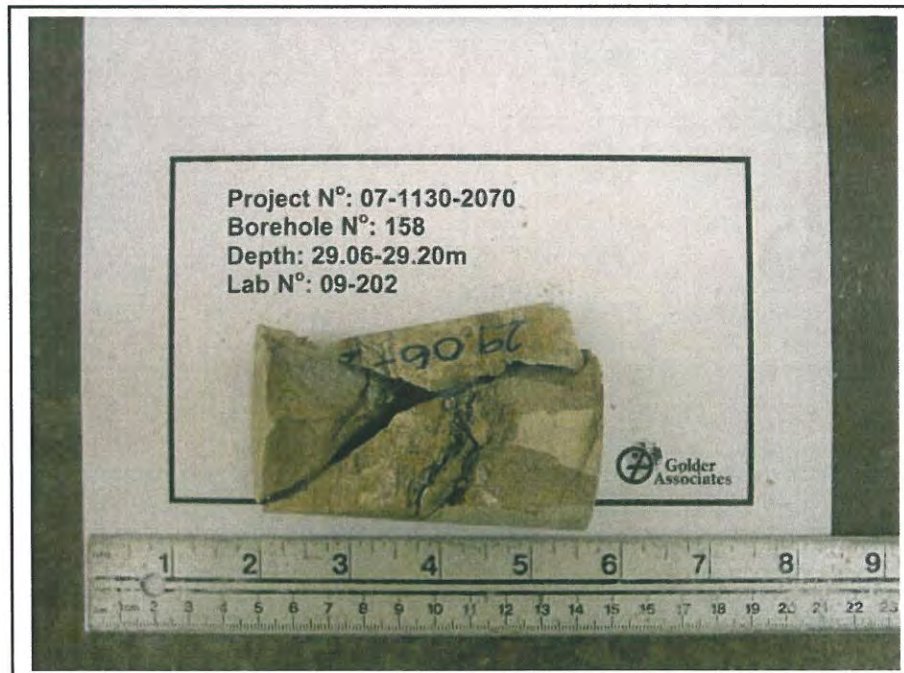
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 158 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJS

# UNCONFINED COMPRESSION TEST (UC)

## ASTM D 7012-04

### SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	160	SAMPLE DEPTH, m	25.83-25.98

### TEST CONDITIONS

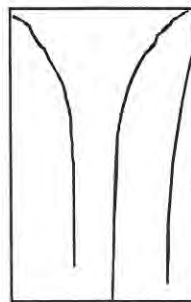
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.32

### SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	10.95	WATER CONTENT, (specimen) %	0.57
SAMPLE DIAMETER, cm	4.71	UNIT WEIGHT, kN/m <sup>3</sup>	24.95
SAMPLE AREA, cm <sup>2</sup>	17.42	DRY UNIT WT., kN/m <sup>3</sup>	24.81
SAMPLE VOLUME, cm <sup>3</sup>	190.79	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	485.64	VOID RATIO	0.07
DRY WEIGHT, g	482.89		

### VISUAL INSPECTION

### FAILURE SKETCH



### TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	61.3
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REMARKS:

DATE:

2/2/2009

Checked By: *SB*

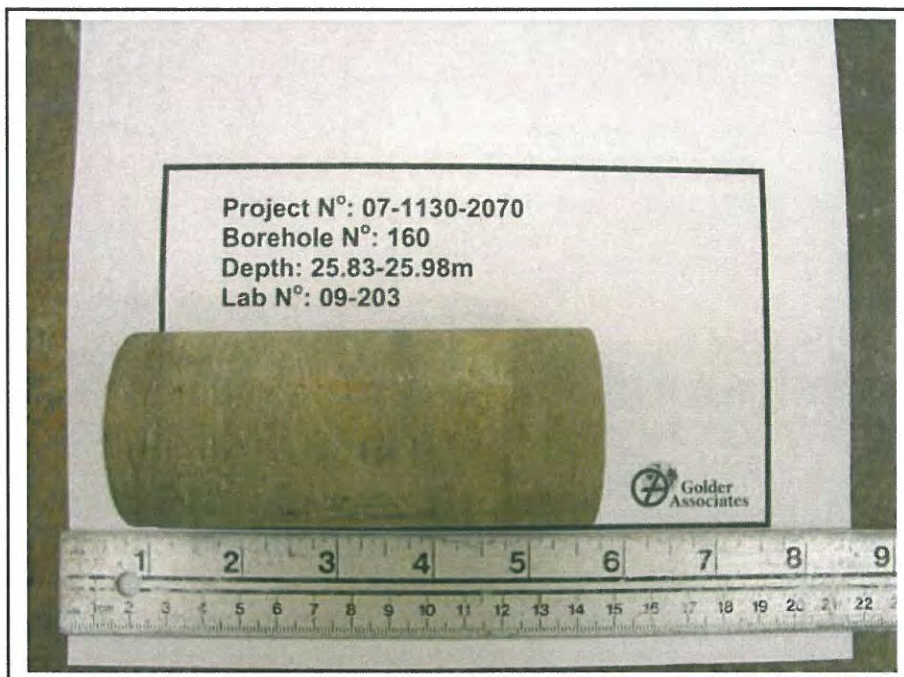
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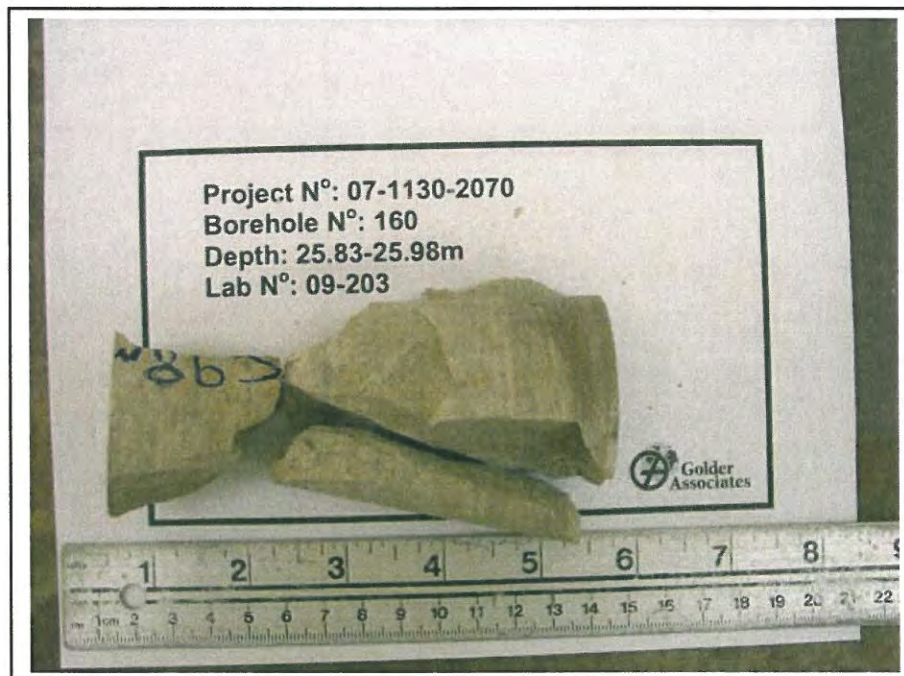
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 160 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB

# UNCONFINED COMPRESSION TEST (UC)

## ASTM D 7012-04

### SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	163	SAMPLE DEPTH, m	26.18-26.32

### TEST CONDITIONS

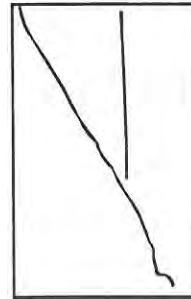
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.38

### SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	11.20	WATER CONTENT, (specimen) %	0.12
SAMPLE DIAMETER, cm	4.70	UNIT WEIGHT, kN/m <sup>3</sup>	23.52
SAMPLE AREA, cm <sup>2</sup>	17.35	DRY UNIT WT., kN/m <sup>3</sup>	23.49
SAMPLE VOLUME, cm <sup>3</sup>	194.31	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	466.18	VOID RATIO	0.13
DRY WEIGHT, g	465.62		

### VISUAL INSPECTION

### FAILURE SKETCH



### TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	56.4
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REMARKS:

DATE:

2/2/2009

Checked By: *SSB*

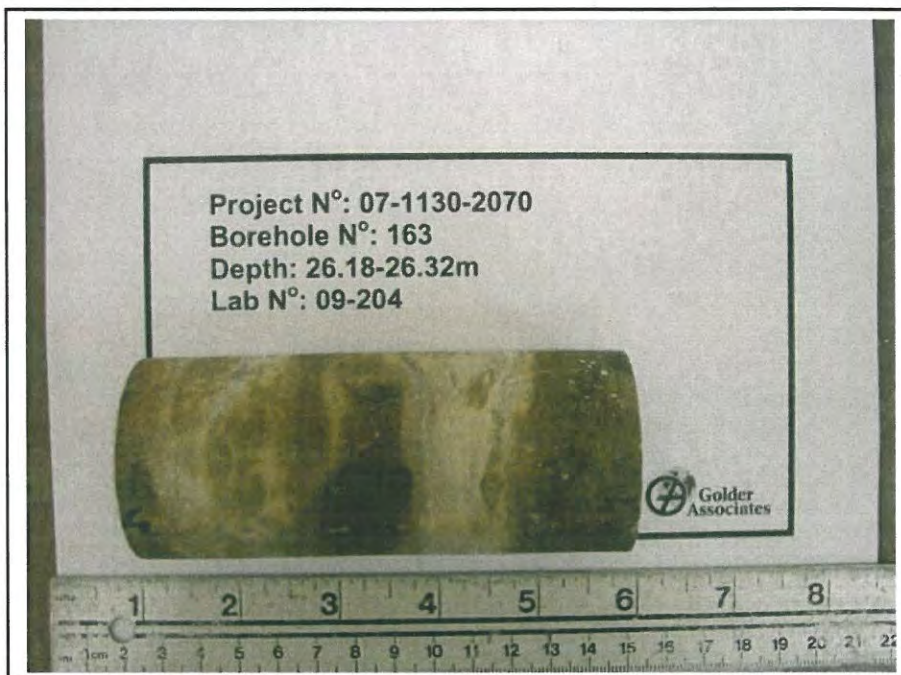
**Golder Associates**



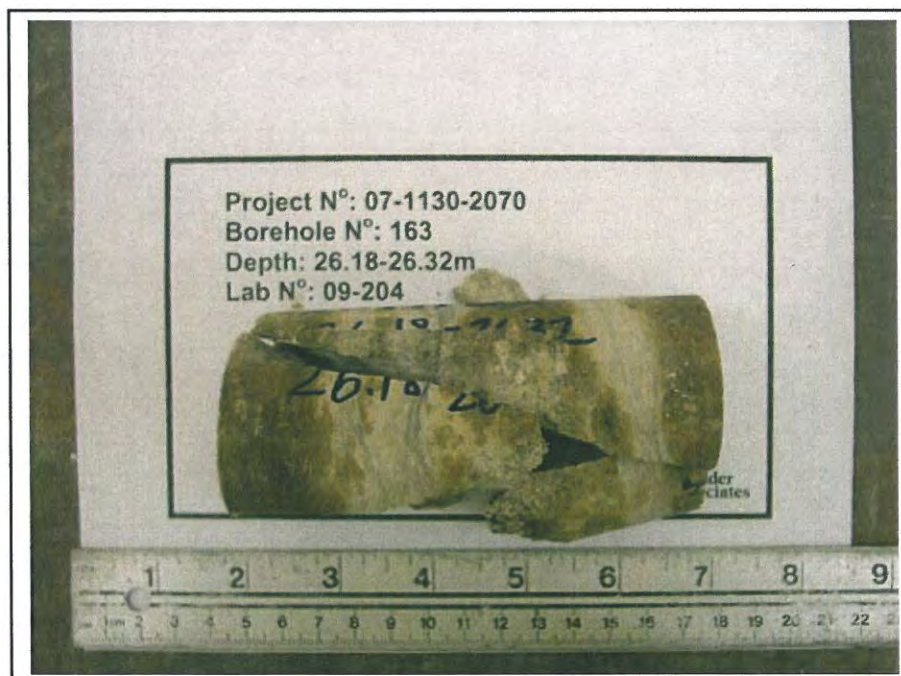
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 163 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJS

# UNCONFINED COMPRESSION TEST (UC)

ASTM D 7012-04

## SAMPLE IDENTIFICATION

PROJECT NUMBER	07-1130-2070	SAMPLE NUMBER	-
BOREHOLE NUMBER	166	SAMPLE DEPTH, m	26.55-26.70

## TEST CONDITIONS

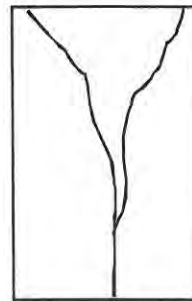
MACHINE SPEED, mm/min	-	TYPE OF SPECIMEN	Rock Core
DURATION OF TEST, min	>2 <15	L/D	2.43

## SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	11.40	WATER CONTENT, (specimen) %	0.08
SAMPLE DIAMETER, cm	4.70	UNIT WEIGHT, kN/m <sup>3</sup>	24.46
SAMPLE AREA, cm <sup>2</sup>	17.35	DRY UNIT WT., kN/m <sup>3</sup>	24.44
SAMPLE VOLUME, cm <sup>3</sup>	197.78	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	493.56	VOID RATIO	0.08
DRY WEIGHT, g	493.17		

## VISUAL INSPECTION

## FAILURE SKETCH



## TEST RESULTS

STRAIN AT FAILURE, %	-	COMPRESSIVE STRESS, MPa	47.4
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REMARKS:

DATE:

2/2/2009

Checked By: *SJB*

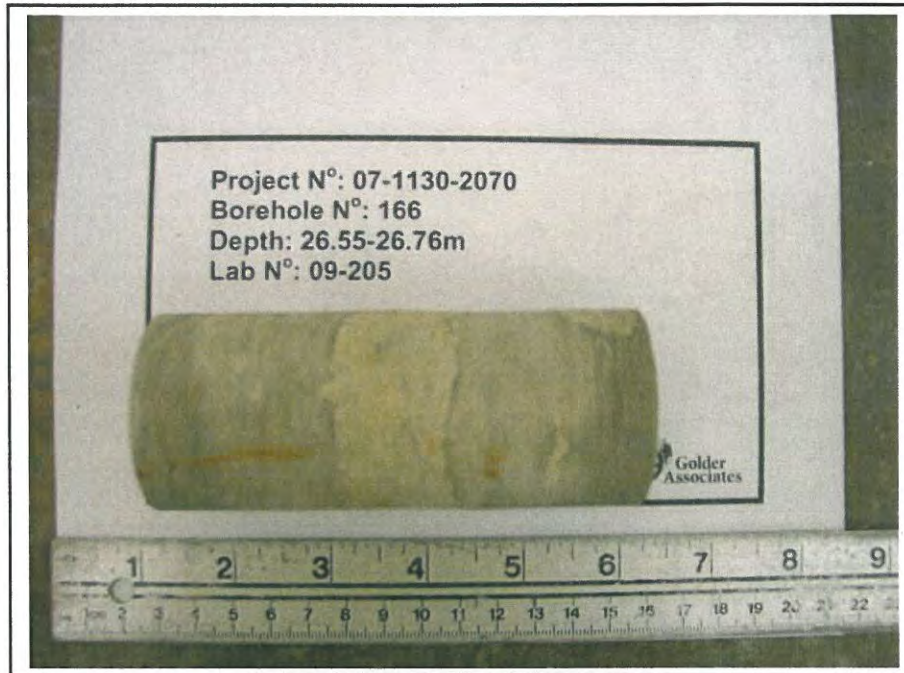
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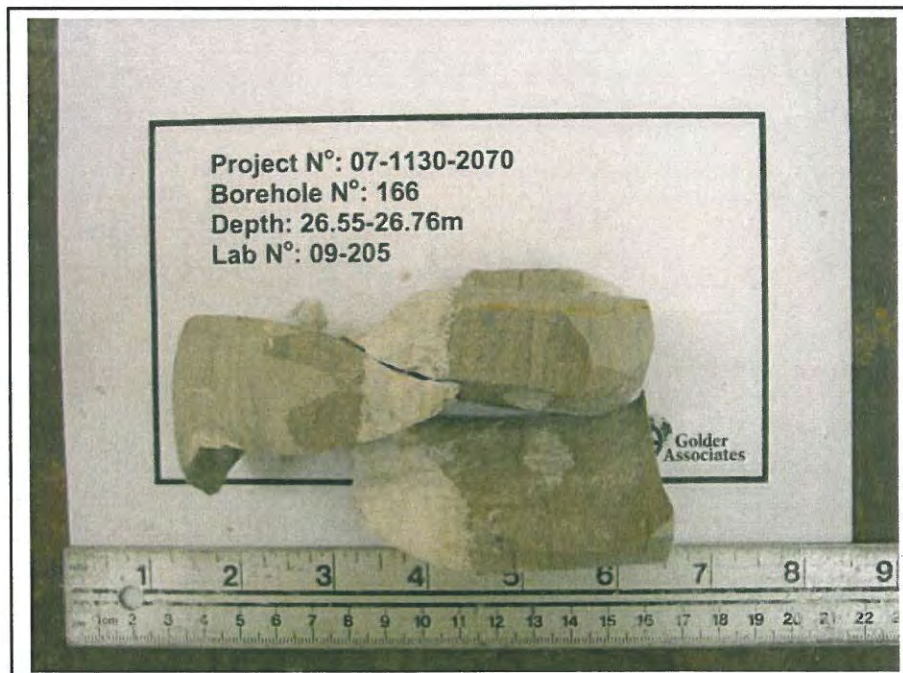
# UNCONFINED COMPRESSION TEST

ASTM D2166-98A

FIGURE BH 166 UC



BEFORE COMPRESSION



AFTER COMPRESSION

Date 2/3/2009  
Project 07-1130-2070

**Golder Associates**

Drawn AH  
Chkd. SJB



At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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Europe	+ 356 21 42 30 20
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