



Nketoana
Local Municipality

CONTRACT NO NKT 176/2018

FOR

**GEOTECHNICAL INVESTIGATION REPORT OF 20KM RAW
WATER PIPELINE FROM ARLINGTON TO LINDLEY**

**GEOTECHNICAL INVESTIGATION
REPORT**

FINAL

PREPARED FOR:

NSVT CONSULTANTS
1 FOURTH STREET
OFFICE 1A, ARBORETUM
BLOEMFONTEIN, 9301

CONTRACT NKT 176/2018

FOR

GEOTECHNICAL INVESTIGATION REPORT OF A 20KM RAW WATE PIPELINE FROM ARLINGTON TO LINDLEY

DATE: APRIL 2019

THIS DOCUMENT WAS COMPILED BY

MAGARENG CIVIL LABORATORY

7 Orleans Road, Bayswater, Bloemfontein, 9301

Tel: (078) 365 9862

Email: patric@mcivilab.co.za



QUALITY ASSURANCE ISSUE DATA

Report title:	Geotechnical Investigation Report (DRAFT)
Client:	NSVT CONSULTANTS
Project Name:	Geotechnical Investigation of 20km Raw Water pipeline from Arlington to Lindley
Project Number:	NKT 176/2018
Revision Number:	00

REVISION HISTORY

Date	Report Status	Written by	Reviewed by	Issued to	
				Name	Institution
22/03/2019	Draft	N. Klaas	W. Badenhorst	N/A	N/A
26/03/2019	Final draft	N. Klaas	W. Badenhorst	L. Tigedi	NSVT
10/04/2019	Final	N. Klaas	W. Bedenhorst	L. Tigedi	NSVT

SUBMISSION

APPROVED: _____

DATE: 10/04/2019

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION AND TERMS OF REFERENCE	2
2. DESCRIPTION OF THE SITE AND ACCESS.....	3
3. INVESTIGATION PROCEDURE.....	4
3.1 DESK STUDY	4
3.2 FIELD-WORK.....	4
3.3 LABORATORY TESTING.....	5
4. SITE GEOLOGY AND CLIMATE.....	5
4.1 GENERAL GEOLOGY	5
4.2 TOPOGRAPHY, DRAINAGE and SITE CLIMATE.....	6
4.3 GEOHYDROLOGY.....	6
5. SUMMARY OF LABORATORY RESULTS.....	7
5.1 POTENTIAL EXPANSIVENESS.....	9
5.2 EXCAVATION CLASSIFICATION.....	11
5.3 ERODABILITY.....	11
5.4 GROUND SLOPE STABILITY.....	11
5.5 CALIFORNIA BEARING RATIO TEST.....	11
6. ENGINEERING PROPERTIES OF SOILS.....	12
7. GEOTECHNICAL CONSIDERATIONS.....	12
7.1 CLASSIFICATION OF SOILS.....	12
7.2 EXCAVATABILITY	13
7.3 SOIL CLASSIFICATION	13
7.4 GROUND WATER.....	13
7.5 STABILITY OF SLOPES AND EXCAVATIONS.....	13
7.6 FLOOD LINE.....	13
8. CONCLUSIONS AND RECOMMENDATIONS.....	14
8.1 EXCAVATABILITY	14
8.2 GEOHYDROLOGY.....	14
8.3 CONSTRUCTION MATERIAL.....	14
8.4 STABILITY OF EXCAVATIONS.....	14
LIST OF REFERENCES.....	15
LIST OF APENDICES.....	16

TABLE OF FIGURES

Fig 1: Site Access.....3
Fig 2: Geological Map of the Study5
Fig 3: Macro-Climatic Regions of Southern Africa (Adapted from Weinert, 1980).....6
Fig 4: Regional Distribution of Expansive Clays.....10

TABLE OF TABLES

Table 1: Reference Summary2
Table 2: Summary of Laboratory Results.....7
Table 3: Estimated Potential Heave.....9
Table 4: Estimated Ultimate Bearing Capacity11
Table 5: COLTO/TRH14 Classification of Materials.....12

EXECUTIVE SUMMARY

Magareng Civil Laboratory was appointed by **NSVT Consultants** to compile a geotechnical engineering report based on the conditions on site. The investigation was carried out in March 2019.

The following activities were carried out to finalize this report

- Desktop Study
- Site Visit
- Field mapping
- Soil profiling
- Laboratory testing (in progress)

The coordinates of the site is 27°57'27.80"S 27°52'45.24"E.

The study area encompasses approximately 20 kilometers between Arlington and Lindley in the Free State Province. Forty (40) test pits were excavated to a depth of 2 meters or shallower refusal and the soil profiles were described according to the standard procedure.

Disturbed samples of the most prominent soil horizons were taken and submitted for indicator, CBR, pH and Conductivity tests. According to the test pits dug, some excavability constraints are expected on this site with 24 refusals shallower than 1.5m. Several rock outcrops (dolerite) were identified on site between test pits 34 and 40 near Lindley.

The geological map from the Council for Geosciences indicates that the site is underlain by fine- to medium-grained, yellow and khaki-coloured sandstone, red, purple and green mudstone of the Tarkastad Subgroup as part of the Beaufort Group. Post-Karoo dolerite intrusions may be encountered throughout the study area, especially near Lindley and Arlington. The soil horizons consisted of silty, clayey and sandy materials with ferricrete, sandstone, mudstone and dolerite encountered in places. The profiles were recorded in the attached soil profiles included as Annexure A.

No ground water occurred in any of the test pits. This may be due to the extreme dry conditions that currently exists in the country.

The potential expansiveness of the material encountered on the site was calculated according to the method proposed by Van der Merwe (1964). The following material characteristics are considered when applying this method:

- Clay content
- Plasticity index
- Liquid limit
- Linear shrinkage

Low expansive in almost ALL the test pits

The following geotechnical considerations that could influence the proposed development were identified:

Engineering properties of soils:

The clayey materials encountered on site should be cut to spoil insofar economically feasible while materials with a plasticity index below 10 being considered suitable for backfilling of the pipe line. The

bedding and blanket materials should comply with the relevant specifications as set by SANS 10200 or the relevant project specifications.

Generally speaking it could be summarised that the geotechnical conditions of the site are **FAVOURABLE** for the proposed pipe line, provided that cognisance is taken of the expected excavatability constraints.

1. INTRODUCTION AND TERMS OF REFERENCE

Magareng Civil Laboratory was appointed by NSVT to compile a materials report on the 20km raw water pipe line project between Alington and Lindley in the Free State Province. The site field investigation was undertaken according to the normal requirements for a pipeline project.

The following aspects were addressed in this report:

1.1 Geology and soil profiles

1.2 Geohydrology

1.3 Engineering properties of soil samples taken

The schedule of services include trial pits (40 for this project), with material classifications (classified according to COLTO), grading analysis, Atterberg limits and potential expansiveness of the in-situ material. For the purpose of this study, 20 foundation indicators were sampled with 20 maximum dry density, optimum moisture content and California Bearing Ratio samples.

Table 1: Reference Summary

Description	Quantity	Relevant method or specification
Test Pits Excavated	40 test pits	As per quotation, excavated by TLB.
Fieldwork and Sampling	20 samples	Sampled according to TMH 5 with relevance to SAICE Geotechnical Investigations Manual. No deviations were recorded.
Analysis of samples	20 samples	Subjected to analysis according to SANS 3001:2011 GR1, GR3, GR10, GR20, GR30 and GR40
Dynamic Cone Penetration Tests (DCP)	78 tests	As per quotation.
Material Classifications	20 classifications	According to COLTO 1998 and TRH14
pH and Conductivity	0 samples	Subjected to analysis according to TMH1 1986: Methods A20 and A21

Phase 1: Fieldwork, which includes the excavation of 40 Test pits, profiled to at least 2m deep or to shallower refusal for soil profiling and sampling purposes as part of the contract.

Phase 2: Laboratory testing to establish the characteristics of the in-situ material on site done by **MAGARENG CIVIL LABORATORY (PTY) LTD**

The testing includes:

- Sieve Analysis and Grading
- Hydrometer Analysis and Moisture content testing
- Atterberg Limits
- Moisture Density Relationship and Californian Bearing Ratio

Phase 3: Assessment Reporting done by N Klaas, which includes the following:

- Geotechnical assessment of the site conditions and recommendations thereon
- Any Precautions to be taken with regards to the geotechnical conditions for the proposed development.
- Other requirements

This report outlines the method of the investigation and describes the geological conditions encountered. The results of the investigation are evaluated and conclusions drawn with regard to the above objectives.

2. DESCRIPTION OF THE SITE AND ACCESS

Arlington is a very small town in the north eastern Free State on the R707 between the towns of Lindley and Senekal. Arlington's 'reason for being' is primarily as an agricultural rail-link, at the rail juncture between the Lindley – Senekal Line and the Bethlehem – Steynsus Line.

Arlington form part of Nketoana Local Municipality (NLM) jurisdiction situated within the Thabo Mofutsanyana District. The site geographical coordinates are 28° 2' 0" South, 27° 51' 0" East.

The study area encompasses approximately 20km between Arlington and Lindley in the Free State Province. Forty (40) test pits were excavated to a depth of 2 meters or shallower refusal and the soil profiles were described according to the standard proposed by Jennings, Brink and Williams (1973).

Access to the site is obtained as follows: (Figure 1)

Figure 1: Site Access



3. INVESTIGATION PROCEDURE

3.1 DESK STUDY

A desk study involving the perusal of the 1:250 000 geological maps as well as a detailed geological description of the area by Brink (1979) was undertaken to establish broad geological boundaries. Geological information obtained from the Council of Geoscience is depicted in Figure 2 within section 4.1.

3.2 FIELD-WORK

The field-work included the excavation of 40 test pits, TP1 to TP40, across the site, in order to determine the soil formations of the underlying soil and to obtain samples for possible laboratory testing.

The test pits were excavated by TLB to a depth of 3 meters or refusal. The test pit positions are indicated on Figure 1. The soil profiling of the 40 test pits was carried out according to the guidelines proposed by Jennings et al (1973). The profile logs of the test pits are given in Appendix A. Soil samples were taken from strategic horizons along the sides of the test pits for laboratory testing (Appendix B).

3.3 LABORATORY TESTING

Soil samples taken during the field-work stage were submitted to the laboratory for the following testing:

- a) Foundation Indicator Test: SANS 3001 GR1, GR10
- b) Optimum Moisture Content and Maximum Dry Density Test: SANS 3001: GR20 and GR30
- c) Californian Bearing Ratio of a Soil Sample: SANS 3001 GR40
- d) pH Test: TMH1 – Test Method A20
- e) Conductivity Test: TMH1 – Test Method A21T

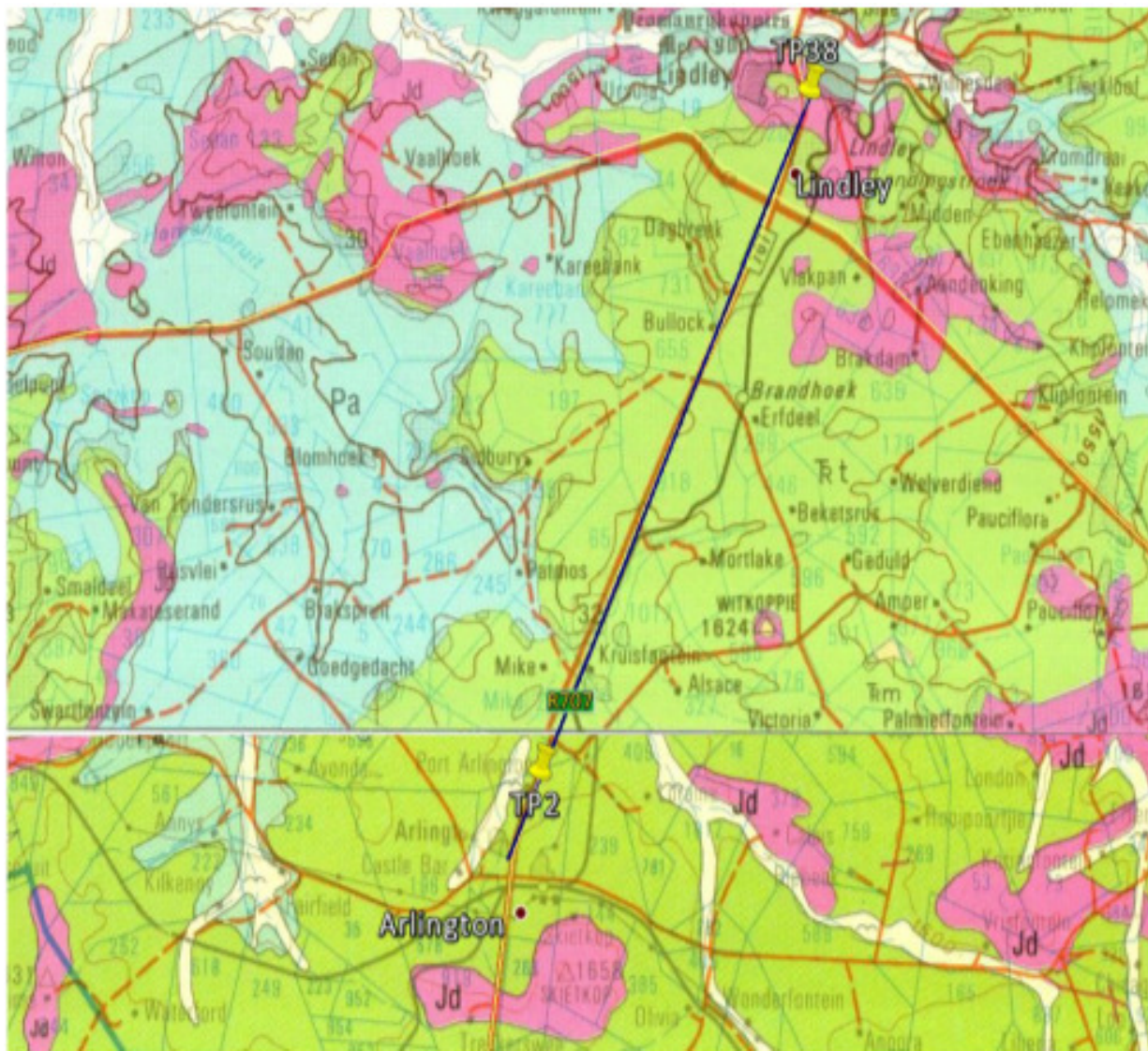
The test results are included in Appendix B at the back of the report.

4. SITE GEOLOGY AND CLIMATE

4.1 GENERAL GEOLOGY

The geological map from the Council for Geosciences indicates that the site is underlain by fine- to medium-grained, yellow and khaki-coloured sandstone, red, purple and green mudstone of the Tarkstad Subgroup as part of the Beaufort Group. Post-Karoo dolerite intrusions may be encountered throughout the study area, especially near Lindley and Arlington. The soil horizons consisted of silty, clayey and sandy materials with ferricrete, sandstone, mudstone and dolerite encountered in places. The profiles were recorded in the attached soil profiles included as Annexure A.

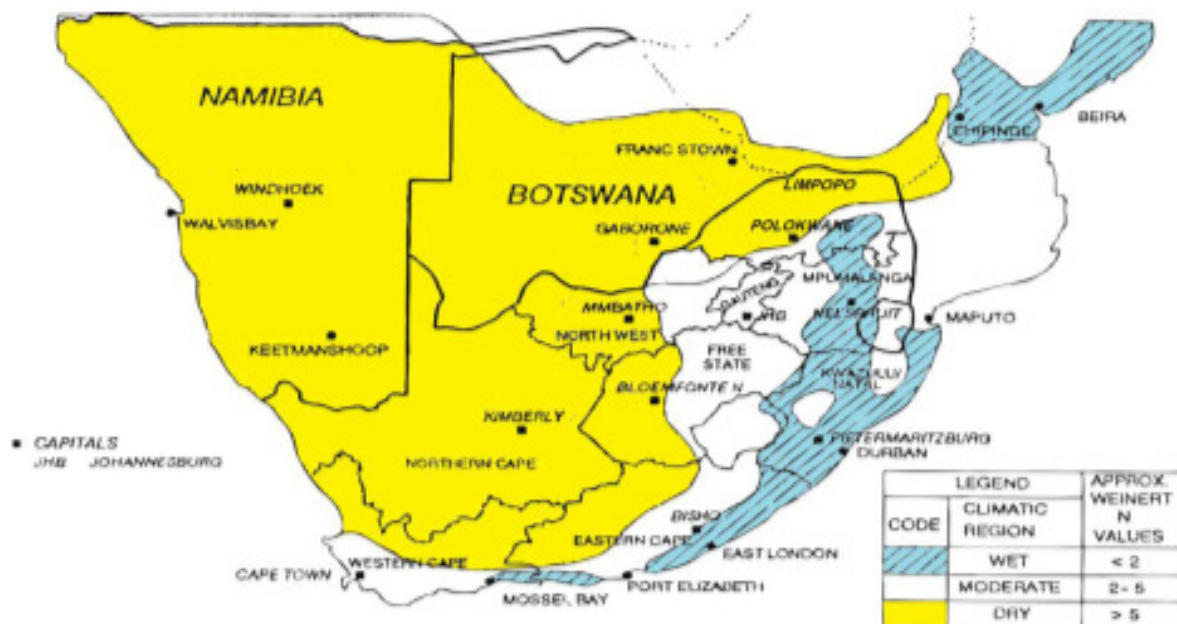
Figure 2: Geological Map of the Study Area



4.2 TOPOGRAPHY, DRAINAGE and SITE CLIMATE

The study area is next to Route R707 between Arlington and Lindley. The drainage of Route 707 may lead to an influx of moisture into the soil profile, drainage measures may be required if problem materials exists in the soil profile. The study area has a flattish gradient and appears to drain well. The area is located in a moderate climatic zone of South Africa with a Weinert N-value between 2 and 5. The region is a moderate one with warm summers, summer rainfall and cold dry winter months.

Figure 3: Macro-Climatic Regions of Southern Africa (Adapted from Weinert, 1980)



4.3 GEOHYDROLOGY

No ground water occurred in any of the test pits. This may be due to the extreme dry conditions that currently exists in the country.

5. SUMMARY OF LABORATORY RESULTS

Table 2: Summary of Laboratory Results

TEST PIT	DEPTH (mm)	MATERIAL DESCRIPTION	PLASTICITY INDEX	PASSING 5mm	PASSING 0.425mm	PASSING 0.075mm	GRADING MODULUS	LIQUID LIMIT	MAXIMUM DRY DENSITY	OPTIMUM MOISTURE CONTENT	CBR AT 95% MOD AASHTO	CLASSIFICATION COLTO/TRH 14
1	1740	Reddish clayey sand with mudstone	10.3	98	93		1.11	31.52	1940	11.3	23	
2	2000	Shale plus clay	15.8	65	40	25	1.82	37.8	1952	10.7	25	
3	1250	Dark brown, shale plus clay	8	93	83		1.28	32.97	1892	10.5	25	
4	1150	Dark brown, clay soil + fercrete	16.2	98	88		1.2	34.56				
6	2070	Sandstone plus clay	17.2	99	90		1.13	37.39	1876	12.7	25	
7	2070	Dark brown, sandstone plus clay	16	90	84		1.29	42.29	1743	14.2	24	
8	1140	Reddish sandstone plus clay	14.9	92	86		1.24	35.84	1827	14.2	25	
9	2055	Reddish clayey sand with sandstone	9.9	100	99	61	0.41	28.5	1886	13.6	24	
10	2150	Dark brown silty sandstone plus clay	14.8	92	96		1.31	36.47	1843	15.5		
11	1160	Dark brown clay soil and fercrete	14.23	99	96		1.06	36.93				
12	1100	Shale plus clay	16.2	71	61		1.71	40.44	1977	10.6	25	
13	1640	Shale plus clay	16.2	65	50	18.8	1.722	39.9	1897	11.2	24	
14	1000	Yellowish soft sandstone	9.3	98	93		1.13	27.65				

16	800	Yellowish soft sandstone	6.3	43	38		2.22	31.57				
18	1420	Dark brown sandstone plus clay	6.7	67	53	23	1.65	26.20	1956	11.7	25	
19	410	Grey Calcrete silty stone plus clay	11.8	98	95		1.09	34.72	1865	12.8	24	
20	1550	Light brown calcrete silty sand with clay	9.9	87	73	51	0.94	28.2	1953	12.1	25	
21	2010	Light brown calcrete silty stone with clay	15.56	92	82		1.29	38.26	1914	13.2	23	
22	1740	Clayey sand with sandstone	9.1	89	77	48	0.9	26.5	1894	12.2	25	
23	1500	Dark brown clayey sand with sandstone	11.7	82	69	44	1.09	29.4	1941	14.7	25	
24	1440	Dark brown sandstone	18.2	97	87		1.2	39.11	1831	15.7	26	
25	1510	Light brown silty calcrete plus silty sandstone	5.1	70	63	21	1.5	24.6	2000	10.4	23	
26	2020	Reddish brown sandstone plus clay	23.26	92	80		1.37	56.59	1875	13.7	25	
27	2010	Grey calcrete plus clay	20.16	95	87		1.21	45	1845	15.5	25	
31	1440	Light brown clayey sand with calcrete	10.7	70	61	43	1.31	28.1				
32	1100	Yellowish soft clay soil plus ferrecrete	14.3	97	87		1.21	36.01				
33	2040	Dark brown clayey sand with sandstone	18	95	91	60	0.57	39	1677	17.7	26	

The relevant engineering characteristics of the materials encountered have been evaluated by visual assessment during profiling and from the results of the field and laboratory testing; these may be summarized as follows:

5.1 POTENTIAL EXPANSIVENESS

The potential expansiveness of the materials encountered on the site was calculated according to the method proposed by Van der Merwe (1964). The following material characteristics are considered when applying this method:

- Clay content
- Plasticity index
- Liquid limit
- Linear shrinkage

The method of Van der Merwe (1964) was used to determine the potential heave of soil samples. In addition to Van der Merwe's method, the plasticity index and linear shrinkage of soil samples were used to indicate the soils potential expansiveness. From the laboratory test results the potential expansiveness of all soils on the site is as follows:

Table 3 : Estimated Potential Heave

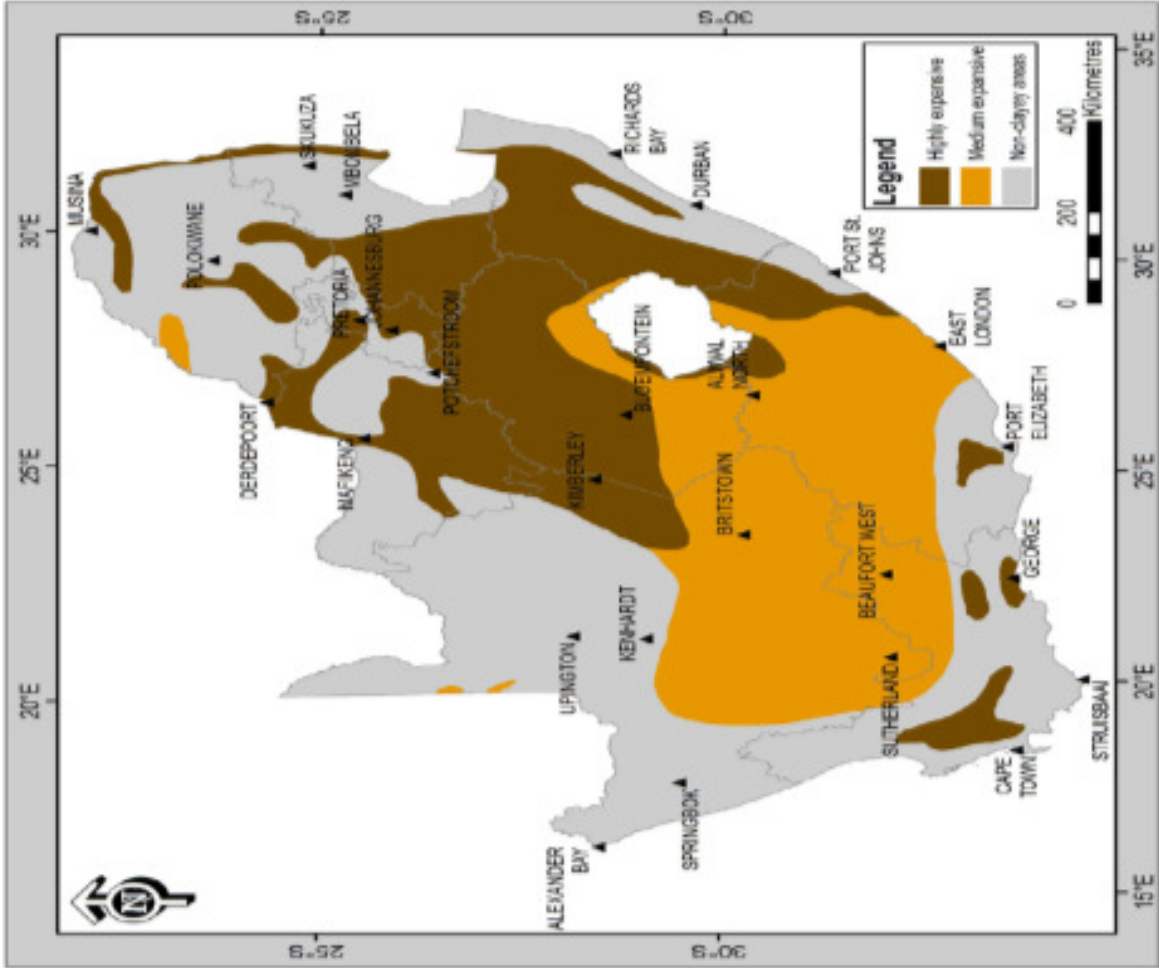
Test Pit	Depth (mm)	Plastic Index	Passing 0.045mm	Heave Potential	Estimated Heave (mm)
1	720 – 1740	10.3	93	Low	0
2	370 – 2000	15.8	40	Low	0
3	630 – 1250	8	83	Low	0
4	510 – 1150	16.2	88	Medium	8.6
6	650 – 2070	17.2	90	Medium	15.7
7	600 – 1140	16	84	Low	0
8	1220 – 2055	14.9	86	Low	0
9	860 – 2150	9.9	99	Low	0
10	820 – 1650	14.8	96	Low	0
11	520 – 1160	14.2	96	Low	0
12	220 – 1100	16.2	61	Low	0
13	250 – 1640	16.2	50	Low	0
14	100 – 1000	9.3	93	Low	0
16	300 – 800	6.3	38	Low	0
18	510 – 1420	6.7	58	Low	0
19	410 – 1210	11.8	95	Low	0
20	660 – 1550	9.9	73	Low	0
21	670 – 2010	15.56	82	Low	0
24	650 – 1440	18.2	87	Low	0
25	610 – 1510	5.1	63	Low	0
26	820 – 2020	23.26	80	Low	0
27	450 – 2010	26.26	87	Low	0
31	750 – 2040	10.6	61	Low	0
32	+700	14.3	87	Low	0

Low expansive in almost all the test pits. Medium expansive was experienced in test pits 4 and 6.

Based on van der Merwe's method (1964) heaving clays are considered to be a geotechnical constraint on site. Heaving clays may lead to significant upwards forces which may have an adverse effect on the proposed pipelines. Clayey materials should not be used for backfilling, bedding or blanket materials and should be cut to spoil in-so-far economically feasible.

The site classes are indicated on the soil profiles.

Figure 4: Regional Distribution of Expansive Clays



5.2 EXCAVATION CLASSIFICATION

Excavatability is defined as the ease with which the ground can be dug to a depth of 1,5m. This is of importance for urban development as increased costs are associated with installing services or foundations in areas where difficulty is experienced during the investigation stage.

According to the test pits dug, some excavability constraints are expected on this site with 24 refusals shallower than 1.5m. Several rock outcrops (dolerite) were identified on site between test pits 5, 15, 17, 28, 29, 30, 34 to 40 near Lindley.

In terms of the SABS 1200 the excavations can be classified as soft to intermediate to 1 meter in depth where after it becomes intermediate to hard.

5.3 ERODABILITY

There were no signs of piping (erosion) visible on site.

5.4 GROUND SLOPE STABILITY

No unstable geological materials that can move either gradually (creep) or suddenly as a slump or a slide are visually present.

5.5 CALIFORNIA BEARING RATIO TEST

California Bearing Ratio (CBR) Tests were conducted to determine the estimated ultimate bearing capacity of the saturated material. This serves as a relatively conservative estimation of the bearing capacity of the in-situ material under the worst expected conditions with the assumption that naturally consolidated materials, especially those with overburden in excess of 500mm, will have the same (or higher) degree of consolidation than a MOD AASHTO of 95%.

A paper by W.P.M Black titled "The Calculation of Laboratory and In-situ Values of California Bearing Ratio from Bearing Capacity Data" indicates that the CBR values of material are roughly 10% of the ultimate bearing capacity (q_u) of the material. In the paper W.P.M Black suggests using a lower factor in order to obtain more conservative values.

The CBR values can be summarised as follows:

Table 4: Estimated Ultimate Bearing Capacity (q_u)

Test Pit	Depth (mm)	CBR value at 95% MOD AASHTO	ESTIMATED BEARING CAPACITY (kPa)
1	1740	23	195.5
2	2000	25	212.5
3	1250	25	212.5
4	1150		
6	2070	25	212.5
7	2070	24	204
8	1140	25	212.5
9	2055	24	204
10	2150		
11	1160		
12	1100	25	212.5
13	1640	24	204

14	1000	23	195.5
16	800		
18	1420	25	212.5
19	410	24	204
20	1550	25	212.5
21	2010	23	195.5
22	1740	25	212.5
23	1500	25	212.5
24	1440	26	221
25	1510	23	195.5
26	2020	25	212.5
27	2010	25	212.5
31	1440		
32	1100		
33	2040	26	221

6. ENGINEERING PROPERTIES OF SOILS

The clayey materials encountered on site should be cut to spoil insofar economically feasible while materials with a plasticity index below 10 being considered suitable for backfilling of the pipe line. The bedding and blanket materials should comply with the relevant specifications as set by SANS 10200 or the relevant project specifications.

7. GEOTECHNICAL CONSIDERATIONS

7.1 CLASSIFICATION OF SOILS

The materials were classified in terms of COLTO and TRH14 for road construction purposes, as shown in the summary of the test pit data. The engineering properties can be summarised as follows:

Table 5: COLTO/TRH14 Classification of Materials

Test Pit	Layer (mm)	Classification
1	720 – 1740	G6/G7
2	370 – 2000	<G9/<G10
3	630 – 1250	G6/G7
4	510 – 1150	<G9/<G10
6	650 – 2070	<G9/<G10
7	600 - 1140	<G9/<G10
8	1220 – 2055	<G9/<G10
9	860 – 2150	G6/G7
10	820 – 1650	<G9/<G10
11	520 - 1160	<G9/<G10
12	220 – 1100	<G9/<G10
13	250 – 1640	<G9/<G10
14	100 – 1000	G6/G7
16	300 – 800	G6/G7
18	510 – 1420	G6/G7
19	410 – 1210	G6/G7
20	660 – 1550	G6/G7
21	670 – 2010	<G9/<G10
24	650 – 1440	<G9/<G10
25	610 – 1510	G6/G7
26	820 – 2020	<G9/<G10
27	450 - 2010	<G9/<G10
31	750 – 2040	G6/G7

Typically material classified as a G5, G6, G7 or G8 can be used for road construction and material classified as G5, G6 and G7 can be used as backfill material, depending on the engineering design and specifications supplied by the consulting engineer.

7.2 EXCAVATABILITY

Several rock outcrops were identified between test pits 34 and 40 near Lindley. Twenty-four (24) test pits refused at depths shallower than 1.5 meters with 9 test pits refusing at depths shallower than 1.0 meter. Excavability constraints are expected.

7.3 SOIL CLASSIFICATION

The materials are predominantly clayey, silty and sandy materials with building rubble, organic matter and plastic encountered between 100-600mm.

7.4 GROUND WATER

No ground water was encountered in any of the test pits. Test pit 28 was located in a large pond of water and was not excavated. Water draining from the R707 may ingress into the soil profile.

7.5 STABILITY OF SLOPES AND EXCAVATIONS

All side walls were stable.

7.6 FLOOD LINE

An exact flood-line should be determined, but in this report it is suggested that 1:50 year flood-line is adopted.

8. CONCLUSIONS AND RECOMMENDATIONS

It is important to note that the recommendations are based primarily on the profiling of test pits and the interpolation of information between test pits. It is therefore possible that variations from the expected conditions can occur.

8.1 EXCAVATABILITY

Several refusals shallower than 800mm indicate that excavability may be a constraint on site.

8.2 GEOHYDROLOGY

Excavations are to be adequately drained should drain water fill trenches during construction or if the water tables rise.

8.3 CONSTRUCTION MATERIAL

The clayey materials encountered on site should be cut to spoil insofar economically feasible while materials with a plasticity index below 10 being considered suitable for backfilling of the pipe line. The bedding and blanket materials should comply with SABS 1200LB.

8.4 STABILITY OF EXCAVATIONS

Excavations were all stable and no side walls collapsed.



W.S. BADENHORST Engineering Technologist (Btech Civil)
Pr Tech Eng (Civil) ECSA Reg nr 201770095

LIST OF REFERENCES

- BRINK A BA. 1985. **ENGINEERING GEOLOGY OF SOUTHERN AFRICA.**
Building Publications: Pretoria.
- DAS B M. 1994. **PRINCIPLES OF GEOTECHNICAL ENGINEERING.**
P WS Publishing Company: Boston.
- HARMSE H J VON M. **DISPERSIEW E GROND EN HUL ONTSTAAN, IDENTIFIKASIE EN STABILISASIE. GROUND PROFILE NO. 22, APRIL 1980.**
- HANDY KH. 1973 **COLLAPSIBLE IOESS IN IOWA. PROCEEDINGS OF THE SOIL SOCIETY OF AMERICA, VOL. 37, 281-284, 1973.**
- JENNINGS J E et al. 1973. **REVISED GUIDE TO SOIL PROFILING FOR CIVIL ENGINEERING PURPOSES IN SOUTHERN AFRICA. THE CIVIL ENGINEERING IN SOUTH AFRICA.**
Volume 15, No. 1, pp. 3-12. SAICE: Johannesburg.
- JENNINGS J E & KNIGHT K. 1975. **A GUIDE TO CONSTRUCTION ON OR WITH MATERIALS EXHIBITING ADDITIONAL SETTLEMENT DUE TO "COLLAPSE" OF GRAIN STRUCTURE. PROCEEDINGS OF THE SIXTH REGIONAL CONFERENCE FOR AFRICA ON SOIL MECHANICS AND FOUNDATION ENGINEERING. pp. 99-105. Durban.**
- NHBRC. 1999. **NATIONAL HOME BUILDERS REGISTRATION COUNCIL, HOME BUILDING MANUAL PARTS 1 & 2. REVISION NO.:1, 1999.**
- PECK R B et al. 1974. **FOUNDATION ENGINEERING.**
John Wiley & Sons: New York.
- PRIKLONSKI V A, 1952 **GRUNTOVEDENIE VITORAIC CHAST. GOSGEOLZDAT, MOSCOW, 1952. (ENGLISH: BELL F G, CULSHAW M G & NORTHMORE K J., THE METASTABILITY OF SOME GULL-FILL MATERIALS FROM ALINGTON, KENT, UK. QUARTERLY JOURNAL OF ENGINEERING GEOLOGY AND HYDROGEOLOGY, 36; ISSUE 3, 217-229).**
- SCHMERTMANN J H. 1955. **THE UNDISTURBED CONSOLIDATION BEHAVIOUR OF CLAY.**
ASCE, Transactions, Volume 120.
- SCHWARTZ K. 1985. **COLLAPSIBLE SOILS. THE CIVIL ENGINEERING IN SOUTH AFRICA, Volume 27, No. 7, pp. 379 - 393. SAICE: Johannesburg.**
- VAN DER MERWE D H. 1964. **THE PREDICTION OF HEAVE FROM THE PLASTICITY INDEX AND PERCENTAGE CLAY FRACTION OF CLAYS. CIVIL ENGINEER IN SOUTH AFRICA, 6, JUNE 1964.**
- SAVAGE P F. 2007. **EVALUATION OF POSSIBLE SWELLING POTENTIAL OF SQL.**
Proceedings of the 26th South African Transport Conference (SATC 2007), 9 – 12 July 2007.

LIST OF APPENDICES


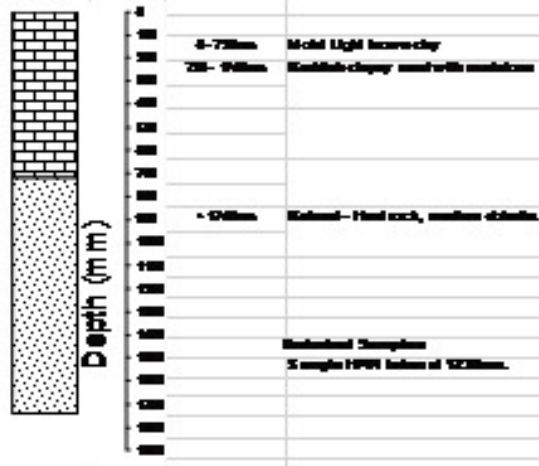


APPENDIX A: Soil Profile Sheets



APPENDIX B: Laboratory Test Results


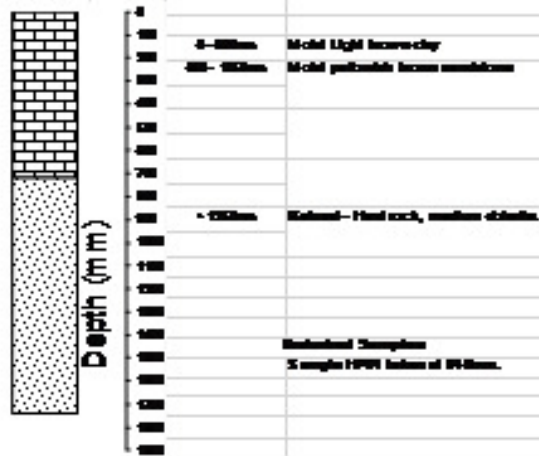


APPENDIX C: Dynamic Cone Penetrometer

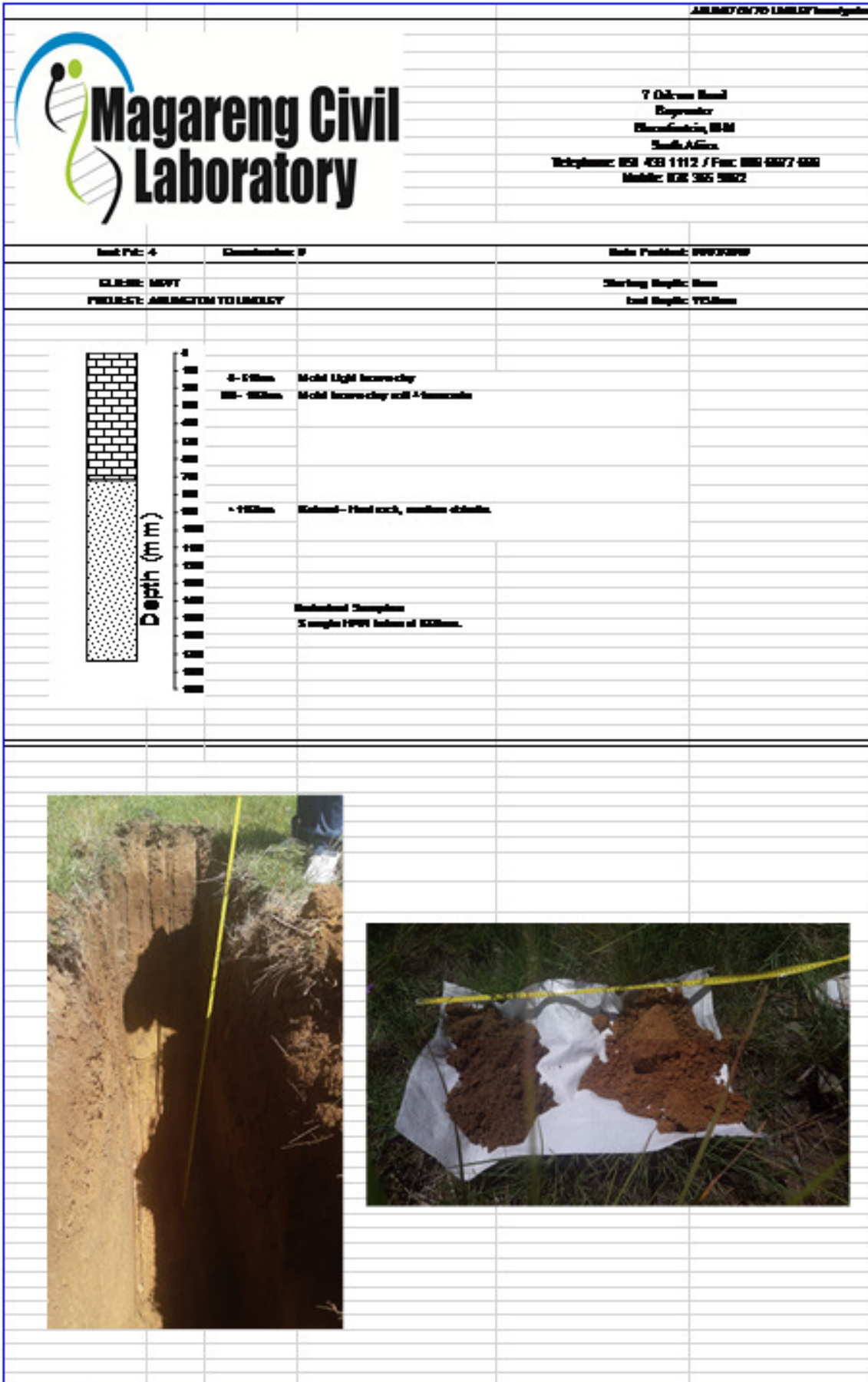
APPENDIX A:

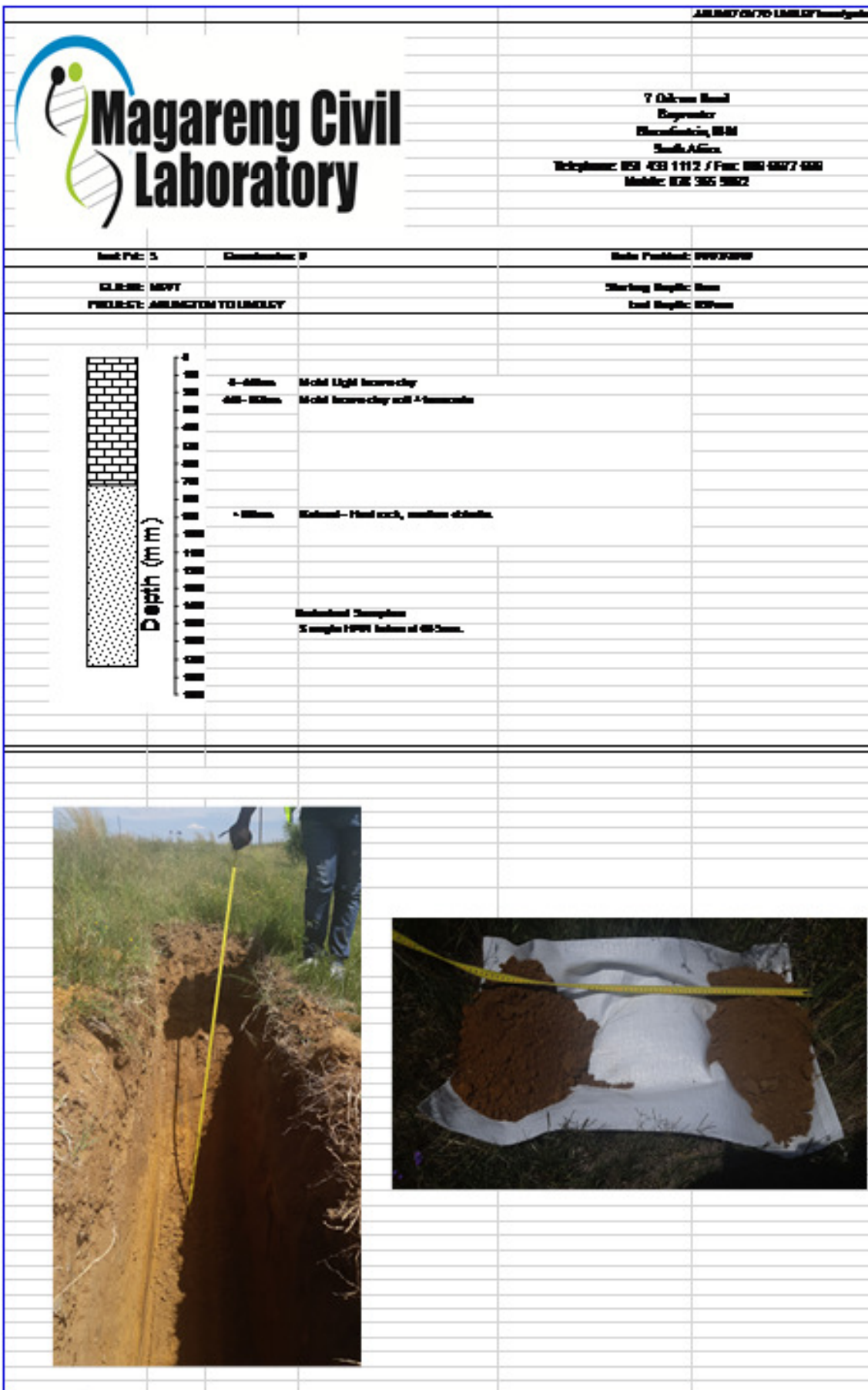
Soil Profile Sheets

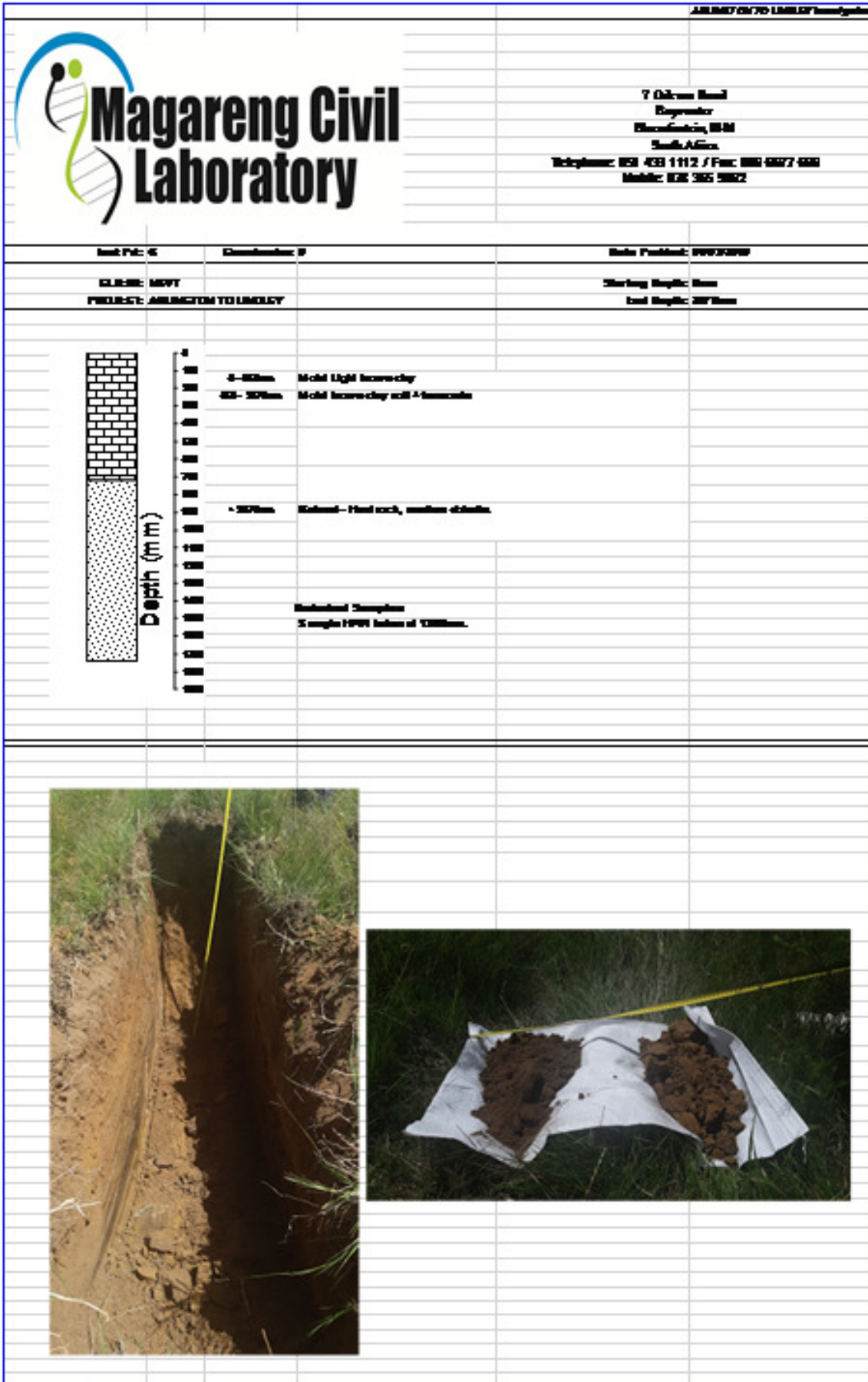
ALINGTON TO LINDLEY Investigation		
 <h1 style="margin: 0;">Magareng Civil Laboratory</h1>		7 Orleans Road Baywater Bloemfontein, B.M South Africa Mobile: 078 365 9862
Test No: 1	Description: B	Date Filled: 09/03/2019
Client: MWT		Starting Depth: 0mm
Project: ALINGTON TO LINDLEY		End Depth: 1740mm
		
 		

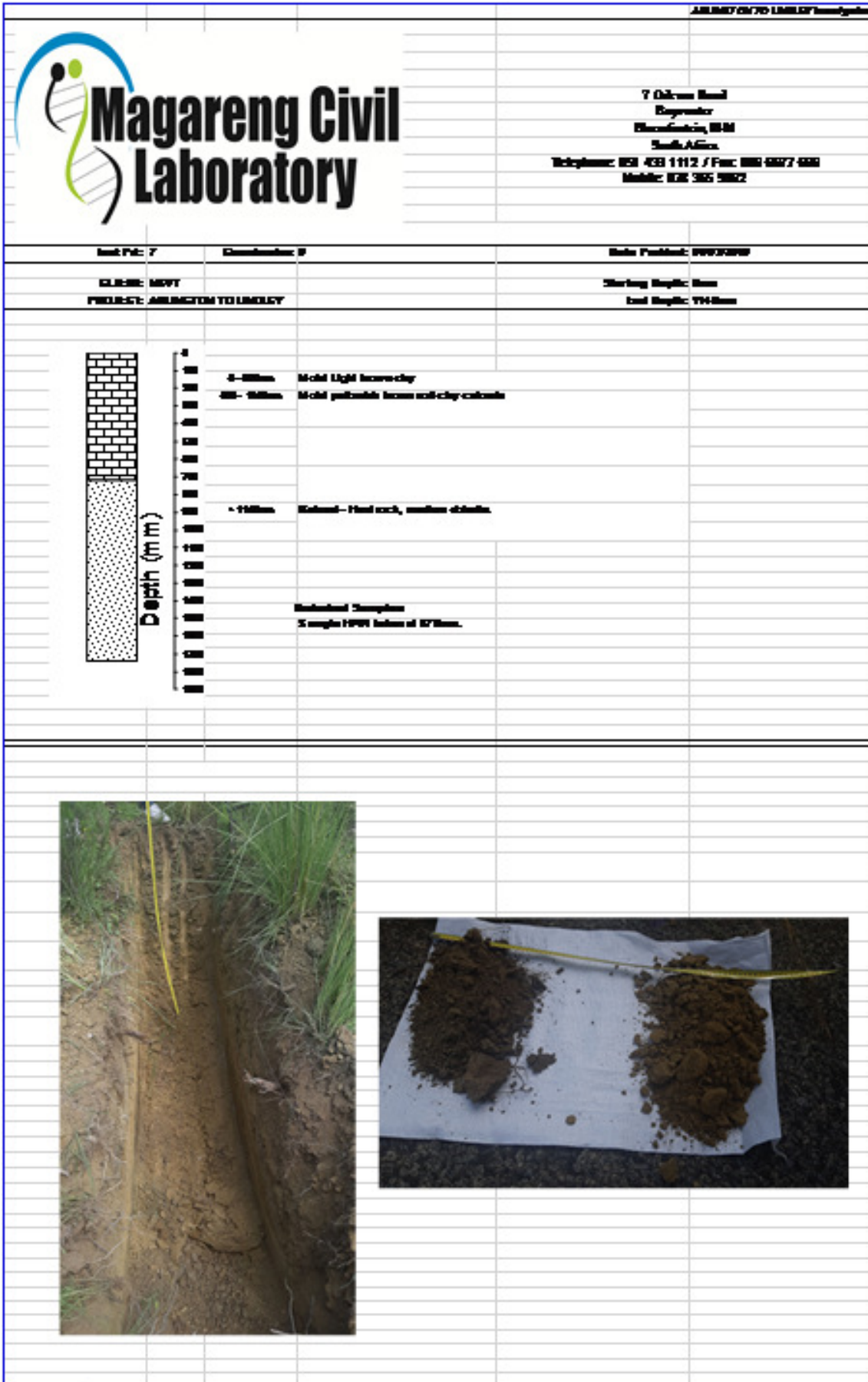
ALINGTON TO LINDLEY Investigation		
 <h1 style="margin: 0;">Magareng Civil Laboratory</h1>		7 Orleans Road Baywater Bloemfontein, B.M South Africa Mobile: 078 365 9862
Test No: Z	Description: B	Date Filled: 09/03/2019
CLIENT: MWT PROJECT: ALINGTON TO LINDLEY		Starting Depth: 0mm End Depth: 2000mm
		
<div style="display: flex; justify-content: space-around;">   </div>		

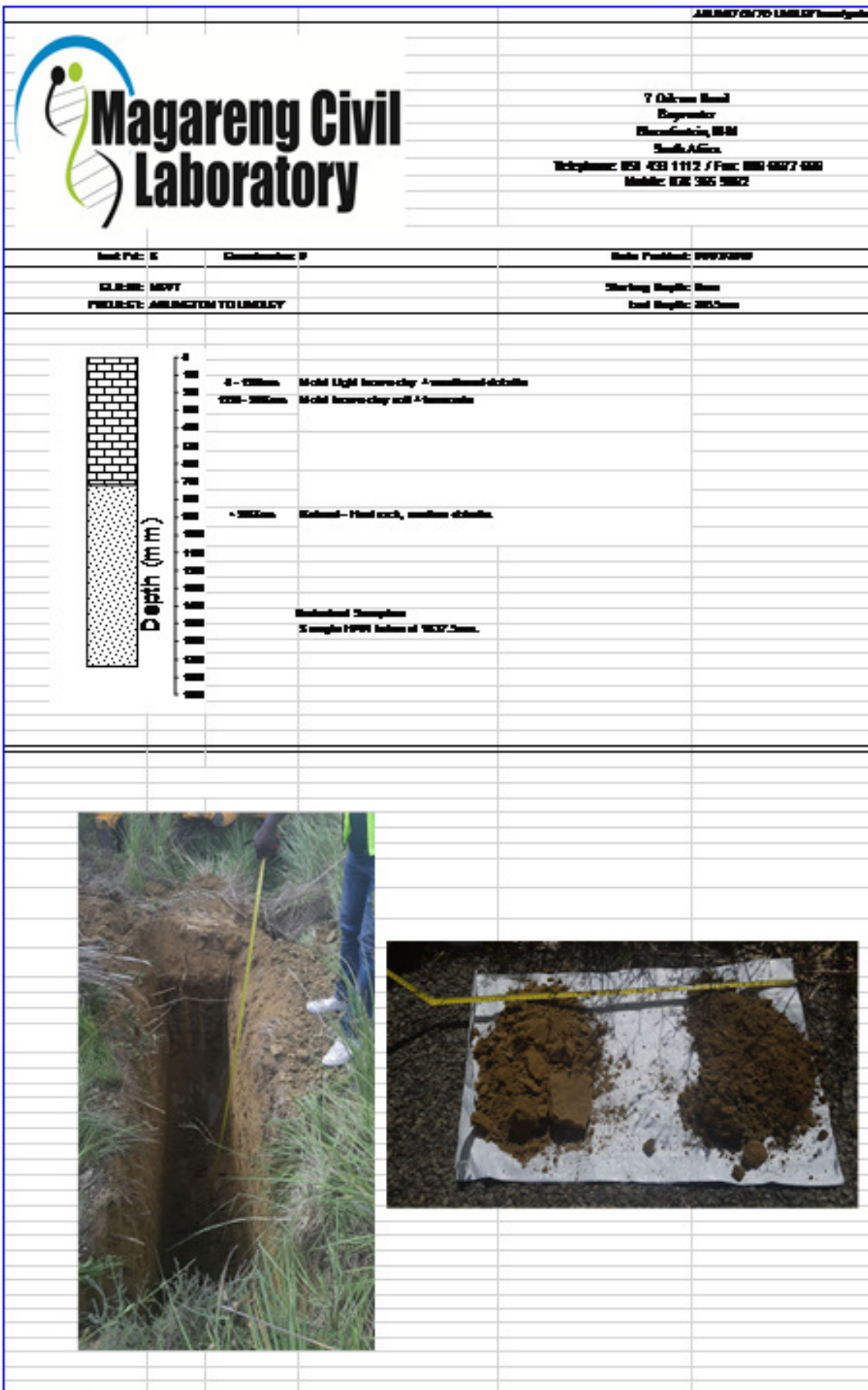
ALINGTON TO LINDLEY Investigation		
 <h1 style="margin: 0;">Magareng Civil Laboratory</h1>		7 Orleans Road Bloemfontein, B.M South Africa Telephone: 053 433 1112 / Fax: 053 4337 500 Mobile: 082 365 9862
Test Pit: X	Classification: B	Date Filled: 09/03/09
Client: MWT		Starting Depth: 0mm
Project: ALINGTON TO LINDLEY		End Depth: 125.0mm
		
 		

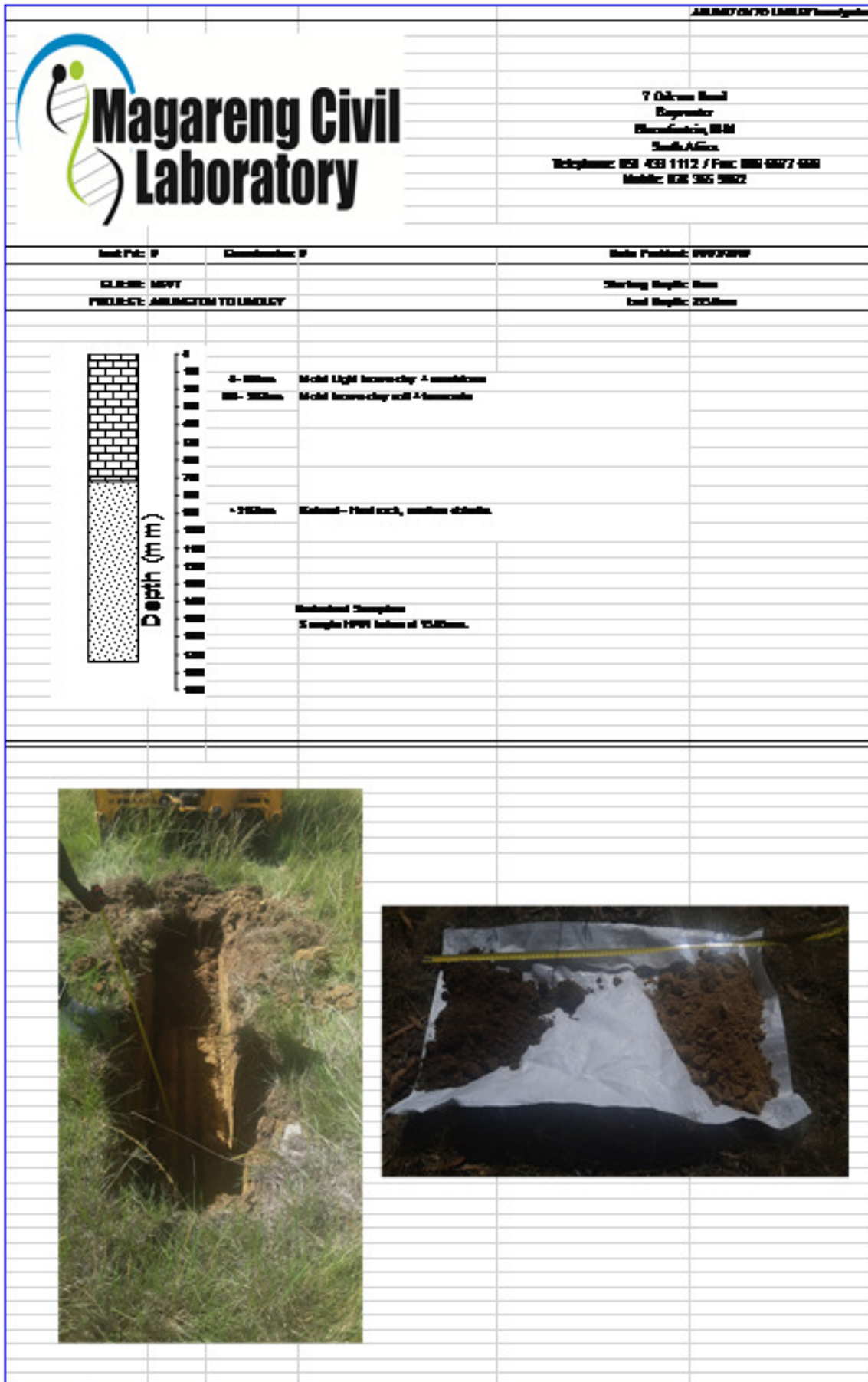



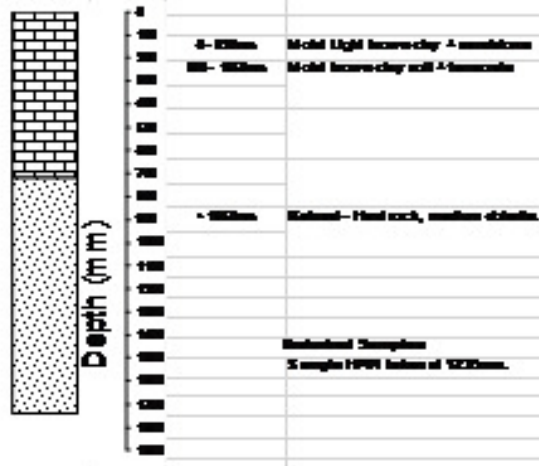




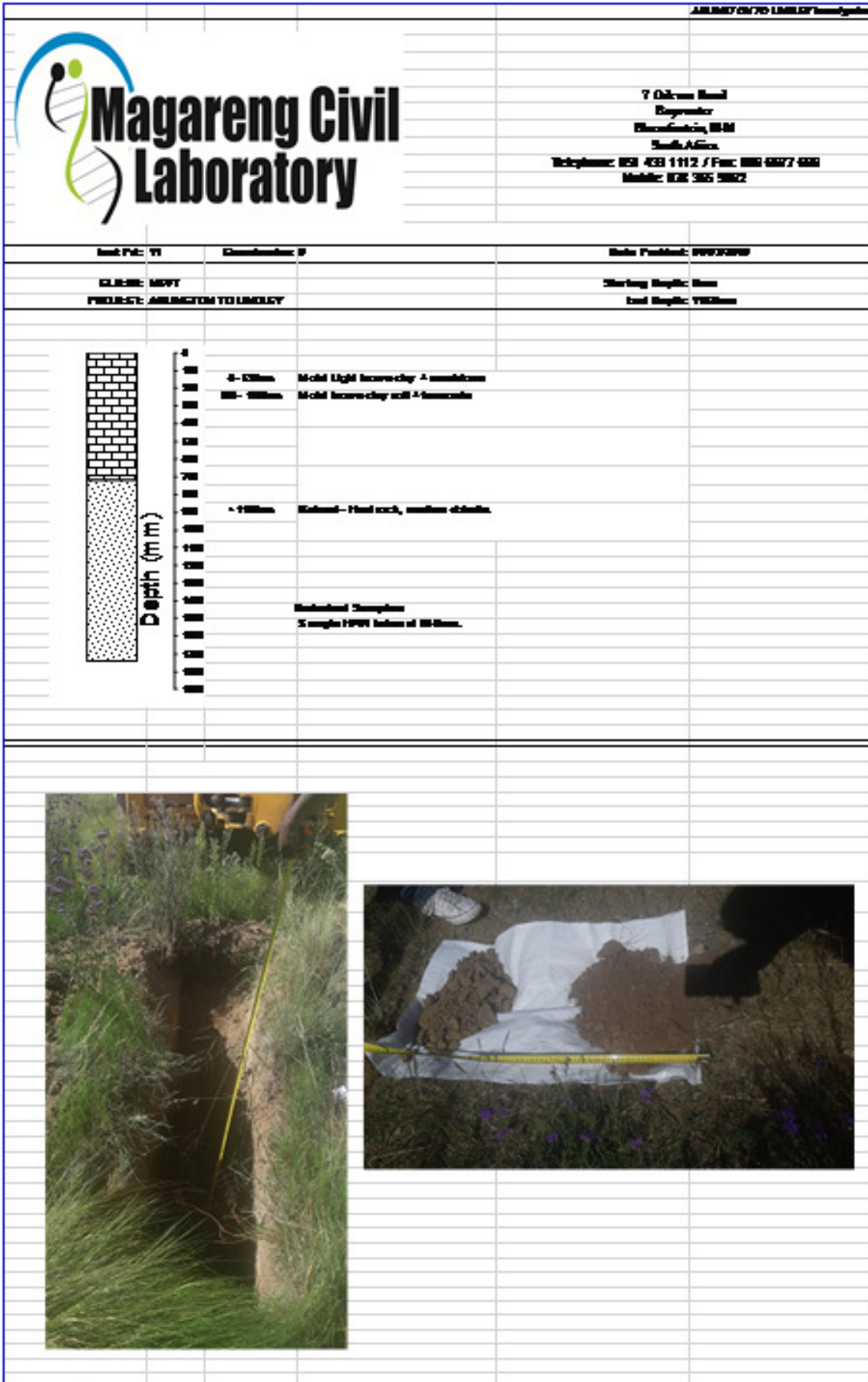



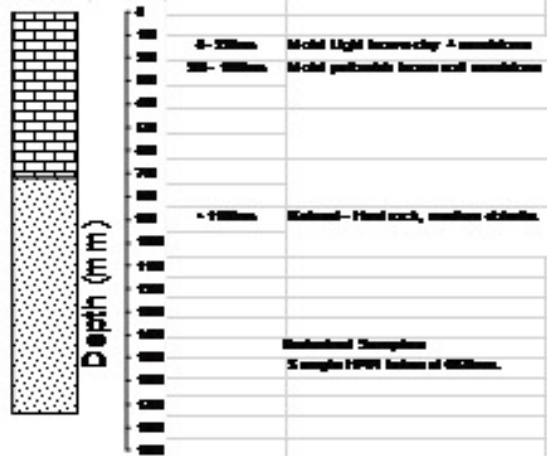




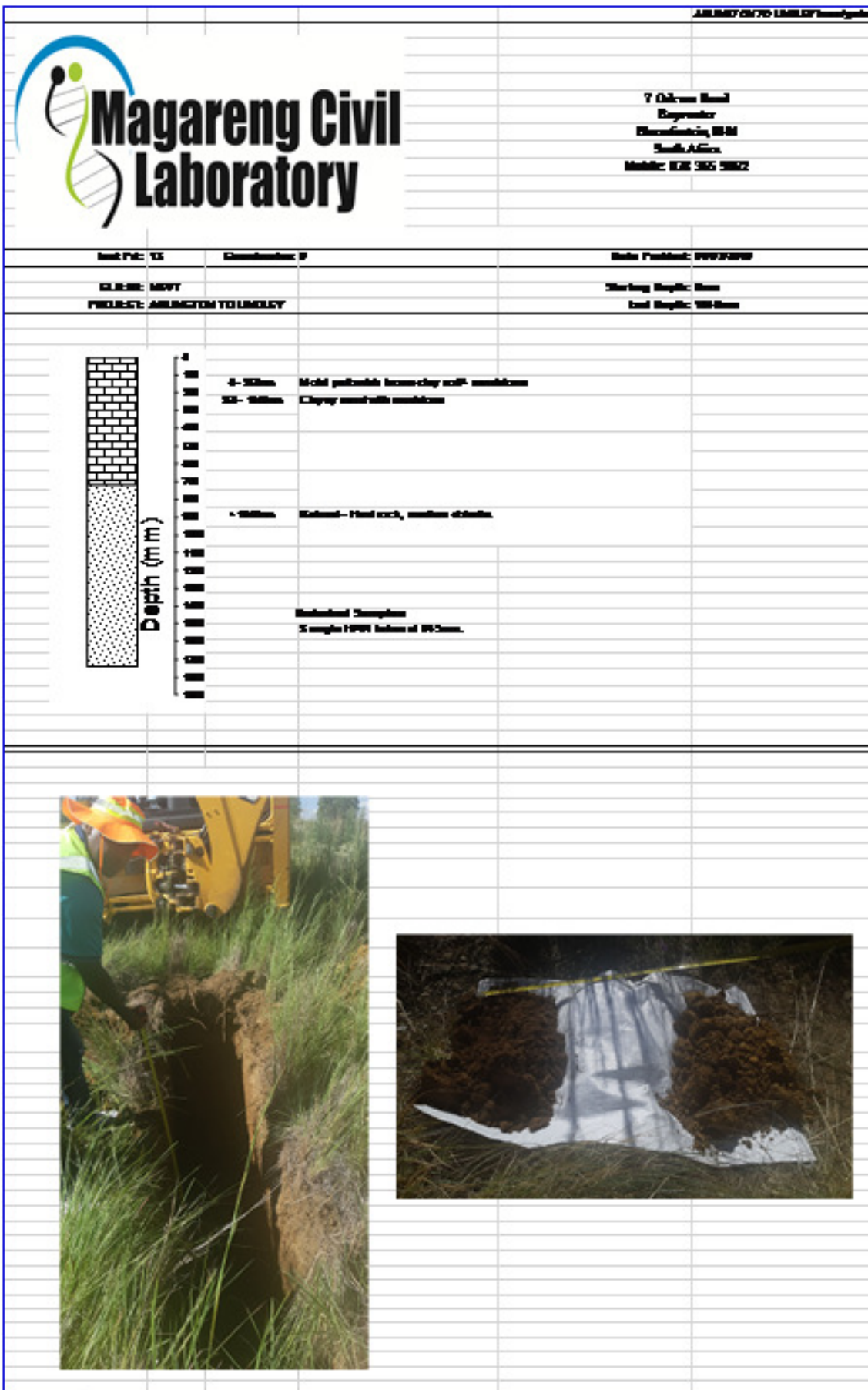


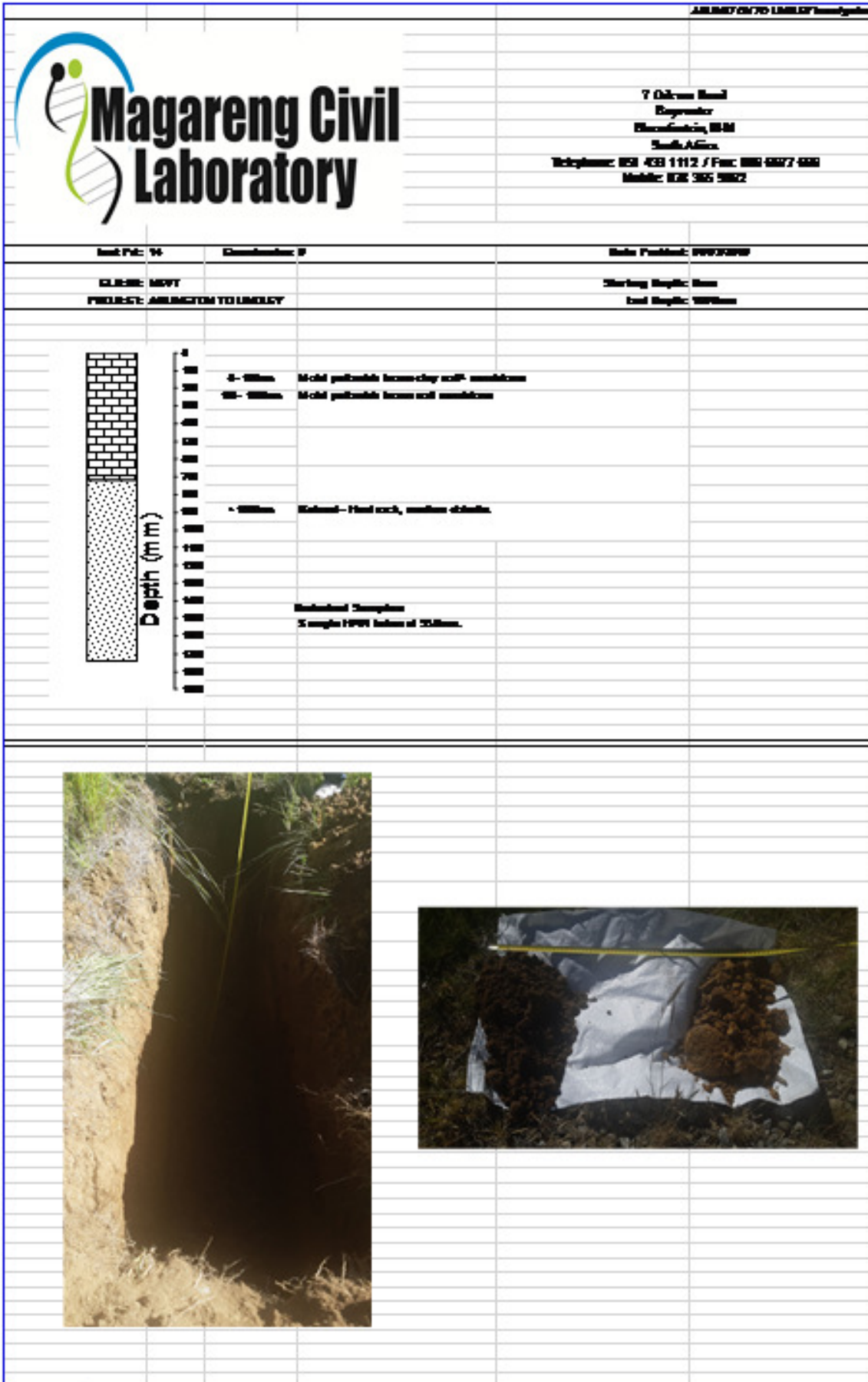


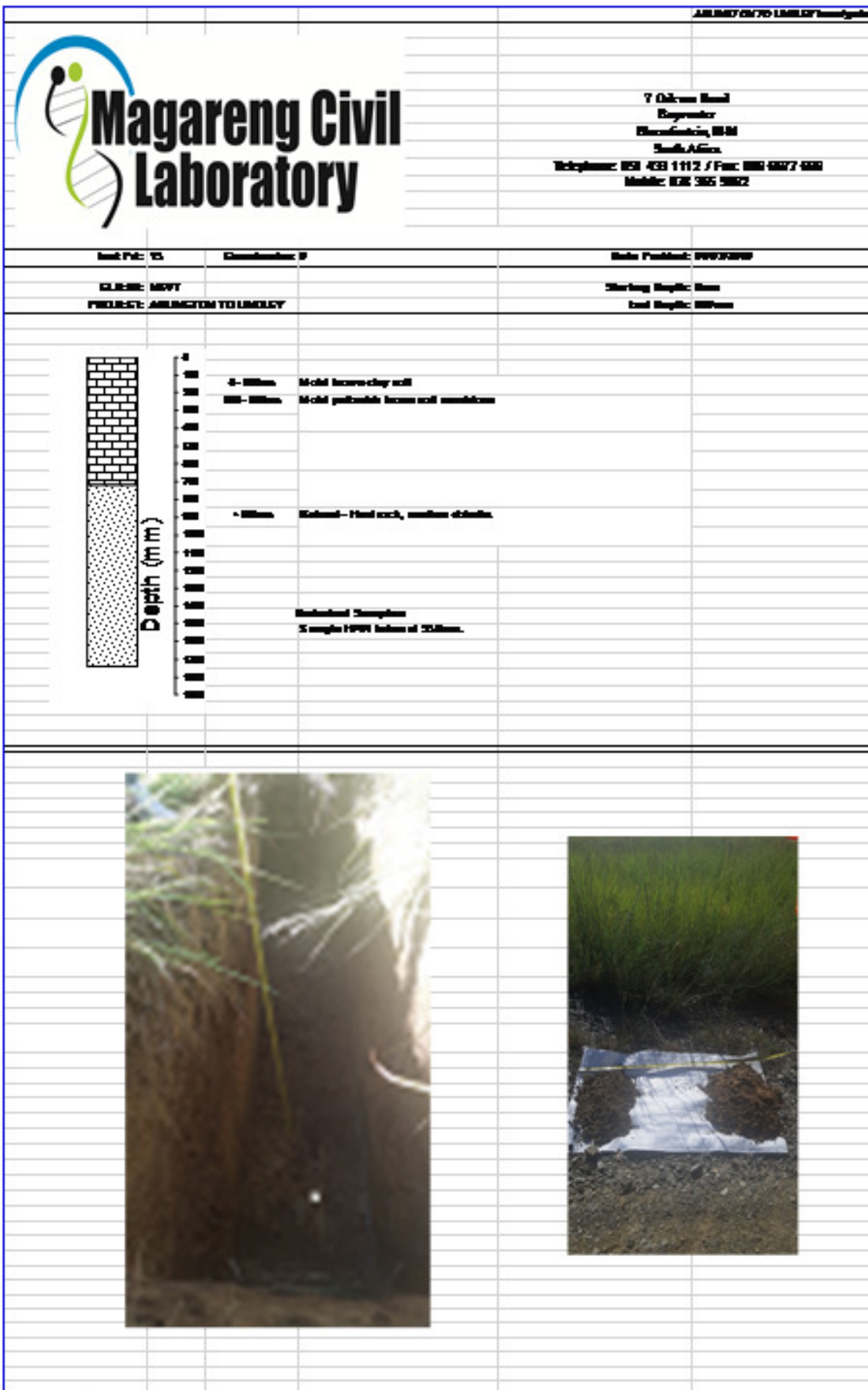
ALINGTON TO LINDLEY Investigation		
 <h1 style="margin: 0;">Magareng Civil Laboratory</h1>		7 Orleans Road Bloemfontein, B.M South Africa Telephone: 053 433 1112 / Fax: 053 4337 500 Mobile: 082 365 9862
Test File: 10	Description: 10	Date Filled: 09/03/2019
CLIENT: MCVT PROJECT: ALINGTON TO LINDLEY		Starting Depth: 0mm End Depth: 1000mm
		
 		

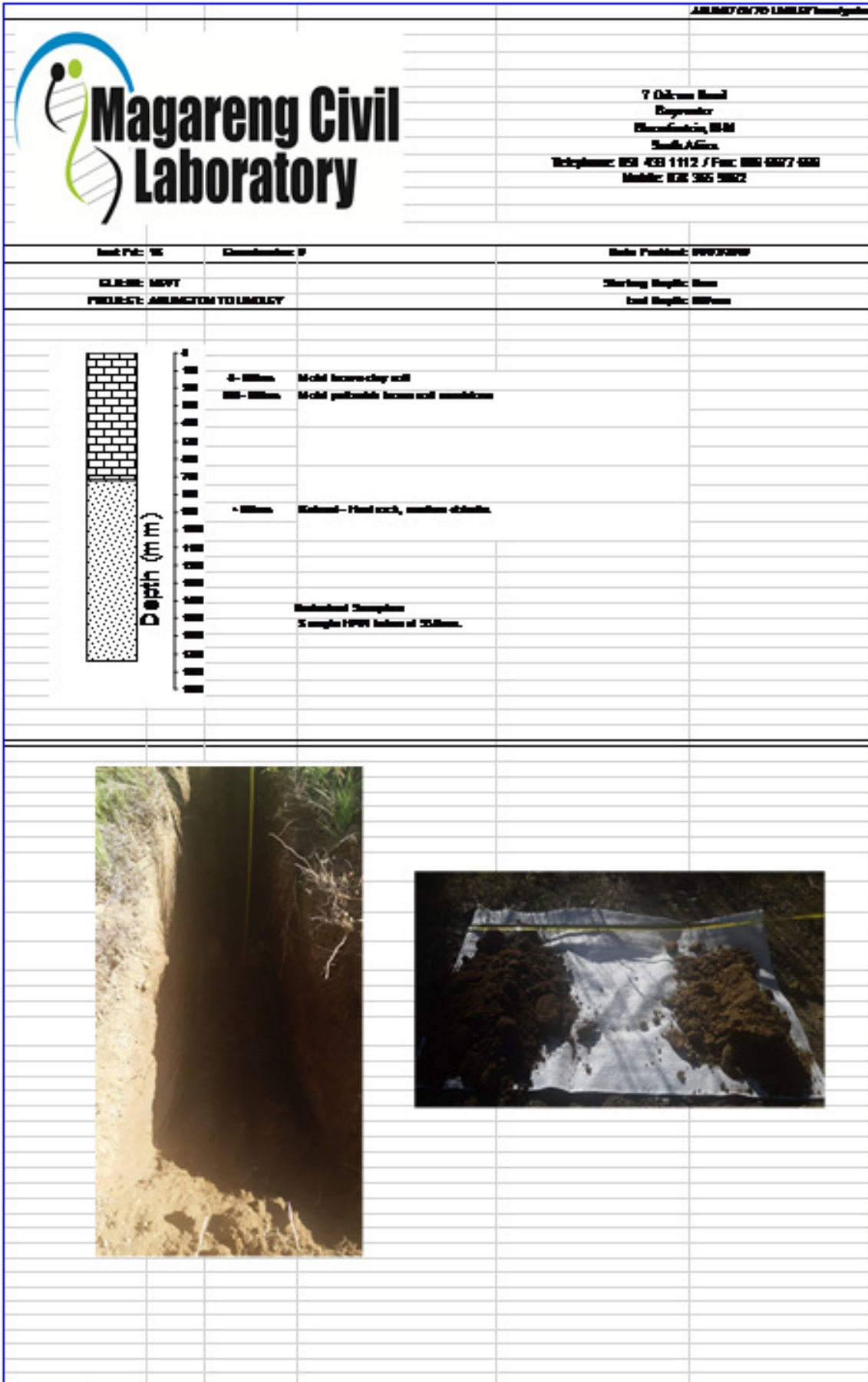


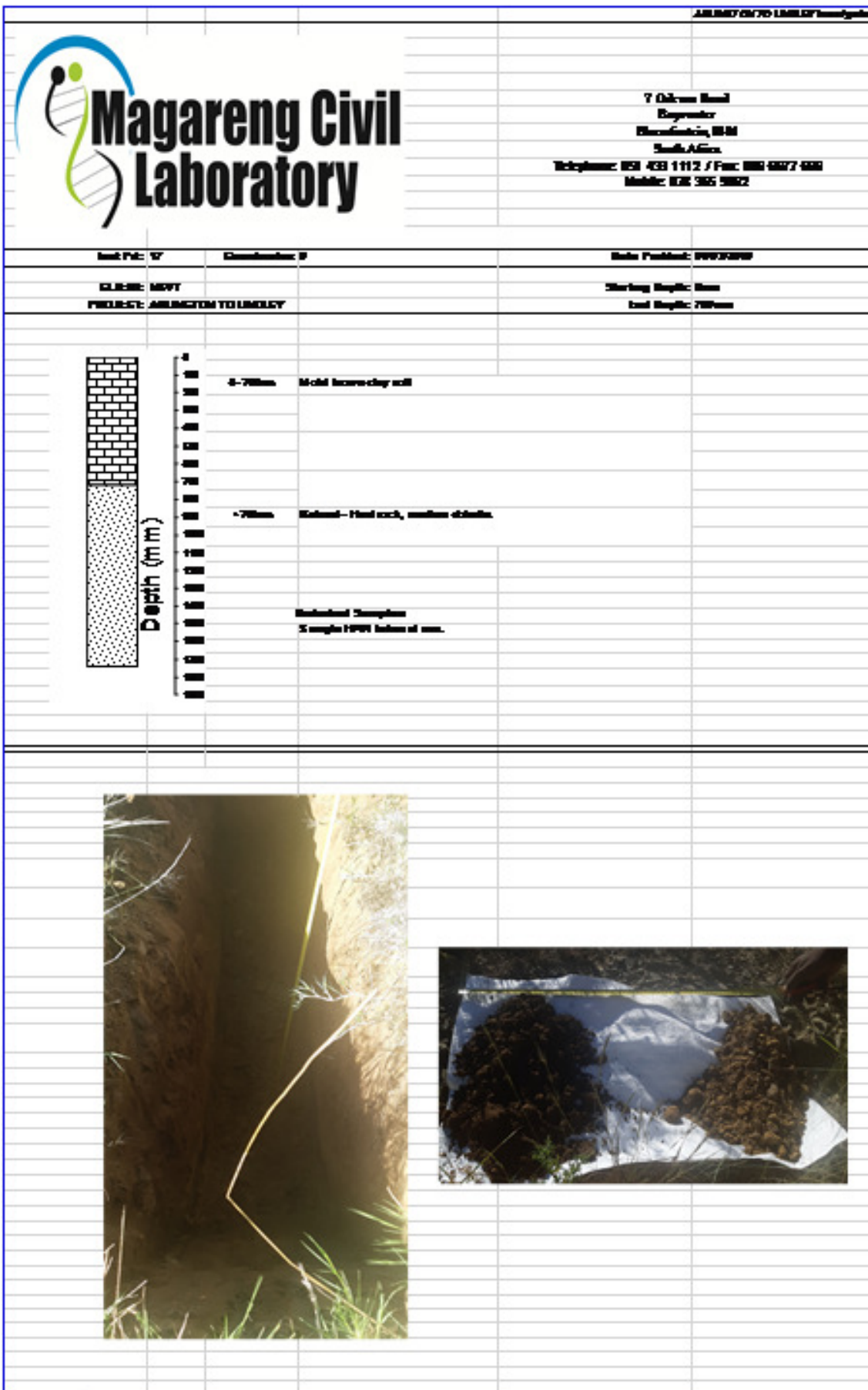
ALINGTON TO LINDLEY Investigation		
 <h1 style="margin: 0;">Magareng Civil Laboratory</h1>		7 Orleans Road Bloemfontein, B.M South Africa Telephone: 053 433 1112 / Fax: 053 4337 500 Mobile: 082 365 9862
Test File: 12	Classification: B	Date Filled: 09/03/2019
CLIENT: MCVT PROJECT: ALINGTON TO LINDLEY		Starting Depth: 0mm End Depth: 1000mm
		
 		

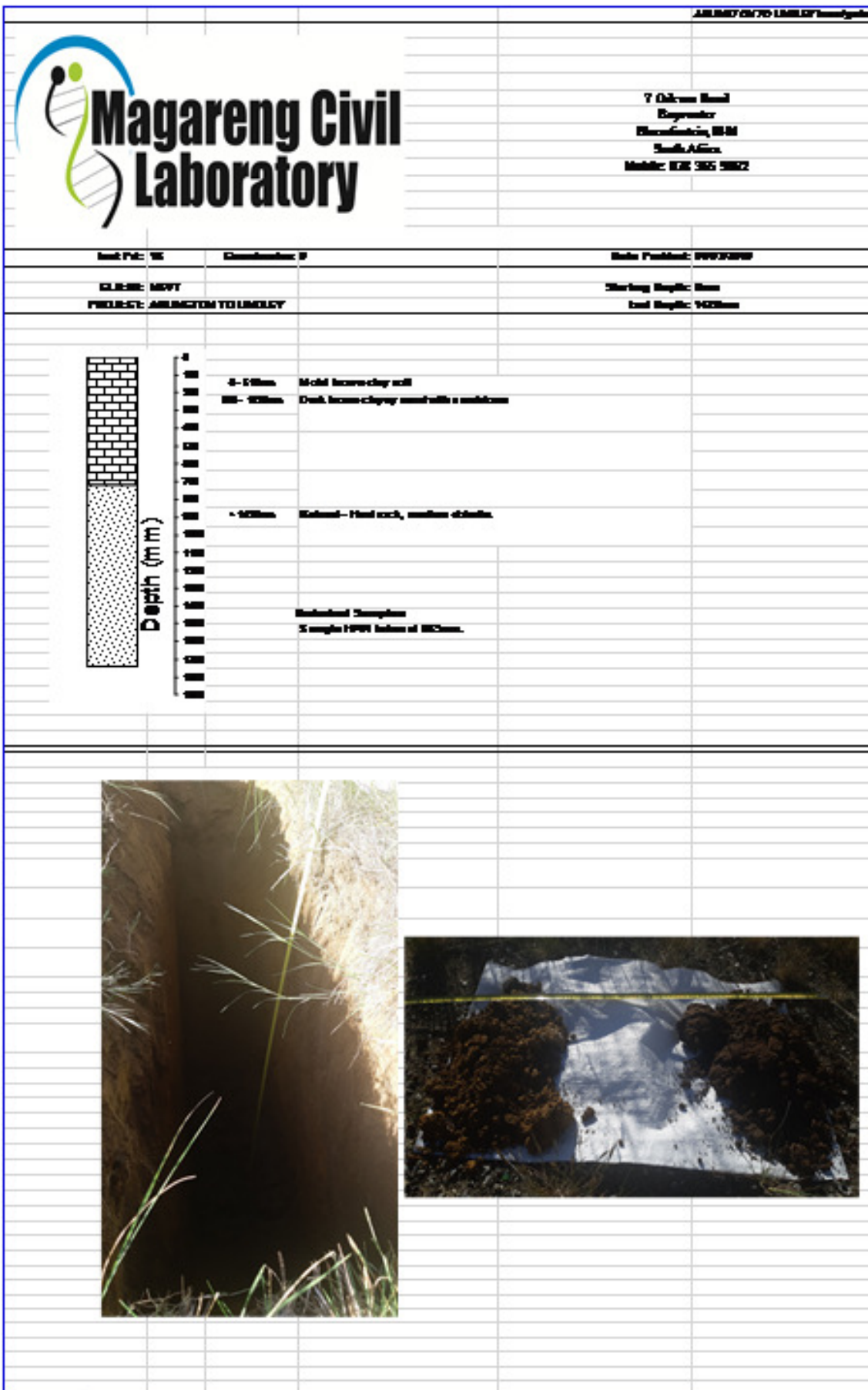


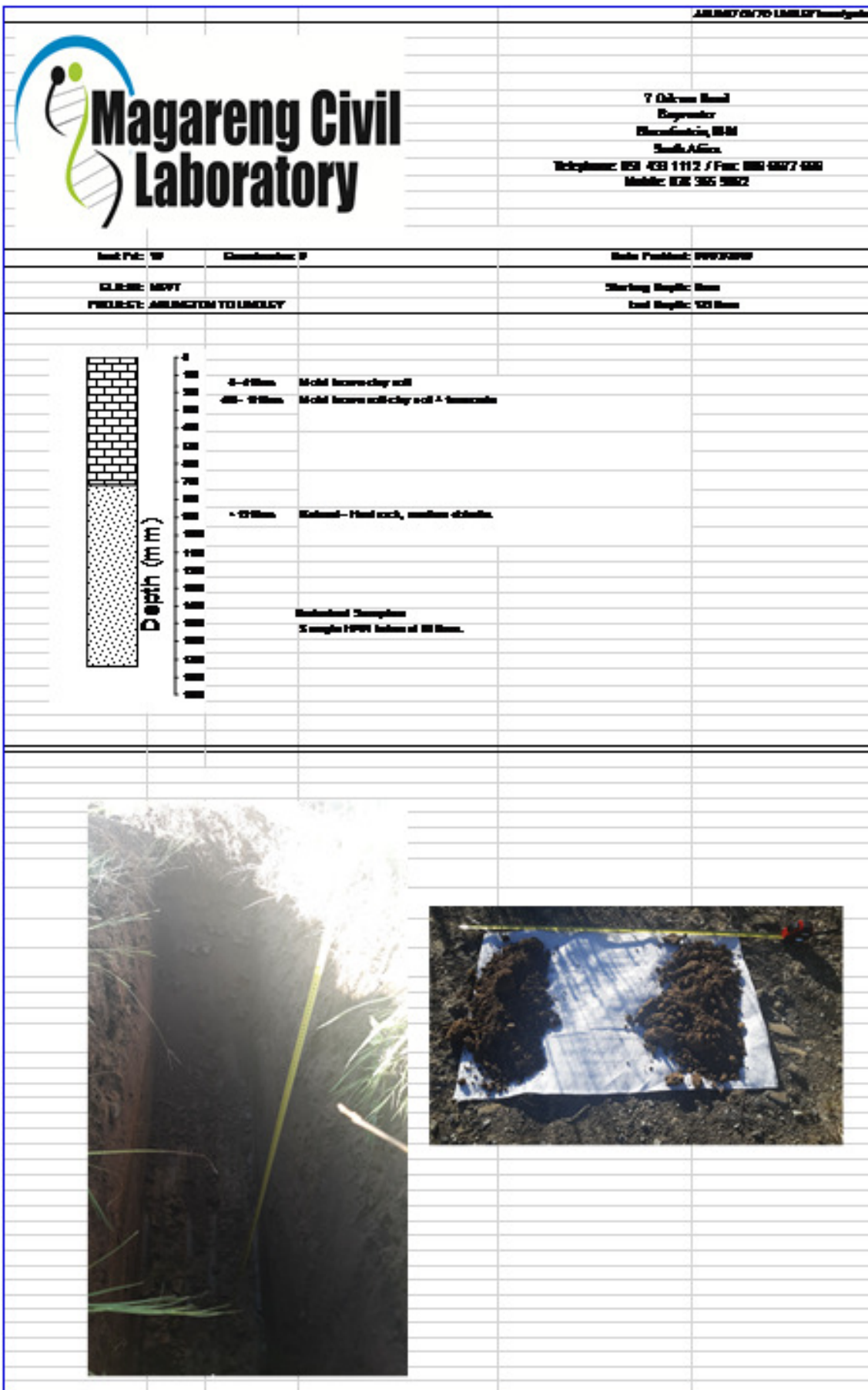


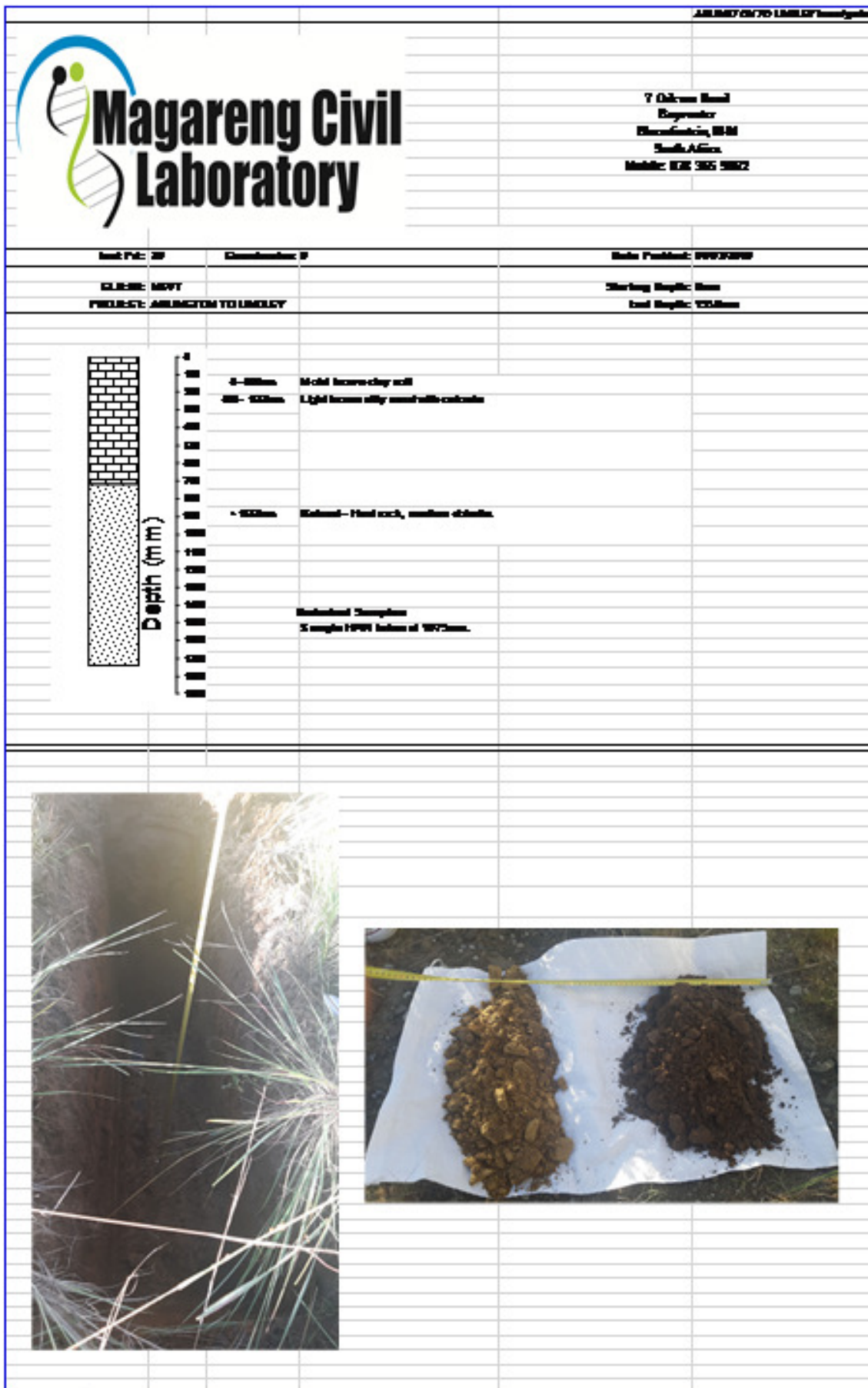


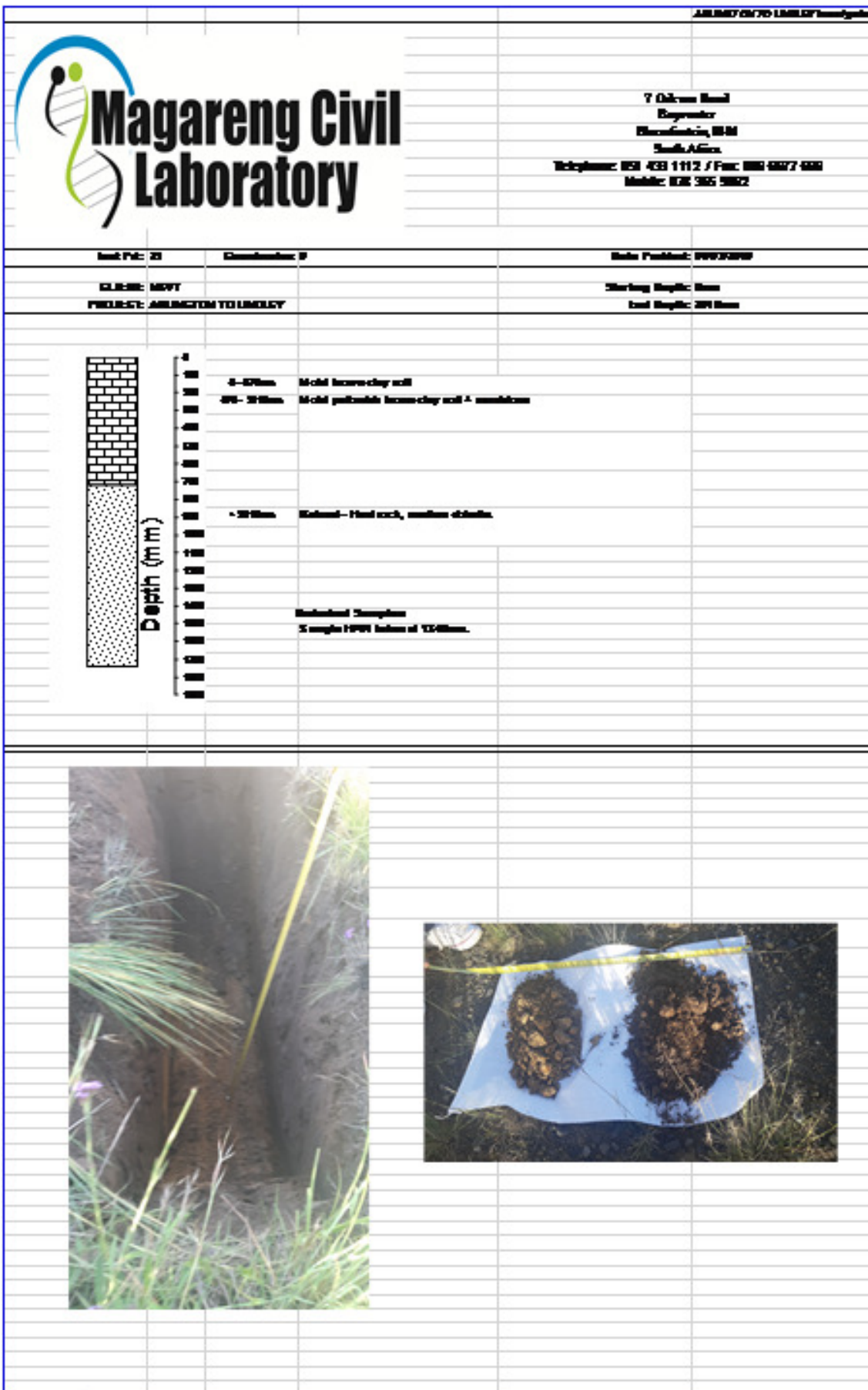


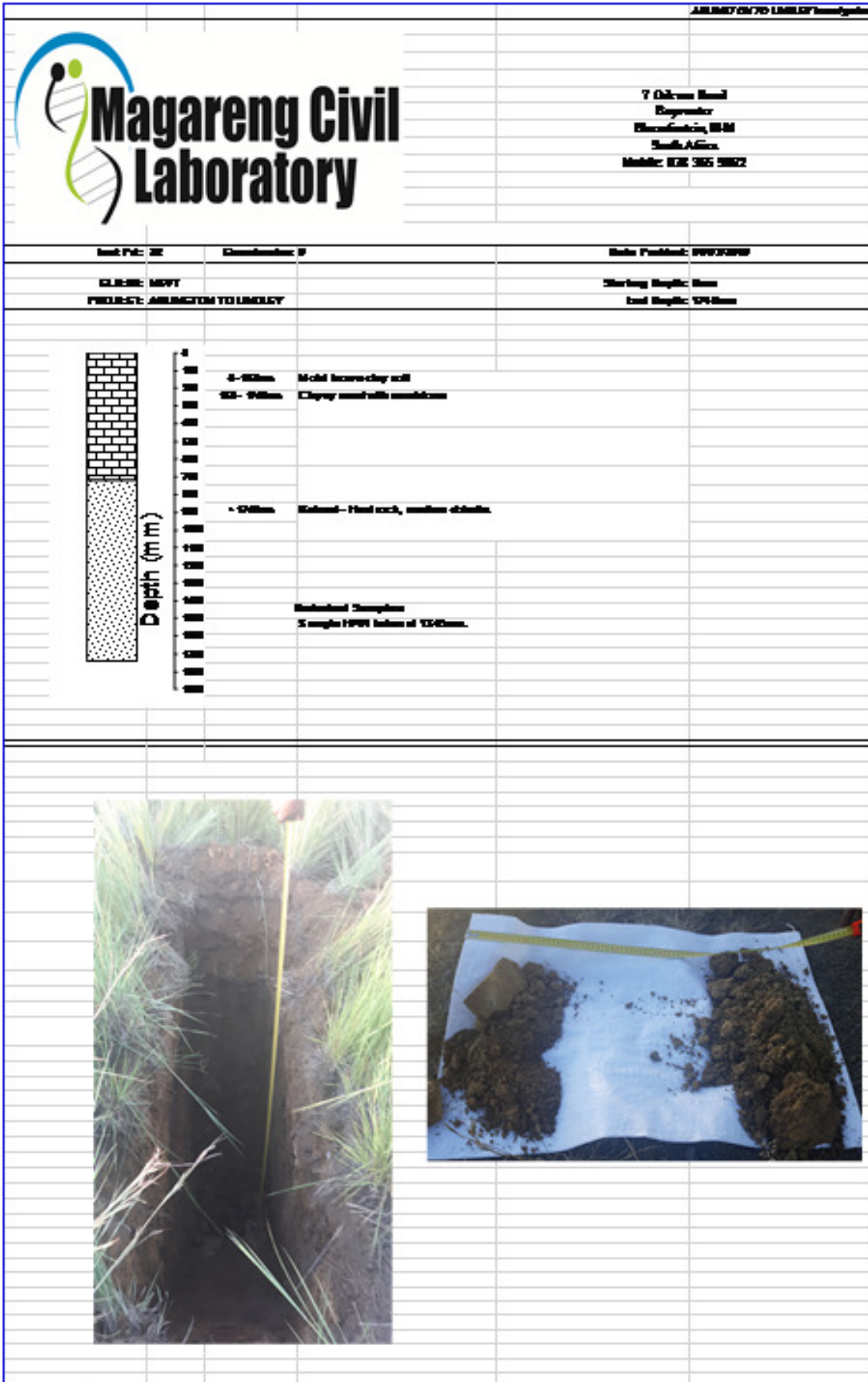


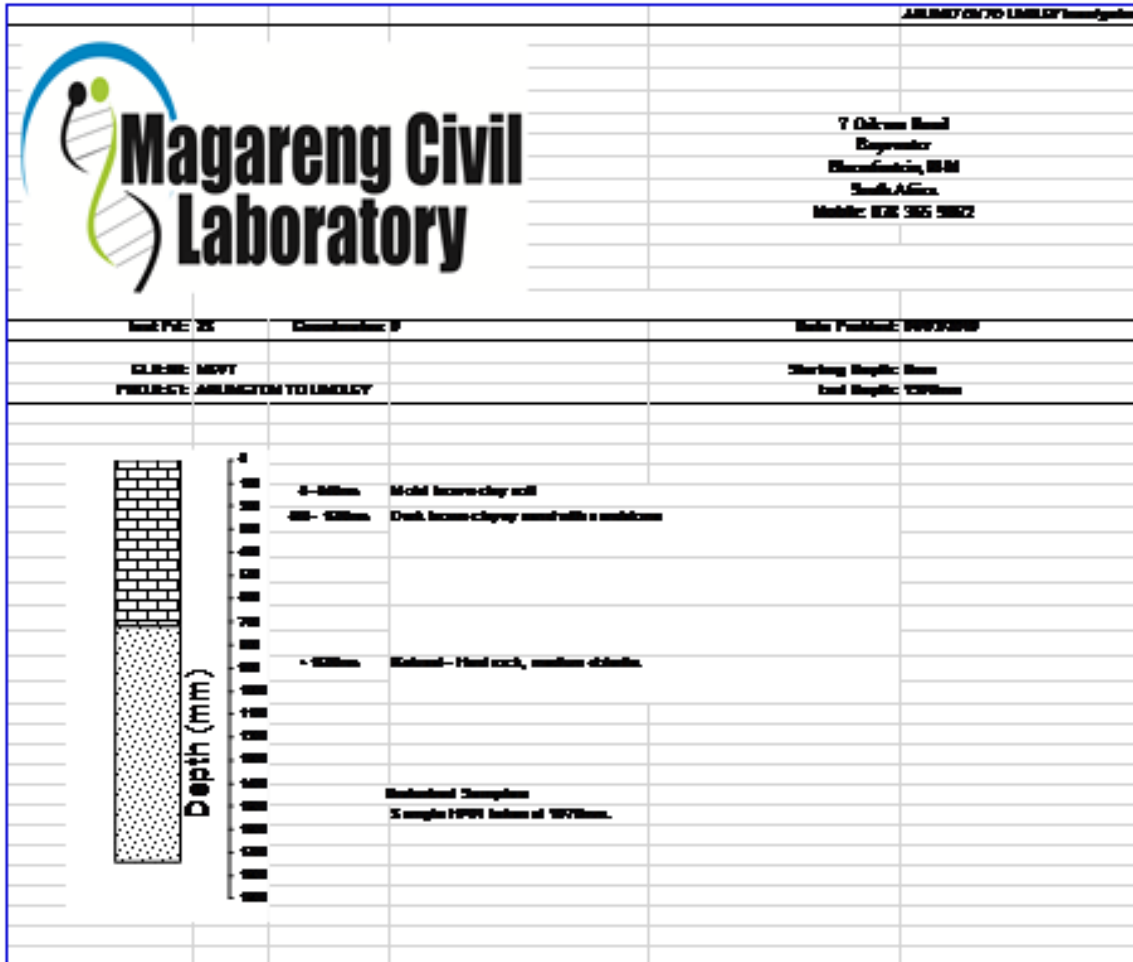


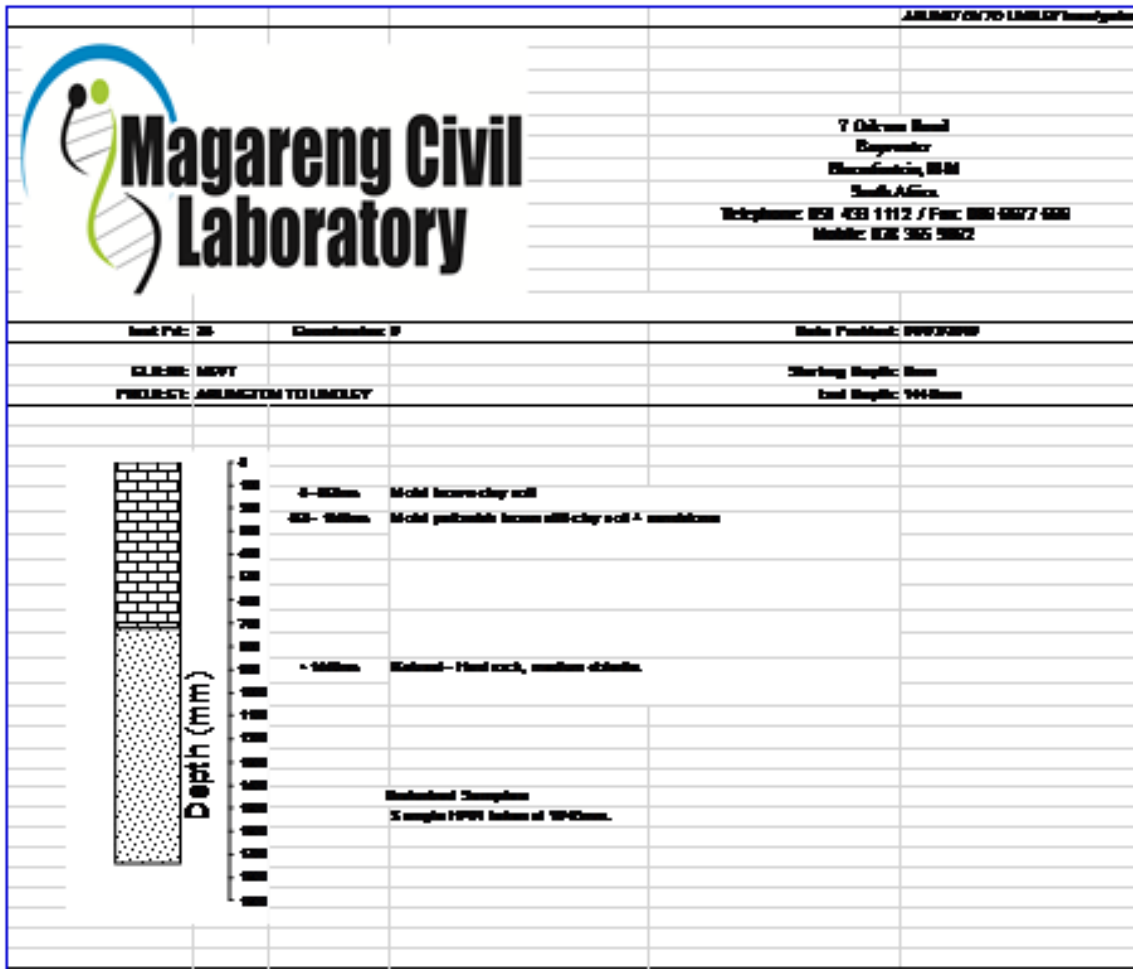


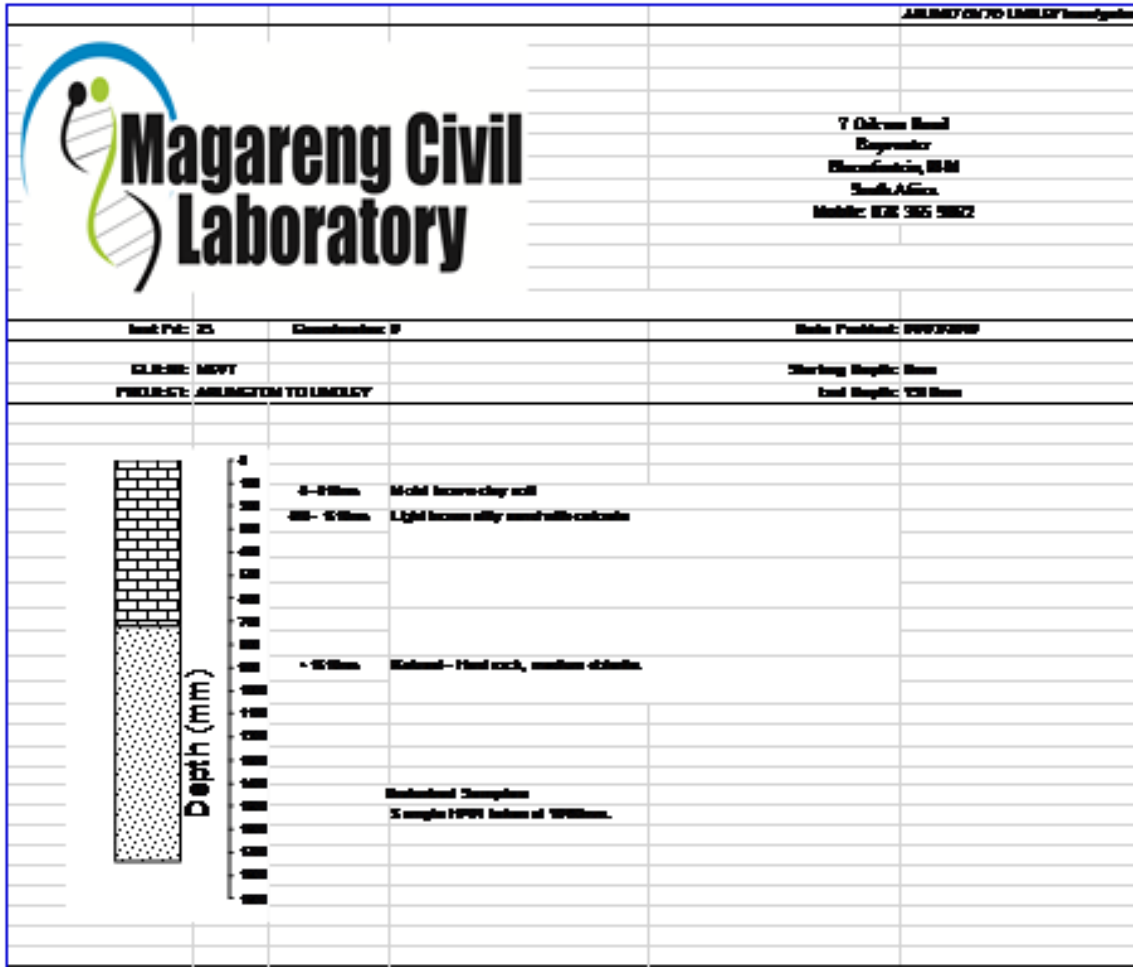


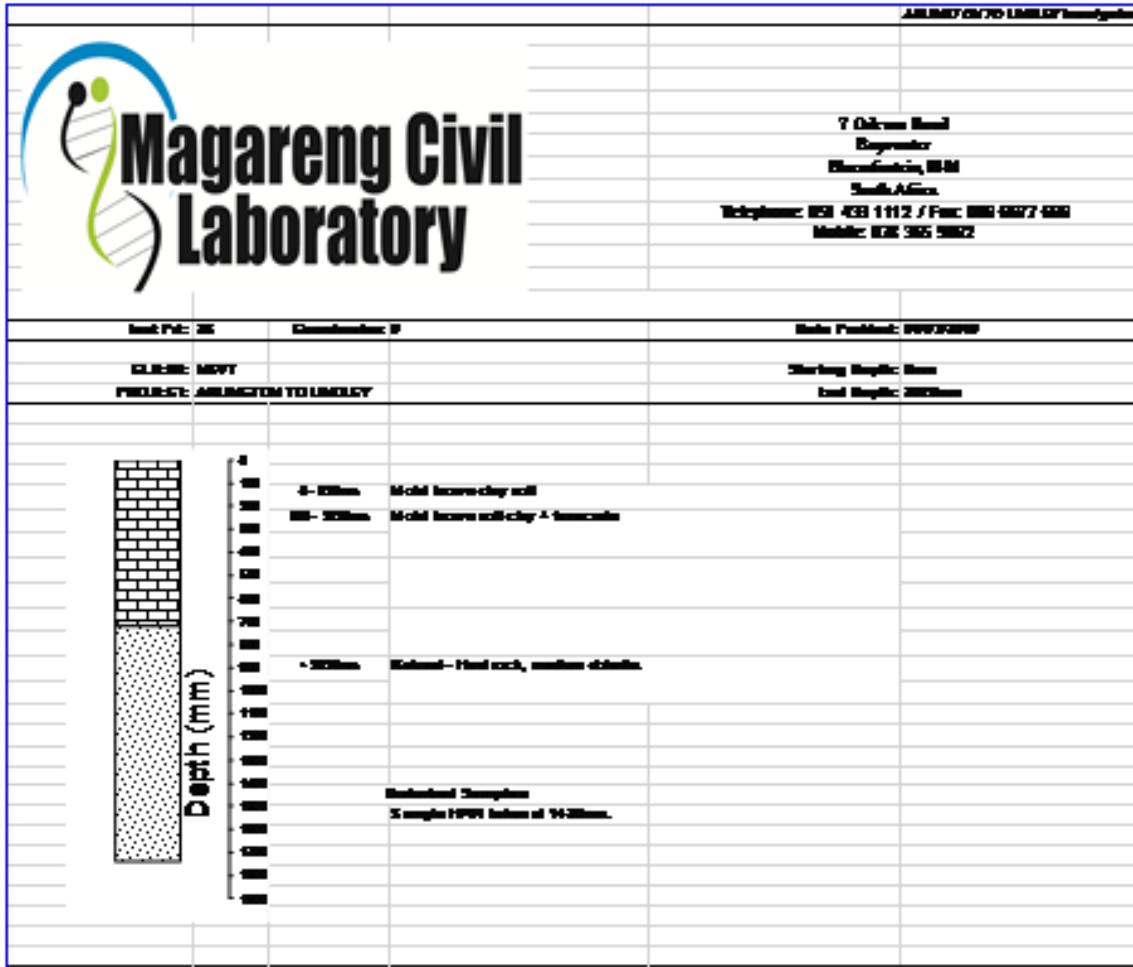


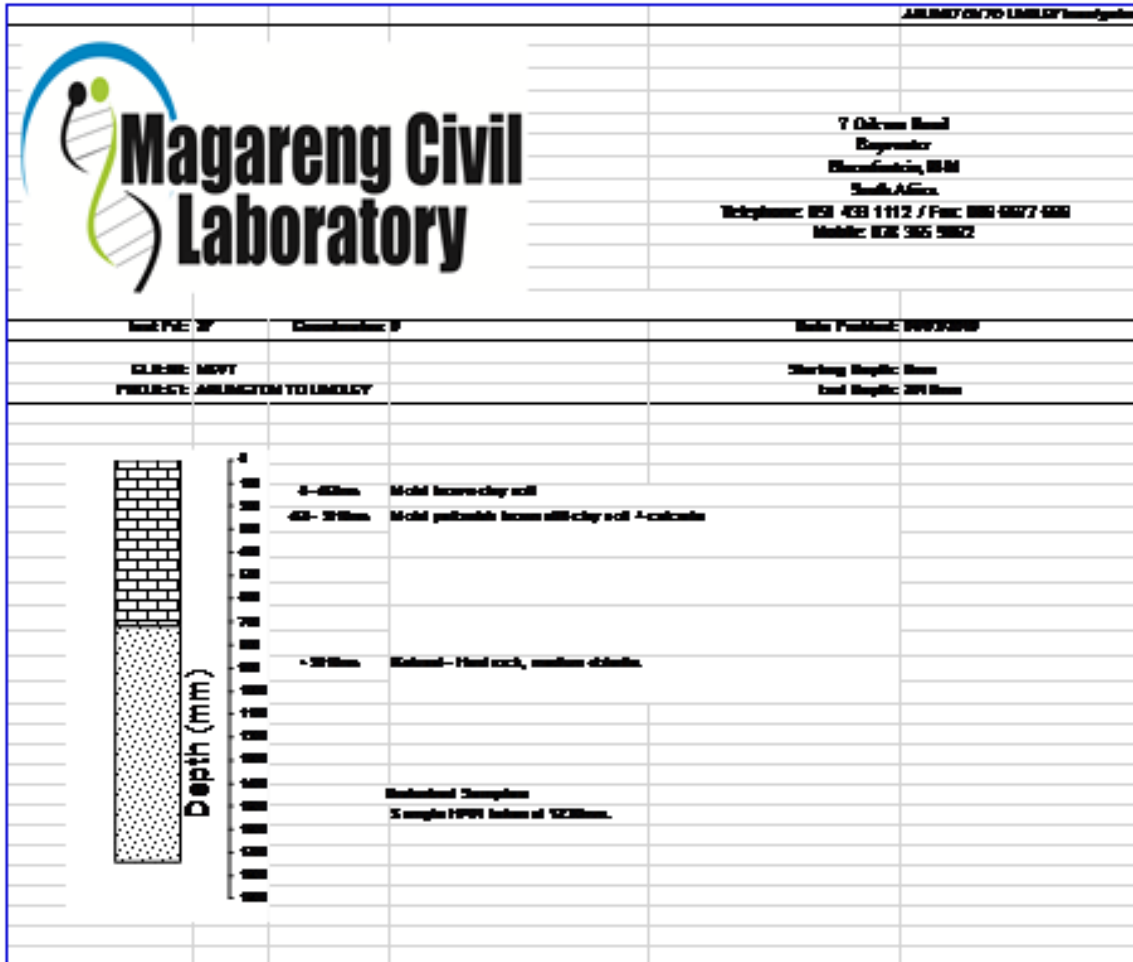


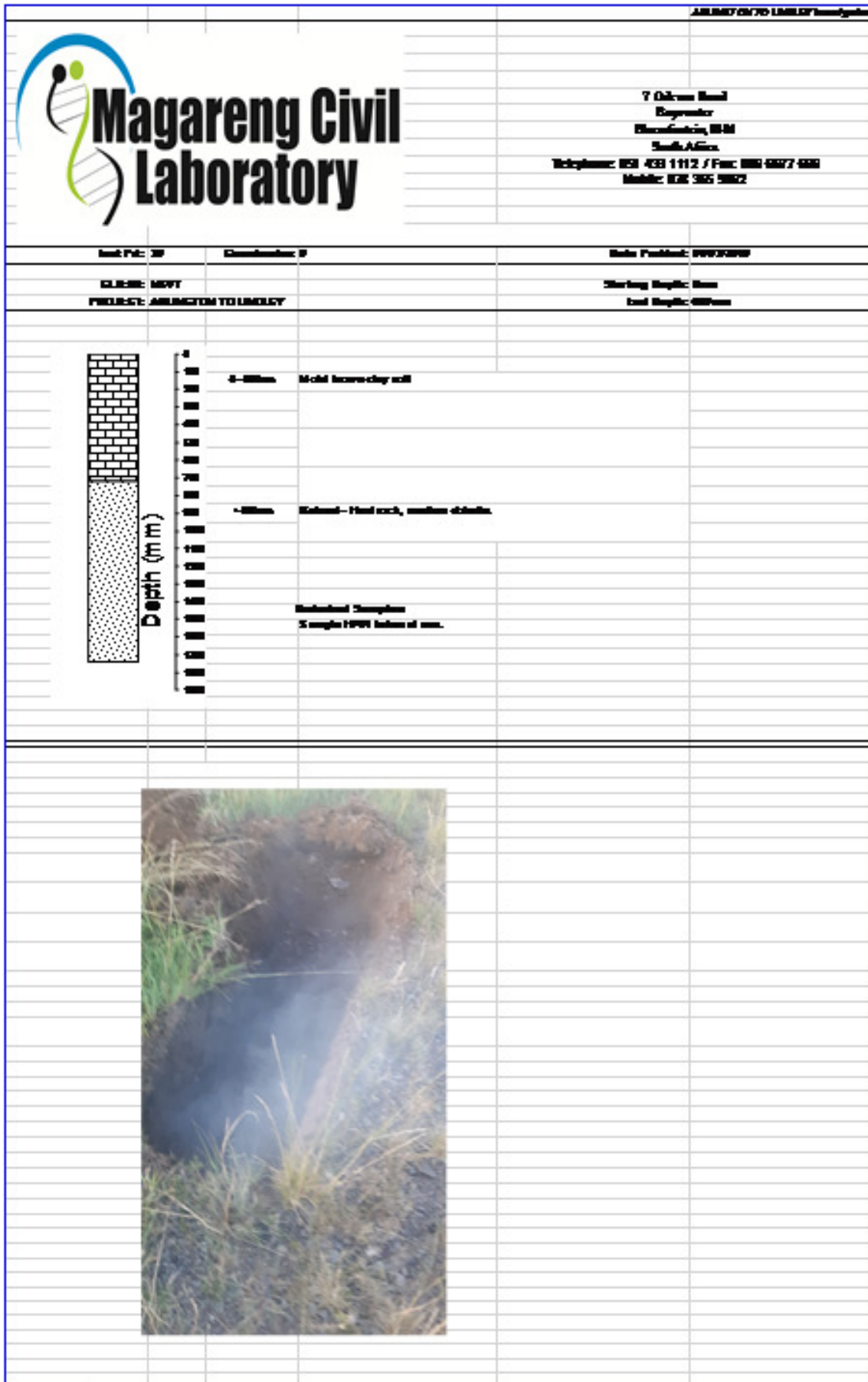


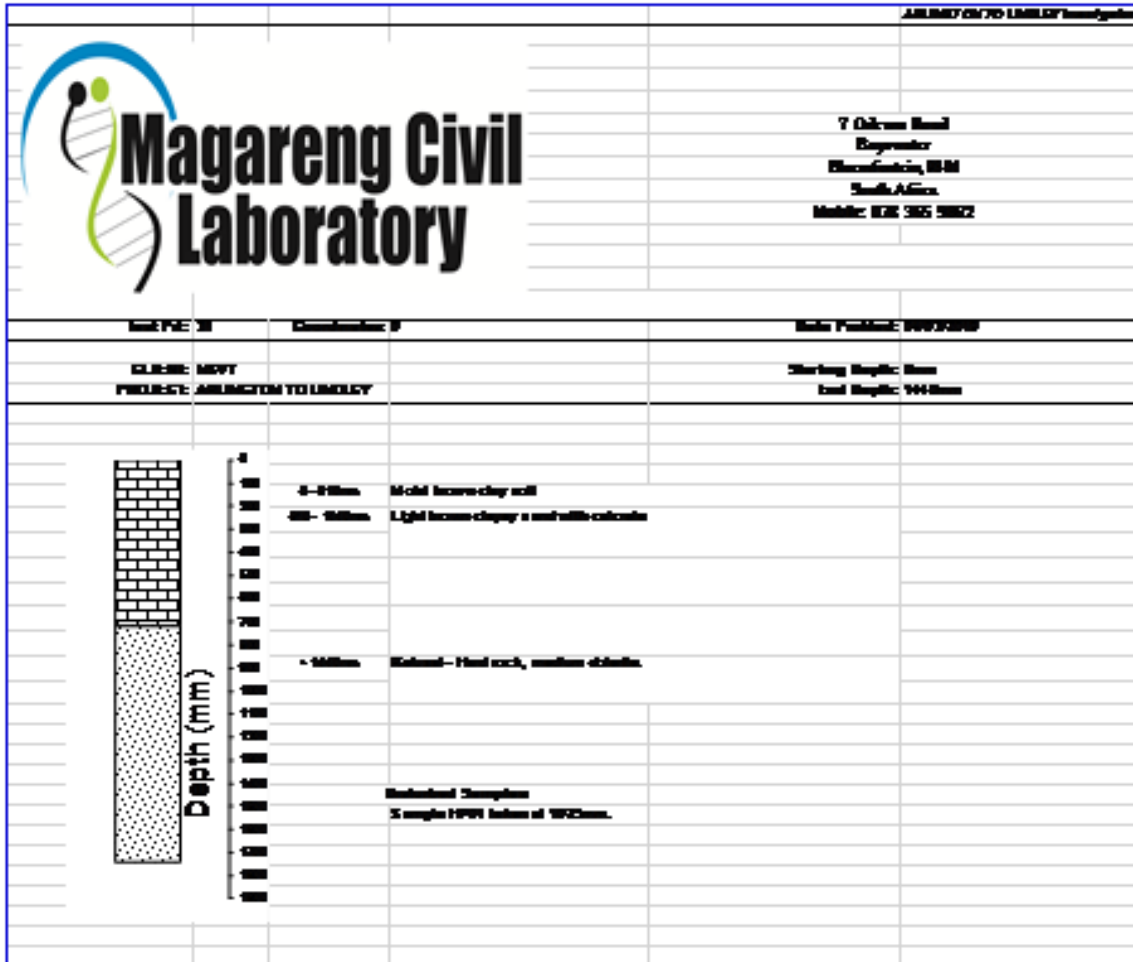


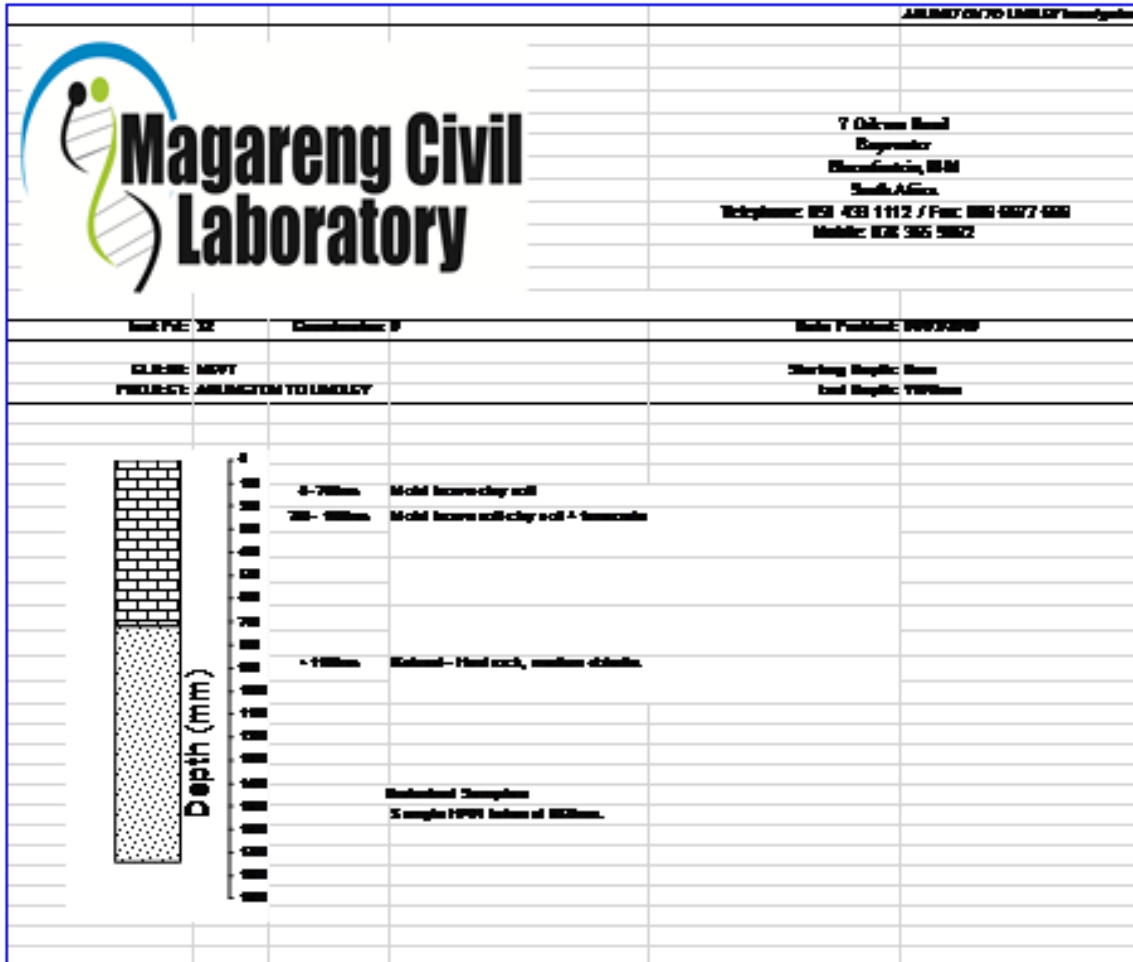


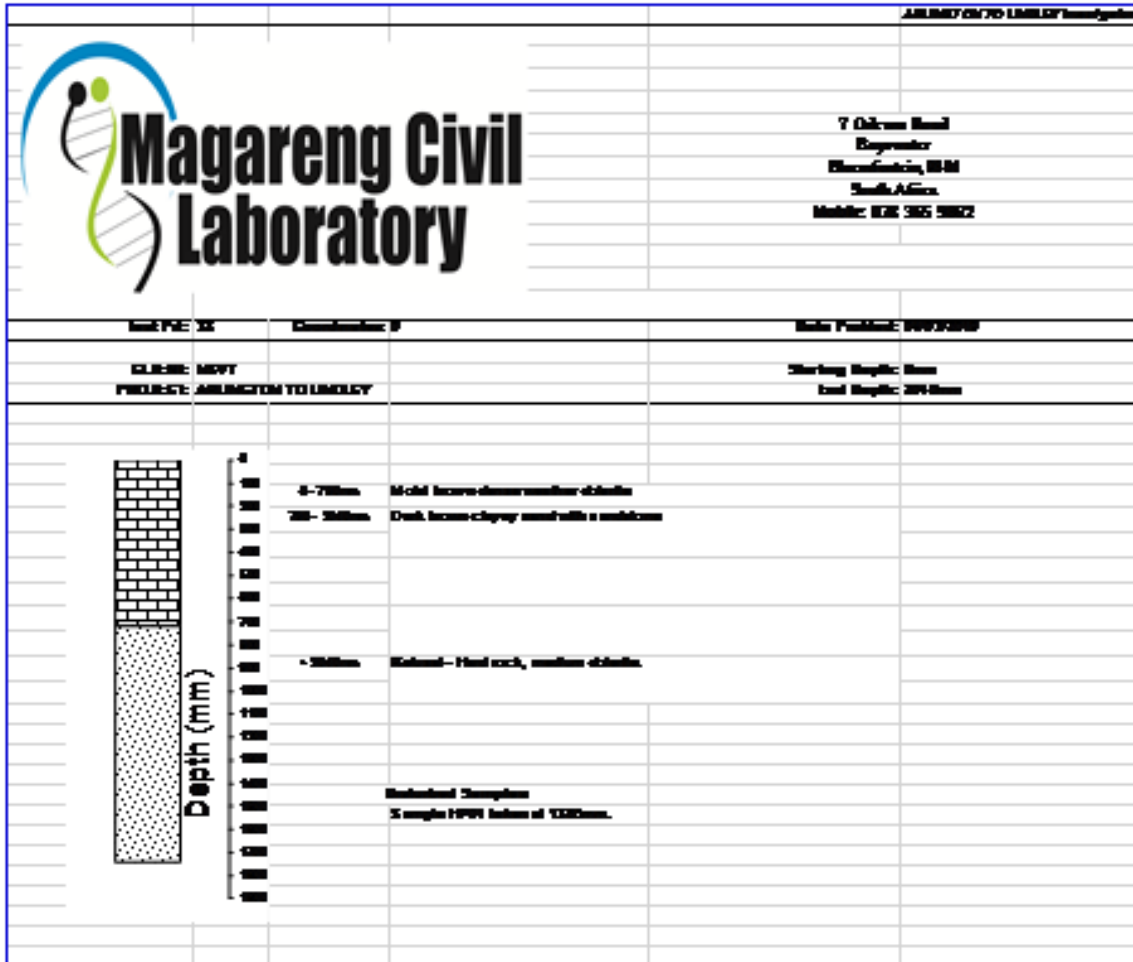


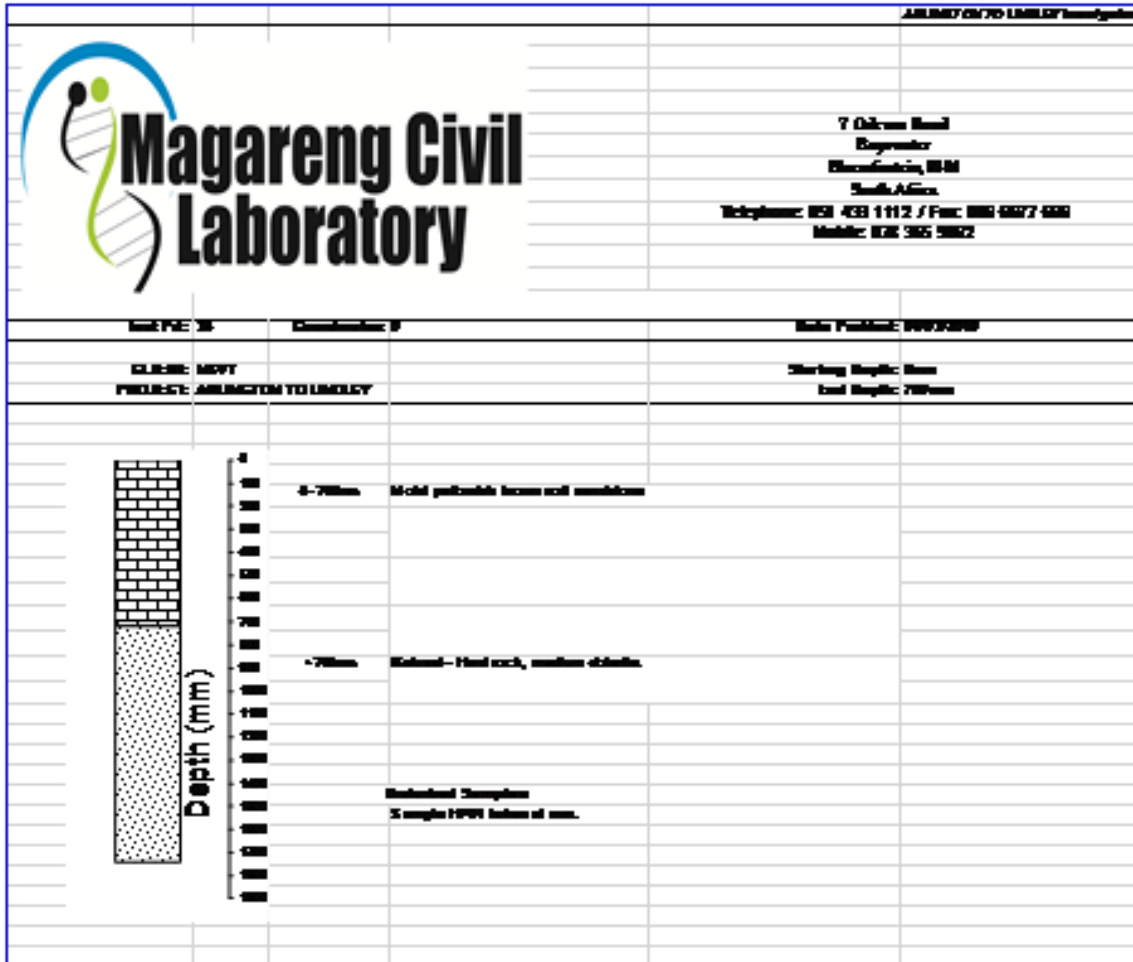


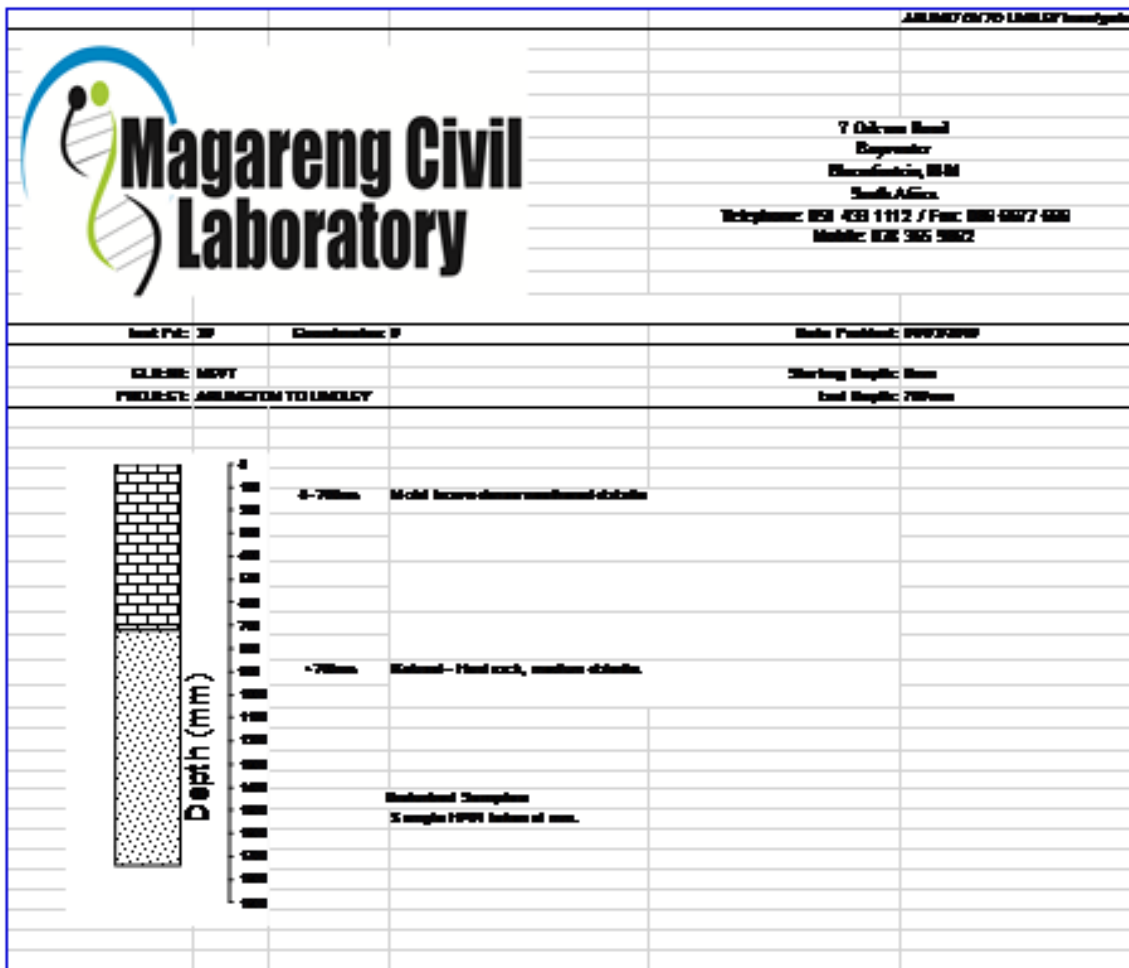


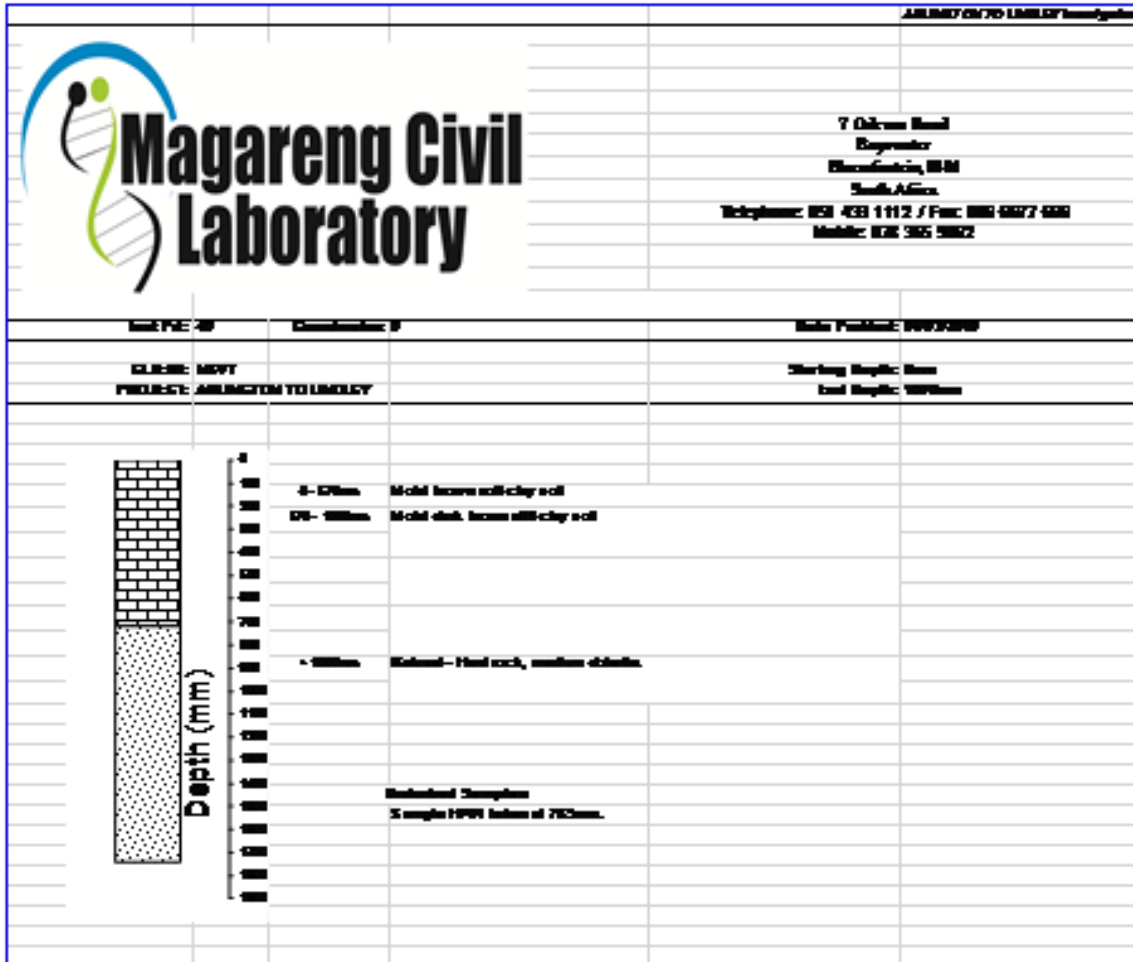














APPENDIX B:


Laboratory Test Results

		Project : Environmental investigation of 200m Floor Under Pipe line from Alington to Lindley				Lab No:	
						Client No: MCLAB010	
						Date: 25-Mar-19	
Layer :		2nd	3rd	3rd	3rd	3rd	3rd
Material description :		Reddish Eumorphic plus clay	Black plus clay	Dark brown, Black plus clay	Dark brown, clay soil + terracote	Dark brown, clay soil + terracote	Eumorphic plus clay
Depth :		1700	2000	1250	1150	150	2000
Chalmers :		8	500	1000	1500	2000	2500
Test Pit:		1	2	3	4	5	6
Test Pit Condition						Refusal no sample	
Moisture Analysis BS 1378 BS 1378	75.0						
	83.0						
	50.0		100				
	37.5		98				
	28		90				
	20.0	100	84				
	14	99	74	100	100		100
	5	98	65	93	98		99
	2.00	96	53	89	92		97
0.425	93	40	83	88		90	
0.075		25					
2.0 - 0.425							
0.425 - 0.075	92.24		82.58	86.39		88.52	
0.075 - 0.020	75.23		77.71	71		79.79	
0.150 - 0.075	52		56.74	49.63		65.57	
<0.075							
Atterberg Limits BS 1378 BS 1378	EM	1.11	1.82	1.28	1.2		1.13
	LL	31.52	37.8	32.97	34.56		
	LP	5.3	7.7	9.6	8.2		8.3
	PI	10.3	15.8	8	16.2		17.2
California bearing Ratio BS 1378 BS 1378	100%	50	53	55		55	
	50%	37	39	40		40	
	25%	32	34	34		34	
	10%	23	25	25		25	
	5%	17	18	18		18	
Swell %	100%	11	11	12		11	
	50%	3.24	3.36	4.46		4.57	
	25%	3.52	3.15	3.87		4.43	
	10%	3.72	3.06	4.56		4.11	
MO BS 1378 BS 1378	kg/m ²	1940	1952	1892		1876	
OM C BS 1378 BS 1378	%	11.3	10.7	10.6		12.7	
UCS c/s BS 1378 BS 1378	100%						
	50%						
	25%						
	10%						
ITS c/s	100%						
	50%						
	25%						
	10%						
Soils to be tested next %							
COULD	H-Check						
Remarks :						Date : 25-Mar-19	Technician : T. MAGLE


Magareng Civil Laboratory		Project :				Lab No:	
		Borehole investigation of 200m Floor Under Pipe line from Alington to Lindley				Chart No: MCLAB/016	
						Date: 25-Mar-19	
Layer :		2nd	2nd	2nd	2nd	2nd	2nd
Material description :		Dark Brown Earthy sand plus clay	Reddish Earthy sand plus clay	Reddish Brown, Earthy sand plus clay	Dark Brown Silty Earthy sand plus clay	Dark brown s, clay sand + concrete	Black plus clay
Depth :		2070	1140	2055	2150	1160	1100
Chiselling :		5000	9500	4000	4500	5000	5500
Test Pit :		7	8	9	10	11	12
Test Pit Condition							
Moisture Analysis D4000 E98-2	75.0						
	83.0						100
	91.0	100	100		100		96
	97.5	97	97		99		92
	98	96	96		98		94
	99.0	96	95		97	100	72
	14	94	94		95	99	
	5	90	92	100	92	99	71
	2.00	87	90	99	86	98	68
	0.425	84	86	99	83	96	61
Soil Moisture %	0.075			61			
	2.0 - 0.425						
	0.425 - 0.075	82.2	84.59	97.88	80.85	94.49	80.78
	0.075 - 0.0075	69.78	71.26	86.53	67.76	78.25	59.78
Atterberg Limits % D4000 E98	<0.075						
	EM	1.29	1.24	0.41	1.31	1.06	1.71
	LL	42.29	35.34	28.5	36.47	36.93	40.44
	LP	8.1	7.4	4.7	7.3	7.1	8.1
California Bearing Ratio % D4000 E98	PI	16	14.9	9.9	14.8	14.23	16.2
	100%	51	55	52	50		57
	90%	38	40	38	37		41
	80%	32	34	33	32		35
	70%	24	25	24	23		25
Swell %	60%	17	18	18	17		18
	50%	11	11	11	11		11
	@ 200 %	7.72	4.53		3.64		5.83
	@ 25 %	7.73	3.5		3.34		5.42
Swell %	@ 50 %	6.93	3.82		3.87		5.91
	1000 D4000 E98/AS	kg/cm ²	1743	1827	1826	1843	1977
	CBR C D4000 E98/AS	%	14.2	14.2	13.6	15.5	10.6
UCS cfs D4000 E98	100%						
	90%						
	80%						
	70%						
ITS cfs	100%						
	90%						
	80%						
	70%						
Soils in test report %							
CDL/D	B - Class						
Remarks :						Date :	25-Mar-19
						Technician :	T. MAGLE

		Project :	Geotechnical Investigation of 200m Deep Water Pipeline from Alington to Lindley				Lab No:	
							Client No :	MCLAB/016
						Date :	25-Mar-19	
Layer :		2nd	2nd	2nd	2nd	2nd	2nd	
Material description :		Black grey Clay	yellowish soft sandstone	No sample	yellowish soft sandstone	No sample	Dark Brown Sandstone grey clay	
Depth :		1000	1000	hard rock	1000	700	1400	
Change :		1000	1000	7000	7500	1000	1000	
Test Pit :		13	14	15	16	17	18	
Test Pit Condition				Hardrock refusal		Hardrock refusal		
Moisture Analysis BS 1378 BS 1378	75.0	100			89			
	83.0	96			87		100	
	50.0	93			80		97	
	37.5	87			69		96	
	28	80			65		94	
	20.0	68			56		88	
	14	67	100		51		85	
	5	65	98		49		67	
	2.00	58	94		40		59	
	0.425	50	93		38		53	
0.075	18.8					23		
Soil Moisture %	2.0-0.425							
	0.425-0.300	49.1	90.29		37.59		52.47	
	0.300-0.250	39.18	66.85		34.35		35.97	
	0.150-0.075	18.77	47.93		17.67		23.08	
Atterberg Limits % BS 1378 BS 1378	EM	1.722	1.13		2.22		1.65	
	LL	39.9	27.85		31.57		26.2	
	LS	8.2	4.7		3.4		3.3	
	PI	16.2	9.3		6.3		6.7	
California bearing ratio % BS 1378 BS 1378	100%	49					54	
	50%	37					39	
	37%	32					34	
	25%	24					25	
	10%	18					18	
Swell %	@ 100 %	3					3.94	
	@ 50 %	2.38					4.05	
	@ 20 %	3.02					3.88	
N ₆₀ BS 1378 BS 1378	kg/cm ²	1887					1956	
	%	11.2					11.7	
UCS kPa BS 1378 BS 1378	100%							
	50%							
	37%							
	25%							
ITS kPa BS 1378 BS 1378	100%							
	50%							
	37%							
	25%							
Soil Classification		E - Class						
Remarks :						Date :	25-Mar-19	
						Technician :	T. MAGLE	

Magareng Civil Laboratory		Project :				Lab No:	
		Geotechnical investigation of 200m Deep Water Pipe line from Alington to Lindley				Chart No: MCLAB/016	
						Date: 25-Mar-19	
Layer:		Top	Top	Top	Top	Top	Top
Material description:		Grey Calcaree Silty sand plus clay	Light Brown Calcaree silty sand plus clay	Light Brown Silty Sand plus clay	Dark Brown Silty Sand plus clay	Dark Brown Silty Sand plus clay	Dark Brown Silty Sand plus clay
Depth:		410	650	2010	1740	1500	1440
Chiselling:		5000	9500	10000	10500	11000	11500
Test Pit:		19	20	21	22	23	24
Test Pit Condition							
Moisture Analysis SAND 30001 EPH-2	75.0					100	
	49.0			100		97	
	50.0			96	100	95	100
	37.5		100		99	92	99
	28		99	95	97	90	
	29.0		98	94	97	88	99
	14	100	97		96	87	
	5	99	87	92	89	82	97
	2.00	96	82	89	85	78	93
	0.425	95	73	82	77	69	87
Soil Moisture %	2.0 - 0.425					48	44
	0.425 - 0.300	92.8	71.97	79.14	74.08	66.37	84.38
	0.300 - 0.250	76.1	61.61	58.23	57.14	52.66	63.29
	0.150 - 0.075 <0.075	57.7	51.41	45.55	48.07	44.42	51.42
Atterberg Limits % SAND 30001 EPH	EM	1.08	0.94	1.29	0.9	1.08	1.2
	LL	34.72	28.2	38.26	26.5	29.4	39.11
	LB	5.7	5.2	7.7	4.5	5.8	9.1
	PI	11.3	9.9	15.56	9.1	11.7	18.2
California Bearing Ratio % SAND 30001 EPH	100%	53	54	50	56	56	59
	80%	39	39	36	41	41	43
	50%	33	34	31	35	35	36
	30%	24	25	23	25	25	26
	20%	17	18	17	18	19	19
Swell %	@ 200 %	2.52		3.8			4.5
	@ 95 %	3.69		3.57			4.96
	@ 50 %	3.08		3.57			4.37
SAND 30001 EPH/LSI	100%						
	100%	1865	1953	1914	1894	1941	1831
SAND 30001 EPH/LSI	%	12.8	12.1	13.2	12.2	14.7	15.7
	100%						
UCS cFt SAND 30001 EPH	100%						
	80%						
	50%						
	25%						
ITS cFt	100%						
	80%						
	50%						
	25%						
Soil Moisture %							
COULD	B-Check						
Remarks:							
						Date:	25-Mar-19
						Technician:	T. MAGLE


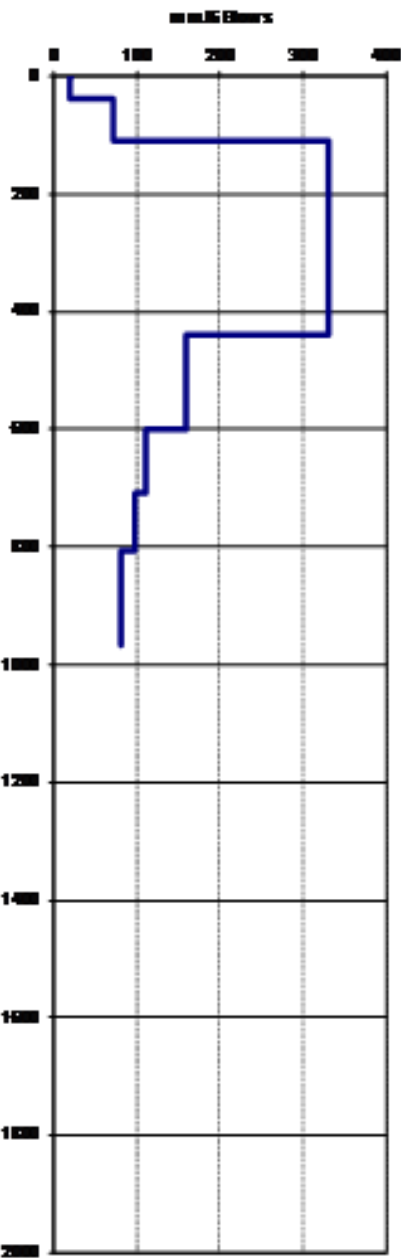
		Project :	Evaluation Investigation of 200m River Water Pipeline from Alington to Lindley				Lab No:	
							Client No:	MCLAB/0116
						Date:	25-Mar-19	
Layer:		Soil	Soil	Soil	Soil	Soil	Soil	
Material description:		Light Brown Clay with silty sandstone	Medium Brown Sandstone with Clay	Grey Clay with Clay				
Depth:		1510	2020	2010	water class	600	600	
Change:		12000	12500	13000	13500	14000	14500	
Test Pit:		25	26	27	28	29	30	
Test Pit Condition					water dam No sample	hardrock refusal No sample	hardrock refusal No sample	
Moisture Analysis SAND 0.075 EPH-Z	75.0	100						
	63.0	97						
	50.0	93	100	100				
	37.5	87	98	98				
	20	81		98				
	20.0	76	98	97				
	14	74	97	97				
	5	70	92	95				
	2.00	66	83	92				
	0.425	63	80	87				
0.075	21							
Soil Moisture %	2.0 - 0.425							
	0.425 - 0.300	61.06	78.57	86.76				
	0.300 - 0.150	38	65.41	61.73				
	0.150 - 0.075 <0.075	21.04	48.8	48.4				
Atterberg Limits % SAND 0.075 EPH	EM	1.5	1.37	1.21				
	LL	24.6	56.58	45				
	LB	2.4	11.6	10.2				
	PI	5.1	23.26	20.16				
California bearing Ratio % SAND 0.075 EPH	100k	51	55	55				
	50k	37	40	40				
	25k	32	34	34				
	12.5k	23	25	25				
	6.25k	17	18	18				
Swell %	@ 100 %		5.44	6.38				
	@ 50 %		4.24	6.16				
	@ 20 %		4.44	5.89				
N 100 SAND 0.075 EPH	100kPa	2000	1875	1845				
	%	10.4	13.7	15.5				
UCS cFt SAND 0.075 EPH	100k							
	50k							
	25k							
	12.5k							
FTS cFt	100k							
	50k							
	25k							
	12.5k							
Test Pit Moisture %								
COULT	B - Check							
Remarks:						Date:	25-Mar-19	
						Technician:	T. MAGLE	


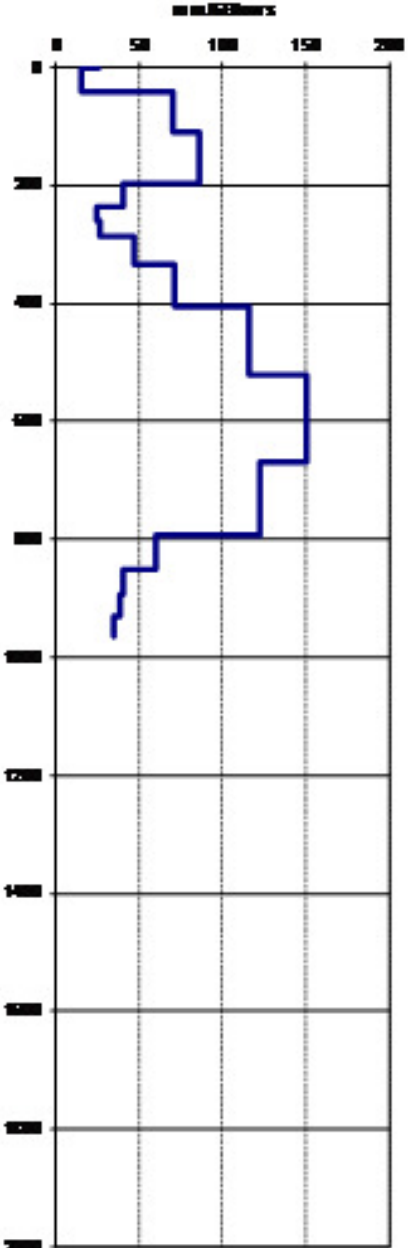
Magareng Civil Laboratory		Project :	Borehole investigation of 200m Floor Under Pipe line from Alington to Lindley				Lab No:	
							Chart No: MCLAB/016	
							Date: 25-Mar-19	
Layer :		2nd	3rd	4th	5th	6th	7th	
Material description :		yellowish soil sandstone	yellowish soil clay soil + terracrite	Dark Brown Sandstone plus Clay				
Depth :		1400	1100	2000	2000	2000	2000	
Chiselling :		15000	15500	15000	16500	17000	17500	
Test Pit :		31	32	33	34	35	36	
Test Pit Condition					Hardrock refusal No Sample	Hardrock refusal No Sample	Hardrock refusal No Sample	
Moisture Analysis BS 1378 EN 12256	75.0							
	82.0							
	50.0	100						
	37.5	99		100				
	26	94		100				
	20.0	88	100	100				
	14	83	99	99				
	5	70	97	95				
Soil Moisture %	2.00	65	92	92				
	0.425	61	87	91				
	0.075	43		60				
	2.0 - 0.425							
Atterberg Limits % BS 1378 EN 12256	0.425 - 0.075	59.94	85.38	86.72				
	0.075 - 0.025	56.27	73.96	77.2				
	0.150 - 0.075	42.7	58.73	59.99				
	<0.075							
California bearing Ratio % BS 1378 EN 12256	EM	1.31	1.21	0.57				
	LL	28.1	36.04	39				
	LB	5.4	7.3	9.2				
	PI	10.7	14.3	18				
Swell %	100%			59				
	50%			43				
	25%			36				
	10%			26				
	5%			19				
Shrinkage %	100%			12				
	50%			3.77				
	25%			3.94				
10%			4.09					
WTD BS 1378 EN 12256	kg/m ³			16.77				
DM C BS 1378 EN 12256	%			17.7				
UCS BS 1378 EN 12256	100%							
	50%							
	25%							
	10%							
FTS BS 1378 EN 12256	100%							
	50%							
	25%							
	10%							
Test Results								
COULD	B - Check							
Remarks :								
						Date :	25-Mar-19	
						Technician :	T. MAGLE	


		Project : Environmental investigation of 200m ² Floor Under Pipe line from Alington to Lindley				Lab No:	
						Chart No:	MCLAB/016
						Date:	25-Mar-19
Lager:		2nd	2nd	2nd	2nd		
Material description:							
Depth:		no sample	no sample	700	1000		
Change:		10000	10500	15000	15500		
Test Pit:		37	38	39	40		
Test Pit Condition		Hardrock refusal	Hardrock refusal	Hardrock refusal	Hardrock refusal		
Moisture Analysis BS 1378:2003 EN 12958	75.0						
	83.0						
	50.0						
	37.5						
	20						
	20.0			100			
	14			99			
	5			97			
2.00			92				
0.425			87				
0.075							
Soil Moisture %	2.0 - 0.425						
	0.425 - 0.300			26.38			
	0.300 - 0.150			73.96			
	0.150 - 0.075			58.23			
<0.075							
Atterberg Limits % BS 1378:2003 EN 12958	EM			1.21			
	LL			34.95			
	LB			6.6			
	PI			14.6			
California Bearing Ratio % BS 1378:2003 EN 12958	100%						
	50%						
	25%						
	12.5%						
	6.25%						
Swell %	0 200 %						
	0 50 %						
	0 30 %						
UCS BS 1378:2003 EN 12958	kg/cm ²			16.77			
	%			17.7			
UCS cFu BS 1378:2003 EN 12958	100%						
	50%						
	25%						
	12.5%						
ITS cFu	100%						
	50%						
	25%						
	12.5%						
Test Pit Moisture %							
COLOUR	B - Choc						
Remarks:							
						Date:	25-Mar-19
						Technician:	T. MAGLE

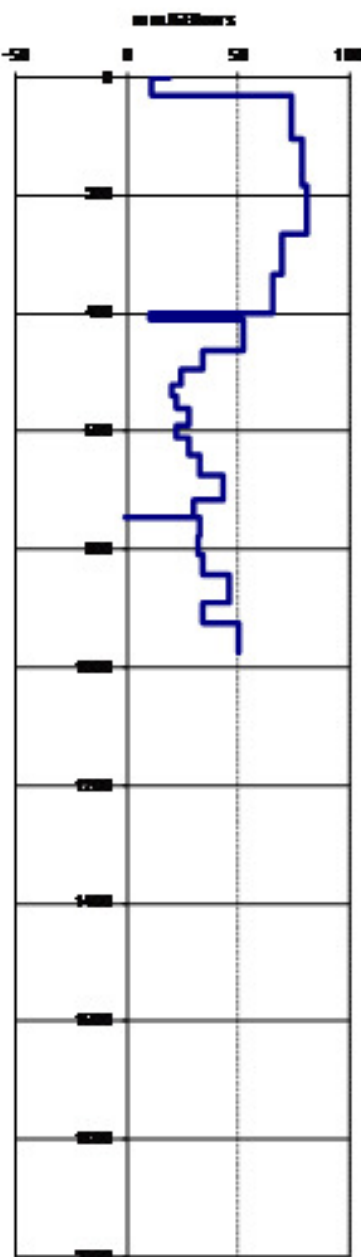
APPENDIX C:


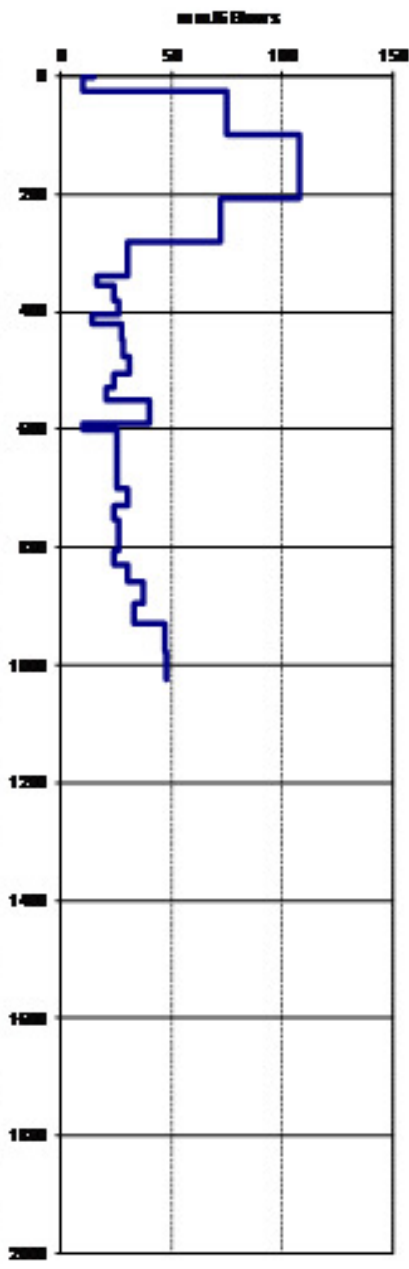
Dynamic Cone Penetrometer (DCP)


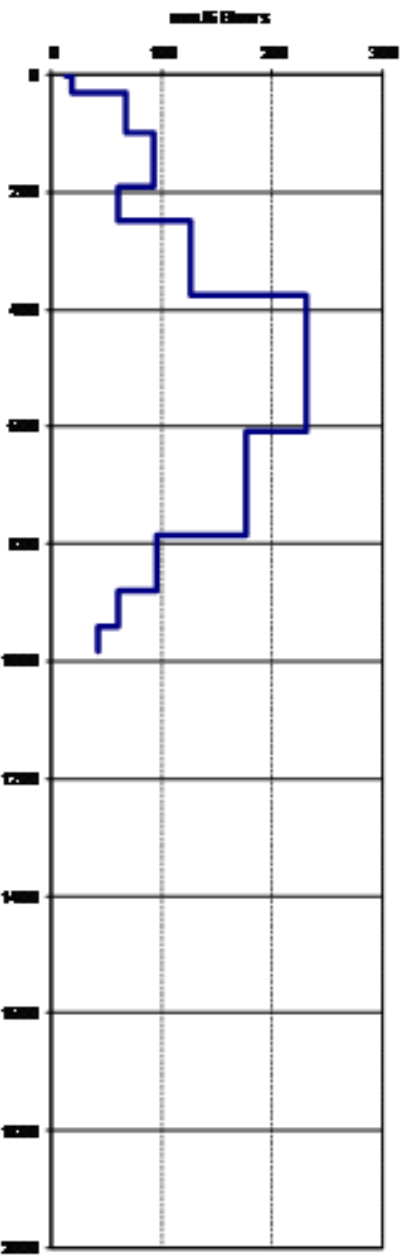
		Project: 2 Mkm Floor under r/pipe line		Lab No:
		Reference No:		Client No:
		Execution No:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method STB				
DCP No.	2			Site: Alington to Lindley
Contract:				Layer type:
Client:				Carriageway:
Field Data		Relevant Parameters		
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CER (%)
0	0			
20	10	5	3.6	75
30	10	5	18.2	16
40	10	5	46.0	2
50	10	5	300	5
70	10	5	20.0	6
80	10	5	10.0	8
90	10	5	10.0	12
100	10	5	10.0	12
Layer Summary				
				
REMARKS				Technician: T Mabinzima
				Date: 26-Mar-19


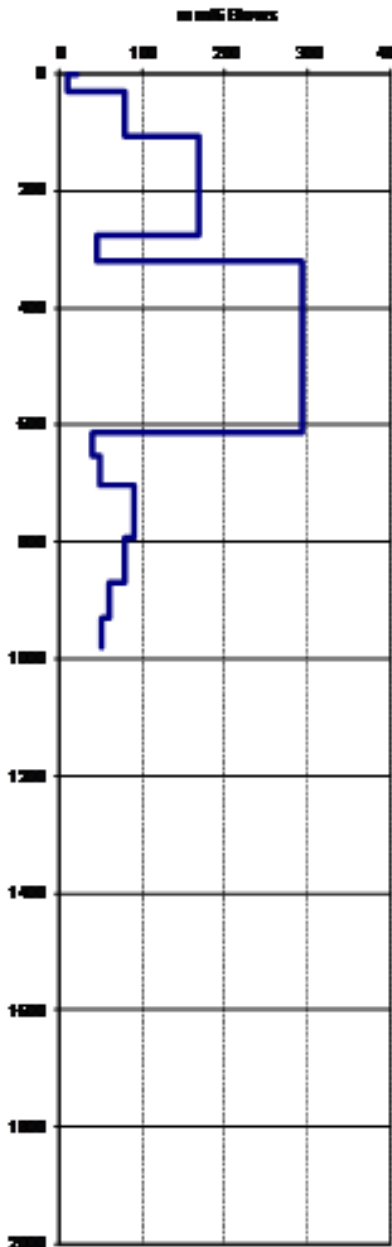
		Project: 28km Renewable pipeline		Lab No:	
		RI name / No:		Client No:	
		Excision from:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TIM-18 Method STB					
DCP No.	3			Site:	
Change:				Layer type:	
Offset:				Carriageway:	
Field Data		Resistance Parameters			Layer boundary
Depth (m)	Interval (mm)	Blows	DPN (mm/Blow)	CEM (%)	
25	0				
40	15	5	30	100	
100	70	5	14.0	6	
165	65	5	17.2	10	
200	35	5	4.0	20	
200	35	5	4.5	25	
200	35	5	5.2	30	
300	100	5	10.0	30	
400	100	5	10.2	6	
500	100	5	20.2	6	
670	170	5	30.0	5	
792	122	5	20.4	7	
852	60	5	10.0	7	
892	40	5	8.0	20	
892	35	5	7.5	30	
892	35	5	7.0	35	
REMARKS					
				Mech : T Malabar Date : 6-Mar-19	


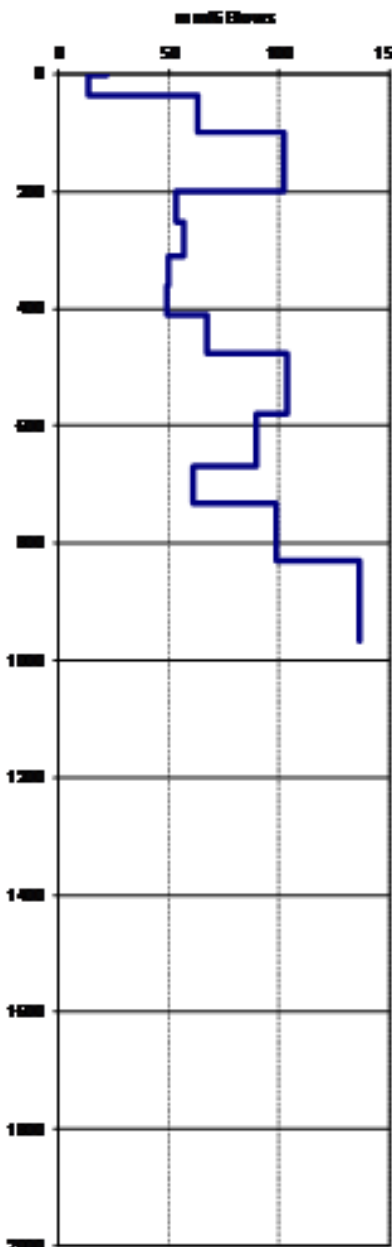
 Magareng Civil Laboratory		Project: 28km Renewable pipeline		Lab No:
		RI name / No:		Client No:
		Excision from:		Date: 26-Mar-19
DYNAMIC CONE PENETROMETER (DCP)				
TIM-18 Method STD				
DCP No.	4			Site: Alington to Lindley
Change:				Layer type:
Offset:				Carriageway:
Field Data		Resistance Parameters		
Depth (m)	Interval (mm)	Blows	DCP (mm/Blow)	CEM (%)
0	0			
20	10	5	22	400
30	20	5	18.5	15
40	20	5	15.5	12
50	20	5	16.2	12
60	20	5	16.0	6
70	20	5	16.2	5
80	20	5	20	400
90	20	5	18.5	20
100	20	5	6.5	35
110	20	5	4.5	35
120	20	5	4.0	70
130	20	5	4.4	62
140	20	5	5.5	45
150	20	5	4.4	62
160	20	5	5.5	45
170	20	5	6.5	37
180	20	5	6.5	37
190	20	5	6.0	42
200	20	5	6.2	42
210	20	5	6.2	42
220	20	5	6.2	42
230	20	5	6.2	42
240	20	5	6.2	42
250	20	5	6.2	42
260	20	5	6.2	42
270	20	5	6.2	42
280	20	5	6.2	42
290	20	5	6.2	42
300	20	5	6.2	42
310	20	5	6.2	42
320	20	5	6.2	42
330	20	5	6.2	42
340	20	5	6.2	42
350	20	5	6.2	42
360	20	5	6.2	42
370	20	5	6.2	42
380	20	5	6.2	42
390	20	5	6.2	42
400	20	5	6.2	42
410	20	5	6.2	42
420	20	5	6.2	42
430	20	5	6.2	42
440	20	5	6.2	42
450	20	5	6.2	42
460	20	5	6.2	42
470	20	5	6.2	42
480	20	5	6.2	42
490	20	5	6.2	42
500	20	5	6.2	42
510	20	5	6.2	42
520	20	5	6.2	42
530	20	5	6.2	42
540	20	5	6.2	42
550	20	5	6.2	42
560	20	5	6.2	42
570	20	5	6.2	42
580	20	5	6.2	42
590	20	5	6.2	42
600	20	5	6.2	42
610	20	5	6.2	42
620	20	5	6.2	42
630	20	5	6.2	42
640	20	5	6.2	42
650	20	5	6.2	42
660	20	5	6.2	42
670	20	5	6.2	42
680	20	5	6.2	42
690	20	5	6.2	42
700	20	5	6.2	42
710	20	5	6.2	42
720	20	5	6.2	42
730	20	5	6.2	42
740	20	5	6.2	42
750	20	5	6.2	42
760	20	5	6.2	42
770	20	5	6.2	42
780	20	5	6.2	42
790	20	5	6.2	42
800	20	5	6.2	42
810	20	5	6.2	42
820	20	5	6.2	42
830	20	5	6.2	42
840	20	5	6.2	42
850	20	5	6.2	42
860	20	5	6.2	42
870	20	5	6.2	42
880	20	5	6.2	42
890	20	5	6.2	42
900	20	5	6.2	42
910	20	5	6.2	42
920	20	5	6.2	42
930	20	5	6.2	42
940	20	5	6.2	42
950	20	5	6.2	42
960	20	5	6.2	42
970	20	5	6.2	42
980	20	5	6.2	42
990	20	5	6.2	42
1000	20	5	6.2	42
REMARKS				Mech : T Mkalane Date : 26-Mar-19


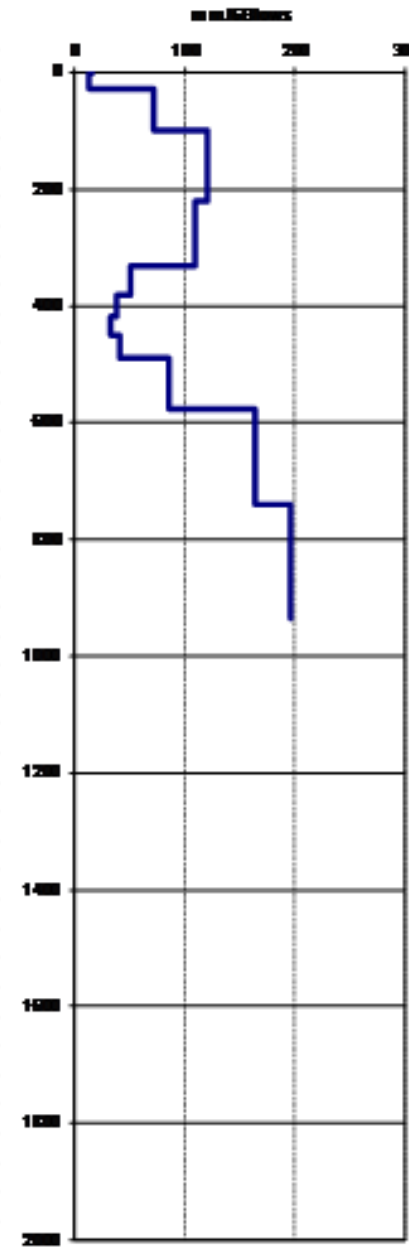



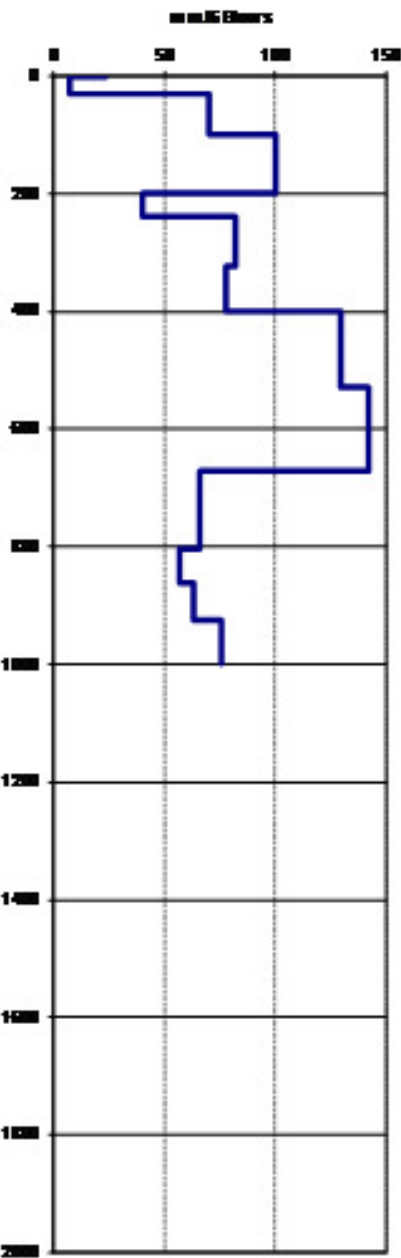
		Project: 2 Mm Floor under pipe line		Lab No:	
		Reference No:		Client No:	
		Execution No:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method STB					
DCP No.	5				
Contract:	Site: Alington to Lindley				
Client:	Layer type:				
Field Data	Carriageway				
Field Data		Relevant Parameters			Layer Summary
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CEM (%)	
0	0				
25	10	5	2.0	40	
100	75	5	10.0	15	
200	100	5	20.0	5	
300	100	5	16.4	10	
350	50	5	6.0	42	
400	50	5	6.0	42	
450	50	5	3.2	84	
500	50	5	4.5	56	
550	50	5	5.2	50	
600	50	5	2.5	40	
650	50	5	5.4	46	
700	50	5	5.6	45	
750	50	5	6.2	40	
800	50	5	4.5	56	
850	50	5	4.0	70	
900	50	5	6.0	30	
950	50	5	2.0	40	
1000	50	5	5.0	50	
1050	50	5	5.0	50	
1100	50	5	5.0	50	
1150	50	5	6.0	42	
1200	50	5	4.5	56	
1250	50	5	5.2	50	
1300	50	5	5.2	50	
1350	50	5	4.5	56	
1400	50	5	6.0	42	
1450	50	5	7.4	32	
1500	50	5	6.6	37	
1550	50	5	16.4	10	
1600	50	5	16.6	10	
REMARKS					
				Technician: T Makhate	
				Date: 6-Mar-19	


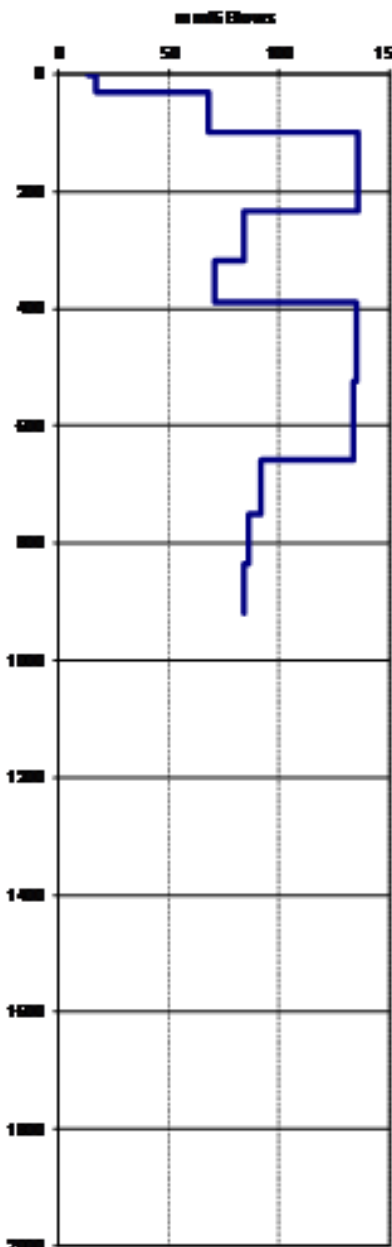
 Magareng Civil Laboratory		Project:	250m Reinforcement project	Lab No:	
		RI name / No:		Client No:	
		Block name:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method STD					
DCP No.	6		Site: Alington to Lindley		
Challenge:			Layer type:		
Client:			Carriageway		
Field Data		Receipt of Parameters		Layer Summary	
Depth (m) Level (m)	Interval (mm)	Blows	DFI (mm/blow)	CER(%)	<div style="text-align: center;">DYNAMIC CONE</div> 
0	0				
0.05	0.05	5	0.01	0	
0.10	0.05	5	0.02	0	
0.15	0.05	5	0.04	0	
0.20	0.05	5	0.08	0	
0.25	0.05	5	0.12	0	
0.30	0.05	5	0.24	0	
0.35	0.05	5	0.32	0	
0.40	0.05	5	0.40	0	
0.45	0.05	5	0.40	0	
0.50	0.05	5	0.40	0	
0.55	0.05	5	0.40	0	
0.60	0.05	5	0.40	0	
0.65	0.05	5	0.40	0	
0.70	0.05	5	0.40	0	
0.75	0.05	5	0.40	0	
0.80	0.05	5	0.40	0	
0.85	0.05	5	0.40	0	
0.90	0.05	5	0.40	0	
0.95	0.05	5	0.40	0	
1.00	0.05	5	0.40	0	
1.05	0.05	5	0.40	0	
1.10	0.05	5	0.40	0	
1.15	0.05	5	0.40	0	
1.20	0.05	5	0.40	0	
1.25	0.05	5	0.40	0	
1.30	0.05	5	0.40	0	
1.35	0.05	5	0.40	0	
1.40	0.05	5	0.40	0	
1.45	0.05	5	0.40	0	
1.50	0.05	5	0.40	0	
1.55	0.05	5	0.40	0	
1.60	0.05	5	0.40	0	
1.65	0.05	5	0.40	0	
1.70	0.05	5	0.40	0	
1.75	0.05	5	0.40	0	
1.80	0.05	5	0.40	0	
1.85	0.05	5	0.40	0	
1.90	0.05	5	0.40	0	
1.95	0.05	5	0.40	0	
2.00	0.05	5	0.40	0	
2.05	0.05	5	0.40	0	
2.10	0.05	5	0.40	0	
2.15	0.05	5	0.40	0	
2.20	0.05	5	0.40	0	
2.25	0.05	5	0.40	0	
2.30	0.05	5	0.40	0	
2.35	0.05	5	0.40	0	
2.40	0.05	5	0.40	0	
2.45	0.05	5	0.40	0	
2.50	0.05	5	0.40	0	
REMARKS					Tech : T Mabin Date : 6-Mar-19


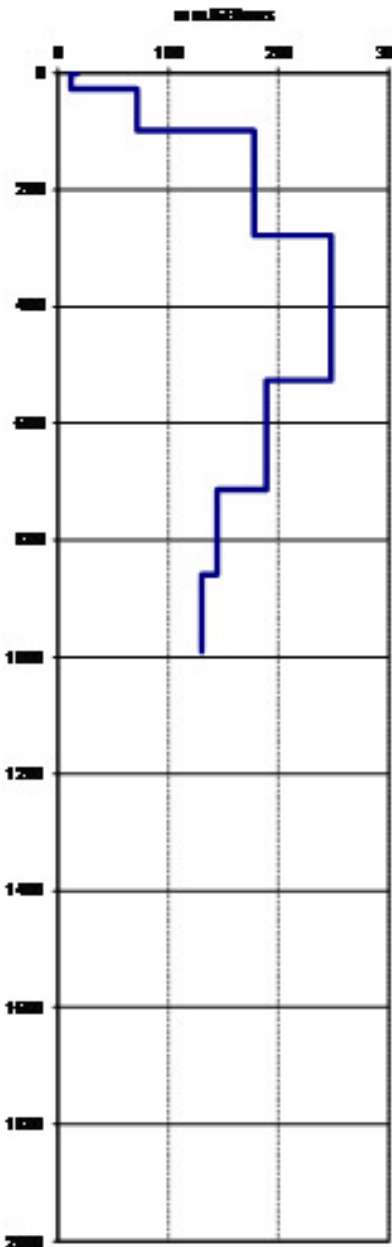
		Project: 2 River Fluvio-erosion pipeline		Lab No:
		RI name / No:		Client No:
		Borehole name:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method STD				
DCP No.	7			Site: Alington to Lindley
Change:				Layer type:
Other:				Carriageway:
Field Data		Relevant Parameters		Layer Summary
Depth (m)	Interval (mm)	Blows	DPN (mm/blow)	CSFL (%)
0	0			
0	10	5	20	100
10	75	5	15	15
20	100	5	20	5
30	40	5	8	25
40	200	5	40	2
45	40	5	8	20
70	45	5	9	25
75	80	5	16	10
80	75	5	15	15
85	40	5	8	10
90	50	5	18	20
				
REMARKS				Test: T Mahele Date: 6-Mar-19


		Project: 20km Fluorinated pipeline		Lab No:
		RI name/No:		Client No:
		Borehole No:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method STD				
DCP No.		#		Site: Alington to Lindley
Change:				Layer type:
Other:				Carriage way:
Field Data		Receival Parameters		Layer Summary
Depth (m)	Interval (mm)	Errors	CFI (mm/Blow)	CEFR (%)
20	0			
25	16	5	206	100
35	46	5	166	76
40	102	5	234	9
45	56	5	166	20
50	57	5	164	19
55	50	5	169	20
60	48	5	166	25
65	67	5	164	15
70	104	5	238	9
75	80	5	167	19
80	66	5	162	17
85	80	5	166	9
90	107	5	274	6
				
REMARKS				
				Tech: T Maitze Date: 6-Mar-19

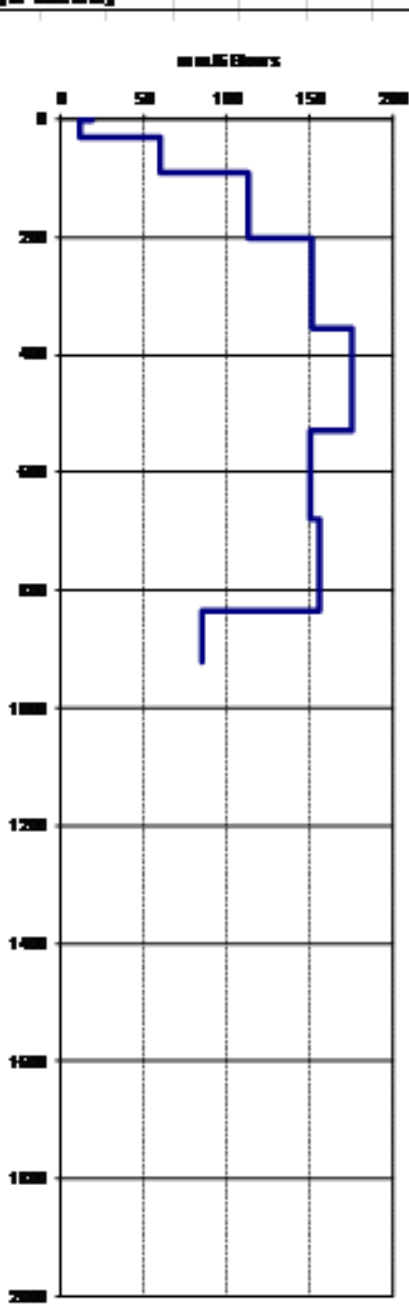
 Magareng Civil Laboratory		Project: 2016m Floor water pipeline		Lab No:
		Reference / No:		Client No:
		Elevation:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TIM-10 Method STD				
DCP No. 3		Site: Arlington to Lindley		
Change:		Layer type:		
Order:		Category:		
File Data		Residual Parameters		Layer Summary
Depth (m)	Interval (mm)	Blows	DCP (mm/Blow)	CEM (%)
15	10			
25	10	5	20.0	100
35	10	5	18.2	10
45	10	5	20.0	7
55	10	5	20.0	6
65	10	5	18.2	20
75	10	5	18.2	30
85	10	5	18.2	30
95	10	5	18.2	30
105	10	5	18.2	10
115	10	5	18.2	5
125	10	5	18.2	4
				
REMARKS:				Tech: T Mokoete Date: 6-Mar-19


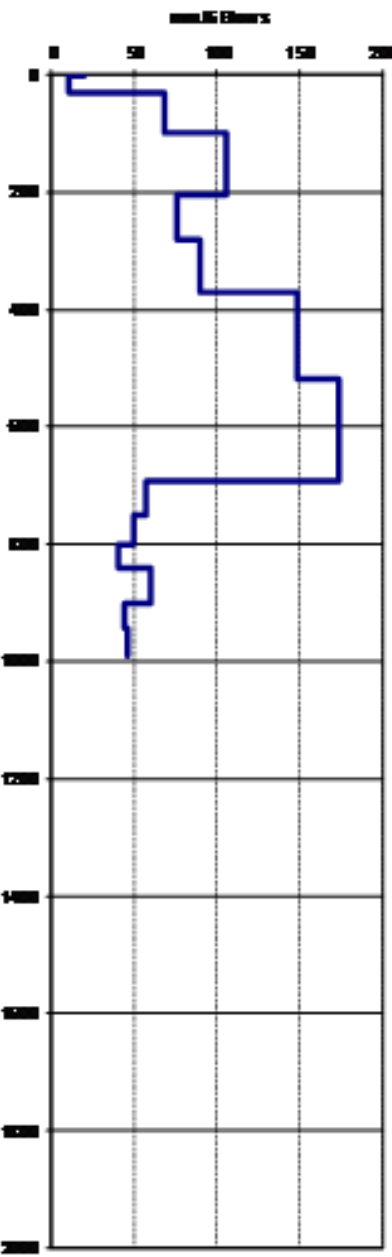
		Project: 2 Mkm Floor under bridge		Lab No:	
		Reference No:		Client No:	
		Execution No:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TMH Method STB					
DCP No.	11			Site: Arlington to Lindley	
Contract:				Layer type:	
Client:				Carriageway:	
Field Data		Relevant Parameters			Laguer Summary
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CER (%)	
25	0				
30	7	5	14	40	
35	70	5	14.0	16	
40	100	5	20.0	0	
45	40	5	15.0	20	
50	62	5	16.4	12	
55	75	5	15.0	16	
60	100	5	20.0	7	
65	102	5	20.4	6	
70	66	5	13.2	15	
75	66	5	13.2	15	
80	57	5	11.4	10	
85	66	5	13.2	16	
90	76	5	15.2	16	
REMARKS					
				Technician: T M Moutie	
				Date: 6-Mar-19	


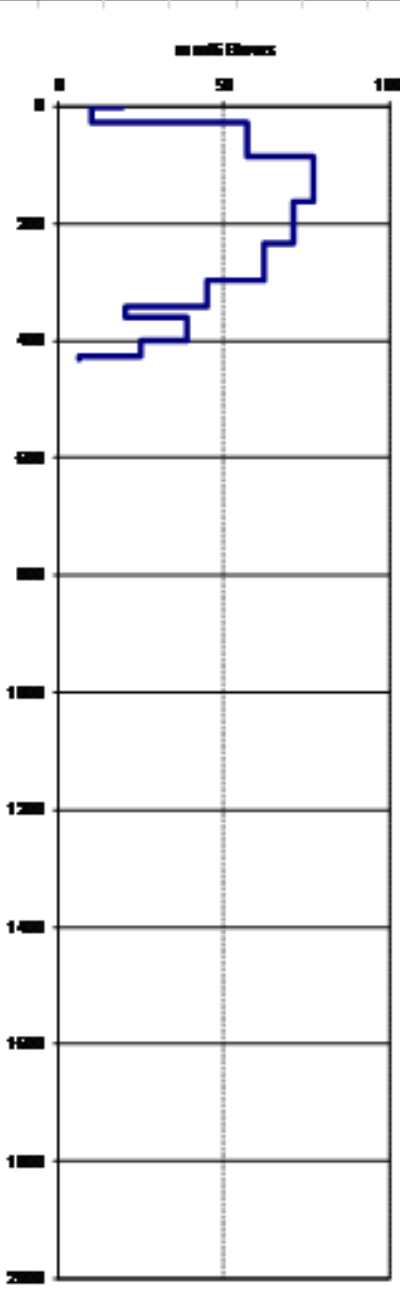
 Magareng Civil Laboratory		Project: 20km Waterworks pipeline		Lab No:	
		RI name/ No:		Client No:	
		Borehole name:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method STD					
DCP No. 11		Site Alington to Lindley			
Change:		Layer type:			
Other:		Carriage way:			
Field Data		Receival Parameters		Layer Summary	
Depth (m)	Interval (mm)	Blows	DFI (mm/blow)	CSR (%)	
15	0				
30	15	5	36	87	
45	15	5	186	15	
60	15	5	272	6	
75	15	5	165	18	
90	15	5	162	18	
105	15	5	273	6	
120	15	5	285	6	
135	15	5	164	18	
150	15	5	172	18	
165	15	5	165	18	
REMARKS					
				Tech: T Maitze Date: 6-Mar-19	


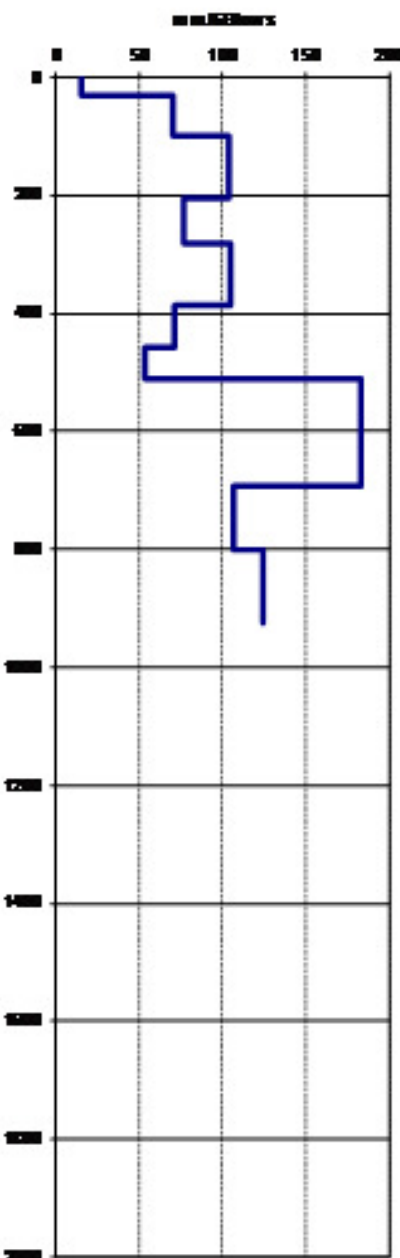
		Project: 200m Floor water pipeline		Lab No:	
		Reference / No:		Client No:	
		Execution:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TMH-B Method STD					
DCP No.		12		Site: Arlington to Lindley	
Change:				Layer type:	
Other:				Category:	
Field Data		Residual Parameters			Layer Summary
Depth (m)	Interval (mm)	Blows	DCP (mm/Blow)	CEM (%)	
0	0				
25	10	5	22	100	
50	22	5	18.6	8	
75	26	5	15.4	4	
100	25	5	18.0	3	
125	25	5	17.2	4	
150	25	5	18.0	6	
175	25	5	18.0	7	
REMARKS				Tech: T Mchabe Date: 6-Mar-19	

		Project: 2 Mile Run water pipeline Reference No: Block/Form:	Lab No: Client No: Date:
DYNAMIC CONE PENETROMETER (DCP) TM-118 Method STB			
DCP No. 13		Site: Arlington to Lindley	
Change:		Layer type:	
Offset:		Carriageway:	
Field Data		Relevant Parameters	
Depth (m)	Interval (mm)	Blows	DCP (mm/blow)
0	0		
20	20	5	2.2
40	40	5	2.0
60	60	5	2.2
80	80	5	2.2
100	100	5	2.2
120	120	5	2.2
140	140	5	2.2
160	160	5	2.2
180	180	5	2.2
200	200	5	2.2
220	220	5	2.2
240	240	5	2.2
260	260	5	2.2
280	280	5	2.2
300	300	5	2.2
320	320	5	2.2
340	340	5	2.2
360	360	5	2.2
380	380	5	2.2
400	400	5	2.2
420	420	5	2.2
440	440	5	2.2
460	460	5	2.2
480	480	5	2.2
500	500	5	2.2
520	520	5	2.2
540	540	5	2.2
560	560	5	2.2
580	580	5	2.2
600	600	5	2.2
620	620	5	2.2
640	640	5	2.2
660	660	5	2.2
680	680	5	2.2
700	700	5	2.2
720	720	5	2.2
740	740	5	2.2
760	760	5	2.2
780	780	5	2.2
800	800	5	2.2
820	820	5	2.2
840	840	5	2.2
860	860	5	2.2
880	880	5	2.2
900	900	5	2.2
920	920	5	2.2
940	940	5	2.2
960	960	5	2.2
980	980	5	2.2
1000	1000	5	2.2
REMARKS		Depth: 7.0 m Date: 6-Mar-19	


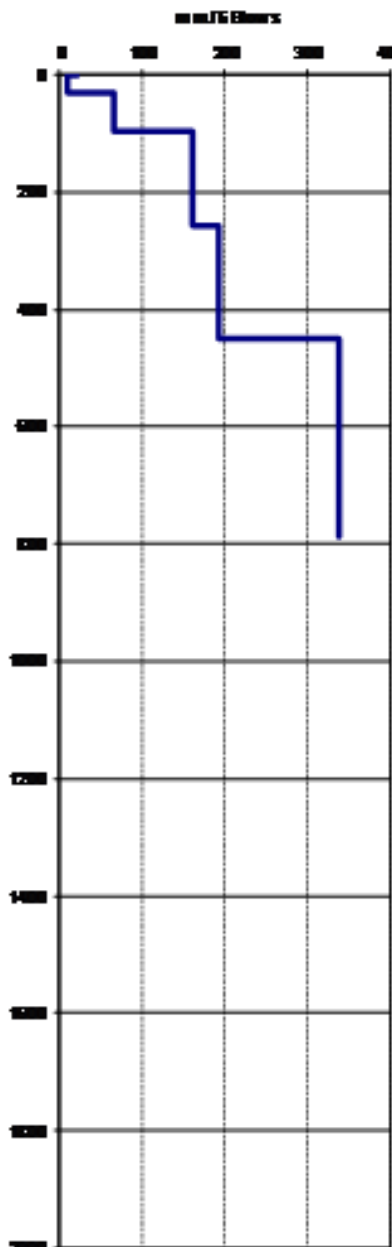



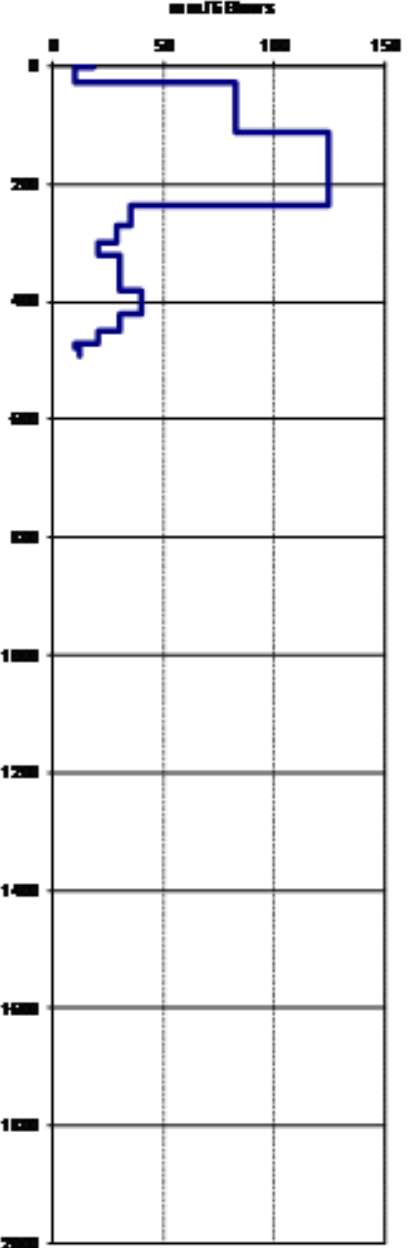
 Magareng Civil Laboratory		Project: 2018a Remembrance project		Lab No:	
		RI name / No:		Client No:	
		Block name:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TMH-B Method STD					
DCP No.	14				
Challenge:	Site: Alington to Lindley				
Client:	Layer type:				
Field Date:	Carriageway				
Field Date		Revised Parameters			Layer Summary
Depth (m)	Interval (mm)	Blows	DFI (mm/blow)	CER (%)	
0.0	0				
0.0	10	5	20	100	
0.0	20	5	16.6	75	
0.0	30	5	21.2	8	
0.0	40	5	15.2	16	
0.0	50	5	16.0	10	
0.0	60	5	20.0	6	
0.0	70	5	16.6	5	
0.0	80	5	16.6	10	
0.0	90	5	16.0	22	
0.0	100	5	16.0	20	
0.0	110	5	16.0	17	
0.0	120	5	16.6	26	
0.0	130	5	16.2	26	
REMARKS					
				Tech: T Mabinde	
				Date: 6-Mar-19	

		Project: 20km Waterworks pipeline			Lab No:			
		RI name / No:			Client No:			
		Borehole No:			Date:			
DYNAMIC CONE PENETROMETER (DCP)								
TM-10 Method STD								
DCP No.		15			Site			Alington to Lindley
Change:					Layer type			
Other:					Carriage way			
Field Data		Relevant Parameters			Layer Summary			
Depth (m) Level (mm)	Interval (mm)	Blows	DFI (mm/blow)	CFR (%)				
0	0							
20	20	5	20	100				
40	20	5	16	10				
60	20	5	12.6	10				
80	20	5	16.2	10				
100	20	5	16.6	10				
120	20	5	16.8	10				
140	20	5	16.8	10				
160	20	5	16.8	10				
180	20	5	16.8	10				
200	20	5	16.8	10				
220	20	5	16.8	10				
240	20	5	16.8	10				
260	20	5	16.8	10				
REMARKS					Test : T M/min Date : 6-Mar-19			

		Project: 28km Renewable pipeline		Lab No:
		RI name / No:		Client No:
		Excision from:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TIM-10 Method STD				
DCP No.	16			Site: Alington to Lindley
Chainage:				Layer type:
Offset:				Carriageway:
Field Data		Resistance Parameters		
Depth (m)	Interval (mm)	Blows	DPN (mm/Blow)	CBR (%)
15	0			
20	15	5	30	100
100	70	5	14.0	6
204	104	5	20.8	8
208	77	5	15.6	6
208	105	5	21.0	8
457	71	5	14.2	6
500	55	5	100	20
605	105	5	200	4
800	100	5	200	5
804	100	5	200	7
				
REMARKS				Tech : T Mubareze Date : 6-Mar-19


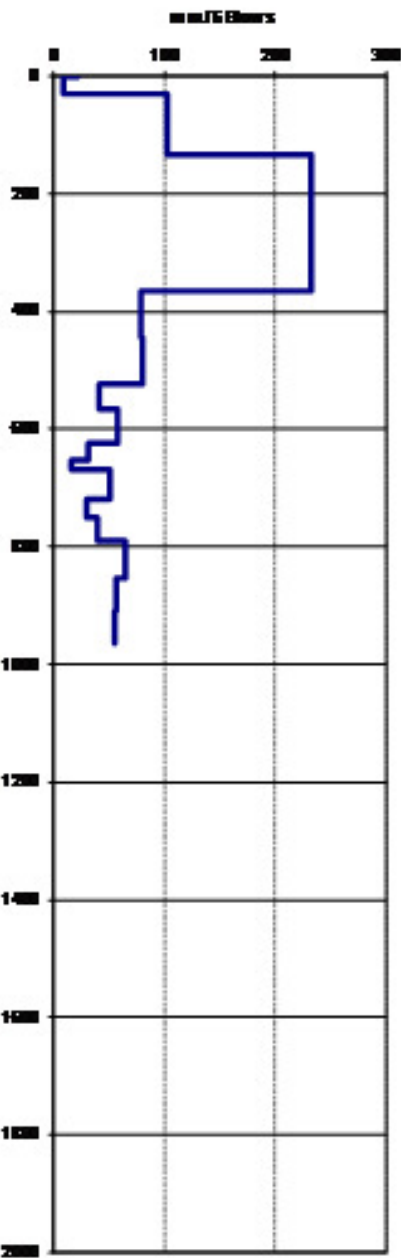
Magareng Civil Laboratory		Project: 2.0km Watermain pipeline		Lab No: _____	
		RI name/No: _____		Client No: _____	
		Block name: _____		Date: _____	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method SIB					
DCP No. 17		Site: Alington to Lindley			
Change:		Layer type:			
Other:		Carriage way:			
Field Data		Receival Parameters		Layer Summary	
Depth Bed Level [mm]	Interval [mm]	Blows	DFI [mm/blow]	CSR [%]	<div style="text-align: center;">in mm Blows</div>
15	0				
30	15	5	225	100	
45	15	5	162	10	
60	15	5	225	6	
75	15	5	225	6	
90	15	5	202	9	
105	15	5	324	4	
120	15	5	324	4	
135	15	5	270	6	
REMARKS: _____				Tech: T Maitze Date: 6-Mar-19	


 Magareng Civil Laboratory		Project:	28 km Reromania pipeline		Lab No:	
		RI name / No:			Client No:	
		Block name:			Date:	
DYNAMIC CONE PENETROMETER (DCP)						
TM-10 Method STD						
DCP No.		10			Site: Alington to Lindley	
Chainage:					Layer type:	
Offset:					Carriageway:	
Field Data		Relevant Parameters			Layer Summary	
Depth (m)	Interval (mm)	Blows	DPN (mm/blow)	CER (%)		
0	100	5	20	100		
100	100	5	162	15		
200	100	5	329	5		
300	100	5	476	4		
400	100	5	476	2		
500	100	5	476	2		
REMARKS					Tech : T Mahele Date : 6-Mar-19	

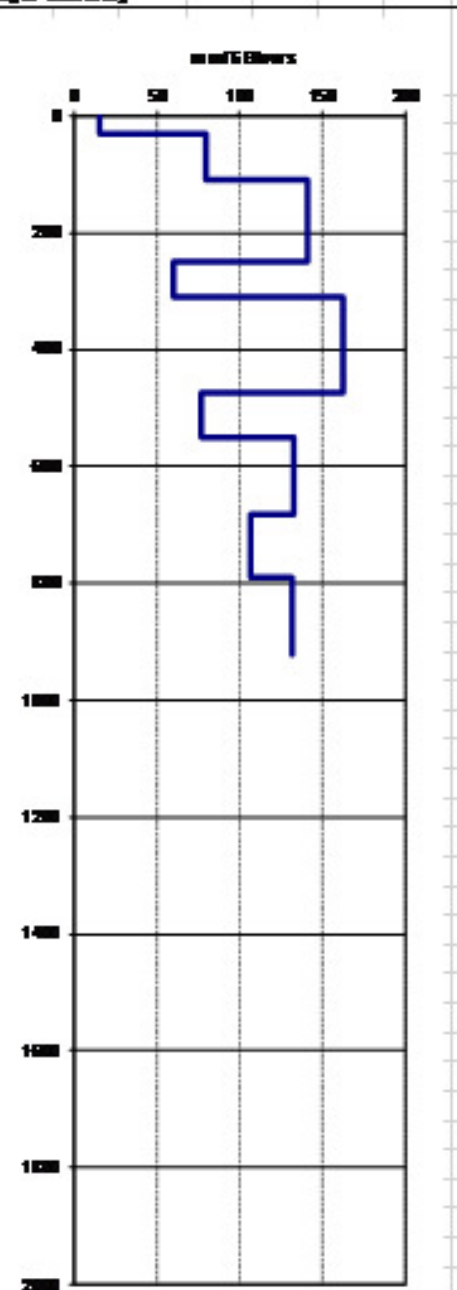
		Project: 2 Block Floor under r/pipe line		Lab No:	
		Reference No:		Client No:	
		Block/Form:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TM-118 Method STB					
DCP No.	12			Site: Alington to Lindley	
Contract:				Layer type:	
Client:				Carriageway:	
Field Data		Relevant Parameters			Layer Summary
Depth (m) Level (mm)	Interval (mm)	Blows	CFI (mm/blow)	CER (%)	
15	0				
25	10	5	2.0	100	
35	20	5	7.0	12	
45	30	5	23.0	7	
55	40	5	7.0	35	
65	50	5	5.5	44	
75	60	5	4.0	70	
85	70	5	6.0	42	
95	80	5	6.0	42	
105	90	5	5.0	30	
115	100	5	6.0	42	
125	110	5	4.0	70	
135	120	5	2.0	100	
145	130	5	2.4	100	
REMARKS				Technician: T Mokoete	
				Date: 6-Mar-19	

Magareng Civil Laboratory		Project: 250km Reinforcement project	Lab No:
RI name / No:			Client No:
Revised name:			Date:
DYNAMIC CONE PENETROMETER (DCP)			
TMR-18 Method STD			
DCP No.	20		Site: Alington to Lindley
Contract:			Layer type:
Client:			Carriageway:
Field Data		Recieved Parameters	
Depth (m)	Interval (mm)	Blows	DFI (mm/blow)
			CER (%)
0	0		
30	5	5	15
60	5	5	15.5
90	5	5	16.2
120	5	5	16.4
150	5	5	16.4
180	5	5	16.4
210	5	5	16.4
240	5	5	16.4
270	5	5	16.4
300	5	5	16.4
330	5	5	16.4
360	5	5	16.4
390	5	5	16.4
420	5	5	16.4
450	5	5	16.4
480	5	5	16.4
510	5	5	16.4
540	5	5	16.4
570	5	5	16.4
600	5	5	16.4
630	5	5	16.4
660	5	5	16.4
690	5	5	16.4
720	5	5	16.4
750	5	5	16.4
780	5	5	16.4
810	5	5	16.4
840	5	5	16.4
870	5	5	16.4
900	5	5	16.4
930	5	5	16.4
960	5	5	16.4
990	5	5	16.4
1020	5	5	16.4
1050	5	5	16.4
1080	5	5	16.4
1110	5	5	16.4
1140	5	5	16.4
1170	5	5	16.4
1200	5	5	16.4
1230	5	5	16.4
1260	5	5	16.4
1290	5	5	16.4
1320	5	5	16.4
1350	5	5	16.4
1380	5	5	16.4
1410	5	5	16.4
1440	5	5	16.4
1470	5	5	16.4
1500	5	5	16.4
1530	5	5	16.4
1560	5	5	16.4
1590	5	5	16.4
1620	5	5	16.4
1650	5	5	16.4
1680	5	5	16.4
1710	5	5	16.4
1740	5	5	16.4
1770	5	5	16.4
1800	5	5	16.4
1830	5	5	16.4
1860	5	5	16.4
1890	5	5	16.4
1920	5	5	16.4
1950	5	5	16.4
1980	5	5	16.4
2010	5	5	16.4
2040	5	5	16.4
2070	5	5	16.4
2100	5	5	16.4
2130	5	5	16.4
2160	5	5	16.4
2190	5	5	16.4
2220	5	5	16.4
2250	5	5	16.4
2280	5	5	16.4
2310	5	5	16.4
2340	5	5	16.4
2370	5	5	16.4
2400	5	5	16.4
2430	5	5	16.4
2460	5	5	16.4
2490	5	5	16.4
2520	5	5	16.4
2550	5	5	16.4
2580	5	5	16.4
2610	5	5	16.4
2640	5	5	16.4
2670	5	5	16.4
2700	5	5	16.4
2730	5	5	16.4
2760	5	5	16.4
2790	5	5	16.4
2820	5	5	16.4
2850	5	5	16.4
2880	5	5	16.4
2910	5	5	16.4
2940	5	5	16.4
2970	5	5	16.4
3000	5	5	16.4
3030	5	5	16.4
3060	5	5	16.4
3090	5	5	16.4
3120	5	5	16.4
3150	5	5	16.4
3180	5	5	16.4
3210	5	5	16.4
3240	5	5	16.4
3270	5	5	16.4
3300	5	5	16.4
3330	5	5	16.4
3360	5	5	16.4
3390	5	5	16.4
3420	5	5	16.4
3450	5	5	16.4
3480	5	5	16.4
3510	5	5	16.4
3540	5	5	16.4
3570	5	5	16.4
3600	5	5	16.4
3630	5	5	16.4
3660	5	5	16.4
3690	5	5	16.4
3720	5	5	16.4
3750	5	5	16.4
3780	5	5	16.4
3810	5	5	16.4
3840	5	5	16.4
3870	5	5	16.4
3900	5	5	16.4
3930	5	5	16.4
3960	5	5	16.4
3990	5	5	16.4
4020	5	5	16.4
4050	5	5	16.4
4080	5	5	16.4
4110	5	5	16.4
4140	5	5	16.4
4170	5	5	16.4
4200	5	5	16.4
4230	5	5	16.4
4260	5	5	16.4
4290	5	5	16.4
4320	5	5	16.4
4350	5	5	16.4
4380	5	5	16.4
4410	5	5	16.4
4440	5	5	16.4
4470	5	5	16.4
4500	5	5	16.4
4530	5	5	16.4
4560	5	5	16.4
4590	5	5	16.4
4620	5	5	16.4
4650	5	5	16.4
4680	5	5	16.4
4710	5	5	16.4
4740	5	5	16.4
4770	5	5	16.4
4800	5	5	16.4
4830	5	5	16.4
4860	5	5	16.4
4890	5	5	16.4
4920	5	5	16.4
4950	5	5	16.4
4980	5	5	16.4
5010	5	5	16.4
5040	5	5	16.4
5070	5	5	16.4
5100	5	5	16.4
5130	5	5	16.4
5160	5	5	16.4
5190	5	5	16.4
5220	5	5	16.4
5250	5	5	16.4
5280	5	5	16.4
5310	5	5	16.4
5340	5	5	16.4
5370	5	5	16.4
5400	5	5	16.4
5430	5	5	16.4
5460	5	5	16.4
5490	5	5	16.4
5520	5	5	16.4
5550	5	5	16.4
5580	5	5	16.4
5610	5	5	16.4
5640	5	5	16.4
5670	5	5	16.4
5700	5	5	16.4
5730	5	5	16.4
5760	5	5	16.4
5790	5	5	16.4
5820	5	5	16.4
5850	5	5	16.4
5880	5	5	16.4
5910	5	5	16.4
5940	5	5	16.4
5970	5	5	16.4
6000	5	5	16.4
6030	5	5	16.4
6060	5	5	16.4
6090	5	5	16.4
6120	5	5	16.4
6150	5	5	16.4
6180	5	5	16.4
6210	5	5	16.4
6240	5	5	16.4
6270	5	5	16.4
6300	5	5	16.4
6330	5	5	16.4
6360	5	5	16.4
6390	5	5	16.4
6420	5	5	16.4
6450	5	5	16.4
6480	5	5	16.4
6510	5	5	16.4
6540	5	5	16.4
6570	5	5	16.4
6600	5	5	16.4
6630	5	5	16.4
6660	5	5	16.4
6690	5	5	16.4
6720	5	5	16.4
6750	5	5	16.4
6780	5	5	16.4
6810	5	5	16.4
6840	5	5	16.4
6870	5	5	16.4
6900	5	5	16.4
6930	5	5	16.4
6960	5	5	16.4
6990	5	5	16.4
7020	5	5	16.4
7050	5	5	16.4
7080	5	5	16.4
7110	5	5	16.4
7140	5	5	16.4
7170	5	5	16.4
7200	5	5	16.4
7230	5	5	16.4
7260	5	5	16.4
7290	5	5	16.4
7320	5	5	16.4
7350	5	5	16.4
7380	5	5	16.4
7410	5	5	16.4
7440	5	5	16.4
7470	5	5	16.4
7500	5	5	16.4
7530	5	5	16.4
7560	5	5	16.4
7590	5	5	16.4
7620	5	5	16.4
7650	5	5	16.4
7680	5	5	16.4
7710	5	5	16.4
7740	5	5	16.4
7770	5	5	16.4
7800	5	5	16.4
7830	5	5	16.4
7860	5	5	16.4
7890	5	5	16.4
7920	5	5	16.4
7950	5	5	16.4
7980	5	5	16.4
8010	5	5	16.4
8040	5	5	16.4
8070	5	5	16.4
8100	5	5	16.4
8130	5	5	16.4
8160	5	5	16.4
8190	5	5	16.4
8220	5	5	16.4
8250	5	5	16.4
8280	5	5	16.4
8310	5	5	16.4
8340	5	5	16.4
8370	5	5	16.4
8400	5	5	16.4
8430	5	5	16.4
8460	5	5	16.4
8490	5	5	16.4
8520	5	5	16.4
8550	5	5	16.4
8580	5	5	16.4
8610	5	5	16.4
8640	5	5	16.4
8670	5	5	16.4
8700	5	5	16.4
8730			

Magareng Civil Laboratory		Project: 2.0km Waterworks pipeline		Lab No:
		RI name/No:		Client No:
		Borehole name:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method STD				
DCP No. 21		Site Alington to Lindley		
Change:		Layer type:		
Comment:		Carriage way:		
Field Data		Receival Parameters		Layer Summary
Depth (m)	Interval (mm)	Blows	DFI (mm/blow)	CSR (%)
25	0			
30	5	5	10	100
35	5	5	222	6
40	5	5	422	4
45	5	5	235	7
50	5	5	85	25
75	25	5	40	4
REMARKS				Tech : T Maitze Date : 6-Mar-19


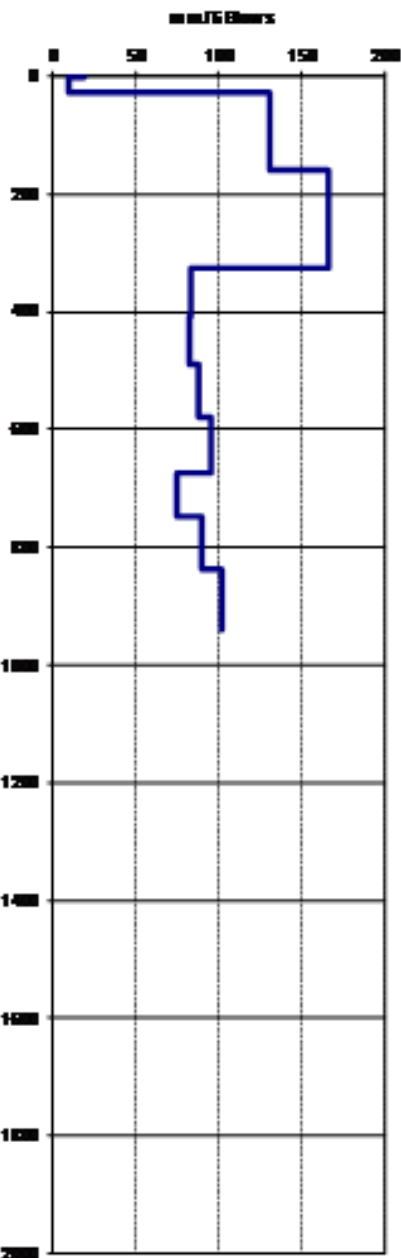
		Project: 2 Mm Floor under pipe line		Lab No:	
		Reference No:		Client No:	
		Execution No:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method STB					
DCP No.	25				
Contract:	Site: Arlington to Lindley				
Client:	Layer type:				
Field Date:	Carriageway				
Field Data		Relevant Parameters			
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CEM (%)	
0	0				
20	0	5	16	100	
40	20	5	16	100	
60	20	5	16	100	
80	20	5	16	100	
100	20	5	16	100	
120	20	5	16	100	
140	20	5	16	100	
160	20	5	16	100	
180	20	5	16	100	
200	20	5	16	100	
220	20	5	16	100	
240	20	5	16	100	
260	20	5	16	100	
280	20	5	16	100	
300	20	5	16	100	
320	20	5	16	100	
340	20	5	16	100	
360	20	5	16	100	
380	20	5	16	100	
400	20	5	16	100	
420	20	5	16	100	
440	20	5	16	100	
460	20	5	16	100	
480	20	5	16	100	
500	20	5	16	100	
520	20	5	16	100	
540	20	5	16	100	
560	20	5	16	100	
580	20	5	16	100	
600	20	5	16	100	
620	20	5	16	100	
640	20	5	16	100	
660	20	5	16	100	
680	20	5	16	100	
700	20	5	16	100	
720	20	5	16	100	
740	20	5	16	100	
760	20	5	16	100	
780	20	5	16	100	
800	20	5	16	100	
820	20	5	16	100	
840	20	5	16	100	
860	20	5	16	100	
880	20	5	16	100	
900	20	5	16	100	
920	20	5	16	100	
940	20	5	16	100	
960	20	5	16	100	
980	20	5	16	100	
1000	20	5	16	100	
1020	20	5	16	100	
1040	20	5	16	100	
1060	20	5	16	100	
1080	20	5	16	100	
1100	20	5	16	100	
1120	20	5	16	100	
1140	20	5	16	100	
1160	20	5	16	100	
1180	20	5	16	100	
1200	20	5	16	100	
1220	20	5	16	100	
1240	20	5	16	100	
1260	20	5	16	100	
1280	20	5	16	100	
1300	20	5	16	100	
1320	20	5	16	100	
1340	20	5	16	100	
1360	20	5	16	100	
1380	20	5	16	100	
1400	20	5	16	100	
1420	20	5	16	100	
1440	20	5	16	100	
1460	20	5	16	100	
1480	20	5	16	100	
1500	20	5	16	100	
1520	20	5	16	100	
1540	20	5	16	100	
1560	20	5	16	100	
1580	20	5	16	100	
1600	20	5	16	100	
1620	20	5	16	100	
1640	20	5	16	100	
1660	20	5	16	100	
1680	20	5	16	100	
1700	20	5	16	100	
1720	20	5	16	100	
1740	20	5	16	100	
1760	20	5	16	100	
1780	20	5	16	100	
1800	20	5	16	100	
1820	20	5	16	100	
1840	20	5	16	100	
1860	20	5	16	100	
1880	20	5	16	100	
1900	20	5	16	100	
1920	20	5	16	100	
1940	20	5	16	100	
1960	20	5	16	100	
1980	20	5	16	100	
2000	20	5	16	100	
REMARKS					
	Technician: T M M... Date: 6-Mar-19				


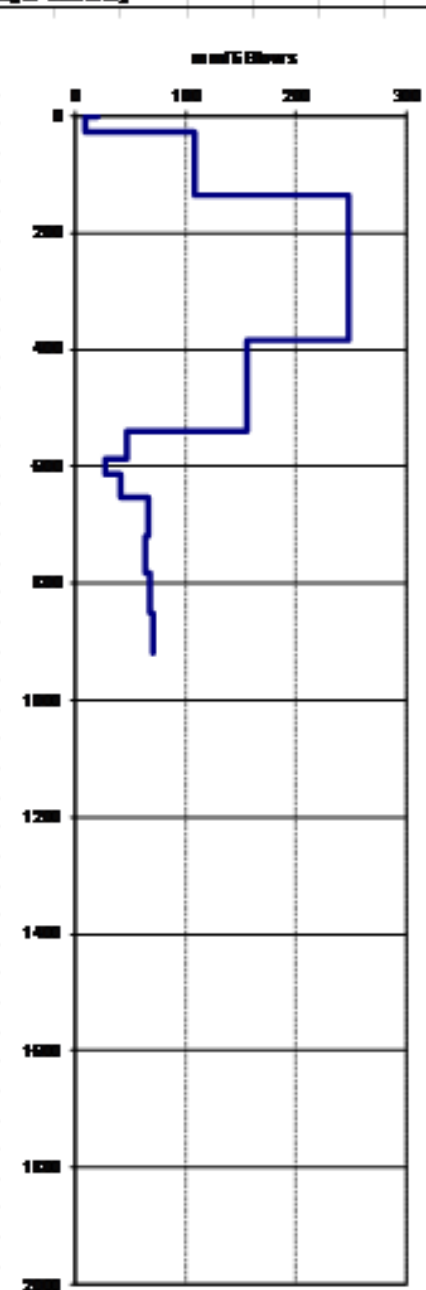
		Project: 28km Floor water pipeline	Lab No:	
		Reference No:	Client No:	
		Execution:	Date:	
DYNAMIC CONE PENETROMETER (DCP)				
TMH-1 B Method STD				
DCP No.	27			Site: Alington to Lindley
Change:				Layer type:
Other:				Category:
Field Data		Residual Parameters		Layer Summary
Depth (m)	Interval (mm)	Blows	DCP (mm/blow)	CSF (%)
15	10			
30	15	5	3.0	10
45	15	5	3.0	10
60	15	5	3.0	10
75	15	5	3.0	10
90	15	5	3.0	10
105	15	5	3.0	10
120	15	5	3.0	10
135	15	5	3.0	10
150	15	5	3.0	10
165	15	5	3.0	10
180	15	5	3.0	10
195	15	5	3.0	10
210	15	5	3.0	10
225	15	5	3.0	10
240	15	5	3.0	10
255	15	5	3.0	10
270	15	5	3.0	10
285	15	5	3.0	10
300	15	5	3.0	10
315	15	5	3.0	10
330	15	5	3.0	10
345	15	5	3.0	10
360	15	5	3.0	10
375	15	5	3.0	10
390	15	5	3.0	10
405	15	5	3.0	10
420	15	5	3.0	10
435	15	5	3.0	10
450	15	5	3.0	10
465	15	5	3.0	10
480	15	5	3.0	10
495	15	5	3.0	10
510	15	5	3.0	10
525	15	5	3.0	10
540	15	5	3.0	10
555	15	5	3.0	10
570	15	5	3.0	10
585	15	5	3.0	10
600	15	5	3.0	10
615	15	5	3.0	10
630	15	5	3.0	10
645	15	5	3.0	10
660	15	5	3.0	10
675	15	5	3.0	10
690	15	5	3.0	10
705	15	5	3.0	10
720	15	5	3.0	10
735	15	5	3.0	10
750	15	5	3.0	10
765	15	5	3.0	10
780	15	5	3.0	10
795	15	5	3.0	10
810	15	5	3.0	10
825	15	5	3.0	10
840	15	5	3.0	10
855	15	5	3.0	10
870	15	5	3.0	10
885	15	5	3.0	10
900	15	5	3.0	10
915	15	5	3.0	10
930	15	5	3.0	10
945	15	5	3.0	10
960	15	5	3.0	10
975	15	5	3.0	10
990	15	5	3.0	10
1005	15	5	3.0	10
1020	15	5	3.0	10
1035	15	5	3.0	10
1050	15	5	3.0	10
1065	15	5	3.0	10
1080	15	5	3.0	10
1095	15	5	3.0	10
1110	15	5	3.0	10
1125	15	5	3.0	10
1140	15	5	3.0	10
1155	15	5	3.0	10
1170	15	5	3.0	10
1185	15	5	3.0	10
1200	15	5	3.0	10
1215	15	5	3.0	10
1230	15	5	3.0	10
1245	15	5	3.0	10
1260	15	5	3.0	10
1275	15	5	3.0	10
1290	15	5	3.0	10
1305	15	5	3.0	10
1320	15	5	3.0	10
1335	15	5	3.0	10
1350	15	5	3.0	10
1365	15	5	3.0	10
1380	15	5	3.0	10
1395	15	5	3.0	10
1410	15	5	3.0	10
1425	15	5	3.0	10
1440	15	5	3.0	10
1455	15	5	3.0	10
1470	15	5	3.0	10
1485	15	5	3.0	10
1500	15	5	3.0	10
1515	15	5	3.0	10
1530	15	5	3.0	10
1545	15	5	3.0	10
1560	15	5	3.0	10
1575	15	5	3.0	10
1590	15	5	3.0	10
1605	15	5	3.0	10
1620	15	5	3.0	10
1635	15	5	3.0	10
1650	15	5	3.0	10
1665	15	5	3.0	10
1680	15	5	3.0	10
1695	15	5	3.0	10
1710	15	5	3.0	10
1725	15	5	3.0	10
1740	15	5	3.0	10
1755	15	5	3.0	10
1770	15	5	3.0	10
1785	15	5	3.0	10
1800	15	5	3.0	10
1815	15	5	3.0	10
1830	15	5	3.0	10
1845	15	5	3.0	10
1860	15	5	3.0	10
1875	15	5	3.0	10
1890	15	5	3.0	10
1905	15	5	3.0	10
1920	15	5	3.0	10
1935	15	5	3.0	10
1950	15	5	3.0	10
1965	15	5	3.0	10
1980	15	5	3.0	10
1995	15	5	3.0	10
2010	15	5	3.0	10
2025	15	5	3.0	10
2040	15	5	3.0	10
2055	15	5	3.0	10
2070	15	5	3.0	10
2085	15	5	3.0	10
2100	15	5	3.0	10
2115	15	5	3.0	10
2130	15	5	3.0	10
2145	15	5	3.0	10
2160	15	5	3.0	10
2175	15	5	3.0	10
2190	15	5	3.0	10
2205	15	5	3.0	10
2220	15	5	3.0	10
2235	15	5	3.0	10
2250	15	5	3.0	10
2265	15	5	3.0	10
2280	15	5	3.0	10
2295	15	5	3.0	10
2310	15	5	3.0	10
2325	15	5	3.0	10
2340	15	5	3.0	10
2355	15	5	3.0	10
2370	15	5	3.0	10
2385	15	5	3.0	10
2400	15	5	3.0	10
2415	15	5	3.0	10
2430	15	5	3.0	10
2445	15	5	3.0	10
2460	15	5	3.0	10
2475	15	5	3.0	10
2490	15	5	3.0	10
2505	15	5	3.0	10
2520	15	5	3.0	10
2535	15	5	3.0	10
2550	15	5	3.0	10
2565	15	5	3.0	10
2580	15	5	3.0	10
2595	15	5	3.0	10
2610	15	5	3.0	10
2625	15	5	3.0	10
2640	15	5	3.0	10
2655	15	5	3.0	10
2670	15	5	3.0	10
2685	15	5	3.0	10
2700	15	5	3.0	10
2715	15	5	3.0	10
2730	15	5	3.0	10
2745	15	5	3.0	10
2760	15	5	3.0	10
2775	15	5	3.0	10
2790	15	5	3.0	10
2805	15	5	3.0	10
2820	15	5	3.0	10
2835	15	5	3.0	10
2850	15	5	3.0	10
2865	15	5	3.0	10
2880	15	5	3.0	10
2895	15	5	3.0	10
2910	15	5	3.0	10
2925	15	5	3.0	10
2940	15	5	3.0	10
2955	15	5	3.0	10
2970	15	5	3.0	10
2985	15	5	3.0	10
3000	15	5	3.0	10


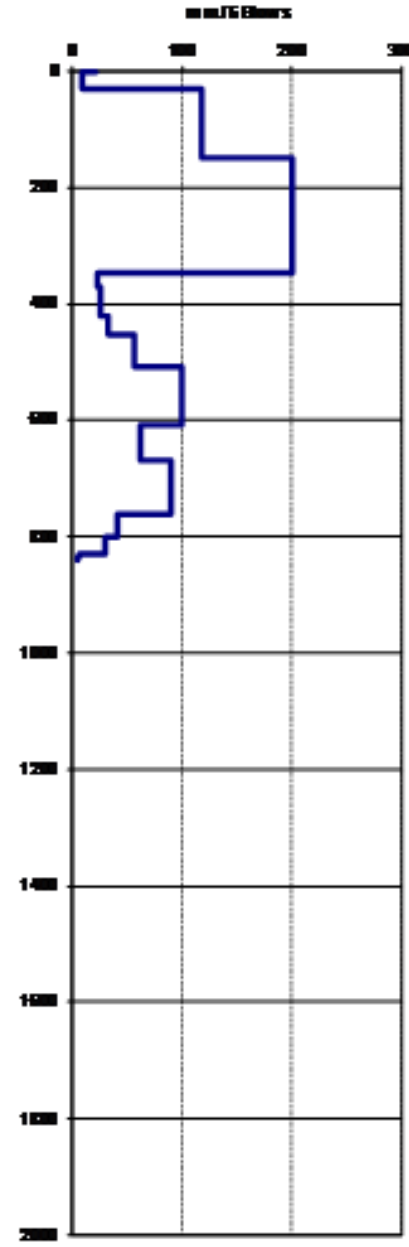


REMARKS

Tech : T Mchane
Date : 6-Mar-19


		Project: 2 Block Floor under r/pipe line		Lab No:	
		Reference No:		Client No:	
		Block/Room:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method S7B					
DCP No.	23			Site: Arlington to Lindley	
Contract:				Layer type:	
Client:				Carriageway:	
Field Data		Relevant Parameters			
Depth (mm)	Interval (mm)	Blows	CFI (mm/Blow)	CEM (%)	
0	0				
25	0	5	16	4.0	
50	25	5	26.2	6	
75	25	5	33.2	5	
100	25	5	36	4	
125	25	5	36.4	4	
150	25	5	36	4	
175	25	5	36.4	4	
200	25	5	36.4	4	
REMARKS				Tech: T Mabinde Date: 6-Mar-19	

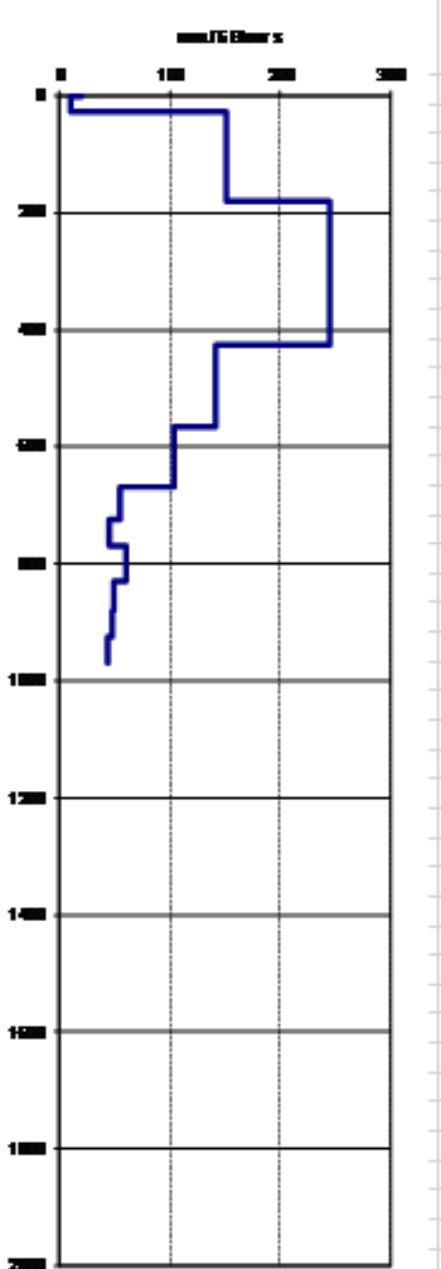
		Project: 200m Floor water pipeline		Lab No:	
		Reference No:		Client No:	
		Execution:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TMI-10 Method STD					
DCP No.		S2		Site: Arlington to Lindley	
Change:				Layer type:	
Other:				Category:	
Field Data		Residual Parameters			Layer Summary
Depth (m)	Interval (mm)	Blows	DPF (mm/Blow)	CEM (%)	
0	0				
25	0	5	16	100	
100	100	5	200	5	
200	200	5	400	5	
300	100	5	300	5	
400	100	5	8.2	20	
500	100	5	5.4	40	
600	100	5	8.2	20	
700	100	5	10.2	15	
750	50	5	150	10	
800	50	5	160	10	
850	50	5	18.0	10	
900	50	5	18.0	10	
950	50	5	18.0	10	
REMARKS					
				Tech: T Mchabe	
				Date: 6-Mar-19	

		Project: 20kva Power under pipeline RFI number/ No: _____ Execution Date: _____		Lab No: _____ Client No: _____ Date: _____	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method STD					
DCP No.		SS		Site: Arlington to Lindley	
Chainage:				Layer type:	
Offset:				Carriageway	
Field Data		Relevant Parameters			Layer Boundary
Depth (m)	Interval (mm)	Blow	CFI (mm/blow)	CEFL (%)	 <p style="text-align: center;">in mm/blow</p>
0	0				
0.0	0	5	0.0	-10	
0.1	10	5	0.2	7	
0.2	20	5	0.4	4	
0.3	30	5	0.6	10	
0.4	40	5	0.8	12	
0.5	50	5	1.0	13	
0.6	60	5	1.2	16	
0.7	70	5	1.4	18	
0.8	80	5	1.6	19	
0.9	90	5	1.8	20	
1.0	100	5	2.0	20	
1.1	110	5	2.2	20	
1.2	120	5	2.4	20	
1.3	130	5	2.6	20	
1.4	140	5	2.8	20	
1.5	150	5	3.0	20	
1.6	160	5	3.2	20	
1.7	170	5	3.4	20	
1.8	180	5	3.6	20	
1.9	190	5	3.8	20	
2.0	200	5	4.0	20	
2.1	210	5	4.2	20	
2.2	220	5	4.4	20	
2.3	230	5	4.6	20	
2.4	240	5	4.8	20	
2.5	250	5	5.0	20	
2.6	260	5	5.2	20	
2.7	270	5	5.4	20	
2.8	280	5	5.6	20	
2.9	290	5	5.8	20	
3.0	300	5	6.0	20	
3.1	310	5	6.2	20	
3.2	320	5	6.4	20	
3.3	330	5	6.6	20	
3.4	340	5	6.8	20	
3.5	350	5	7.0	20	
3.6	360	5	7.2	20	
3.7	370	5	7.4	20	
3.8	380	5	7.6	20	
3.9	390	5	7.8	20	
4.0	400	5	8.0	20	
4.1	410	5	8.2	20	
4.2	420	5	8.4	20	
4.3	430	5	8.6	20	
4.4	440	5	8.8	20	
4.5	450	5	9.0	20	
4.6	460	5	9.2	20	
4.7	470	5	9.4	20	
4.8	480	5	9.6	20	
4.9	490	5	9.8	20	
5.0	500	5	10.0	20	
5.1	510	5	10.2	20	
5.2	520	5	10.4	20	
5.3	530	5	10.6	20	
5.4	540	5	10.8	20	
5.5	550	5	11.0	20	
5.6	560	5	11.2	20	
5.7	570	5	11.4	20	
5.8	580	5	11.6	20	
5.9	590	5	11.8	20	
6.0	600	5	12.0	20	
6.1	610	5	12.2	20	
6.2	620	5	12.4	20	
6.3	630	5	12.6	20	
6.4	640	5	12.8	20	
6.5	650	5	13.0	20	
6.6	660	5	13.2	20	
6.7	670	5	13.4	20	
6.8	680	5	13.6	20	
6.9	690	5	13.8	20	
7.0	700	5	14.0	20	
7.1	710	5	14.2	20	
7.2	720	5	14.4	20	
7.3	730	5	14.6	20	
7.4	740	5	14.8	20	
7.5	750	5	15.0	20	
7.6	760	5	15.2	20	
7.7	770	5	15.4	20	
7.8	780	5	15.6	20	
7.9	790	5	15.8	20	
8.0	800	5	16.0	20	
8.1	810	5	16.2	20	
8.2	820	5	16.4	20	
8.3	830	5	16.6	20	
8.4	840	5	16.8	20	
8.5	850	5	17.0	20	
8.6	860	5	17.2	20	
8.7	870	5	17.4	20	
8.8	880	5	17.6	20	
8.9	890	5	17.8	20	
9.0	900	5	18.0	20	
9.1	910	5	18.2	20	
9.2	920	5	18.4	20	
9.3	930	5	18.6	20	
9.4	940	5	18.8	20	
9.5	950	5	19.0	20	
9.6	960	5	19.2	20	
9.7	970	5	19.4	20	
9.8	980	5	19.6	20	
9.9	990	5	19.8	20	
10.0	1000	5	20.0	20	

REMARKS


Technician: T. M. M. M.
Date: 6-Mar-19

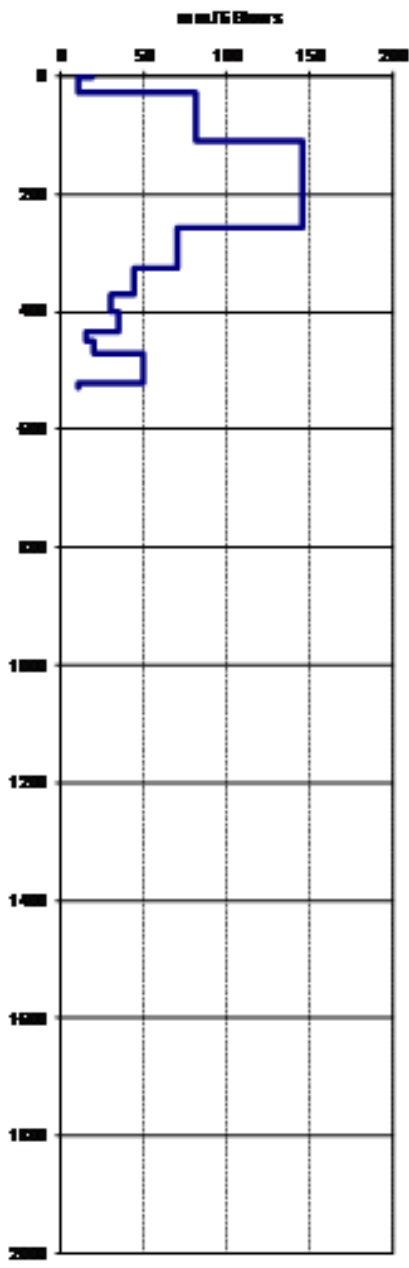
 Magareng Civil Laboratory		Project: 2 River Pumpworks pipeline		Lab No:
		RI name/ No:		Client No:
		Borehole name:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method STD				
DCP No. 54		Site: Alington to Lindley		
Change:		Layer type:		
Other:		Carriageway		
Field Data		Recorded Parameters		Layer Summary
Depth (m)	Interval (mm)	Blows	CFR (mm/blow)	CSFR (kPa)
0	0			
20	10	5	200	1400
30	10	5	200	5
40	10	5	200	3
50	10	5	200	6
60	10	5	200	9
70	10	5	200	20
77.5	7.5	5	150	30
85	7.5	5	150	25
92.5	7.5	5	150	17
100	7.5	5	150	25
107.5	7.5	5	150	28
115	7.5	5	150	30
122.5	7.5	5	150	30
130	7.5	5	150	30
137.5	7.5	5	150	30
145	7.5	5	150	30
152.5	7.5	5	150	30
160	7.5	5	150	30
167.5	7.5	5	150	30
175	7.5	5	150	30
182.5	7.5	5	150	30
190	7.5	5	150	30
197.5	7.5	5	150	30
205	7.5	5	150	30
212.5	7.5	5	150	30
220	7.5	5	150	30
227.5	7.5	5	150	30
235	7.5	5	150	30
242.5	7.5	5	150	30
250	7.5	5	150	30
257.5	7.5	5	150	30
265	7.5	5	150	30
272.5	7.5	5	150	30
280	7.5	5	150	30
287.5	7.5	5	150	30
295	7.5	5	150	30
302.5	7.5	5	150	30
310	7.5	5	150	30
317.5	7.5	5	150	30
325	7.5	5	150	30
332.5	7.5	5	150	30
340	7.5	5	150	30
347.5	7.5	5	150	30
355	7.5	5	150	30
362.5	7.5	5	150	30
370	7.5	5	150	30
377.5	7.5	5	150	30
385	7.5	5	150	30
392.5	7.5	5	150	30
400	7.5	5	150	30
407.5	7.5	5	150	30
415	7.5	5	150	30
422.5	7.5	5	150	30
430	7.5	5	150	30
437.5	7.5	5	150	30
445	7.5	5	150	30
452.5	7.5	5	150	30
460	7.5	5	150	30
467.5	7.5	5	150	30
475	7.5	5	150	30
482.5	7.5	5	150	30
490	7.5	5	150	30
497.5	7.5	5	150	30
505	7.5	5	150	30
512.5	7.5	5	150	30
520	7.5	5	150	30
527.5	7.5	5	150	30
535	7.5	5	150	30
542.5	7.5	5	150	30
550	7.5	5	150	30
557.5	7.5	5	150	30
565	7.5	5	150	30
572.5	7.5	5	150	30
580	7.5	5	150	30
587.5	7.5	5	150	30
595	7.5	5	150	30
602.5	7.5	5	150	30
610	7.5	5	150	30
617.5	7.5	5	150	30
625	7.5	5	150	30
632.5	7.5	5	150	30
640	7.5	5	150	30
647.5	7.5	5	150	30
655	7.5	5	150	30
662.5	7.5	5	150	30
670	7.5	5	150	30
677.5	7.5	5	150	30
685	7.5	5	150	30
692.5	7.5	5	150	30
700	7.5	5	150	30
707.5	7.5	5	150	30
715	7.5	5	150	30
722.5	7.5	5	150	30
730	7.5	5	150	30
737.5	7.5	5	150	30
745	7.5	5	150	30
752.5	7.5	5	150	30
760	7.5	5	150	30
767.5	7.5	5	150	30
775	7.5	5	150	30
782.5	7.5	5	150	30
790	7.5	5	150	30
797.5	7.5	5	150	30
805	7.5	5	150	30
812.5	7.5	5	150	30
820	7.5	5	150	30
827.5	7.5	5	150	30
835	7.5	5	150	30
842.5	7.5	5	150	30
850	7.5	5	150	30
857.5	7.5	5	150	30
865	7.5	5	150	30
872.5	7.5	5	150	30
880	7.5	5	150	30
887.5	7.5	5	150	30
895	7.5	5	150	30
902.5	7.5	5	150	30
910	7.5	5	150	30
917.5	7.5	5	150	30
925	7.5	5	150	30
932.5	7.5	5	150	30
940	7.5	5	150	30
947.5	7.5	5	150	30
955	7.5	5	150	30
962.5	7.5	5	150	30
970	7.5	5	150	30
977.5	7.5	5	150	30
985	7.5	5	150	30
992.5	7.5	5	150	30
1000	7.5	5	150	30


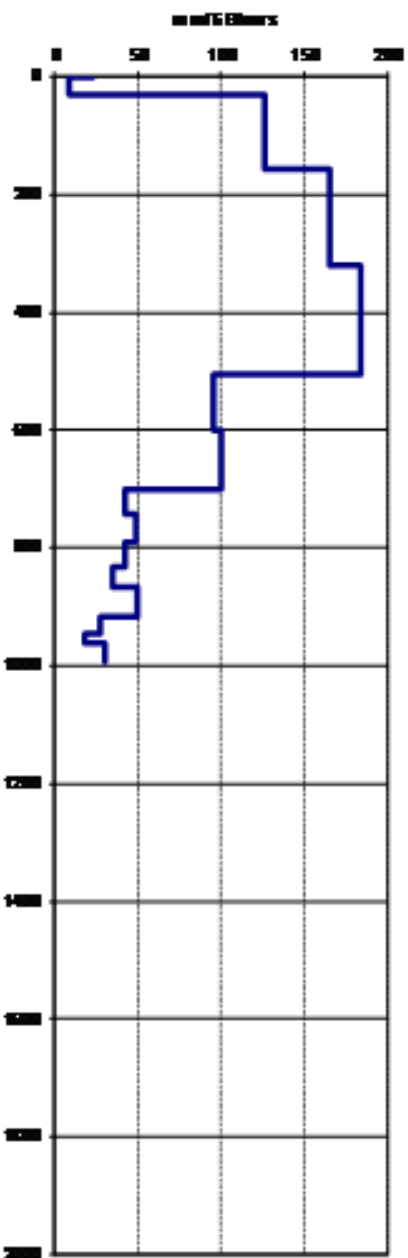



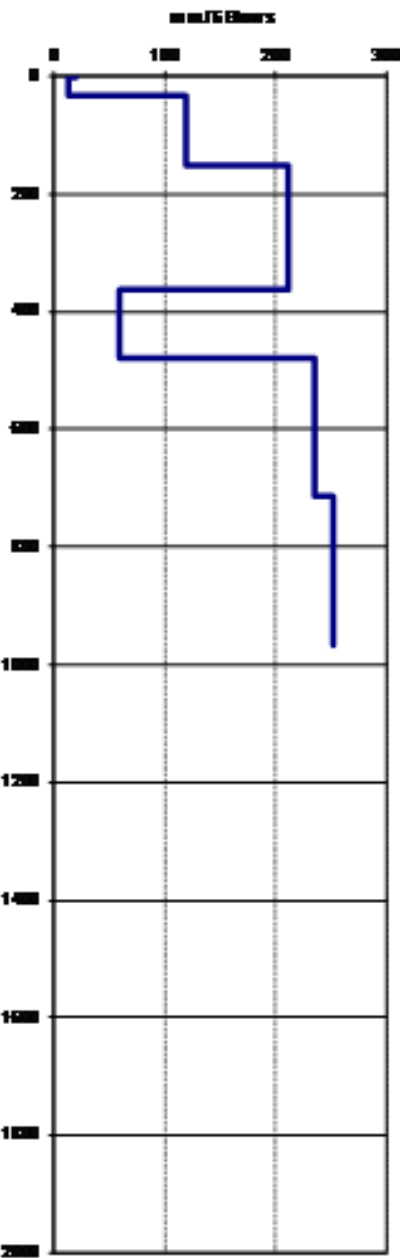
The graph plots blow count (blows/100mm) on the x-axis (0 to 300) against depth (m) on the y-axis (0 to 2000). The data points are connected by a blue line, showing a step-like increase in blow count as depth increases, corresponding to the values in the table.


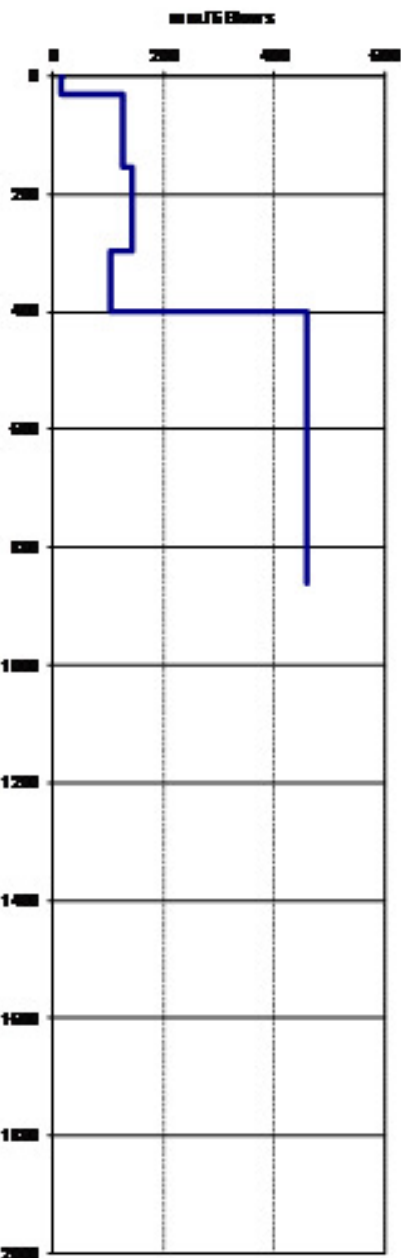
REMARKS	Tech : T Maizite Date : 6-Mar-19
---------	-------------------------------------


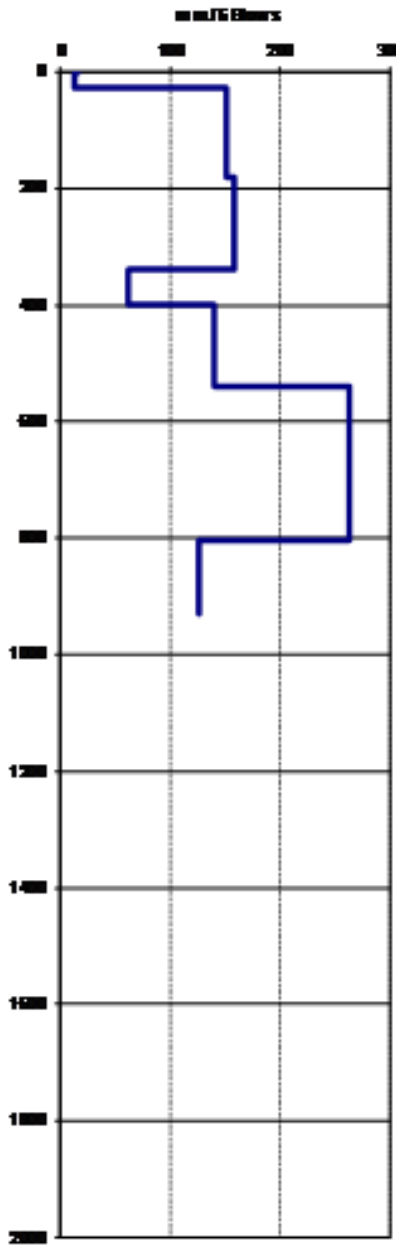
		Project: 2 Block Floor under r/pipe line		Lab No:
		Reference No:		Client No:
		Block/Form:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-118 Method STB				
DCP No.	35			Site: Alington to Lindley
Contract:				Layer type:
Client:				Carriageway:
Field Data		Relevant Parameters		
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CBR (%)
0	0			
20	10	5	2.0	4.0
30	10	5	3.0	6
40	10	5	4.0	8
50	10	5	5.0	10
60	10	5	6.0	12
70	10	5	7.0	14
80	10	5	8.0	16
90	10	5	9.0	18
100	10	5	10.0	20
110	10	5	11.0	22
120	10	5	12.0	24
130	10	5	13.0	26
140	10	5	14.0	28
150	10	5	15.0	30
160	10	5	16.0	32
170	10	5	17.0	34
180	10	5	18.0	36
190	10	5	19.0	38
200	10	5	20.0	40
210	10	5	21.0	42
220	10	5	22.0	44
230	10	5	23.0	46
240	10	5	24.0	48
250	10	5	25.0	50
260	10	5	26.0	52
270	10	5	27.0	54
280	10	5	28.0	56
290	10	5	29.0	58
300	10	5	30.0	60
310	10	5	31.0	62
320	10	5	32.0	64
330	10	5	33.0	66
340	10	5	34.0	68
350	10	5	35.0	70
360	10	5	36.0	72
370	10	5	37.0	74
380	10	5	38.0	76
390	10	5	39.0	78
400	10	5	40.0	80
410	10	5	41.0	82
420	10	5	42.0	84
430	10	5	43.0	86
440	10	5	44.0	88
450	10	5	45.0	90
460	10	5	46.0	92
470	10	5	47.0	94
480	10	5	48.0	96
490	10	5	49.0	98
500	10	5	50.0	100
510	10	5	51.0	102
520	10	5	52.0	104
530	10	5	53.0	106
540	10	5	54.0	108
550	10	5	55.0	110
560	10	5	56.0	112
570	10	5	57.0	114
580	10	5	58.0	116
590	10	5	59.0	118
600	10	5	60.0	120
610	10	5	61.0	122
620	10	5	62.0	124
630	10	5	63.0	126
640	10	5	64.0	128
650	10	5	65.0	130
660	10	5	66.0	132
670	10	5	67.0	134
680	10	5	68.0	136
690	10	5	69.0	138
700	10	5	70.0	140
710	10	5	71.0	142
720	10	5	72.0	144
730	10	5	73.0	146
740	10	5	74.0	148
750	10	5	75.0	150
760	10	5	76.0	152
770	10	5	77.0	154
780	10	5	78.0	156
790	10	5	79.0	158
800	10	5	80.0	160
810	10	5	81.0	162
820	10	5	82.0	164
830	10	5	83.0	166
840	10	5	84.0	168
850	10	5	85.0	170
860	10	5	86.0	172
870	10	5	87.0	174
880	10	5	88.0	176
890	10	5	89.0	178
900	10	5	90.0	180
910	10	5	91.0	182
920	10	5	92.0	184
930	10	5	93.0	186
940	10	5	94.0	188
950	10	5	95.0	190
960	10	5	96.0	192
970	10	5	97.0	194
980	10	5	98.0	196
990	10	5	99.0	198
1000	10	5	100.0	200
REMARKS				Technician: T Mabinde
				Date: 6-Mar-19


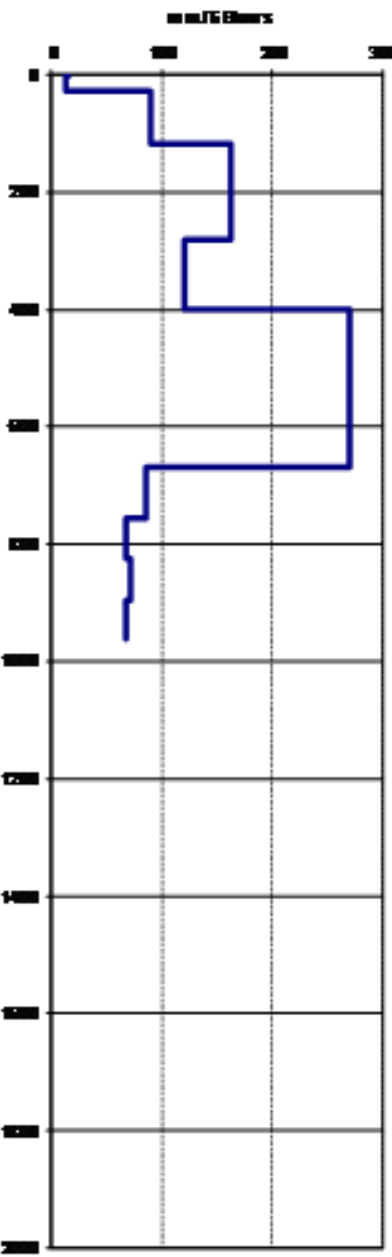



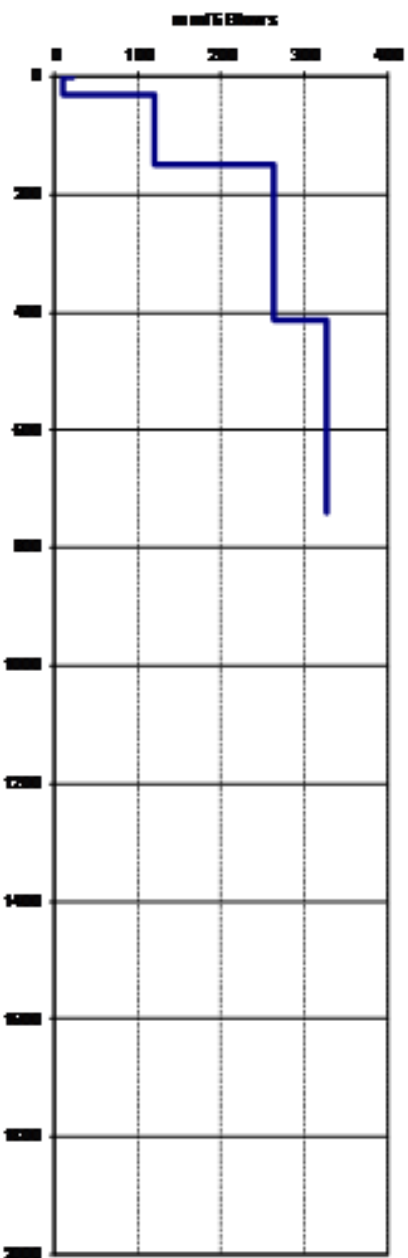
		Project:	28km Renewables pipeline		Lab No:
		RI name / No:			Client No:
		Section from:			Date:
DYNAMIC CONE PENETROMETER (DCP)					
TIM-B Method STB					
DCP No.		SE		Site Alington to Lindley	
Chainage:				Layer type	
Offset:				Carriageway	
Field Data		Reactional Parameters			
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CEFR (%)	
20	0				
20	5	5	10	100	
25	10	5	25.2	7	
30	10	5	30.0	5	
35	10	5	30.0	4	
40	10	5	30.0	10	
45	10	5	30.0	0	
50	10	5	30.0	0	
55	10	5	30.0	0	
60	10	5	30.0	0	
65	10	5	30.0	0	
70	10	5	30.0	0	
75	10	5	30.0	0	
80	10	5	30.0	0	
85	10	5	30.0	0	
90	10	5	30.0	0	
95	10	5	30.0	0	
100	10	5	30.0	0	
105	10	5	30.0	0	
110	10	5	30.0	0	
115	10	5	30.0	0	
120	10	5	30.0	0	
125	10	5	30.0	0	
130	10	5	30.0	0	
135	10	5	30.0	0	
140	10	5	30.0	0	
145	10	5	30.0	0	
150	10	5	30.0	0	
155	10	5	30.0	0	
160	10	5	30.0	0	
165	10	5	30.0	0	
170	10	5	30.0	0	
175	10	5	30.0	0	
180	10	5	30.0	0	
185	10	5	30.0	0	
190	10	5	30.0	0	
195	10	5	30.0	0	
200	10	5	30.0	0	
REMARKS					Mech : T Mkhabela Date : 6-Mar-19


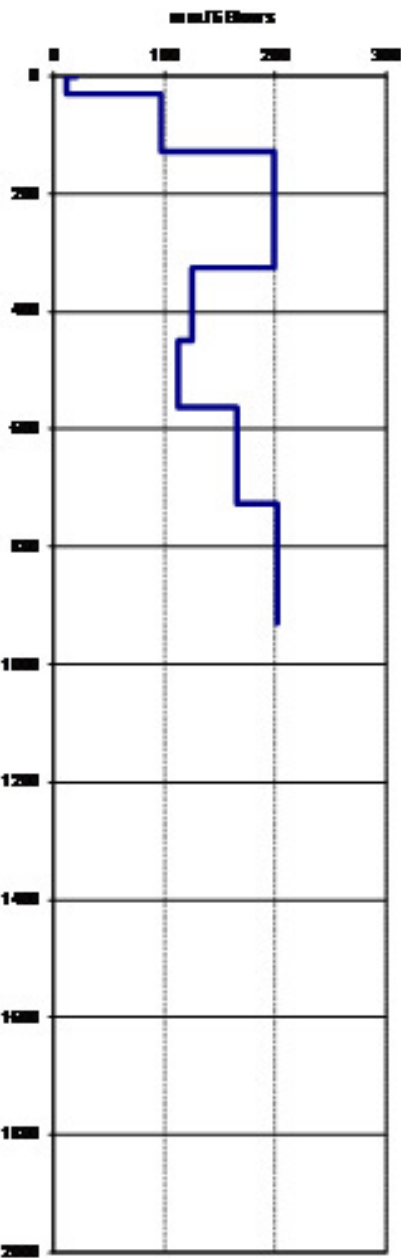
		Project: 2 Mkm Floor under pipe line		Lab No:	
		Reference No:		Client No:	
		Execution No:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TM-18 Method STB					
DCP No.	ST			Site: Alington to Lindley	
Change:				Layer type:	
Comment:				Carriageway:	
Field Data		Relevant Parameters			
Depth (mm)	Interval (mm)	Blows	SFR (mm/blow)	CER (%)	
0	0				
32	32	5	25.6	4.8	
64	32	5	25.6	7	
96	32	5	42.2	4	
128	32	5	36	6	
160	32	5	36	6	
192	32	5	47.8	3	
224	32	5	38.4	3	
REMARKS					
				Technician: T. M. M. M. M.	
				Date: 4-Mar-19	


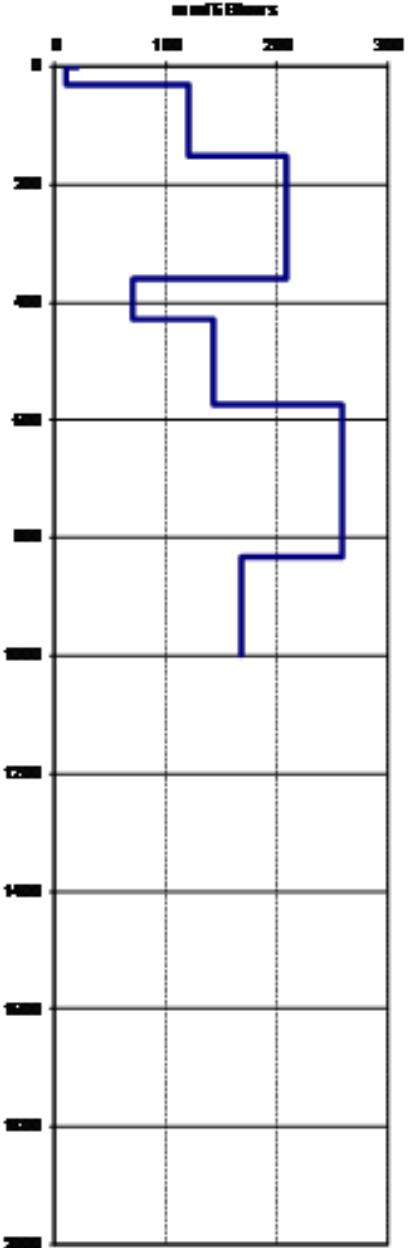
		Project: 2 Block Floor under r/pipe line		Lab No:
		Reference No:		Client No:
		Block Name:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-118 Method STB				
DCP No.	SI			Site: Alington to Lindley
Change:				Layer type:
Comment:				Carriageway:
Field Data		Relevant Parameters		
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CER (%)
0	0			
20	15	5	25.5	4.8
35	15	5	25.5	7
50	15	5	25.5	6
65	15	5	25.5	8
80	15	5	25.5	1
				
REMARKS				Tech: T Maitane Date: 6-Mar-19


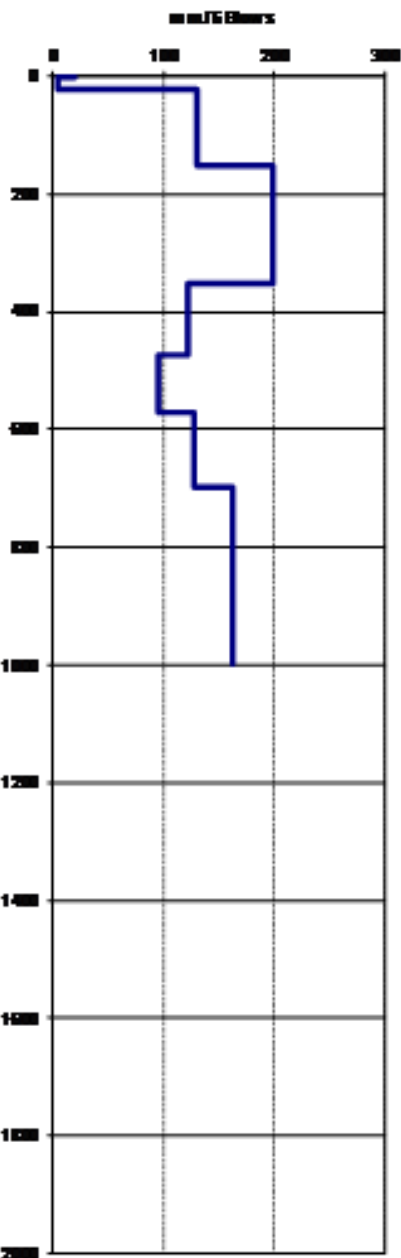
		Project: 28km Roadworks pipeline		Lab No:	
		RII name / No:		Client No:	
		Erection time:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method STD					
DCP No.	48			Site: Alington to Lindley	
Change:				Layer type:	
Order:				Carriageway	
Field Data		Revised Parameters			Layer Summary
Depth (m)	Measured (mm)	Blows	DFI (mm/blow)	DCP (kg)	
25	9				
50	12	5	24	400	
100	132	5	264	5	
150	136	5	272	5	
200	42	5	84	9	
300	180	5	360	6	
350	288	5	576	3	
400	186	5	372	7	
REMARKS					


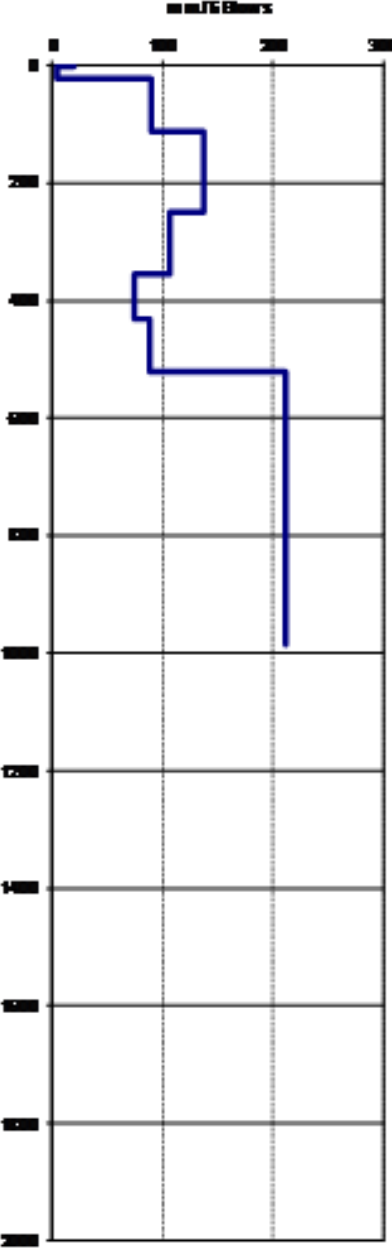
 Magareng Civil Laboratory		Project: 20 km Reinforcement project		Lab No:
		RI name / No:		Client No:
		Recon name:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TMR-18 Method STD				
DCP No.	41			
Challenge:	Site: Alington to Lindley			
Client:	Layer type:			
Field Data	Recon Data Parameters			
Depth (m)	Interval (mm)	Blows	DR (mm/Blow)	CER (%)
0	0			
25	12	5	24	100
100	80	5	16.0	10
200	102	5	20.4	5
400	180	5	36.0	7
670	270	5	54.0	5
735	65	5	14.7	10
800	65	5	13.0	15
865	72	5	14.4	10
885	20	5	15.4	15
Layer Summary				
in MLG Blows				
				
REMARKS:				Tech: T Mabinde
				Date: 6-Mar-19


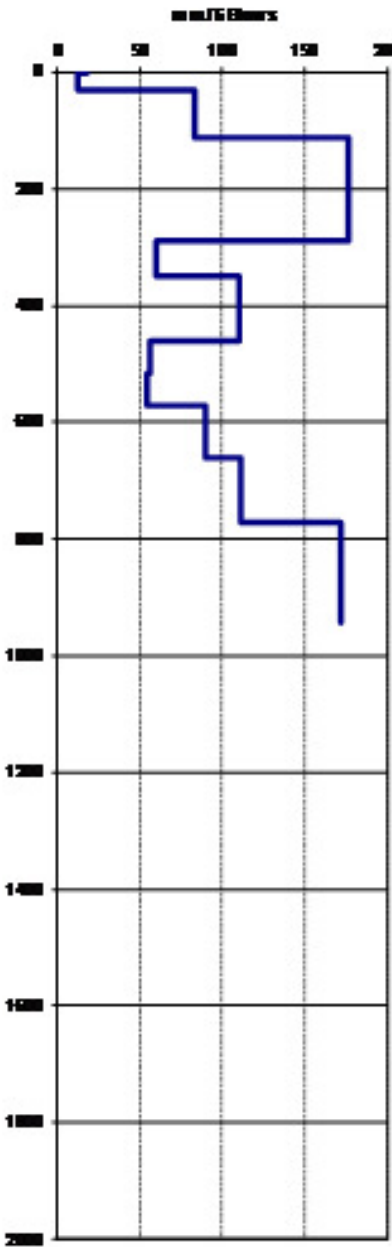
		Project: 200m Reinforced pipeline		Lab No:
		RI name / No:		Client No:
		Section from:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TIM-B Method STB				
DCP No. 42		Site Alington to Lindley		
Challenge:		Layer type:		
Obst:		Carriageway		
Field Data		Receival Parameters		
Depth (mm)	Interval (mm)	Blows	CFI (mm/blow)	CEFR (%)
0	0			
20	20	5	20	400
40	20	5	200	7
60	20	5	500	3
740	220	5	45.6	2
				
REMARKS		Tech: T Mkhabela Date: 6-Mar-19		

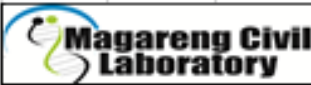
		Project: 2 Mile Flume under pipeline		Lab No:
		Reference No:		Client No:
		Execution No:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method STB				
DCP No.	45			Site: Arlington to Lindley
Contract:				Layer type:
Client:				Carriageway:
Field Data		Relevant Parameters		Layer Summary
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CEM (%)
0	0			
20	10	5	2.2	40
30	10	5	2.0	0
40	10	5	2.0	4
50	10	5	2.0	7
60	10	5	2.0	6
70	10	5	2.0	5
80	10	5	2.0	4
				
REMARKS				Technician: T M M Date: 6-Mar-19


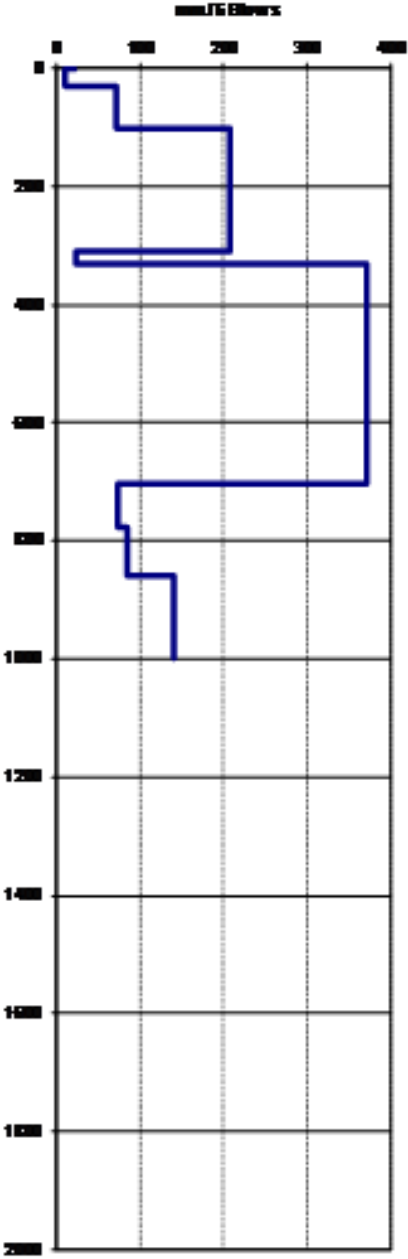
 Magareng Civil Laboratory		Project: 200m Reinforced pipeline		Lab No:	
		RI name / No:		Client No:	
		Excision from:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TIM-18 Method STB					
DCP No.	46			Site: Alington to Lindley	
Change:				Layer type:	
Offset:				Carriageway:	
Field Data		Receival Parameters			
Depth (mm)	Interval (mm)	Blows	DCP (mm/Blow)	CBR (%)	
0	0				
20	20	5	20	4.0	
40	20	5	20.2	7	
60	20	5	19.6	4	
80	20	5	19.9	6	
100	20	5	20.0	6	
120	20	5	20.0	5	
140	20	5	20.0	5	
REMARKS					
				Techn: T Mkhabela	
				Date: 6-Mar-19	


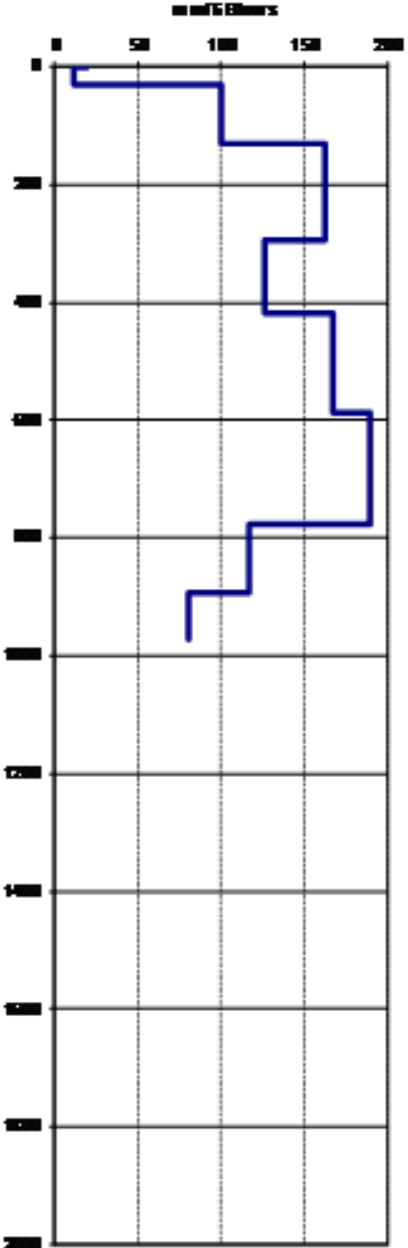
		Project: 2 Mile Flume under pipeline		Lab No:
		Reference No:		Client No:
		Block/Form:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-118 Method STB				
DCP No.	47			
Challenge:				
Client:				
Field Data		Relevant Parameters		
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CEM (%)
0	0			
25	4	5	8.0	40
50	10	5	20.0	7
75	10	5	20.0	4
100	10	5	20.4	7
125	10	5	20.2	10
150	10	5	21.6	7
175	10	5	22.4	5
200	10	5	16.0	20
225	10	5	16.0	20
250	10	5	7.6	20
275	10	5	5.2	20
				
REMARKS				
				Tech: T Mchabe Date: 6-Mar-19

		Project: 28 km Reinforcement project		Lab No:
		RI name / No:		Client No:
		Recon name:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TIM-B Method STD				
DCP No.	48			Site: Alington to Lindley
Chairs:				Layer type:
Notes:				Carriageway:
Field Data		Resolution Parameters		
Depth (m)	Interval (mm)	Blows	DR (mm/blow)	CER (%)
0	0			
25	4	5	50	100
100	100	5	100	10
200	100	5	200	5
300	100	5	300	5
400	100	5	400	5
500	100	5	500	5
700	200	5	700	5
900	200	5	900	5
1100	200	5	1100	5
				
REMARKS:				Tech: T Mabinzima Date: 6-Mar-19


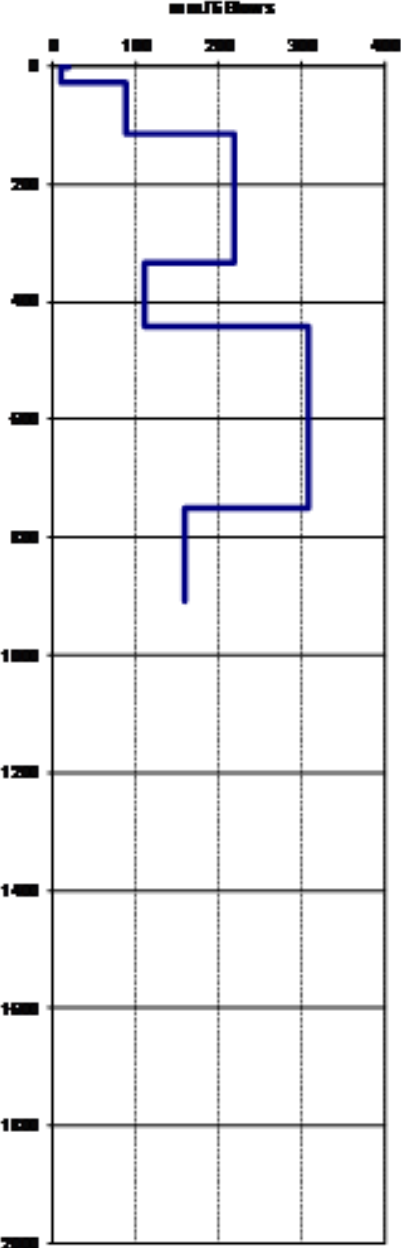
		Project: 25kva Fluorimetry pipeline		Lab No:	
		RII name / No:		Client No:	
		Execution time:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TMR-10 Method STD					
DCP No.	43			Site: Alington to Lindley	
Change:				Layer type:	
Order:				Carriageway	
Field Data		Results of Parameters			Layer Summary
Depth (m)	Measur (mm)	Blows	DFI (mm/blow)	CEM (kg)	
0	0				
30	12	5	24	400	
60	32	5	32	10	
90	37	5	35.4	4	
120	40	5	32.0	17	
150	39	5	32.0	5	
180	36	5	32	19	
210	34	5	32.6	20	
240	39	5	32.0	19	
270	38	5	32.2	5	
300	32	5	32.4	5	
REMARKS					
				Techn: T Moshiri	
				Date: 6-Mar-19	


		Project: 20 km Reinforcement project		Lab No:
		RI name / No:		Client No:
		Recommender:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TMH B Method STD				
DCP No.		58		Site: Alington to Lindley
Chainage:				Layer type:
Offset:				Carriageway:
Field Data		Recursive Parameters		Layer Summary
Depth (m)	Interval (mm)	Blows	DR (mm/Blow)	CER (%)
0	0			
30	30	5	22	100
60	30	5	15.0	10
90	30	5	20.0	7
120	30	5	15.0	10
150	30	5	20.0	8
180	30	5	15.0	10
210	30	5	20.0	8
240	30	5	15.0	10
270	30	5	20.0	8
300	30	5	15.0	10
330	30	5	20.0	8
360	30	5	15.0	10
390	30	5	20.0	8
420	30	5	15.0	10
450	30	5	20.0	8
480	30	5	15.0	10
510	30	5	20.0	8
540	30	5	15.0	10
570	30	5	20.0	8
600	30	5	15.0	10
630	30	5	20.0	8
660	30	5	15.0	10
690	30	5	20.0	8
720	30	5	15.0	10
750	30	5	20.0	8
780	30	5	15.0	10
810	30	5	20.0	8
840	30	5	15.0	10
870	30	5	20.0	8
900	30	5	15.0	10
930	30	5	20.0	8
960	30	5	15.0	10
990	30	5	20.0	8
1020	30	5	15.0	10
1050	30	5	20.0	8
1080	30	5	15.0	10
1110	30	5	20.0	8
1140	30	5	15.0	10
1170	30	5	20.0	8
1200	30	5	15.0	10
1230	30	5	20.0	8
1260	30	5	15.0	10
1290	30	5	20.0	8
1320	30	5	15.0	10
1350	30	5	20.0	8
1380	30	5	15.0	10
1410	30	5	20.0	8
1440	30	5	15.0	10
1470	30	5	20.0	8
1500	30	5	15.0	10
1530	30	5	20.0	8
1560	30	5	15.0	10
1590	30	5	20.0	8
1620	30	5	15.0	10
1650	30	5	20.0	8
1680	30	5	15.0	10
1710	30	5	20.0	8
1740	30	5	15.0	10
1770	30	5	20.0	8
1800	30	5	15.0	10
1830	30	5	20.0	8
1860	30	5	15.0	10
1890	30	5	20.0	8
1920	30	5	15.0	10
1950	30	5	20.0	8
1980	30	5	15.0	10
2010	30	5	20.0	8
2040	30	5	15.0	10
2070	30	5	20.0	8
2100	30	5	15.0	10
2130	30	5	20.0	8
2160	30	5	15.0	10
2190	30	5	20.0	8
2220	30	5	15.0	10
2250	30	5	20.0	8
2280	30	5	15.0	10
2310	30	5	20.0	8
2340	30	5	15.0	10
2370	30	5	20.0	8
2400	30	5	15.0	10
2430	30	5	20.0	8
2460	30	5	15.0	10
2490	30	5	20.0	8
2520	30	5	15.0	10
2550	30	5	20.0	8
2580	30	5	15.0	10
2610	30	5	20.0	8
2640	30	5	15.0	10
2670	30	5	20.0	8
2700	30	5	15.0	10
2730	30	5	20.0	8
2760	30	5	15.0	10
2790	30	5	20.0	8
2820	30	5	15.0	10
2850	30	5	20.0	8
2880	30	5	15.0	10
2910	30	5	20.0	8
2940	30	5	15.0	10
2970	30	5	20.0	8
3000	30	5	15.0	10
3030	30	5	20.0	8
3060	30	5	15.0	10
3090	30	5	20.0	8
3120	30	5	15.0	10
3150	30	5	20.0	8
3180	30	5	15.0	10
3210	30	5	20.0	8
3240	30	5	15.0	10
3270	30	5	20.0	8
3300	30	5	15.0	10
3330	30	5	20.0	8
3360	30	5	15.0	10
3390	30	5	20.0	8
3420	30	5	15.0	10
3450	30	5	20.0	8
3480	30	5	15.0	10
3510	30	5	20.0	8
3540	30	5	15.0	10
3570	30	5	20.0	8
3600	30	5	15.0	10
3630	30	5	20.0	8
3660	30	5	15.0	10
3690	30	5	20.0	8
3720	30	5	15.0	10
3750	30	5	20.0	8
3780	30	5	15.0	10
3810	30	5	20.0	8
3840	30	5	15.0	10
3870	30	5	20.0	8
3900	30	5	15.0	10
3930	30	5	20.0	8
3960	30	5	15.0	10
3990	30	5	20.0	8
4020	30	5	15.0	10
4050	30	5	20.0	8
4080	30	5	15.0	10
4110	30	5	20.0	8
4140	30	5	15.0	10
4170	30	5	20.0	8
4200	30	5	15.0	10
4230	30	5	20.0	8
4260	30	5	15.0	10
4290	30	5	20.0	8
4320	30	5	15.0	10
4350	30	5	20.0	8
4380	30	5	15.0	10
4410	30	5	20.0	8
4440	30	5	15.0	10
4470	30	5	20.0	8
4500	30	5	15.0	10
4530	30	5	20.0	8
4560	30	5	15.0	10
4590	30	5	20.0	8
4620	30	5	15.0	10
4650	30	5	20.0	8
4680	30	5	15.0	10
4710	30	5	20.0	8
4740	30	5	15.0	10
4770	30	5	20.0	8
4800	30	5	15.0	10
4830	30	5	20.0	8
4860	30	5	15.0	10
4890	30	5	20.0	8
4920	30	5	15.0	10
4950	30	5	20.0	8
4980	30	5	15.0	10
5010	30	5	20.0	8
5040	30	5	15.0	10
5070	30	5	20.0	8
5100	30	5	15.0	10
5130	30	5	20.0	8
5160	30	5	15.0	10
5190	30	5	20.0	8
5220	30	5	15.0	10
5250	30	5	20.0	8
5280	30	5	15.0	10
5310	30	5	20.0	8
5340	30	5	15.0	10
5370	30	5	20.0	8
5400	30	5	15.0	10
5430	30	5	20.0	8
5460	30	5	15.0	10
5490	30	5	20.0	8
5520	30	5	15.0	10
5550	30	5	20.0	8
5580	30	5	15.0	10
5610	30	5	20.0	8
5640	30	5	15.0	10
5670	30	5	20.0	8
5700	30	5	15.0	10
5730	30	5	20.0	8
5760	30	5	15.0	10
5790	30	5	20.0	8
5820	30	5	15.0	10
5850	30	5	20.0	8
5880	30	5	15.0	10
5910	30	5	20.0	8
5940	30	5	15.0	10
5970	30	5	20.0	8
6000	30	5	15.0	10
6030	30	5	20.0	8
6060	30	5	15.0	10
6090	30	5	20.0	8
6120	30	5	15.0	10
6150	30	5	20.0	8
6180	30	5	15.0	10
6210	30	5	20.0	8
6240	30	5	15.0	10
6270	30	5	20.0	8
6300	30	5	15.0	10
6330	30	5	20.0	8
6360	30	5	15.0	10
6390	30	5	20.0	8
6420	30	5	15.0	10
6450	30	5	20.0	8
6480	30	5	15.0	10
6510	30	5	20.0	8
6540	30	5	15.0	10
6570	30	5	20.0	8
6600	30	5	15.0	10
6630	30	5	20.0	8
6660	30	5	15.0	10
6690	30	5	20.0	8
6720	30	5	15.0	10
6750	30	5	20.0	8
6780	30	5	15.0	10
6810	30	5	20.0	8
6840	30	5	15.0	10
6870	30	5	20.0	8
6900	30	5	15.0	10
6930	30	5	20.0	8
6960	30	5	15.0	10
6990	30	5	20.0	8
7020	30	5	15.0	10
7050	30	5	20.0	8
7080	30	5	15.0	10
7110	30	5	20.0	8
7140	30	5	15.0	10
7170	30	5	20.0	8
7200	30	5	15.0	10
7230	30	5		


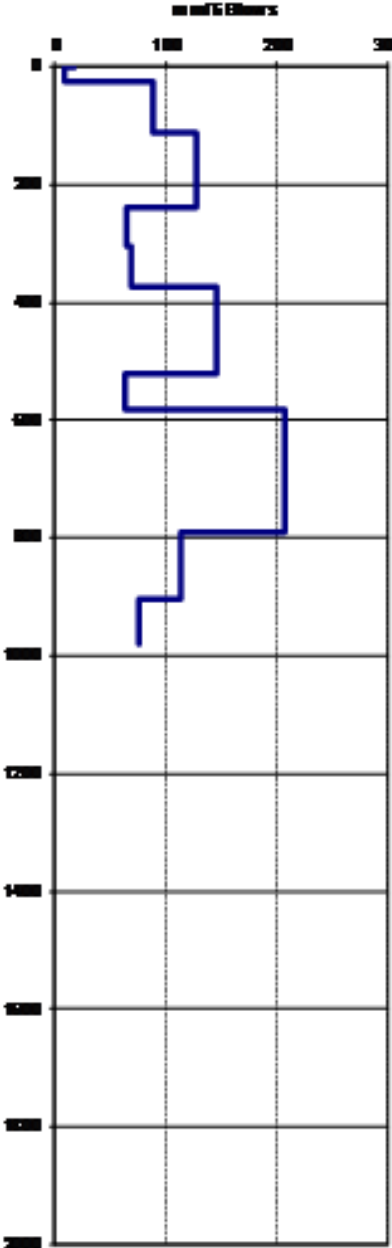
 Magareng Civil Laboratory		Project: 2 Mile Run water pipeline		Lab No:
		RI name / No:		Client No:
		Execution:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TIM-B Method STD				
DCP No.	51			
Challenge:	Site: Alington to Lindley			
Offset:	Layer type:			
Field Data		Revised Parameters		
Depth (m)	Interval (mm)	Blows	DPF (mm/Blow)	CER (%)
0	0			
0.05	10	5	2.0	100
0.1	21	5	6.2	16
0.15	36	5	4.6	4
0.2	46	5	4.4	62
0.25	57	5	4.4	2
0.3	73	5	6.6	16
0.35	88	5	6.6	16
0.4	100	5	20.0	6
Layer Summary				
mm/16 Blows				
				
REMARKS				
				Tech: T Mkhalele Date: 6-Mar-19


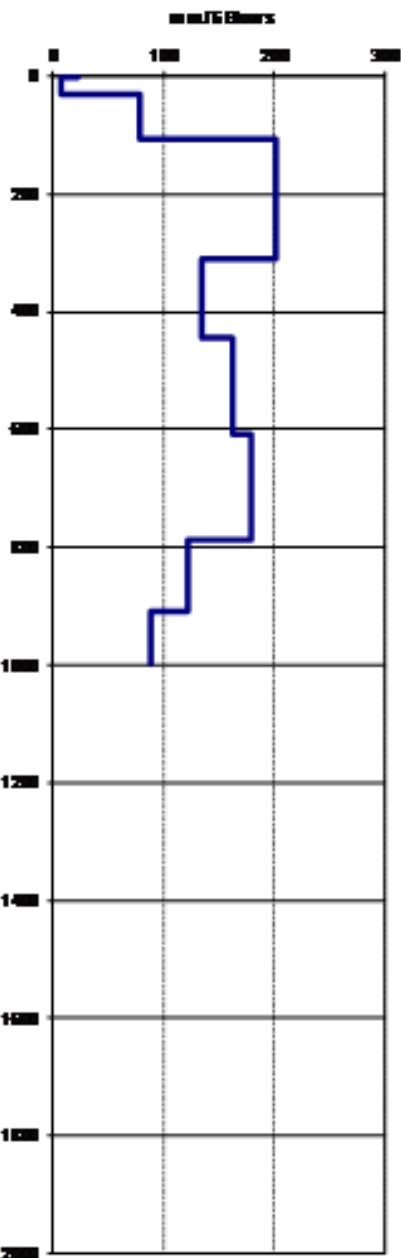
		Project: 200m Reinforcement pipeline		Lab No:	
		RI name / No:		Client No:	
		Excision from:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TIM-18 Method STB					
DCP No.	52			Site: Alington to Lindley	
Change:				Layer type:	
Offset:				Carriageway:	
Field Data		Receival Parameters			
Depth (mm)	Interval (mm)	Blows	DCP (mm/blow)	CBR (%)	
0	0				
20	20	5	22	4.0	
40	20	5	20.0	5	
60	20	5	20.0	5	
80	20	5	25.2	7	
100	20	5	20.0	5	
120	20	5	20.0	4	
140	20	5	25.2	7	
160	20	5	20.0	5	
180	20	5	25.2	7	
200	20	5	20.0	5	
REMARKS				Mech: T Mkhobane Date: 6-Mar-19	


		Project: 20 km Reinforcement project		Lab No:	
		RI name / No:		Client No:	
		Receptor name:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TIM-B Method STD					
DCP No.		53		Site: Alington to Lindley	
Contract:				Layer type:	
Client:				Carriageway:	
Field Data		Receptor Parameters		Layer Summary	
Depth (m)	Interval (mm)	Blows	DFI (mm/blow)	CER (%)	
20	0				
30	10	5	20	100	
40	10	5	16.0	10	
50	10	5	20.0	6	
60	10	5	16.0	10	
70	10	5	16.0	10	
80	10	5	16.0	10	
90	10	5	16.0	10	
100	10	5	16.0	10	
110	10	5	16.0	10	
120	10	5	16.0	10	
130	10	5	16.0	10	
140	10	5	16.0	10	
150	10	5	16.0	10	
160	10	5	16.0	10	
170	10	5	16.0	10	
180	10	5	16.0	10	
190	10	5	16.0	10	
200	10	5	16.0	10	
210	10	5	16.0	10	
220	10	5	16.0	10	
230	10	5	16.0	10	
240	10	5	16.0	10	
250	10	5	16.0	10	
260	10	5	16.0	10	
270	10	5	16.0	10	
280	10	5	16.0	10	
290	10	5	16.0	10	
300	10	5	16.0	10	
310	10	5	16.0	10	
320	10	5	16.0	10	
330	10	5	16.0	10	
340	10	5	16.0	10	
350	10	5	16.0	10	
360	10	5	16.0	10	
370	10	5	16.0	10	
380	10	5	16.0	10	
390	10	5	16.0	10	
400	10	5	16.0	10	
410	10	5	16.0	10	
420	10	5	16.0	10	
430	10	5	16.0	10	
440	10	5	16.0	10	
450	10	5	16.0	10	
460	10	5	16.0	10	
470	10	5	16.0	10	
480	10	5	16.0	10	
490	10	5	16.0	10	
500	10	5	16.0	10	
510	10	5	16.0	10	
520	10	5	16.0	10	
530	10	5	16.0	10	
540	10	5	16.0	10	
550	10	5	16.0	10	
560	10	5	16.0	10	
570	10	5	16.0	10	
580	10	5	16.0	10	
590	10	5	16.0	10	
600	10	5	16.0	10	
610	10	5	16.0	10	
620	10	5	16.0	10	
630	10	5	16.0	10	
640	10	5	16.0	10	
650	10	5	16.0	10	
660	10	5	16.0	10	
670	10	5	16.0	10	
680	10	5	16.0	10	
690	10	5	16.0	10	
700	10	5	16.0	10	
710	10	5	16.0	10	
720	10	5	16.0	10	
730	10	5	16.0	10	
740	10	5	16.0	10	
750	10	5	16.0	10	
760	10	5	16.0	10	
770	10	5	16.0	10	
780	10	5	16.0	10	
790	10	5	16.0	10	
800	10	5	16.0	10	
810	10	5	16.0	10	
820	10	5	16.0	10	
830	10	5	16.0	10	
840	10	5	16.0	10	
850	10	5	16.0	10	
860	10	5	16.0	10	
870	10	5	16.0	10	
880	10	5	16.0	10	
890	10	5	16.0	10	
900	10	5	16.0	10	
910	10	5	16.0	10	
920	10	5	16.0	10	
930	10	5	16.0	10	
940	10	5	16.0	10	
950	10	5	16.0	10	
960	10	5	16.0	10	
970	10	5	16.0	10	
980	10	5	16.0	10	
990	10	5	16.0	10	
1000	10	5	16.0	10	
1010	10	5	16.0	10	
1020	10	5	16.0	10	
1030	10	5	16.0	10	
1040	10	5	16.0	10	
1050	10	5	16.0	10	
1060	10	5	16.0	10	
1070	10	5	16.0	10	
1080	10	5	16.0	10	
1090	10	5	16.0	10	
1100	10	5	16.0	10	
1110	10	5	16.0	10	
1120	10	5	16.0	10	
1130	10	5	16.0	10	
1140	10	5	16.0	10	
1150	10	5	16.0	10	
1160	10	5	16.0	10	
1170	10	5	16.0	10	
1180	10	5	16.0	10	
1190	10	5	16.0	10	
1200	10	5	16.0	10	
1210	10	5	16.0	10	
1220	10	5	16.0	10	
1230	10	5	16.0	10	
1240	10	5	16.0	10	
1250	10	5	16.0	10	
1260	10	5	16.0	10	
1270	10	5	16.0	10	
1280	10	5	16.0	10	
1290	10	5	16.0	10	
1300	10	5	16.0	10	
1310	10	5	16.0	10	
1320	10	5	16.0	10	
1330	10	5	16.0	10	
1340	10	5	16.0	10	
1350	10	5	16.0	10	
1360	10	5	16.0	10	
1370	10	5	16.0	10	
1380	10	5	16.0	10	
1390	10	5	16.0	10	
1400	10	5	16.0	10	
1410	10	5	16.0	10	
1420	10	5	16.0	10	
1430	10	5	16.0	10	
1440	10	5	16.0	10	
1450	10	5	16.0	10	
1460	10	5	16.0	10	
1470	10	5	16.0	10	
1480	10	5	16.0	10	
1490	10	5	16.0	10	
1500	10	5	16.0	10	
1510	10	5	16.0	10	
1520	10	5	16.0	10	
1530	10	5	16.0	10	
1540	10	5	16.0	10	
1550	10	5	16.0	10	
1560	10	5	16.0	10	
1570	10	5	16.0	10	
1580	10	5	16.0	10	
1590	10	5	16.0	10	
1600	10	5	16.0	10	
1610	10	5	16.0	10	
1620	10	5	16.0	10	
1630	10	5	16.0	10	
1640	10	5	16.0	10	
1650	10	5	16.0	10	
1660	10	5	16.0	10	
1670	10	5	16.0	10	
1680	10	5	16.0	10	
1690	10	5	16.0	10	
1700	10	5	16.0	10	
1710	10	5	16.0	10	
1720	10	5	16.0	10	
1730	10	5	16.0	10	
1740	10	5	16.0	10	
1750	10	5	16.0	10	
1760	10	5	16.0	10	
1770	10	5	16.0	10	
1780	10	5	16.0	10	
1790	10	5	16.0	10	
1800	10	5	16.0	10	
1810	10	5	16.0	10	
1820	10	5	16.0	10	
1830	10	5	16.0	10	
1840	10	5	16.0	10	
1850	10	5	16.0	10	
1860	10	5	16.0	10	
1870	10	5	16.0	10	
1880	10	5	16.0	10	
1890	10	5	16.0	10	
1900	10	5	16.0	10	
1910	10	5	16.0	10	
1920	10	5	16.0	10	
1930	10	5	16.0	10	
1940	10	5	16.0	10	
1950	10	5	16.0	10	
1960	10	5	16.0	10	
1970	10	5	16.0	10	
1980	10	5	16.0	10	
1990	10	5	16.0	10	
2000	10	5	16.0	10	
2010	10	5	16.0	10	
2020	10	5	16.0	10	
2030	10	5	16.0	10	
2040	10	5	16.0	10	
2050	10	5	16.0	10	
2060	10	5	16.0	10	
2070	10	5	16.0	10	
2080	10	5	16.0	10	
2090	10	5	16.0	10	
2100	10	5	16.0	10	
2110	10	5	16.0	10	
2120	10	5	16.0	10	
2130	10	5	16.0	10	
2140	10	5	16.0	10	
2150	10	5	16.0	10	
2160	10	5	16.0	10	
2170	10	5	16.0	10	
2180	10	5	16.0	10	
2190	10	5	16.0	10	
2200	10	5	16.0	10	
2210	10	5	16.0	10	
2220	10	5	16.0	10	
2230	10	5	16.0	10	
2240	10	5	16.0	10	
2250	10	5	16.0	10	
2260	10	5	16.0	10	
2270	10	5	16.0	10	
2280	10	5	16.0	10	
2290	10	5	16.0	10	
2300	10	5	16.0	10	
2310	10	5	16.0	10	
2320	10	5	16.0	10	
2330	10	5	16.0	10	
2340	10	5	16.0	10	
2350	10	5	16.0	10	
2360	10	5	16.0	10	
2370	10	5	16.0	10	
2380					

		Project: 2 River Flume under pipeline		Lab No:	
		Reference No:		Client No:	
		Execution No:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TM-118 Method STB					
DCP No.	54			Site: Alington to Lindley	
Contract:				Layer type:	
Client:				Carriageway:	
Field Data		Relevant Parameters			Layer Summary
Depth (m) Level (mm)	Interval (mm)	Blows	CFI (mm/blow)	CER (%)	
15	0				
20	0	5	15	100	
35	15	5	15	10	
35	25	5	15	5	
45	10	5	20	5	
75	30	5	15	2	
80	5	5	15	5	
REMARKS				Tech: T Mchabe Date: 6-Mar-19	


 Magareng Civil Laboratory		Project: 2 Mile Run water pipeline		Lab No:
		RD name / No :		Client No :
		Eccleston No :		Date :
DYNAMIC CONE PENETROMETER (DCP)				
TIM-B Method STD				
DCP No.		SS		Site: Alington to Lindley
Chainage:				Layer type:
Offset:				Carriage way:
Field Data		Revised Parameters		Loger Summary
Depth (m)	Interval (mm)	Blows	DP1 (mm/blow)	DCR (%)
20	0			
30	5	5	15	100
100	75	5	15	15
200	100	5	20	5
300	100	5	15	10
400	100	5	20	5
500	100	5	20	5
600	100	5	15	10
700	100	5	20	5
800	100	5	20	5
REMARKS				Tech : T Mkhalele Date : 6-Mar-19

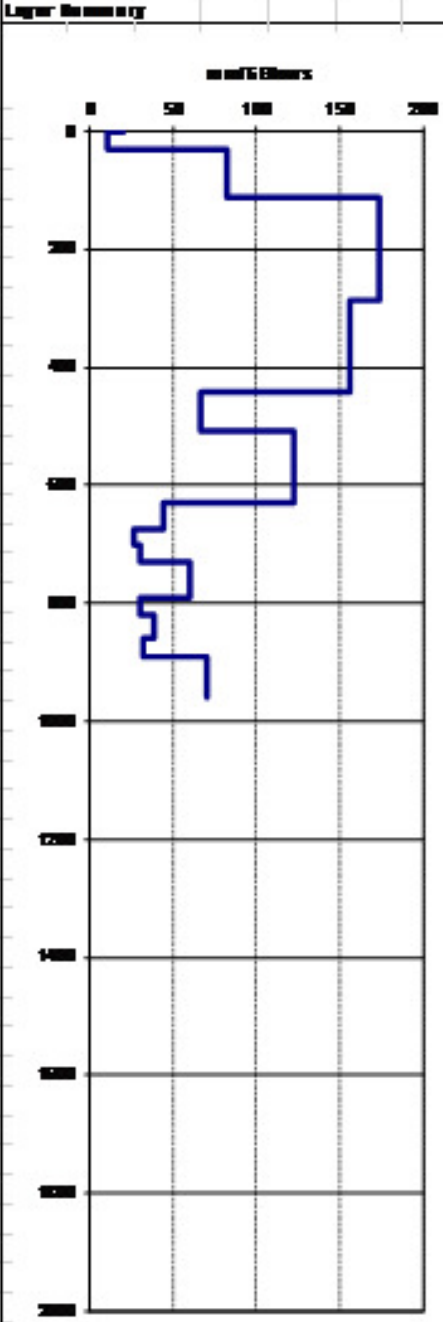
		Project: 200m Reinforced pipeline		Lab No:	
		RI name / No:		Client No:	
		Section from:		Date:	
DYNAMIC CONE PENETROMETER (DCP)					
TIM-B Method STB					
DCP No.		SE		Site: Alington to Lindley	
Chainage:				Layer type:	
Offset:				Carriageway:	
Field Data		Receival Parameters			Layer No. name or y
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CEFR (%)	
0	0				
25	5	5	10	100	
30	5	5	10	10	
35	5	5	25.6	7	
40	5	5	10.0	10	
45	5	5	10.0	10	
50	5	5	20.2	6	
55	5	5	10.0	10	
60	5	5	4.0	4	
65	5	5	20.0	6	
70	5	5	15.2	10	
REMARKS					
				Techn: T Mkhabela	
				Date: 6-Mar-19	


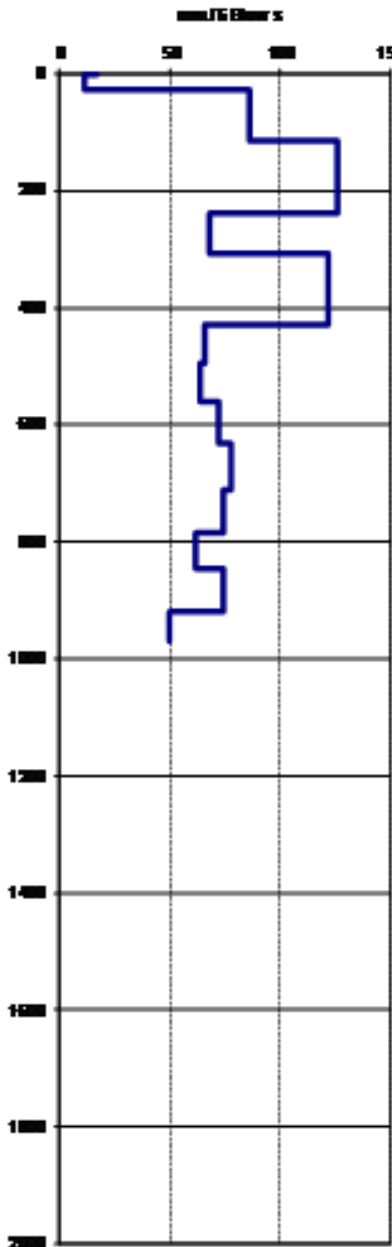
		Project: 2 Mile Flume water pipeline		Lab No:
		Reference No:		Client No:
		Execution No:		Date:
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method S7B				
DCP No.	57			Site: Alington to Lindley
Contract:				Layer type:
Client:				Carriageway:
Field Data		Relevant Parameters		
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CER (%)
25	0			
30	7	5	16	100
100	70	5	100	10
300	200	5	40.4	4
400	100	5	27.0	6
400	100	5	32.0	5
700	300	5	36.0	4
800	100	5	30.4	7
800	0	5	17.5	10
				
REMARKS				Techn: T Mchabe
				Date: 6-Mar-19


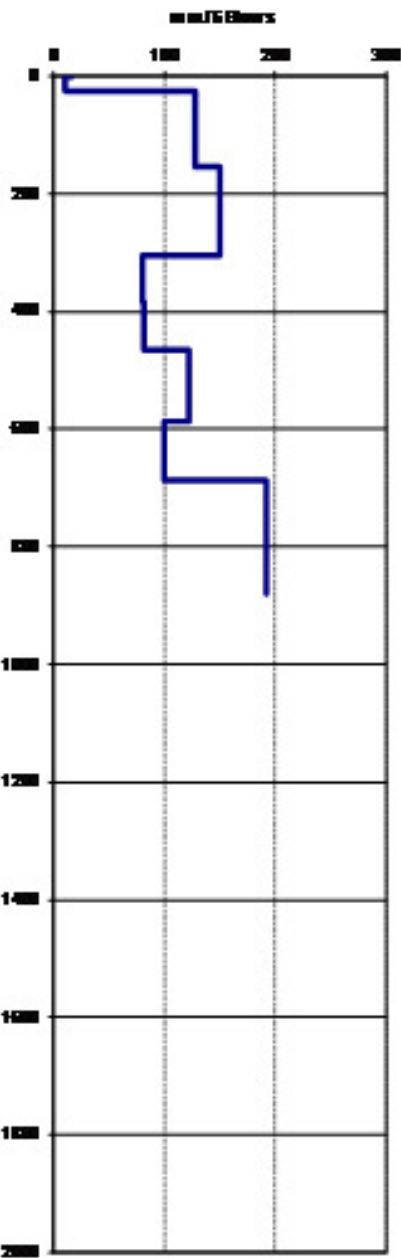
		Project: 2015a - Riverbank / r / rd / rd / rd		Lab No:
		RII name / No:		Client No:
		Execution Name:		Date: 6-Mar-19
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method STD				
DCP No.	SI			Site: Arlington to Lindley
Change:				Layer type:
Client:				Carriage way:
Field Data		Relevant Parameters		Layer Boundary
Depth (m)	Deflection (mm)	Blow	CFI (mm/blow)	CEFL (%)
0	0			
20	10	5	2.0	~10
40	20	5	4.0	10
60	35	5	7.0	5
80	50	5	10.0	10
100	70	5	14.0	10
120	90	5	18.0	10
140	110	5	22.0	4
160	130	5	26.0	10
180	150	5	30.0	10
200	170	5	34.0	10
220	190	5	38.0	10
240	210	5	42.0	10
260	230	5	46.0	10
280	250	5	50.0	10
300	270	5	54.0	10
320	290	5	58.0	10
340	310	5	62.0	10
360	330	5	66.0	10
380	350	5	70.0	10
400	370	5	74.0	10
420	390	5	78.0	10
440	410	5	82.0	10
460	430	5	86.0	10
480	450	5	90.0	10
500	470	5	94.0	10
520	490	5	98.0	10
540	510	5	102.0	10
560	530	5	106.0	10
580	550	5	110.0	10
600	570	5	114.0	10
620	590	5	118.0	10
640	610	5	122.0	10
660	630	5	126.0	10
680	650	5	130.0	10
700	670	5	134.0	10
720	690	5	138.0	10
740	710	5	142.0	10
760	730	5	146.0	10
780	750	5	150.0	10
800	770	5	154.0	10
820	790	5	158.0	10
840	810	5	162.0	10
860	830	5	166.0	10
880	850	5	170.0	10
900	870	5	174.0	10
920	890	5	178.0	10
940	910	5	182.0	10
960	930	5	186.0	10
980	950	5	190.0	10
1000	970	5	194.0	10
1020	990	5	198.0	10
1040	1010	5	202.0	10
1060	1030	5	206.0	10
1080	1050	5	210.0	10
1100	1070	5	214.0	10
1120	1090	5	218.0	10
1140	1110	5	222.0	10
1160	1130	5	226.0	10
1180	1150	5	230.0	10
1200	1170	5	234.0	10
1220	1190	5	238.0	10
1240	1210	5	242.0	10
1260	1230	5	246.0	10
1280	1250	5	250.0	10
1300	1270	5	254.0	10
1320	1290	5	258.0	10
1340	1310	5	262.0	10
1360	1330	5	266.0	10
1380	1350	5	270.0	10
1400	1370	5	274.0	10
1420	1390	5	278.0	10
1440	1410	5	282.0	10
1460	1430	5	286.0	10
1480	1450	5	290.0	10
1500	1470	5	294.0	10
1520	1490	5	298.0	10
1540	1510	5	302.0	10
1560	1530	5	306.0	10
1580	1550	5	310.0	10
1600	1570	5	314.0	10
1620	1590	5	318.0	10
1640	1610	5	322.0	10
1660	1630	5	326.0	10
1680	1650	5	330.0	10
1700	1670	5	334.0	10
1720	1690	5	338.0	10
1740	1710	5	342.0	10
1760	1730	5	346.0	10
1780	1750	5	350.0	10
1800	1770	5	354.0	10
1820	1790	5	358.0	10
1840	1810	5	362.0	10
1860	1830	5	366.0	10
1880	1850	5	370.0	10
1900	1870	5	374.0	10
1920	1890	5	378.0	10
1940	1910	5	382.0	10
1960	1930	5	386.0	10
1980	1950	5	390.0	10
2000	1970	5	394.0	10
2020	1990	5	398.0	10
2040	2010	5	402.0	10
2060	2030	5	406.0	10
2080	2050	5	410.0	10
2100	2070	5	414.0	10
2120	2090	5	418.0	10
2140	2110	5	422.0	10
2160	2130	5	426.0	10
2180	2150	5	430.0	10
2200	2170	5	434.0	10
2220	2190	5	438.0	10
2240	2210	5	442.0	10
2260	2230	5	446.0	10
2280	2250	5	450.0	10
2300	2270	5	454.0	10
2320	2290	5	458.0	10
2340	2310	5	462.0	10
2360	2330	5	466.0	10
2380	2350	5	470.0	10
2400	2370	5	474.0	10
2420	2390	5	478.0	10
2440	2410	5	482.0	10
2460	2430	5	486.0	10
2480	2450	5	490.0	10
2500	2470	5	494.0	10
2520	2490	5	498.0	10
2540	2510	5	502.0	10
2560	2530	5	506.0	10
2580	2550	5	510.0	10
2600	2570	5	514.0	10
2620	2590	5	518.0	10
2640	2610	5	522.0	10
2660	2630	5	526.0	10
2680	2650	5	530.0	10
2700	2670	5	534.0	10
2720	2690	5	538.0	10
2740	2710	5	542.0	10
2760	2730	5	546.0	10
2780	2750	5	550.0	10
2800	2770	5	554.0	10
2820	2790	5	558.0	10
2840	2810	5	562.0	10
2860	2830	5	566.0	10
2880	2850	5	570.0	10
2900	2870	5	574.0	10
2920	2890	5	578.0	10
2940	2910	5	582.0	10
2960	2930	5	586.0	10
2980	2950	5	590.0	10
3000	2970	5	594.0	10
3020	2990	5	598.0	10
3040	3010	5	602.0	10
3060	3030	5	606.0	10
3080	3050	5	610.0	10
3100	3070	5	614.0	10
3120	3090	5	618.0	10
3140	3110	5	622.0	10
3160	3130	5	626.0	10
3180	3150	5	630.0	10
3200	3170	5	634.0	10
3220	3190	5	638.0	10
3240	3210	5	642.0	10
3260	3230	5	646.0	10
3280	3250	5	650.0	10
3300	3270	5	654.0	10
3320	3290	5	658.0	10
3340	3310	5	662.0	10
3360	3330	5	666.0	10
3380	3350	5	670.0	10
3400	3370	5	674.0	10
3420	3390	5	678.0	10
3440	3410	5	682.0	10
3460	3430	5	686.0	10
3480	3450	5	690.0	10
3500	3470	5	694.0	10
3520	3490	5	698.0	10
3540	3510	5	702.0	10
3560	3530	5	706.0	10
3580	3550	5	710.0	10
3600	3570	5	714.0	10
3620	3590	5	718.0	10
3640	3610	5	722.0	10
3660	3630	5	726.0	10
3680	3650	5	730.0	10
3700	3670	5	734.0	10
3720	3690	5	738.0	10
3740	3710	5	742.0	10
3760	3730	5	746.0	10
3780	3750	5	750.0	10
3800	3770	5	754.0	10
3820	3790	5	758.0	10
3840	3810	5	762.0	10
3860	3830	5	766.0	10
3880	3850	5	770.0	10
3900	3870	5	774.0	10
3920	3890	5	778.0	10
3940	3910	5	782.0	10
3960	3930	5	786.0	10
3980	3950	5	790.0	10
4000	3970	5	794.0	10
4020	3990	5	798.0	10
4040	4010	5	802.0	10
4060	4030	5	806.0	10
4080	4050	5	810.0	10
4100	4070	5	814.0	10
4120	4090	5	818.0	10
4140	4110	5	822.0	10
4160	4130	5	826.0	10
4180	4150	5	830.0	10
4200	4170	5	834.0	10
4220	4190	5	838.0	10
4240	4210	5	842.0	10
4260	4230	5	846.0	10
4280	4250	5	850.0	10
4300	4270	5	854.0	10
4320	4290	5	858.0	10
4340	4310	5	862.0	10
4360	4330	5	866.0	10
4380	4350	5	870.0	10
4400	4370	5	874.0	10
4420	4390	5	878.0	10
4440	4410	5	882.0	10
4460	4430	5	886.0	10
4480	4450	5	890.0	10
4500	4470	5	894.0	10
4520	4490	5	898.0	10
4540	451			


Magareng Civil Laboratory		Project: 28 km Reinforcement project		Lab No: _____	
		RI name / No: _____		Client No: _____	
		Reconform: _____		Date: 6-Mar-19	
DYNAMIC CONE PENETROMETER (DCP)					
TIM-B Method STD					
DCP No. 61		Site: Alington to Lindley			
Challenge:		Layer type:			
Obst:		Carriageway			
Field Data		Residual Parameters		Layer Summary	
Depth (m)	Interval (mm)	Blows	DR (mm/blow)	CER (%)	<p style="text-align: center;">in m/mG Blows</p>
16	0				
20	16	5	38	14	
25	10	5	38.2	7	
30	20	5	48	4	
35	10	5	37	5	
40	17	5	38	20	
45	16	5	38	25	
50	16	5	38	10	
55	16	5	38	10	
60	10	5	38.0	20	
65	10	5	38.0	10	
70	10	5	38.0	10	
75	10	5	38.0	10	
80	10	5	38.0	10	
REMARKS: _____					
				Tech: T Mabinz	
				Date: 6-Mar-19	


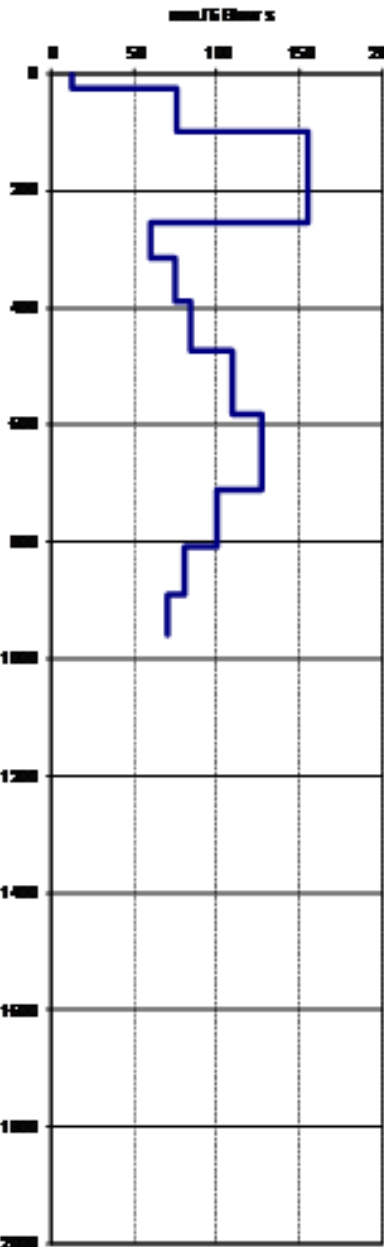
		Project: 200m Reinforced pipeline		Lab No:
		RI name / No:		Client No:
		Excision from:		Date: 6-Mar-19
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method STD				
DCP No. 67		Site: Alington to Lindley		
Change:		Layer type:		
Offset:		Carriageway		
Field Data		Resistance Parameters		
Depth (m)	Interval (mm)	Blows	DPN (mm/Blow)	CBR (%)
0	0			
0	10	5	20	400
10	10	5	16.6	12
20	10	5	20.6	5
30	10	5	20.2	5
40	10	5	16.2	6
50	10	5	20.6	7
60	10	5	16.6	26
70	10	5	13.2	30
80	10	5	16.0	42
90	10	5	16.0	7
100	10	5	16.0	42
110	10	5	16.6	30
120	10	5	16.6	30
130	10	5	16.6	400
140	10	5	16.6	400
150	10	5	16.6	400
160	10	5	16.6	400
170	10	5	16.6	400
180	10	5	16.6	400
190	10	5	16.6	400
200	10	5	16.6	400
REMARKS		Tech: T Malabar		
		Date: 6-Mar-19		


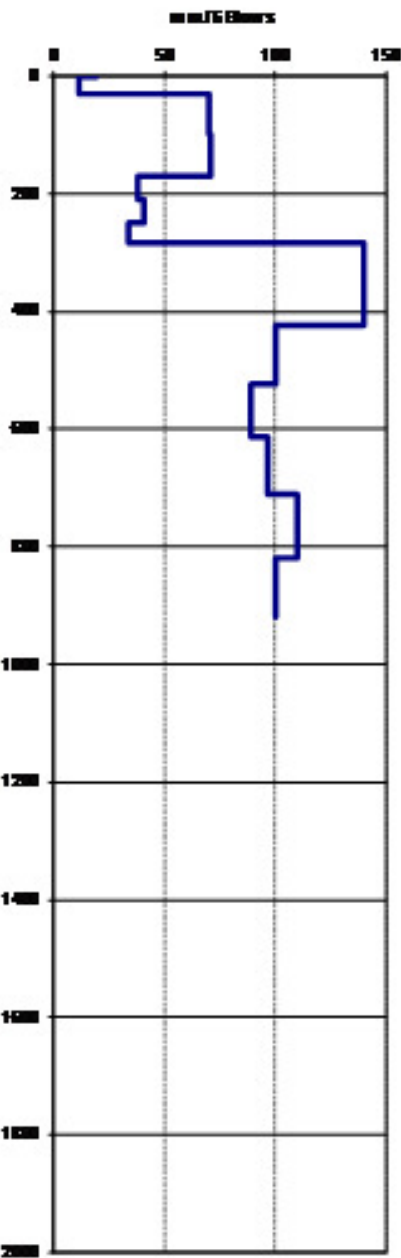



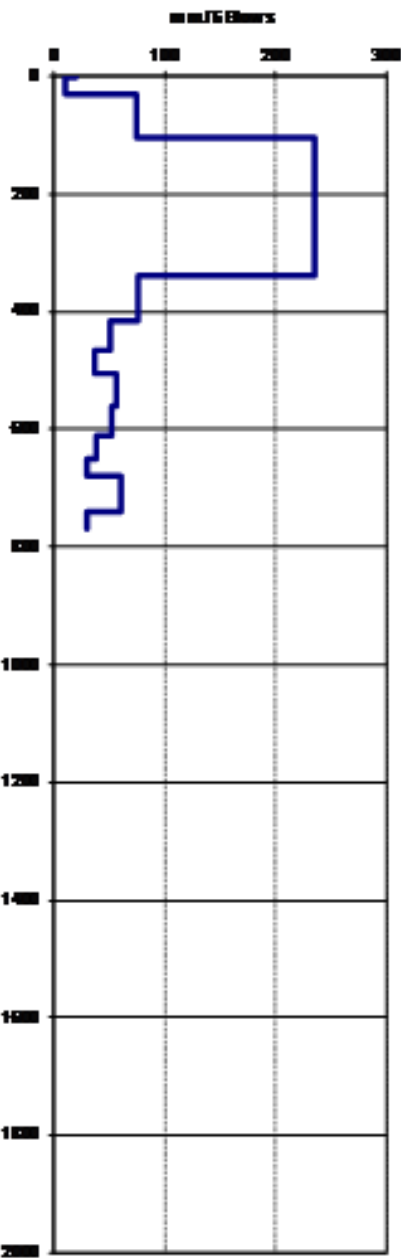
		Project: 20km Fluorinated pipeline		Lab No:	
		RI name/ No:		Client No:	
		Execution No:		Date: 6-Mar-19	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method STD					
DCP No.	08			Site: Alington to Lindley	
Change:				Layer type:	
Other:				Carriageway:	
Field Data	Recorded Parameters				Layer Summary
Depth (m) Level (mm)	Interval (mm)	Blows	DPN (mm/blow)	CSR (kPa)	
0	0				
25	10	5	22	140	
50	25	5	17.2	10	
75	50	5	23.2	7	
100	75	5	16	15	
125	100	5	24.4	7	
150	125	5	16.2	15	
175	150	5	16.5	16	
200	175	5	16.4	16	
225	200	5	16.5	16	
250	225	5	16.5	16	
275	250	5	16.4	17	
300	275	5	16.5	16	
325	300	5	16.9	22	
350	325	5			
375	350	5			
400	375	5			
425	400	5			
450	425	5			
475	450	5			
500	475	5			
525	500	5			
550	525	5			
575	550	5			
600	575	5			
625	600	5			
650	625	5			
675	650	5			
700	675	5			
725	700	5			
750	725	5			
775	750	5			
800	775	5			
825	800	5			
850	825	5			
875	850	5			
900	875	5			
925	900	5			
950	925	5			
975	950	5			
1000	975	5			
1025	1000	5			
1050	1025	5			
1075	1050	5			
1100	1075	5			
1125	1100	5			
1150	1125	5			
1175	1150	5			
1200	1175	5			
1225	1200	5			
1250	1225	5			
1275	1250	5			
1300	1275	5			
1325	1300	5			
1350	1325	5			
1375	1350	5			
1400	1375	5			
1425	1400	5			
1450	1425	5			
1475	1450	5			
1500	1475	5			
1525	1500	5			
1550	1525	5			
1575	1550	5			
1600	1575	5			
1625	1600	5			
1650	1625	5			
1675	1650	5			
1700	1675	5			
1725	1700	5			
1750	1725	5			
1775	1750	5			
1800	1775	5			
1825	1800	5			
1850	1825	5			
1875	1850	5			
1900	1875	5			
1925	1900	5			
1950	1925	5			
1975	1950	5			
2000	1975	5			
REMARKS				Test: T Mahele	
				Date: 6-Mar-19	

		Project: 2 Mile Flume water pipe line		Lab No:	
		Reference No:		Client No:	
		Execution No:		Date: 6-Mar-19	
DYNAMIC CONE PENETROMETER (DCP)					
TM-10 Method STB					
DCP No.	62			Site: Arlington to Lindley	
Contract:				Layer type:	
Client:				Carriageway:	
Field Data		Relevant Parameters			
Depth (m)	Interval (mm)	Blows	DCP (mm/blow)	CER (%)	
0	0				
25	25	5	2.0	4.0	
75	50	5	25.6	7	
125	50	5	28.0	5	
175	50	5	12.0	12	
225	50	5	16.0	12	
275	50	5	26.4	7	
325	50	5	18.0	9	
375	50	5	26.4	4	
REMARKS					
				Technician: T M Moutz	
				Date: 6-Mar-19	

		Project : 2 Mm Flume under pipe bore	Lab No:
		Reference No :	Client No :
		Execution No :	Date : 6-Mar-19
DYNAMIC CONE PENETROMETER (DCP)			
TM18 Method STB			
DCP No.	78		Site: Alington to Lindley
Change:			Layer type:
Comment:			Carriageway:
Field Data		Residual Parameters	
Depth (mm)	Interval (mm)	Blows	DCP (mm/blow)
25	8		
33	8	5	16.8
41	8	5	16.8
49	8	5	16.8
57	8	5	16.8
65	8	5	16.8
73	8	5	16.8
81	8	5	16.8
89	8	5	16.8
97	8	5	16.8
105	8	5	16.8
113	8	5	16.8
121	8	5	16.8
129	8	5	16.8
137	8	5	16.8
145	8	5	16.8
153	8	5	16.8
161	8	5	16.8
169	8	5	16.8
177	8	5	16.8
185	8	5	16.8
193	8	5	16.8
201	8	5	16.8
209	8	5	16.8
217	8	5	16.8
225	8	5	16.8
233	8	5	16.8
241	8	5	16.8
249	8	5	16.8
257	8	5	16.8
265	8	5	16.8
273	8	5	16.8
281	8	5	16.8
289	8	5	16.8
297	8	5	16.8
305	8	5	16.8
313	8	5	16.8
321	8	5	16.8
329	8	5	16.8
337	8	5	16.8
345	8	5	16.8
353	8	5	16.8
361	8	5	16.8
369	8	5	16.8
377	8	5	16.8
385	8	5	16.8
393	8	5	16.8
401	8	5	16.8
409	8	5	16.8
417	8	5	16.8
425	8	5	16.8
433	8	5	16.8
441	8	5	16.8
449	8	5	16.8
457	8	5	16.8
465	8	5	16.8
473	8	5	16.8
481	8	5	16.8
489	8	5	16.8
497	8	5	16.8
505	8	5	16.8
513	8	5	16.8
521	8	5	16.8
529	8	5	16.8
537	8	5	16.8
545	8	5	16.8
553	8	5	16.8
561	8	5	16.8
569	8	5	16.8
577	8	5	16.8
585	8	5	16.8
593	8	5	16.8
601	8	5	16.8
609	8	5	16.8
617	8	5	16.8
625	8	5	16.8
633	8	5	16.8
641	8	5	16.8
649	8	5	16.8
657	8	5	16.8
665	8	5	16.8
673	8	5	16.8
681	8	5	16.8
689	8	5	16.8
697	8	5	16.8
705	8	5	16.8
713	8	5	16.8
721	8	5	16.8
729	8	5	16.8
737	8	5	16.8
745	8	5	16.8
753	8	5	16.8
761	8	5	16.8
769	8	5	16.8
777	8	5	16.8
785	8	5	16.8
793	8	5	16.8
801	8	5	16.8
809	8	5	16.8
817	8	5	16.8
825	8	5	16.8
833	8	5	16.8
841	8	5	16.8
849	8	5	16.8
857	8	5	16.8
865	8	5	16.8
873	8	5	16.8
881	8	5	16.8
889	8	5	16.8
897	8	5	16.8
905	8	5	16.8
913	8	5	16.8
921	8	5	16.8
929	8	5	16.8
937	8	5	16.8
945	8	5	16.8
953	8	5	16.8
961	8	5	16.8
969	8	5	16.8
977	8	5	16.8
985	8	5	16.8
993	8	5	16.8
1001	8	5	16.8
1009	8	5	16.8
1017	8	5	16.8
1025	8	5	16.8
1033	8	5	16.8
1041	8	5	16.8
1049	8	5	16.8
1057	8	5	16.8
1065	8	5	16.8
1073	8	5	16.8
1081	8	5	16.8
1089	8	5	16.8
1097	8	5	16.8
1105	8	5	16.8
1113	8	5	16.8
1121	8	5	16.8
1129	8	5	16.8
1137	8	5	16.8
1145	8	5	16.8
1153	8	5	16.8
1161	8	5	16.8
1169	8	5	16.8
1177	8	5	16.8
1185	8	5	16.8
1193	8	5	16.8
1201	8	5	16.8
1209	8	5	16.8
1217	8	5	16.8
1225	8	5	16.8
1233	8	5	16.8
1241	8	5	16.8
1249	8	5	16.8
1257	8	5	16.8
1265	8	5	16.8
1273	8	5	16.8
1281	8	5	16.8
1289	8	5	16.8
1297	8	5	16.8
1305	8	5	16.8
1313	8	5	16.8
1321	8	5	16.8
1329	8	5	16.8
1337	8	5	16.8
1345	8	5	16.8
1353	8	5	16.8
1361	8	5	16.8
1369	8	5	16.8
1377	8	5	16.8
1385	8	5	16.8
1393	8	5	16.8
1401	8	5	16.8
1409	8	5	16.8
1417	8	5	16.8
1425	8	5	16.8
1433	8	5	16.8
1441	8	5	16.8
1449	8	5	16.8
1457	8	5	16.8
1465	8	5	16.8
1473	8	5	16.8
1481	8	5	16.8
1489	8	5	16.8
1497	8	5	16.8
1505	8	5	16.8
1513	8	5	16.8
1521	8	5	16.8
1529	8	5	16.8
1537	8	5	16.8
1545	8	5	16.8
1553	8	5	16.8
1561	8	5	16.8
1569	8	5	16.8
1577	8	5	16.8
1585	8	5	16.8
1593	8	5	16.8
1601	8	5	16.8
1609	8	5	16.8
1617	8	5	16.8
1625	8	5	16.8
1633	8	5	16.8
1641	8	5	16.8
1649	8	5	16.8
1657	8	5	16.8
1665	8	5	16.8
1673	8	5	16.8
1681	8	5	16.8
1689	8	5	16.8
1697	8	5	16.8
1705	8	5	16.8
1713	8	5	16.8
1721	8	5	16.8
1729	8	5	16.8
1737	8	5	16.8
1745	8	5	16.8
1753	8	5	16.8
1761	8	5	16.8
1769	8	5	16.8
1777	8	5	16.8
1785	8	5	16.8
1793	8	5	16.8
1801	8	5	16.8
1809	8	5	16.8
1817	8	5	16.8
1825	8	5	16.8
1833	8	5	16.8
1841	8	5	16.8
1849	8	5	16.8
1857	8	5	16.8
1865	8	5	16.8
1873	8	5	16.8
1881	8	5	16.8
1889	8	5	16.8
1897	8	5	16.8
1905	8	5	16.8
1913	8	5	16.8
1921	8	5	16.8
1929	8	5	16.8
1937	8	5	16.8
1945	8	5	16.8
1953	8	5	16.8
1961	8	5	16.8
1969	8	5	16.8
1977	8	5	16.8
1985	8	5	16.8
1993	8	5	16.8
2001	8	5	16.8
2009	8	5	16.8
2017	8	5	16.8
2025	8	5	16.8
2033	8	5	16.8
2041	8	5	16.8
2049	8	5	16.8
2057	8	5	16.8
2065	8	5	16.8
2073	8	5	16.8
2081	8	5	16.8
2089	8	5	16.8
2097	8	5	16.8
2105	8	5	16.8
2113	8	5	16.8
2121	8	5	16.8
2129	8	5	16.8
2137	8	5	16.8
2145	8	5	16.8
2153	8	5	16.8
2161	8	5	16.8
2169	8	5	16.8
2177	8	5	16.8
2185	8	5	16.8
2193	8	5	16.8
2201	8	5	16.8
2209	8	5	16.8
2217	8	5	16.8
2225	8	5	16.8
2233	8	5	16.8
2241	8	5	16.8
2249	8	5	16.8
2257	8	5	16.8
2265	8	5	16.8
2273	8	5	16.8
2281	8	5	16.8
2289	8	5	16.8
2297	8	5	16.8
2305	8	5	16.8
2313	8	5	16.8
2321	8	5	16.8
2329	8	5	16.8
2337	8	5	16.8
2345	8	5	16.8
2353	8	5	16.8
2361	8	5	16.8
2369	8	5	16.8
2377			

		Project: 2.0km Fluorinated pipeline		Lab No:
		RI name/ No:		Client No:
		Eccell name:		Date: 6-Mar-19
DYNAMIC CONE PENETROMETER (DCP)				
TM-10 Method STD				
DCP No. 71		Site: Alington to Lindley		
Change:		Layer type:		
Other:		Carriageway		
Field Data		Recorded Parameters		Layer Summary
Depth (m)	Interval (mm)	Blows	DPN (mm/blow)	CSF (%)
12	0			
25	12	5	24	100
100	75	5	15.2	16
205	105	5	20.9	5
305	100	5	18.9	17
380	75	5	15.0	16
425	45	5	18.0	18
505	80	5	23.0	6
710	105	5	25.4	7
800	90	5	23.9	8
880	80	5	18.9	16
880	70	5	18.0	16
				
REMARKS				Tech: T. Malhotra Date: 6-Mar-19

		Project: 2 Mile Flume water pipe line		Lab No:	
		Reference No:		Client No:	
		Execution No:		Date: 6-Mar-19	
DYNAMIC CONE PENETROMETER (DCP)					
TM-18 Method STB					
DCP No.	J2				
Contract:					
Client:					
Field Data		Relevant Parameters			Site: Arlington to Lindley Layer type: Carriageway Layer Summary 
Depth (mm)	Interval (mm)	Blows	CFI (mm/blow)	CEM (%)	
0	0				
20	20	5	2.2	40	
40	20	5	16.0	16	
60	20	5	16.2	16	
80	20	5	7.6	30	
100	20	5	6.2	36	
120	20	5	6.6	36	
140	20	5	26.0	6	
160	20	5	26.0	6	
180	20	5	17.6	18	
200	20	5	16.4	18	
220	20	5	26.0	6	
240	20	5	26.0	6	
REMARKS					
				Technician: T M Moutie	
				Date: 6-Mar-19	

		Project: 2 Mile Flume water pipeline		Lab No:
		Reference No:		Client No:
		Execution No:		Date: 6-Mar-19
DYNAMIC CONE PENETROMETER (DCP)				
TM-18 Method STB				
DCP No.	75			Site: Arlington to Lindley
Contract:				Layer type:
Contract:				Carriageway:
Field Data		Relevant Parameters		
Depth (m)	Interval (mm)	Blows	CFI (mm/blow)	CER (%)
0	0			
30	30	5	2.9	40
60	30	5	18.6	16
90	30	5	47.2	3
120	30	5	13.2	16
150	30	5	10.2	23
180	30	5	7.4	32
210	30	5	10.2	19
240	30	5	10.4	23
270	30	5	7.6	38
300	30	5	6.9	42
330	30	5	10.9	17
360	30	5	6.9	42
Layer Summary				
				
REMARKS				
				Tech: T Mkhize Date: 6-Mar-19

