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REPORT
ON
PRELIMINARY ACID SULPHATE SOIL ASSESSMENT

PROPOSED TOURIST & RESIDENTIAL DEVELOPMENT
COMBERTON GRANGE
JERVIS BAY

Prepared for:
SHAOLIN TEMPLE FOUNDATION (AUSTRALIA)

PROJECT 48670.01
SEPTEMBER 2009

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AC:ds
Project 48670.01
15 September 2009

REPORT ON PRELIMINARY ACID SULPHATE SOIL ASSESSMENT
PROPOSED TOURIST AND RESIDENTIAL DEVELOPMENT
COMBERTON GRANGE, JERVIS BAY

1. INTRODUCTION

This report presents the results of an acid sulphate soil assessment undertaken at the site of a proposed tourist and residential development at Comberton Grange, Jervis Bay. The work was commissioned by Conybeare Morrison International Pty Ltd, project managers acting on behalf of the Shaolin Temple Foundation (Australia), developers of the site.

It is understood that the proposed development comprises a mixed tourist, residential and commercial development, including a temple, educational facilities, farms, hotel, staff accommodation, dwellings, commercial centre and a golf course. Investigation was carried out to provide information on subsurface conditions within the proposed development area (which comprises a 285 ha portion within the overall 1249 ha property), in order to assess the acid sulphate potential of the underlying soils.

The investigation comprised test pit excavation and borehole drilling, followed by laboratory testing of selected samples, engineering analysis and reporting. Details of the work undertaken and the results obtained are given in the report, together with comments relating to acid sulphate potential.

A draft report was circulated by mail on 20 August 2009. This report supersedes all previous verbal advice and written correspondence.

The field work was undertaken concurrently with preliminary contamination and geotechnical soil assessments, the results of which are given in separate reports (Project 48670 and 48670.02) dated September 2009.

Site survey plans and aerial photos were provided by the client for the investigation.

2. SITE DESCRIPTION

The site, which comprises two individual portions, nominated as the Northern (174.5 ha) and Southern (110.5 ha) Development Areas, is located within the north-western section of a larger property that includes Lot 1 in DP 725955, Lot 1 DP 550098, Lot 4 DP 63404 and Lots 59 – 61 in DP 755928.

The Northern Development Area (NDA, refer Drawing 1) is an irregular shaped area with maximum north-south and east-west dimensions of 1400 m and 1200 m respectively. It is centred on a series of west to north-east and west to south-east ridgelines which are separated by south-easterly trending depressions which drain to the Currambene Creek floodplain some 2 km to the south. Site levels fall at grades of 1 in 10 to 1 in 25, with an overall difference in level estimated to be about 36 m from the highest part to the lowest part of the development area. At the time of the assessment, the northern development area was heavily vegetated and largely inaccessible with the exception of a grid of tracks formerly used for timber transportation.

The Southern Development Area (SDA, refer Drawing 1) is an irregular shaped, elongated area with maximum plan dimensions of 2300 m and 600 m respectively. It is located on the south-west facing flanks of a ridgeline with site levels falling towards Currambene Creek at grades of 1 in 10 to 1 in 25, with an overall difference of about 34 m. At the time of the assessment, the southern development area was predominantly cleared and used for cattle grazing. Remnant forest was located along the north-eastern extent of the proposed development area.

3. REGIONAL GEOLOGY

Reference to the 1:250 000 Wollongong Geological Series Sheet (Ref 1) indicates that the proposed development area is underlain by Nowra Sandstone and Wandrawandian Siltstone, both belonging to the Shoalhaven Group of Permian age. The Nowra Sandstone comprises quartz sandstone whilst the Wandrawandian Siltstone comprises sandstone, siltstone and conglomerate. The test pits confirmed the geological mapping, with sandstone and siltstone encountered in those pits that intersected rock.

Reference to the 1:25 000 Yalwal/Nowra Acid Sulphate Risk Map (Ref 2) indicates *"no known occurrence – acid sulphate soils are not known or expected to occur in these environments"*, within the proposed development area. The mapping indicates the likelihood of acid sulphate soils within the Currambene Creek floodplain (below about RL 4) to the south of the development area. The extent of acid sulphate soils as given by the published mapping is shown on Drawing 1.

4. FIELD WORK

4.1 Methods

The field work comprised field mapping by a senior geotechnical engineer followed by test pit excavation and borehole drilling.

Pits 1 – 25 were excavated to depths of 0.8 – 3.3 m with a John Deere 315SJ backhoe fitted with a 600 mm wide bucket. The pits were logged on site by an environmental scientist who collected representative disturbed samples to aid in strata identification and for possible laboratory testing.

Bores 26 – 28 were drilled with a Gemcodril 210B soil sampling and drilling rig and were advanced with 125 mm diameter continuous solid flight augers to the termination depths (limit of investigation) of 6 m. Standard penetration tests (SPT) were carried out at regular intervals to assist with strata identification and for possible laboratory testing. Details of the SPT procedure are given in the accompanying notes (Appendix A) with the penetration 'N' values recorded on the borehole log.

The approximate locations of the field tests are shown on Drawing 1 (Appendix A). The surface levels (to Australian Height Datum, AHD) and coordinates (MGA) shown on the logs were determined by contour interpolation and by hand-held GPS receivers respectively and as such, are approximate only.

4.2 Results

Details of the subsurface conditions encountered are given on the test pit and borehole logs included in Appendix A, together with notes defining classification methods and descriptive terms.

Relatively uniform conditions were encountered underlying the site, with the succession of strata broadly summarised as follows:

TOPSOIL/FILLING:	to depths of 0.1 – 0.5 m (but generally to 0.2 – 0.4 m);
CLAY:	variably stiff to hard clay and shaly clay to depths of 0.8 – 3.7 m. Pits 9, 11 – 16, 18 and 19 were terminated in residual clay at depths of 1.5 – 3.3 m;
BEDROCK:	initially extremely low to very low strength sandstone and siltstone becoming low to medium strength at refusal of the backhoe bucket at depths of 0.8 – 2.8m in Pits 4, 6 – 8, 10 and 20 – 24. Pits 1, 2, 5 and 17 and Bores 26 – 28 were terminated in extremely weathered rock at depths of 1.8 – 6.0m.

No free groundwater was observed in any of the pits during excavation or whilst auger drilling in the boreholes. It is noted that the pits were immediately backfilled following excavation, which precluded long term monitoring of groundwater levels.

5. LABORATORY TESTING

Selected samples from the test pits were tested in the DP laboratory for measurement of pH in H_2O (pH_F) and pH after oxidation with H_2O_2 (pH_{FOX}) using a calibrated pH meter. The detailed results of the screening tests (pH_F and pH_{FOX}) are included in Appendix B. As positive indicators of potential acid sulphate soils (eg: lowering of pH by at least one unit following peroxide oxidation and final pH_{FOX} < 3.5) were not found in any of the soils, the undertaking of chromium suite tests was not required.

6. PROPOSED DEVELOPMENT

It is understood that the proposed development comprises a tourist and residential complex, including temple, education complex, hotel, staff accommodation, dwellings, commercial buildings and a golf course.

7. COMMENTS

7.1 General

The following comments are based on subsurface conditions encountered at the time of the assessment and the results of laboratory testing from within the proposed development area. It is noted that should development be proposed outside the current investigation areas, site-specific investigation and assessment will be required.

7.2 Acid Sulphate Soil Assessment

Based on the laboratory test results and the ASSMAC (Ref 3) and QASSIT (Ref 4) guidelines, the following interpretations are made with respect to acid sulphate potential.

Screening Tests

- The results of the initial screening tests for pH in H_2O (pH_F) were in the range 6.2 – 7.1, which typically indicate that Actual Acid Sulphate Soils (AASS) are not present at the location depths sampled. This interpretation is based on the ASSMAC/QASSIT guidelines which suggest that oxidation of pyrite has occurred in the past when pH_F is less than 4.
- The results of the initial screening tests for pH following addition of H_2O_2 (pH_{FOX}) were in the range 5.0 – 5.2. Whilst pH drops in excess of 1 pH unit were noted in most of the samples, this is considered due to the presence of organics within the topsoil matrix and not an indication of acid sulphate potential. Furthermore, as all samples remained well above pH 3 following oxidation, the results indicate absence of acid generation potential and thus Potential Acid Sulphate Soils (PASS).
- Screening of the remaining samples collected was not undertaken as the soils encountered comprise residual strata formed by weathering of the underlying bedrock (ie: not compatible with acid sulphate soil formations), together with site elevations well above RL 5.

In summary, the results of the testing undertaken indicate the absence of acid sulphate soils. Furthermore, the proposed development area is located above RL 5 (below which acid sulphate soils are generally situated) and underlain by residual soils (ie: not alluvial or marine). The results are consistent with the broad scale mapping and as such, acid sulphate soils are not expected to be encountered within the proposed development area and the formation of an acid sulphate management plan is not required.

DOUGLAS PARTNERS PTY LTD

A Castrissios
Senior Associate

Reviewed by:

G W McIntosh
Principal

References:

1. Geology of Wollongong 1:250 000 Geological Series Sheet No 56-9 – 11, Dept of Mines, (1966).
2. 1:25 000 Yalwal/Nowra Acid Sulphate Risk Map, Dept of Land and Water Conservation (1997).
3. ASSMAC (1998), *"Acid Sulfate Soil Manual*, New South Wales Acid Sulphate Soil Management Advisory Committee.
4. Soil Management Guidelines, Queensland Acid Sulphate Soil Technical Manual, Version 3.8 (2002).

APPENDIX A

Notes Relating to this Report
Test Pit Logs (Pits 1 – 25)
Borehole Logs (Bores 26 – 28)

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NOTES RELATING TO THIS REPORT

Introduction

These notes have been provided to amplify the geotechnical report in regard to classification methods, specialist field procedures and certain matters relating to the Discussion and Comments section. Not all, of course, are necessarily relevant to all reports.

Geotechnical reports are based on information gained from limited subsurface test boring and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, Geotechnical Site Investigations Code. In general, descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (eg. sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	less than 0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.06 to 2.00 mm
Gravel	2.00 to 60.00 mm

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Undrained Shear Strength kPa
Very soft	less than 12
Soft	12—25
Firm	25—50
Stiff	50—100
Very stiff	100—200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer tests (CPT) as below:

Relative Density	SPT "N" Value (blows/300 mm)	CPT Cone Value (q_c — MPa)
Very loose	less than 5	less than 2
Loose	5—10	2—5
Medium dense	10—30	5—15
Dense	30—50	15—25
Very dense	greater than 50	greater than 25

Rock types are classified by their geological names. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling

Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing with a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling are given in the report.

Drilling Methods.

The following is a brief summary of drilling methods currently adopted by the Company and some comments on their use and application.

Test Pits — these are excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descent into the pit. The depth of penetration is limited to about 3 m for a backhoe and up to 6 m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Large Diameter Auger (eg. Pengo) — the hole is advanced by a rotating plate or short spiral auger, generally 300 mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube sampling.

Continuous Sample Drilling — the hole is advanced by pushing a 100 mm diameter socket into the ground and withdrawing it at intervals to extrude the sample. This is the most reliable method of drilling in soils, since moisture content is unchanged and soil structure, strength, etc. is only marginally affected.

Continuous Spiral Flight Augers — the hole is advanced using 90—115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water

table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be contaminated. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability, due to remoulding, contamination or softening of samples by ground water.

Non-core Rotary Drilling — the hole is advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from 'feel' and rate of penetration.

Rotary Mud Drilling — similar to rotary drilling, but using drilling mud as a circulating fluid. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg. from SPT).

Continuous Core Drilling — a continuous core sample is obtained using a diamond-tipped core barrel, usually 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in very weak rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation.

Standard Penetration Tests

Standard penetration tests (abbreviated as SPT) are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" — Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of say 4, 6 and 7

  as 4, 6, 7
  N = 13

- In the case where the test is discontinued short of full penetration, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm

  as 15, 30/40 mm.

The results of the tests can be related empirically to the engineering properties of the soil.

Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the borelogs in brackets.

Cone Penetrometer Testing and Interpretation

Cone penetrometer testing (sometimes referred to as Dutch cone — abbreviated as CPT) described in this report has been carried out using an electrical friction cone penetrometer. The test is described in Australian Standard 1289, Test 6.4.1.

In the tests, a 35 mm diameter rod with a cone-tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130 mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20 mm per second) the information is plotted on a computer screen and at the end of the test is stored on the computer for later plotting of the results.

The information provided on the plotted results comprises: —

- Cone resistance — the actual end bearing force divided by the cross sectional area of the cone — expressed in MPa.
- Sleeve friction — the frictional force on the sleeve divided by the surface area — expressed in kPa.
- Friction ratio — the ratio of sleeve friction to cone resistance, expressed in percent.

There are two scales available for measurement of cone resistance. The lower scale (0—5 MPa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main scale (0—50 MPa) is less sensitive and is shown as a full line.

The ratios of the sleeve friction to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1%—2% are commonly encountered in sands and very soft clays rising to 4%—10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:—

q_c (MPa) = (0.4 to 0.6) N (blows per 300 mm)

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:—

q_c = (12 to 18) c_u

Interpretation of CPT values can also be made to allow estimation of modulus or compressibility values to allow calculation of foundation settlements.

Inferred stratification as shown on the attached reports is assessed from the cone and friction traces and from experience and information from nearby boreholes, etc. This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties, and where precise information on soil classification is required, direct drilling and sampling may be preferable.

Hand Penetrometers

Hand penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 150 mm increments of penetration. Normally, there is a depth limitation of 1.2 m but this may be extended in certain conditions by the use of extension rods.

Two relatively similar tests are used.

- Perth sand penetrometer — a 16 mm diameter flat-ended rod is driven with a 9 kg hammer, dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.
- Cone penetrometer (sometimes known as the Scala Penetrometer) — a 16 mm rod with a 20 mm diameter cone end is driven with a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). The test was developed initially for pavement subgrade investigations, and published correlations of the test results with California bearing ratio have been published by various Road Authorities.

Laboratory Testing

Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedure used are given on the individual report forms.

Bore Logs

The bore logs presented herein are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable, or possible to justify on economic grounds. In any case, the boreholes represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes, the frequency of sampling and the possibility of other than 'straight line' variations between the boreholes.

Ground Water

Where ground water levels are measured in boreholes, there are several potential problems;

- In low permeability soils, ground water although present, may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Engineering Reports

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building), the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface condition, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- unexpected variations in ground conditions — the potential for this will depend partly on bore spacing and sampling frequency
- changes in policy or interpretation of policy by statutory authorities
- the actions of contractors responding to commercial pressures.

If these occur, the Company will be pleased to assist with investigation or advice to resolve the matter.

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes

Attention is drawn to the document "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section

is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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DESCRIPTION AND CLASSIFICATION OF ROCKS FOR ENGINEERING PURPOSES

DEGREE OF WEATHERING

Term	Symbol	Definition
Extremely Weathered	EW	Rock substance affected by weathering to the extent that the rock exhibits soil properties - i.e. it can be remoulded and can be classified according to the Unified Classification System, but the texture of the original rock is still evident.
Highly Weathered	HW	Rock substance affected by weathering to the extent that limonite staining or bleaching affects the whole of the rock substance and other signs of chemical or physical decomposition are evident. Porosity and strength may be increased or decreased compared to the fresh rock usually as a result of iron leaching or deposition. The colour and strength of the original fresh rock substance is no longer recognisable.
Moderately Weathered	MW	Rock substance affected by weathering to the extent that staining or discolouration of the rock substance usually by limonite has taken place. The colour of the fresh rock is no longer recognisable.
Slightly Weathered	SW	Rock substance affected by weathering to the extent that partial staining or discolouration of the rock substance usually by limonite has taken place. The colour and texture of the fresh rock is recognisable.
Fresh Stained	Fs	Rock substance unaffected by weathering, but showing limonite staining along joints.
Fresh	Fr	Rock substance unaffected by weathering.

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index ($I_{S(50)}$) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by Australian Standard 4133.4.1 - 1993.

Term	Symbol	Field Guide*	Point Load Index $I_{S(50)}$ MPa	Approx Unconfined Compressive Strength q_u ** MPa
Extremely low	EL	Easily remoulded by hand to a material with soil properties	<0.03	< 0.6
Very low	VL	Material crumbles under firm blows with sharp end of pick; can be peeled with a knife; too hard to cut a triaxial sample by hand. SPT will refuse. Pieces up to 3 cm thick can be broken by finger pressure.	0.03-0.1	0.6-2
Low	L	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long 40 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.	0.1-0.3	2-6
Medium	M	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.	0.3-1.0	6-20
High	H	Can be slightly scratched with a knife. A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken with pick with a single firm blow, rock rings under hammer.	1 - 3	20-60
Very high	VH	Cannot be scratched with a knife. Hand specimen breaks with pick after more than one blow, rock rings under hammer.	3 - 10	60-200
Extremely high	EH	Specimen requires many blows with geological pick to break through intact material, rock rings under hammer.	>10	> 200

Note that these terms refer to strength of rock material and not to the strength of the rock mass, which may be considerably weaker due to rock defects.

* The field guide assessment of rock strength may be used for preliminary assessment or when point load testing is not able to be done.

** The approximate unconfined compressive strength (q_u) shown in the table is based on an assumed ratio to the point load index of 20:1. This ratio may vary widely.

STRATIFICATION SPACING

Term	Separation of Stratification Planes
Thinly laminated	<6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	>2 m

DEGREE OF FRACTURING

This classification applies to diamond drill cores and refers to the spacing of all types of natural fractures along which the core is discontinuous. These include bedding plane partings, joints and other rock defects, but exclude known artificial fractures such as drilling breaks. The orientation of rock defects is measured as an angle relative to a plane perpendicular to the core axis. Note that where possible, recordings of the actual defect spacing or range of spacings is preferred to the general terms given below.

Term	Description
Fragmented	The core consists mainly of fragments with dimensions less than 20 mm.
Highly Fractured	Core lengths are generally less than 20 mm - 40 mm with occasional fragments.
Fractured	Core lengths are mainly 40 mm - 200 mm with occasional shorter and longer sections.
Slightly Fractured	Core lengths are generally 200 mm - 1000 mm with occasional shorter and longer sections.
Unbroken	The core does not contain any fracture.

ROCK QUALITY DESIGNATION (RQD)

This is defined as the ratio of sound (i.e. low strength or better) core in lengths of greater than 100 mm to the total length of the core, expressed in percent. If the core is broken by handling or by the drilling process (i.e. the fracture surfaces are fresh, irregular breaks rather than joint surfaces) the fresh broken pieces are fitted together and counted as one piece.

SEDIMENTARY ROCK TYPES

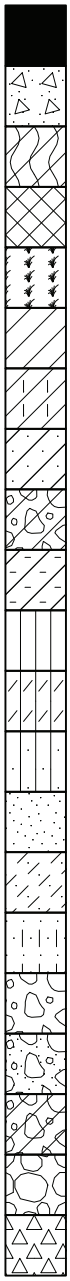
This classification system provides a standardised terminology for the engineering description of sandstone and shales, particularly in the Sydney area, but the terms and definitions may be used elsewhere when applicable.

Rock Type	Definition
Conglomerate	More than 50% of the rock consists of gravel-sized (greater than 2 mm) fragments
Sandstone:	More than 50% of the rock consists of sand-sized (0.06 to 2 mm) grains
Siltstone:	More than 50% of the rock consists of silt-sized (less than 0.06 mm) granular particles and the rock is not laminated.
Claystone:	More than 50% of the rock consists of clay or sericitic material and the rock is not laminated.
Shale:	More than 50% of the rock consists of silt or clay-sized particles and the rock is laminated.

Rocks possessing characteristics of two groups are described by their predominant particle size with reference also to the minor constituents, eg. clayey sandstone, sandy shale.

GRAPHIC SYMBOLS FOR SOIL & ROCK

SOIL



BITUMINOUS CONCRETE

CONCRETE

TOPSOIL

FILLING

PEAT

CLAY

SILTY CLAY

SANDY CLAY

GRAVELLY CLAY

SHALY CLAY

SILT

CLAYEY SILT

SANDY SILT

SAND

CLAYEY SAND

SILTY SAND

GRAVEL

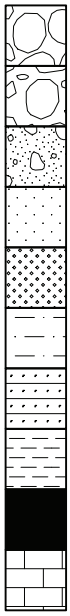
SANDY GRAVEL

CLAYEY GRAVEL

COBBLES/BOULDERS

TALUS

SEDIMENTARY ROCK



BOULDER CONGLOMERATE

CONGLOMERATE

CONGLOMERATIC SANDSTONE

SANDSTONE FINE GRAINED

SANDSTONE COARSE GRAINED

SILTSTONE

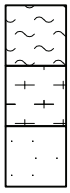
LAMINITE

MUDSTONE, CLAYSTONE, SHALE

COAL

LIMESTONE

METAMORPHIC ROCK

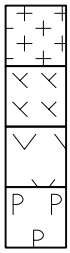


SLATE, PHYLITTE, SCHIST

GNEISS

QUARTZITE

IGNEOUS ROCK



GRANITE

DOLERITE, BASALT

TUFF

PORPHYRY

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 20 m AHD
EASTING: 283492
NORTHING: 6125086
DIP/AZIMUTH: 90°/--

PIT No: 1
PROJECT No: 48670
DATE: 29 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
20									5 10 15 20
		FILLING - brown fine to coarse gravelly (siltstone) silty clay filling with some cobbles, boulders (siltstone) and rootlets		E	0.0				
					0.1				
				D	0.25				
	0.3	CLAY - grey mottled orange red clay with some sand and rootlets			0.3				
				D					
					0.5				
				U					
	0.8	CLAY - red orange mottled grey clay with trace rootlets		D, E	0.8		pp = 310-340kPa		
19	1				0.9				1
					1.3		pp = 190-220kPa		
				D					
					1.5				
	1.8	SILTSTONE - very low strength, slightly to moderately weathered, red orange mottled grey brown siltstone		D, E	1.8				
18	2				2.0				2
					2.3				
				D					
	2.6	Pit discontinued at 2.6m (slow progress in low strength siltstone)			2.6				
17	3								3

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 16 m AHD
EASTING: 283535
NORTHING: 6125197
DIP/AZIMUTH: 90°/--

PIT No: 2
PROJECT No: 48670
DATE: 29 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
16		TOPSOIL - brown silty clay with some rootlets, humid to damp		E	0.0				5 10 15 20
				D	0.1				
					0.25				
	0.4	CLAY - grey mottled yellow brown clay with some rootlets		D, E	0.4		pp = 330-440kPa		
	0.5	CLAY - red orange mottled grey clay			0.5				
					0.8		pp = 190-240kPa		
				D, E					
15	1				1.0				1
					1.3		pp = 160-290kPa		
				D					
					1.5				
					1.8		pp = 230-290kPa		
				D, E					
14	2				2.0				2
					2.3		pp = 230kPa		
				D					
					2.5				
	2.8	SILTSTONE - very low strength, slightly to moderately weathered, red orange mottled grey siltstone			2.8				
13	3			D, E					
	3.0	Pit discontinued at 3.0m (limit of investigation)			3.0				3

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 12 m AHD
EASTING: 283427
NORTHING: 6125437
DIP/AZIMUTH: 90°/--

PIT No: 3
PROJECT No: 48670
DATE: 29 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
12		TOPSOIL - brown silty clay with some rootlets, humid to damp		E	0.0 0.1				
	0.2	CLAY - red mottled brown clay with some rootlets		D, E	0.2 0.25		pp = 320-430kPa		
	0.4	CLAY - grey mottled yellow orange red clay with some rootlets and trace silt		D, E	0.4 0.5		pp = 340-410kPa		
	0.8	CLAY - yellow red mottled grey clay with trace silt and rootlets		B, E	0.8		pp = 330kPa		
11	1								1
				D	1.3 1.5		pp = 400-440kPa		
				D, E	1.8		pp = 210-280kPa		
10	2				2.0				2
	2.3	SILTSTONE - very low to low strength, slightly to moderately weathered, orange red mottled grey siltstone		D	2.5 2.6				
9	3			D, E	3.0				3
	3.2	Pit discontinued at 3.2m (limit of investigation)			3.2				

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 5/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 19 m AHD
EASTING: 2833565
NORTHING: 6125698
DIP/AZIMUTH: 90°/--

PIT No: 4
PROJECT No: 48670
DATE: 29 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
19	0.0	TOPSOIL - brown silty clay with some rootlets, damp to moist		E	0.0 – 0.1				
	0.2	CLAY - orange mottled brown grey clay with some rootlets, damp to moist		D	0.2 – 0.25		pp = 260-300kPa		
	0.4	CLAY - red mottled orange clay with some rootlets and trace silt, humid to damp		D, E	0.4 – 0.5		pp = 280-360kPa		
	0.8	CLAY - grey mottled orange red clay with trace silt and rootlets, humid to damp		D, E	0.8 – 1.0		pp = 280-380kPa		
18	1								1
	1.3	CLAY - orange red mottled grey clay with trace rootlets and silt, humid to damp (RESIDUAL SOIL)		D	1.3 – 1.5		pp = 300-370kPa		
		- becoming more grey below 1.7m		D, E	1.8 – 2.0		pp = 300-400kPa		
17	2								2
	2.5	SILTSTONE - low strength, slightly to moderately weathered, orange red mottled grey siltstone		D, E	2.5 – 2.8				
	2.8	Pit discontinued at 2.8m (refusal in medium strength siltstone)							
16	3								3

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 16 m AHD
EASTING: 283374
NORTHING: 6125864
DIP/AZIMUTH: 90°/--

PIT No: 5
PROJECT No: 48670
DATE: 28 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
16		TOPSOIL - brown silty clay with some rootlets, damp to moist		E	0.0 0.1				
	0.2	CLAY - grey red mottled yellow brown clay with some rootlets and trace silt, humid to damp		D, E	0.2 0.25		pp = 280-380kPa		
	0.4	CLAY - red mottled grey clay with some rootlets and trace silt, humid to damp		B, E	0.4 0.5		pp = 340-540kPa		
				D, E	0.8		pp = 340-490kPa		
15	1				1.0				1
	1.3	CLAY - orange mottled grey clay with some sand and trace rootlets, damp to moist		D	1.3 1.5		pp = 120-210kPa		
	1.8	SILTSTONE - low strength, slightly to moderately weathered, orange red mottled grey siltstone		D, E	1.8				
14	2				2.0				2
				D	2.3 2.5				
				D, E	2.8				
13	3	3.0 Pit discontinued at 3.0m (limit of investigation)			3.0				3

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 5/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 32 m AHD
EASTING: 283337
NORTHING: 6126165
DIP/AZIMUTH: 90°/--

PIT No: 6
PROJECT No: 48670
DATE: 28 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
32	0.0	TOPSOIL - brown silty clay with some rootlets, damp to moist		E	0.0 – 0.1				
	0.2	CLAY - grey mottled orange red clay with some silt and rootlets and trace sand, humid to damp		D	0.2 – 0.25		pp = 180-400kPa		
	0.4	SANDY CLAY - yellow orange mottled grey sandy clay with some rootlets, humid to damp		D, E	0.4 – 0.5		pp = 230-250kPa		
				U					
	0.7	CLAY - orange red mottled grey clay with trace sand and silt, humid to damp		D, E	0.7 – 1.0		pp = 330-380kPa		
31	1								1
	1.2	SILTSTONE - low strength, slightly to moderately weathered, orange red mottled grey brown siltstone		D, E	1.3 – 1.5				
	1.9	Pit discontinued at 1.9m (refusal in medium strength siltstone)							
30	2								2
29	3								3

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 16 m AHD
EASTING: 283117
NORTHING: 6126243
DIP/AZIMUTH: 90°/--

PIT No: 7
PROJECT No: 48670
DATE: 27 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
16	0.0	TOPSOIL - brown silty clay with some fine to coarse gravel and rootlet remains, humid to damp		E, D	0.0, 0.1, 0.2				
	0.3	CLAY - orange mottled red clay with trace silt, humid to damp		D, E	0.3, 0.5		pp = 300-400kPa		
	0.7	CLAY - red orange mottled grey clay, humid to damp		D, E	0.7, 1.0		pp = 320kPa		
15	1			D	1.3, 1.5		pp = 280-310kPa		1
	1.6	CLAY - grey brown clay, humid to damp		D, E	1.7, 2.0		pp = 300-370kPa		
14	2								2
	2.3	SILTSTONE - low strength, grey brown siltstone		D, E	2.5				
	2.8	Pit discontinued at 2.8m (refusal on medium strength siltstone)			2.8				
13	3								3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/6/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 30 m AHD
EASTING: 283052
NORTHING: 6126522
DIP/AZIMUTH: 90°/--

PIT No: 8
PROJECT No: 48670
DATE: 27 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
30		TOPSOIL - dark brown silty clay with some rootlets, damp to moist		E	0.0				5 10 15 20
				D	0.1				
	0.3				0.25				
		CLAY - orange red mottled grey clay with trace silt, humid to damp		D, E	0.3		pp = 300-420kPa		
					0.5				
				U					
	0.8			D, E	0.8		pp = 200-300kPa		
29	1	SANDY CLAY - orange mottled grey sandy clay, humid to damp			0.9				1
					1.3		pp = 200-300kPa		
				D, E					
					1.5				
	1.7	Pit discontinued at 1.7m (refusal on low to medium strength siltstone)							
28	2								2
27	3								3

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Duplicate BD1/270509 collected at 0 - 0.1m

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 9/6/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 11 m AHD
EASTING: 282698
NORTHING: 6126697
DIP/AZIMUTH: 90°/--

PIT No: 9
PROJECT No: 48670
DATE: 28 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
11		TOPSOIL - brown silty clay with some rootlets, damp to moist		E	0.0				
				D	0.1				
					0.25				
	0.4	CLAY - yellow mottled brown grey clay with trace rootlets, humid to damp		D, E	0.4		pp = 260-330kPa		
					0.5				
					0.8		pp = 300-440kPa		
10	1			D, E	1.0				1
					1.3		pp = 230-290kPa		
				D	1.5				
		- becoming damp to moist below 1.8m			1.8		pp = 130-170kPa		
				D, E					
9	2				2.0				2
		- trace silt below 2.3m			2.3		pp = 90-180kPa		
				B	2.5				
					2.8		pp = 160-190kPa		
8	3			D, E					
	3.0	Pit discontinued at 3.0m (limit of investigation)			3.0				3

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U,	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 26 m AHD
EASTING: 282803
NORTHING: 6126789
DIP/AZIMUTH: 90°/--

PIT No: 10
PROJECT No: 48670
DATE: 28 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
26	0.0	TOPSOIL - light to dark brown silty clay with trace rootlets, damp to moist		E	0.0				5 10 15 20
				D	0.1				
	0.3	CLAY - orange mottled brown slightly sandy clay with trace rootlets, humid to damp			0.25				
				D	0.4		pp = 190kPa		
					0.5				
	0.8	CLAY - orange red mottled grey clay with some sand and trace rootlets and root remains, humid to damp		D, E	0.8		pp = 220-270kPa		
25	1				1.0				1
				D	1.3		pp = 120-200kPa		
					1.5				
				D, E	1.8		pp = 160-190kPa		
24	2				2.0				2
				D	2.3		pp = 190-300kPa		
	2.5	SANDSTONE - very low to low strength, slightly to moderately weathered, orange red mottled grey brown sandstone		D	2.5				
	2.6	Pit discontinued at 2.6m (refusal in medium strength sandstone)			2.6				
23	3								3

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo Ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 8 m AHD
EASTING: 282550
NORTHING: 6126445
DIP/AZIMUTH: 90°/--

PIT No: 11
PROJECT No: 48670
DATE: 28 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.0	TOPSOIL - light grey to brown silty clay with some rootlets, humid to damp		E	0.0				
				D	0.1				
					0.25				
	0.4	CLAY - red mottled brown clay with some rootlets and trace silt		D	0.4		pp = 420-480kPa		
					0.5				
	0.8	SANDY CLAY - yellow red mottled grey brown sandy clay with trace silt and rootlets		D, E	0.8		pp = 480-600kPa		
7	1				1.0				1
					1.3		pp > 600kPa		
				D					
					1.5				
	1.6	CLAY - red mottled grey brown clay with some sand and trace silt and rootlets, humid to damp							
					1.8		pp = 270-340kPa		
				D, E					
6	2				2.0				2
					2.3		pp = 200-320kPa		
				D					
					2.5				
	2.9	CLAY - orange red mottled brown grey slightly sandy clay, humid to damp							
5	3				3.0		pp = 190-230kPa		3
				D, E					
	3.3	Pit discontinued at 3.3m (limit of investigation)			3.3				

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Duplicate BD1/280509 collected at 0 - 0.1m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 18 m AHD
EASTING: 282892
NORTHING: 6126425
DIP/AZIMUTH: 90°/--

PIT No: 12
PROJECT No: 48670
DATE: 27 May 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
18	0.0	TOPSOIL - brown silty clay with some rootlets, humid to damp		E	0.0				5 10 15 20
				D	0.1				
					0.25				
	0.3	CLAY - orange yellow mottled grey brown clay with trace silt, humid to damp			0.3		pp = 230-350kPa		
				D, E	0.5				
					0.8		pp = 310-440kPa		
17	1			D, E	1.0				1
	1.1	CLAY - red mottled grey clay, humid to damp							
					1.3		pp = 250-290kPa		
				D	1.5				
					1.7		pp = 230-320kPa		
				D, E					
16	2				2.0				2
		- trace sand below 2.3m			2.3		pp = 230-320kPa		
				D	2.5				
					2.8		pp = 340-380kPa		
15	3			D, E					3
	3.0	Pit discontinued at 3.0m (limit of investigation)			3.0				

RIG: Deere 315SJ - 600mm bucket

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 16 m AHD
EASTING: 283615
NORTHING: 6125034
DIP/AZIMUTH: 90°/--

PIT No: 13
PROJECT No: 48670
DATE: 17 Jun 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
16	0.0				0.0				5 10 15 20
	0.1	TOPSOIL - brown silty clay with some rootlets and organic content		E	0.1		pp = 360-480kPa		
		CLAY - yellow mottled brown grey clay with some rootlets and trace silt (RESIDUAL SOIL)		D	0.2				
	0.5	CLAY - orange grey mottled red clay with trace rootlets and silt (RESIDUAL SOIL)		D	0.5		pp = 200-330kPa		
					0.7				
15	1			D, E	1.0		pp = 120-150kPa		1
					1.3				
	1.4	CLAY - orange red mottled grey clay with trace ironstone gravel		B	1.4		pp = 120-200kPa		
	1.5	Pit discontinued at 1.5m (limit of investigation)			1.5				
14	2								2
13	3								3

RIG: Gemco 210B

LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 38 m AHD
EASTING: 283263
NORTHING: 6127173
DIP/AZIMUTH: 90°/--

PIT No: 14
PROJECT No: 48670
DATE: 01 Jul 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
38	0.0	TOPSOIL - brown silty clay with rootlets and some fine to course sand		E, D	0.0		pp = 0kPa		
					0.2				
	0.3	CLAY - hard, brown mottled red and grey clay							
					0.5		pp > 600kPa pp > 600kPa		
				U E, D, B	0.8				
	0.8	SHALY CLAY - hard, grey mottled red shaly clay (extremely weathered siltstone)			0.9				
37	1				1.0		pp > 600kPa		1
				E, D					
					1.3				
					1.5		pp > 600kPa		
				E, D					
					1.8				
36	2				2.0		pp > 600kPa		2
				D					
					2.3				
					2.6		pp > 600kPa		
				D					
					2.8				
35	3				3.0		pp > 600kPa		3
				D					
	3.2	Pit discontinued at 3.2m (limit of investigation)			3.2				

RIG: Deere 315SJ - 600mm bucket

LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 16 m AHD
EASTING: 283318
NORTHING: 6127538
DIP/AZIMUTH: 90°/--

PIT No: 15
PROJECT No: 48670
DATE: 01 Jul 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
16		TOPSOIL - brown slightly sandy silty clay with some rootlets		D, E	0.0				
					0.2				
	0.4	CLAY - stiff, orange mottled grey and red clay, humid							
				D, E	0.5		pp = 150-200kPa		
					0.7				
	0.8	CLAY - very stiff, grey mottled orange (slightly shaly) clay, humid							
15	1			D	1.0		pp = 240-470kPa		1
					1.2				
				D	1.5		pp = 170-340kPa		
					1.7				
14	2			E, D	2.0		pp = 270-320kPa		2
					2.2				
				D	2.5		pp = 290-410kPa		
		- becoming hard shaly clay below 2.7m			2.7				
				D	2.8		pp = 400-480kPa		
13	3	3.0 Pit discontinued at 3.0m (limit of investigation)			3.0				3

RIG: Deere 315SJ - 600mm bucket

LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample, Duplicate BD1/010709 collected at 0 - 0.2m

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 22 m AHD
EASTING: 284347
NORTHING: 6128172
DIP/AZIMUTH: 90°/--

PIT No: 16
PROJECT No: 48670
DATE: 01 Jul 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
22	0.0	TOPSOIL - brown silty clay with some rootlets and trace fine sand		E, D	0.0		pp = 0		
					0.2				
	0.5	CLAY - stiff, orange clay			0.5		pp = 470-550kPa		
				U	0.7				
				D, B	0.9				
21	1.0	SHALY CLAY - very stiff, grey mottled orange shaly clay		D, E	1.0		pp > 600kPa		1
					1.2				
				D	1.5		pp > 600kPa		
					1.7				
20	2			D	2.0		pp > 600kPa		2
					2.2				
		- becoming hard below 2.4m		D, E	2.5		pp > 600kPa		
					2.7				
		- becoming humid to damp below 2.8m		D	2.9		pp > 600kPa		
19	3								3
	3.1	Pit discontinued at 3.1m (limit of investigation)			3.1				

RIG: Deere 315SJ - 600mm bucket

LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U,	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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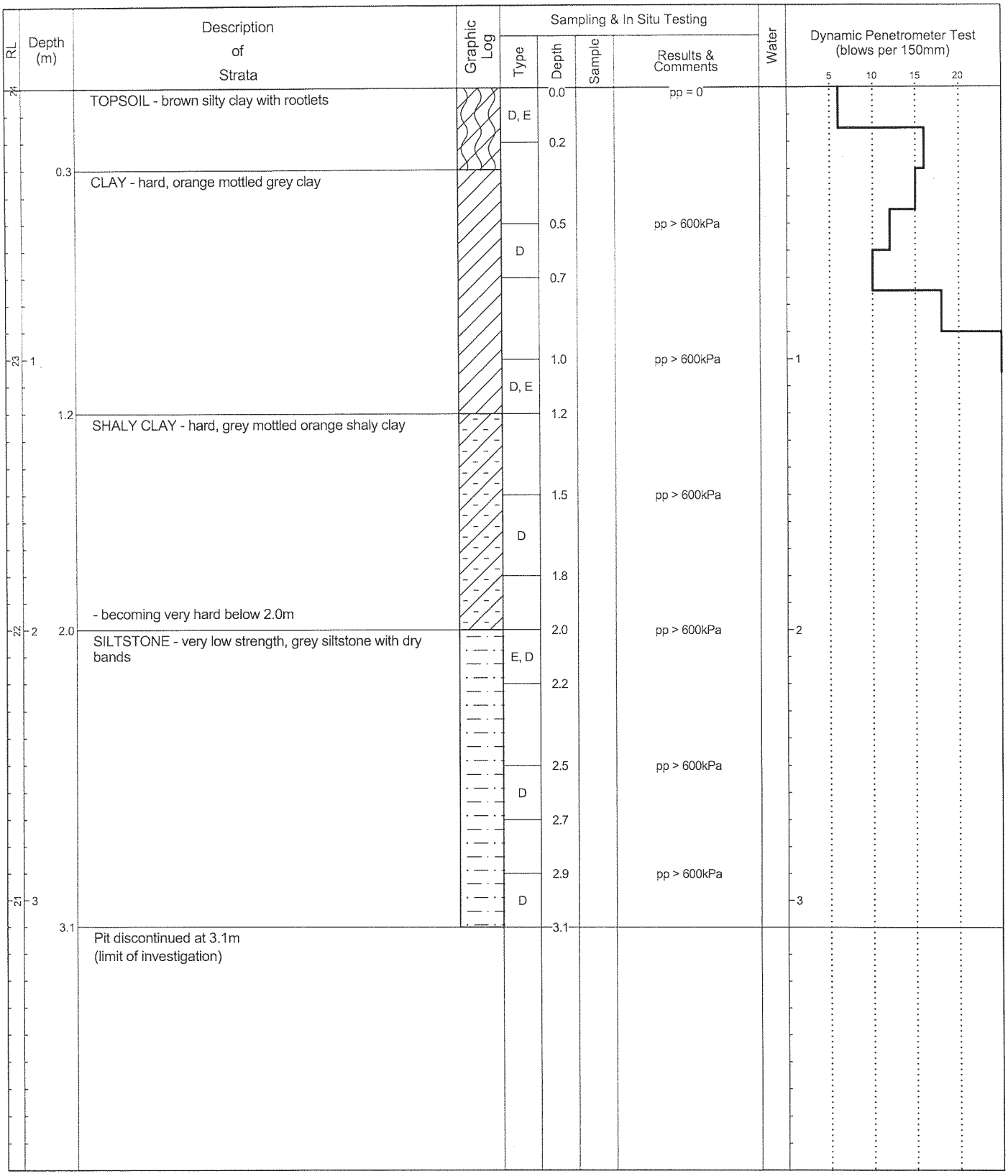
TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 24 m AHD
EASTING: 284521
NORTHING: 6127846
DIP/AZIMUTH: 90°/--

PIT No: 17
PROJECT No: 48670
DATE: 02 Jul 09
SHEET 1 OF 1



RIG: Deere 315SJ - 600mm bucket

LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo Ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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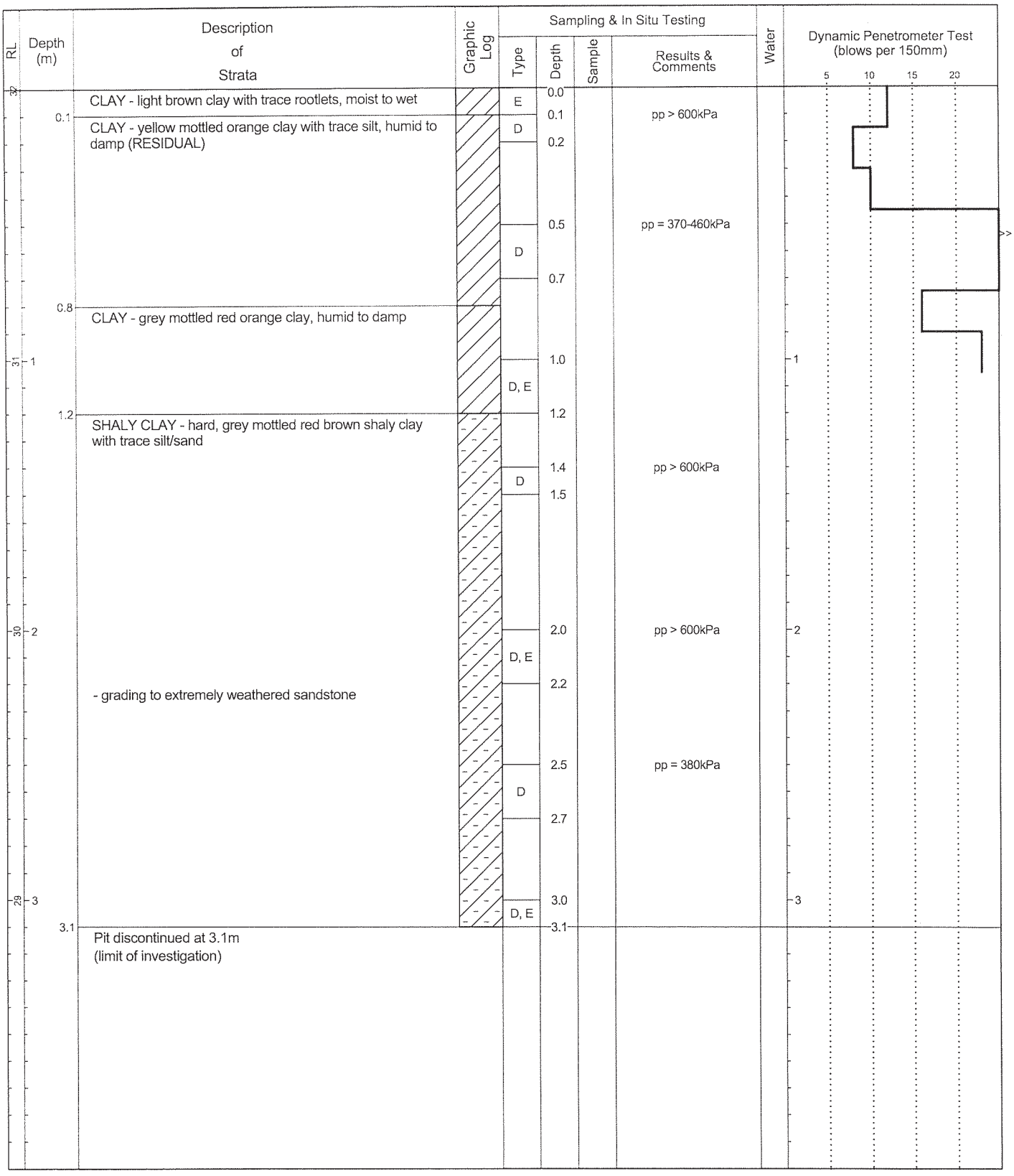
TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 32 m AHD
EASTING: 283940
NORTHING: 6127777
DIP/AZIMUTH: 90°/--

PIT No: 18
PROJECT No: 48670
DATE: 17 Jun 09
SHEET 1 OF 1



RIG: Gemco 210B
LOGGED: DBY

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/7/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 24 m AHD
EASTING: 284007
NORTHING: 6128182
DIP/AZIMUTH: 90°/--

PIT No: 19
PROJECT No: 48670
DATE: 02 Jul 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
24	0.0	TOPSOIL - brown clay with some rootlets		E, D	0.0		pp > 600kPa		
					0.2				
	0.3	CLAY - very stiff, orange mottled grey clay with trace organic content							
				E, D	0.5		pp > 600kPa		
	0.7	CLAY - stiff, red mottled grey clay			0.7				
23	1			D	1.0		pp = 320-470kPa		1
	1.2	CLAY - stiff, grey mottled red clay			1.2				
				E, D	1.5		pp = 180-310kPa		
					1.7				
22	2	- becoming very stiff below 2.0 m		D	2.0		pp = 200-450kPa		2
					2.2				
				D	2.5		pp = 380-480kPa		
					2.7				
				D	2.9		pp = 310-500kPa		
21	3								3
	3.1	Pit discontinued at 3.1m (limit of investigation)			3.1				

RIG: Deere 315SJ - 600mm bucket

LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample, Duplicate BD1/020709 collected at 0-0.2 m

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/7/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 36 m AHD
EASTING: 284060
NORTHING: 6128555
DIP/AZIMUTH: 90°/--

PIT No: 20
PROJECT No: 48670
DATE: 01 Jul 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
36	0.0	TOPSOIL - brown clay with some rootlets, humid		D, E	0.0		pp = 90-160kPa		
					0.2				
	0.4	CLAY - stiff, brown mottled red and grey clay							
				D, E	0.5		pp = 200-310kPa		
					0.7				
	0.8	CLAY - hard, red mottled grey clay							
35	1			D	1.0		pp > 600kPa		1
					1.2				
				D	1.5		pp > 600kPa		
					1.7				
34	2			D	2.0		pp > 600kPa		2
	2.2	Pit discontinued at 2.2m (refusal in hard slightly shaly clay)			2.2				
33	3								3

5 10 15 20

RIG: Deere 315SJ - 600mm bucket

LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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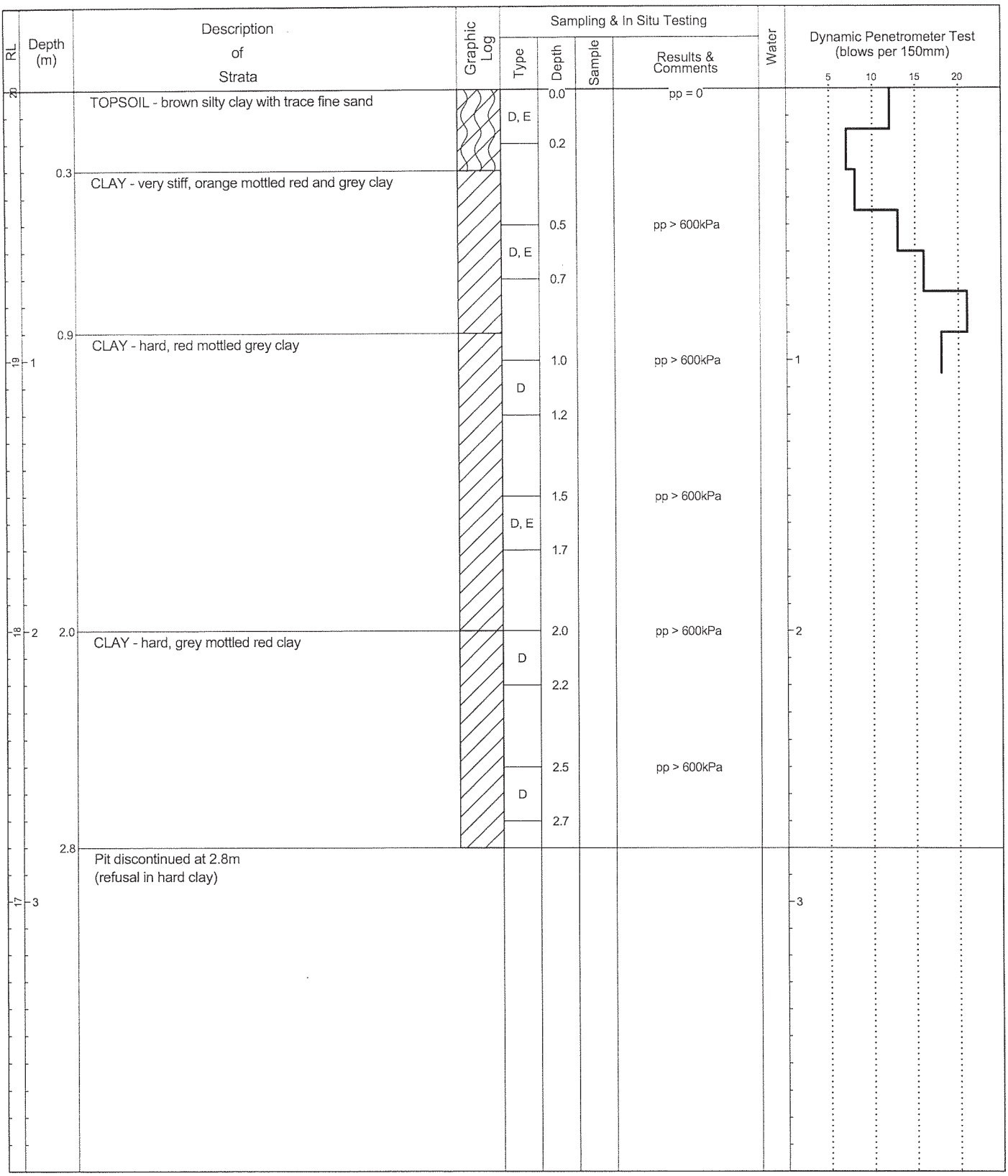
TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 20 m AHD
EASTING: 283900
NORTHING: 6127455
DIP/AZIMUTH: 90°/--

PIT No: 21
PROJECT No: 48670
DATE: 01 Jul 09
SHEET 1 OF 1



RIG: Deere 315SJ - 600mm bucket

LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample, Duplicate BD2/010709 collected at 0-0.2 m

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U,	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 3/9/09

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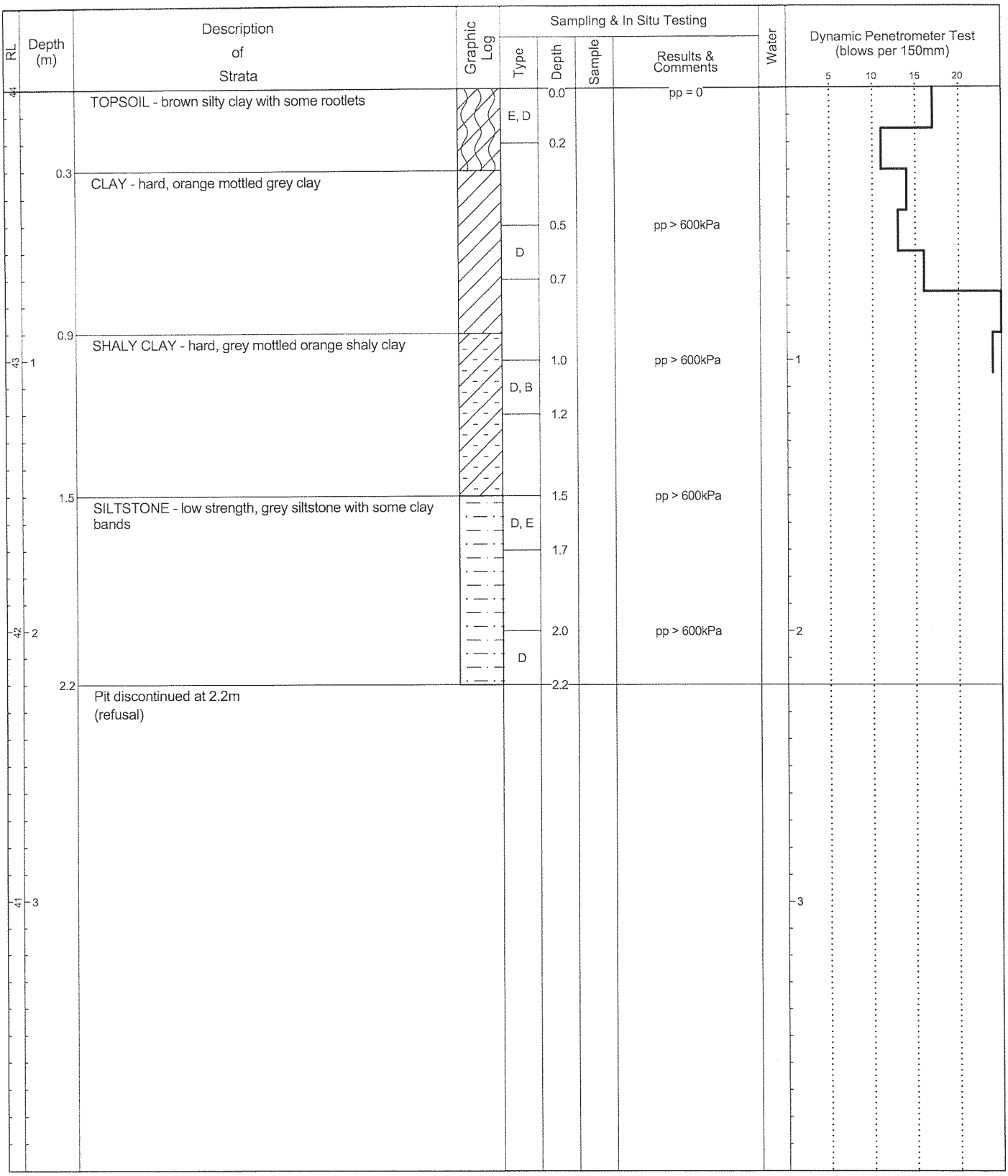
TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 44 m AHD
EASTING: 283475
NORTHING: 6128641
DIP/AZIMUTH: 90°/--

PIT No: 22
PROJECT No: 48670
DATE: 01 Jul 09
SHEET 1 OF 1



RIG: Deere 315SJ - 600mm bucket
LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/7/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 16 m AHD
EASTING: 283351
NORTHING: 6127832
DIP/AZIMUTH: 90°/--

PIT No: 23
PROJECT No: 48670
DATE: 01 Jul 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
16	0	TOPSOIL - brown silty clay with some roots		E, D	0.0		pp = 180-290kPa		
					0.2				
	0.4	CLAY - hard, orange mottled grey slightly sandy clay							
				D	0.5		pp > 600kPa		
					0.7				
15	1			E, D	1.0		pp = 340-480kPa		1
					1.2				
	1.3	SANDY CLAY - stiff, grey mottled orange sandy clay, damp							
				D	1.5		pp = 220-300kPa		
					1.7				
14	2			D	2.0		pp = 240-370kPa		2
					2.2				
				D	2.5		pp = 320-420kPa		
	2.7	SILTSTONE - dark brown and red siltstone		D	2.7		pp > 600kPa		
	2.8	Pit discontinued at 2.8m (refusal on siltstone)			2.8				
13	3								3

RIG: Deere 315SJ - 600mm bucket
LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 20 m AHD
EASTING: 284314
NORTHING: 6127397
DIP/AZIMUTH: 90°/--

PIT No: 24
PROJECT No: 48670
DATE: 01 Jul 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
20		TOPSOIL - brown silty clay with some sand		D, E	0.0		pp = 0		5 10 15 20
					0.2				
	0.3	CLAY - hard, grey mottled orange clay							
				D, E	0.5		pp > 600kPa		>>
					0.7				
	0.8	Pit discontinued at 0.8m (refusal in medium strength, weathered, red and grey shale)							
19	1								1
18	2								2
17	3								3

RIG: Deere 315SJ - 600mm bucket

LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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TEST PIT LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 20 m AHD
EASTING: 283757
NORTHING: 6127080
DIP/AZIMUTH: 90°/--

PIT No: 25
PROJECT No: 48670
DATE: 01 Jul 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
20	0.0	SANDY CLAY - brown sandy clay with some silt		E, D	0.0		pp = 20-30kPa		
					0.2				
	0.4	CLAY - stiff, grey mottled orange clay with trace sand, humid		E, D	0.5		pp = 250-320kPa		
					0.7				
19	1			D	1.0		pp = 160-170kPa		1
					1.2				
	1.4	CLAY - stiff, red mottled grey clay, humid		D	1.5		pp = 180-250kPa		
					1.7				
18	2			D	2.0		pp = 160-210kPa		2
					2.2				
		- becoming firm to stiff below 2.5 m		D, E	2.5		pp = 60-100kPa		
					2.7				
					2.9		pp = 60-150kPa		
17	3			D					3
	3.1	Pit discontinued at 3.1m (limit of investigation)			3.1				

RIG: Deere 315SJ - 600mm bucket

LOGGED: AAW

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = environmental sample

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 18/9/09

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BOREHOLE LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 32 m AHD
EASTING: 282968
NORTHING: 6126708
DIP/AZIMUTH: 90°/--

BORE No: BH26
PROJECT No: 48670
DATE: 17 Jun 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
32	0	TOPSOIL - black sandy topsoil							Monument cover
	0.25	TOPSOIL - brown sandy topsoil with some gravel							
	0.5	CLAY - light brown/red clay							
	0.75	CLAY - very stiff, mottled orange, grey and red clay							
31	1				1.0		5,8,13 N = 21		1 backfill
				S					
					1.45				casing
30	2	2.0 CLAY - hard, mottled grey and red silty clay							2
		- some moist daly at 2.4m			2.5		6,17,21 N = 38		
				S					bentonite
29	3				2.95				3
	3.65	SANDSTONE - extremely low strength, extremely weathered, mottled orange/red and grey sandstone							
28	4				4.0		13,5/50mm refusal		4
				S	4.16				screen
27	5								5 sand
					5.5		17/140mm,-,- refusal		
				S	5.64				
26	6	6.0 Bore discontinued at 6.0m (limit of investigation)							6

RIG: Gemco 210B **DRILLER:** P Boers **LOGGED:** AC **CASING:**

TYPE OF BORING: Solid flight auger (TC-bit) to 6.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Standpipe installed to 6.0m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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BOREHOLE LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 16 m AHD
EASTING: 283421
NORTHING: 6125283
DIP/AZIMUTH: 90°/--

BORE No: BH27
PROJECT No: 48670
DATE: 17 Jun 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
16	0	CLAY - brown clay							Monument cover
	0.3	CLAY - very stiff, mottled orange and grey clay							
15	1			S	1.0		3,8,13 N = 21		backfill
					1.45				casing
14	2			S	2.5		6,18,- refusal		
	2.8	SANDSTONE - extremely low strength, extremely weathered, brown sandstone			2.8				bentonite
13	3								
12	4			S	4.0 4.06		5/60mm,-,- refusal		
	4.0	SANDSTONE - extremely low strength, extremely weathered, brown sandstone with bands of low strength, highly weathered, grey sandstone							screen
11	5								sand
10	6								
	6.0	Bore discontinued at 6.0m (limit of investigation)							

RIG: Gemco 210B **DRILLER:** P Boers **LOGGED:** AC **CASING:**

TYPE OF BORING: Solid flight auger (TC-bit) to 6.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Standpipe installed to 6.0m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/9/09

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BOREHOLE LOG

CLIENT: Shaolin Temple Foundation (Australia)
PROJECT: Proposed Residential & Tourist Development
LOCATION: Comberton Grange

SURFACE LEVEL: 20 m AHD
EASTING: 284010
NORTHING: 6128076
DIP/AZIMUTH: 90°/--

BORE No: BH28
PROJECT No: 48670
DATE: 17 Jun 09
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
20	0	CLAY - orange clay							Monument cover
	0.6	CLAY - very stiff, mottled orange red and grey clay							
19	1			S	1.0		5,10,13 N = 23		backfill
		- moist clay at 1.4m			1.45				casing
18	2								
				S	2.5		8,10,16 N = 26		bentonite
					2.95				
17	3	3.0 SANDSTONE - extremely low strength, extremely weathered sandstone							
16	4	4.0 SANDSTONE - extremely low strength, extremely weathered, grey sandstone		S	4.0 4.11		10/110mm,-,- refusal		screen
15	5	5.0 SHALE - extremely low strength, extremely weathered, grey shale							sand
14	6	6.0 Bore discontinued at 6.0m (limit of investigation)							

RIG: Gemco 210B **DRILLER:** P Boers **LOGGED:** AC **CASING:**

TYPE OF BORING: Solid flight auger (TC-bit) to 6.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Standpipe installed to 6.0m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U,	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	>	Water seep ▼ Water level

CHECKED
Initials:
Date: 15/7/09

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APPENDIX B

Laboratory Report Sheet

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RESULTS OF ACID SULFATE SCREENING TESTS

Client: Shaolin Temple Foundation (Australia)
Project: Acid Sulphate Soil Assessment
Proposed Tourist & Residential Development
Project Location: Comberton Grange

Project No: 48670.01
pH Meter: ☐ TPS with Ionode IJ46/WP80 pH/Temp. Electrode
☐
Calibration Buffer: ☑ pH4
☑ pH7
☑ pH10

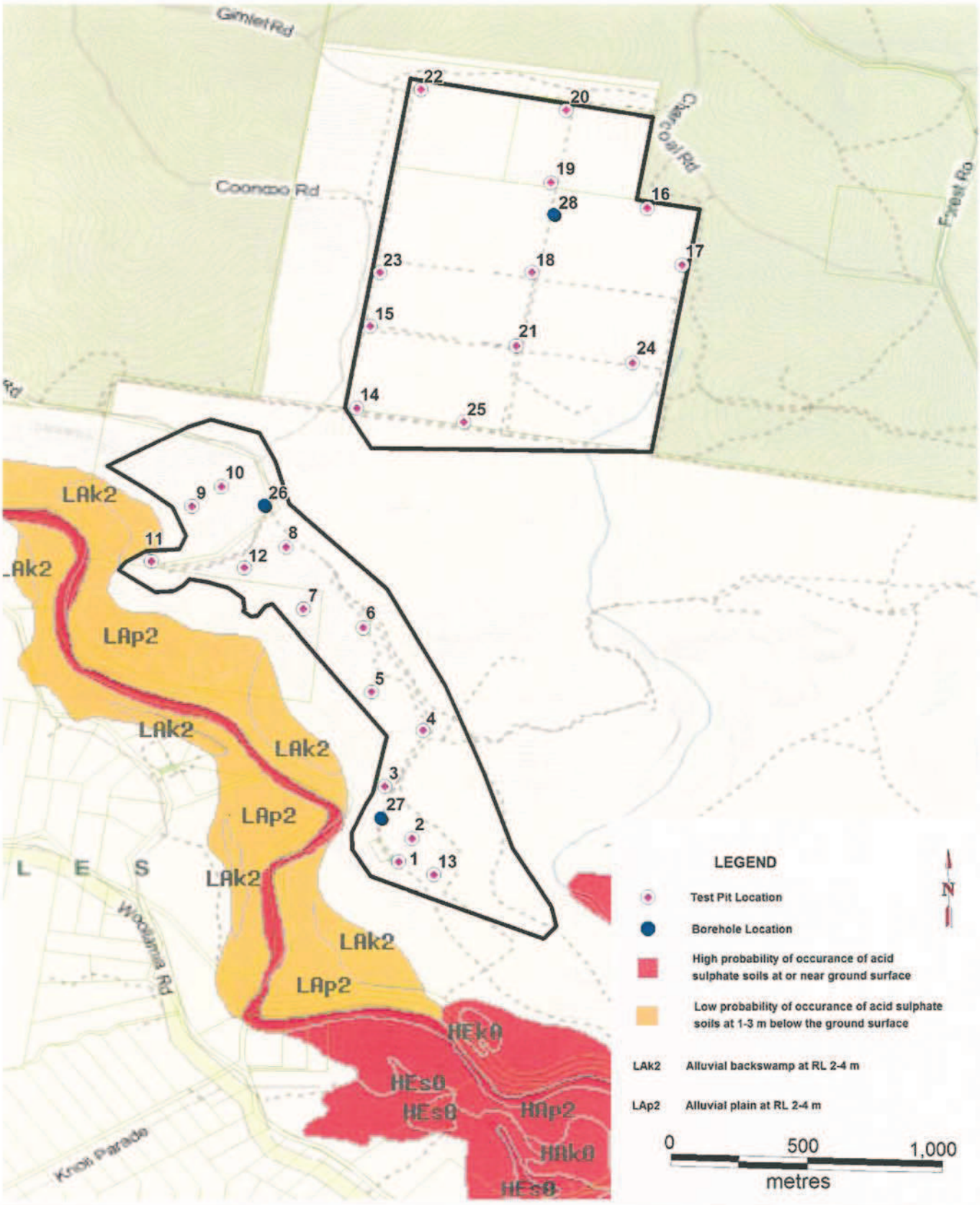
Sample Location	Depth (m)	pH_F (in distilled water)	pH_{FOX} (oxidised in H_sO_s)			Strength of Reaction (1,2,3,4)* F **	Soil Description
		Date: 03/06/09	Date: 03/06/09	Date:	Date:		
		Time: 8;45 am	Time: 9:30 am	Time:	Time:		
TP1	0 – 0.25	7.1	6.2				Brown Clayey Silt
TP2	0 – 0.25	7.0	5.6				Brown Clayey Silt
TP3	0.2 – 0.25	7.6	5.6				Red Brown Silty Clay
TP4	0.2 – 0.25	6.3	5.4				Red Brown Silty Clay
TP5	0.2 – 0.25	6.2	5.4				Orange Brown Silty Clay
TP6	0.2 – 0.25	6.6	5.8				Brown Clay
TP7	0 – 0.25	6.6	5.1				Dark Brown Silty Clay
TP8	0 – 0.25	6.3	5.0				Brown Silty Clay
TP9	0 – 0.25	6.4	5.0				Brown Clayey Silt
TP10	0 – 0.25	6.6	5.4				Brown Slightly Gravelly Clayey Silt
TP11	0 – 0.25	6.7	5.3				Light Brown Slightly Gravelly Clayey Silt
TP12	0 – 0.25	6.6	5.0				Brown Clayey Silt

Legend: * *1 denotes no or slight effervescence*
2 denotes moderate effervescence
3 denotes vigorous effervescence
4 denotes "volcano" ie. very vigorous effervescence, gas evolution and heat
** *F after reaction number indicates a bubbling/frothy reaction (organics)*

Operator: James Russell
Date: 03/06/09

APPENDIX C

Drawing 1



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Brisbane, Cairns, Campbelltown, Canberra, Darwin, Gold Coast, Melbourne, Newcastle, Perth, Sydney, Townsville, Wollongong, Wyong

Title: **Preliminary Acid Sulphate Soil Assessment**
Proposed Shaolin Development
Comberton Grange, Jervis Bay

Client: Shaolin Temple Foundation Australia				Office: Wollongong
Drawn by: AAW	Scale: 1:20,000	Project Number:	48670.01	Drawing No: 1
Approved by: AC		Date:	July 2009	