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GEOTECHNICAL INVESTIGATION REPORT

230-242 ALDINGTON ROAD, KEMPS CREEK, NSW

Report E23529.G03
22 September 2017

Report Distribution

Geotechnical Investigation Report

230-242 Aldington Road, Kemps Creek, NSW

EI Report No. *E23529.G03*

Date: *22 September 2017*

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1 Soft Copy (PDF – Secured, issued by email)	Mr Kiran Parekh BAPS Australia 40 Eleanor Street, **ROSEHILL NSW 2142**
1 Original (Saved to Digital Archives)	EI Australia Suite 6.01, 55 Miller Street **PYRMONT NSW 2009**

Authors:	Technical Reviewer:
	
Stephen Kim Geotechnical Engineer	**Janak Patel** Senior Engineering Geologist

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1 INTRODUCTION

1.1 BACKGROUND

At the request of BAPS Australia (the Client), EI Australia (EI) has carried out a Geotechnical Investigation (GI) for the proposed development at 230-242 Aldington Road, Kemps Creek, NSW (the Site).

This GI report has been prepared to provide advice and recommendations to assist in the preparation of designs for the proposed development. The investigation has been carried out in accordance with the agreed scope of works outlined in EI's proposal referenced P14888.2 Rev1, dated 15 August 2017, and the Client's signed authorisation to proceed with works, dated 29 August 2017.

EI has also been commissioned to carry out following environmental investigation reports:

- Preliminary and Detailed Site Investigation Report (E23529.E02)
- Hazardous Materials Survey Report (E23529.E10 Rev0, dated 19 September 2017)

This GI report should be read in conjunction with the above reports when available.

1.2 PROPOSED DEVELOPMENT

To assist us with the preparation of this GI report, the Client has supplied EI with the following documents:

- Architectural plans prepared by DDC Architects Pty Ltd, Drawings Nos. 16079-DA-03 to 16079-DA-07, dated 6 September 2017; 16079-SK1001, 16079-SK1003 to 16079-SK1007, dated 2 August 2017;
- Architectural site layout plan prepared by Shayona Consultant, Reference Site Layout R10, dated 31 May 2017;
- Survey Plan prepared by CitiSurv Pty Ltd, Plot file No. 9987-DET, dated 15 December 2015. The datum is in Australian Height Datum (AHD). All levels referred to in this report are in reference to AHD.

Based on the provided documents, EI understands that the site is an agricultural land that comprises an area of approximately 10.1 hectares, with a residential house at the eastern end of the site. The proposed development involved demolition of the existing structures on site and a construction of BAPS Temple including activity block, accommodation place, halls, santnivas, and study classrooms. The site is sloping, so the new development aims at stepping the site into 8 levels:

- Level 1: Comprising landscape garden area including main entrance, reception, toilet blocks, car and bus parking area, paved access roads, and existing lake. Excavation to a depth of about 2.5m below existing ground level (BEGL) and filling up to about 6m is anticipated to achieve the overall surface RL of about 59.6m.
- Level 2: This level will be about 3.1m higher than level 1 and will comprise central facility and car parking including three storey twin buildings (activity Block, school, boarding facility, meal area etc.) having a common one basement level beneath the western portion of the building. Excavation to a depth of about 4.5m BEGL and filling up to 6.5m is anticipated to achieve the overall surface RL of about 62.7m. Additional excavation to a depth of about 3.5m will be required for the proposed basement.
- Level 3: The landscaped gardens and car parking and access roads have been proposed at this level. Level 4 to the east will be supported by about 6m high retaining wall. Excavation to a depth of about 0.5m and filling up to about 5.6m will be required to achieve an overall surface RL of about 68.6m;
- Level 4: A drop off point, car parking, and children's playground have been proposed at level 4. Level 5 to the east will be about 3m higher than level 4 and will be supported by a retaining wall. Excavation to a depth of about 2.4m and filling up to about 4m will be required to achieve an overall surface RL of about 71.6m;
- Level 5: The landscaped gardens, access roads, and car parking area have been proposed at level 5. This level will be about 4.5m higher than Level 4 and will supported by a retaining wall. Minor excavation to a

depth of about 0.5m and filling up to about 6m will be required to achieve an overall surface RL of about 76.1m.

- Level 6: The Mandir, land scaped area, water feature, car parking, and access roads have been proposed at this level. This level will be about 4.5m higher than level 5 and will be supported by a retaining wall to the west. Excavation to a depth of about 5.7m and filling up to about 7m will be required to achieve an overall surface RL of about 80.5m.
- Level 7: Santinivas, landscape gardens, and access roads have been proposed on this level. This level will be about 4.3m higher than level 6 and will be supported by a retaining wall to the west. Excavation to a depth of about 4m and filling up to about 4.2m will be required to achieve the FFL of an RL of about 84.8m.
- Level 8: This level will mainly comprise a landscape area, minor cutting and filling up to about 1.5m is anticipated to achieve an overall surface level RL of about 88.0m.

The majority of the site would require excavations between <0.5m to 5.7m Below Existing Ground Level (BEGL) and filling up to about 7m will be required to achieve design subgrade levels. Local excavations may also be required for the pavements, footings, and service trenches.

1.3 Investigation Objectives

The objective of the GI was to assess site surface and subsurface conditions at 31 borehole locations, and to provide geotechnical advice and recommendations addressing the following:

- Site classification in accordance with AS2870-2011;
- Earthworks;
- Excavation methodologies;
- Excavation support requirements;
- Retaining walls;
- Foundations;
- Pavement design; and
- The requirement for additional geotechnical works.

1.4 Scope of Works

The scope of works for the GI included:

- Preparation of a Work Health and Safety Plan;
- Review of relevant geological maps for the project area;
- Site walkover inspection by a Geotechnical Engineer to assess topographical features and site conditions;
- Scanning of proposed borehole locations for buried conductive services using a licensed service locator with reference to Dial Before You Dig (DBYD) plans;
- Auger drilling of 31 boreholes (BH201 to BH231) by a track-mounted drill rig using solid flight augers equipped with a 'Tungsten-Carbide' (T-C) bit. The boreholes were auger drilled to depths ranging between about 1.3m and 7.0m BEGL. The approximate surface levels shown on the borehole logs were approximated from spot levels shown on the survey plan, which formed the basis of **Figure 2**. Approximate borehole locations are shown on **Figure 2**;
- Standard Penetration Testing (SPT) was carried out during auger drilling of the boreholes to assess soil strength/relative densities. These were augmented, where possible, by hand penetrometer readings on cohesive soil samples collected in the SPT split tube sampler;
- The strength of the sandstone bedrock in the augered sections of the boreholes was assessed by observation of the auger penetration resistance using a T-C drill bit, and examination of the recovered rock cuttings. It should be noted that rock strengths assessed from augered boreholes are approximate and strength variances can be expected;
- Soil samples were sent to Macquarie Geotechnical Pty Ltd (Macquarie) and SGS Australia Pty Ltd (SGS), which are National Australian Testing Authority (NATA) accredited laboratories, for testing and storage;
- Continuation of BH205 and BH208 using NMLC diamond coring techniques to termination depths of about 9.7m and 8.8m BEGL, respectively. Rock cores recovered from the boreholes were boxed, logged, photographed and sent to Macquarie for point load strength index testing and storage. The test results are presented in **Appendix B**, and the rock core photographs are presented in **Appendix A**;
- Measurements of groundwater seepage/levels, where possible, in the augered sections of the boreholes during and shortly after completion of auger drilling;
- Preparation of this GI report.

An EI Geotechnical Engineer was present on site to set out the borehole locations, direct the testing and sampling, log the subsurface conditions and record groundwater levels.

1.5 Investigation Constraints

The GI was limited by the intent of the investigation. The discussions and advice presented in this report are intended to assist in the preparation of initial designs for the proposed development. Further geotechnical inspections should be carried out during construction to confirm both the geotechnical model and the design parameters provided in this report.

At the time of the investigation, it was not clear whether the existing dam will be refurbished, retained, removed, or backfilled. Once the final design regarding the existing is available, further geotechnical advice must be sought.

2 SITE DESCRIPTION

2.1 SITE DESCRIPTION AND IDENTIFICATION

The site identification details and associated information are presented in **Table 2-1** below while the site locality is shown on **Figure 1.**

Table 2-1 Summary of Site Information

Information	Detail
Street Address	230-242 Aldington Road, Kemps Creek, NSW 2178
Lot and Deposited Plan (DP) Identification	Lot 18 in DP253503
Local Government Authority	Penrith City Council
Site Description	The site is located approximately 37 km west of the Sydney CBD. The site is bound by residential properties on large sized lots of agricultural land to the north and south, Aldington Road then residential properties on large sized lots of agricultural land to the west, and vacant land to the east. At the time of the inspection, the site consisted of one single storey residential building, one vacant single storey office/flat, two vacant sheds/workshops and two dams on extensive grassland. Some overgrown vegetation was also noted on the site. A large water storage dam located towards the west contained water and the sides appeared to be in good condition, no substantial seepage was evident from the dam. The residential building on site is a single storey, brick dwelling with an external car parking under a rear patio. The office/flat dwelling is a single storey. All structures appeared to be in good condition based on cursory inspection. These structures were located towards the eastern end of the site. A paved driveway was located along the northern boundary and provided access from Aldington Road to the residential house.
Site Area	Approx. 10.1 ha (Ref. http://maps.six.nsw.gov.au)

2.2 LOCAL LAND USE

The site is situated within an area of rural residential and agricultural use. Current uses on surrounding land are described in **Table 2-2** below.

Table 2-2 Summary of Local Land Use

Direction Relative to Site	Land Use Description
North	Residential (rural) property on large block of agricultural grassland.
East	Vacant open grassland.
South	Residential (rural) property on large block of agricultural grassland.
West	Aldington Road then a residential (rural) property on a large block of agricultural grassland.

2.3 REGIONAL SETTING

The site topography and geological information for the locality is summarised in **Table 2-3** below**.**

Table 2-3 Topographic, Geological and Hydrogeological Information

Attribute	Description
Topography	The ground surface across the site declines gradually on an east-west axis across the site towards the west. Reduced levels across the site generally range from RL 88m AHD at the eastern edge of the site around the residential property, to RL 57m AHD on the western edge along Aldington Road. As the majority of the site comprised grassland with exception to the paved driveway runs along the northern boundary, stormwater is expected to infiltrate directly into exposed soils. Surface runoff is expected to flow westerly, downhill towards the onsite dams.
Regional Geology	The 1:100 000 Scale Geological Series Penrith Sheet 9030 (DMR, 1991) indicated the site is underlain by Ashfield Shale of the Wianamatta Group, consisting of dark grey to black claystone-siltstone and fine sandstone-siltstone laminite.

3 INVESTIGATION RESULTS

3.1 STRATIGRAPHY

For the development of a site-specific geotechnical model, the observed stratigraphy during the GI has been grouped into three geotechnical units. A summary of the subsurface conditions across the site, interpreted from the investigation results, is presented in **Table 3-1** below. More detailed descriptions of subsurface conditions at each borehole location are available on the borehole logs presented in **Appendix A**. The details of the method of soil and rock classification, explanatory notes and abbreviations adopted on the borehole logs are also presented in **Appendix A**.

Table 3-1 Summary of Subsurface Conditions

Unit	Material [2]	Depth to top of Unit (m BEGL) [1]	Observed Thickness (m)	Material Description [2]	Comments
1	**Topsoil / Fill**	Surface	0.1 to 2.5	Silty SAND/ Silty CLAY TOPSOIL/FILL	Topsoil/Fill was encountered in all boreholes consisting of silty sand or silty clay of low to high plasticity, sand is fine grained, with variable content of gravel and rootlets. BH203 was drilled within the existing asphalt access road surface near and encountered 100mm thick asphalt pavement, which was underlain by silty sand fill.
2	**Residual Soil**	0.1 to 2.5	0.7 to 4.5	Silty CLAY	Generally very stiff to hard clay of medium to high plasticity. The clay grades into extremely weathered rock with depth. SPT N values range from 6 to 48, and hand penetrometer readings on the SPT samples ranged from 140kPa to >500kPa.
3	**Sandstone Bedrock**	1.6 to 5.5	- [3]	SANDSTONE	Generally very low to low strength, distinctly to slightly weathered sandstone with siltstone bands. All boreholes terminated within the bedrock.

Notes:
1 Approximate depth at the time of our investigation. Depths may vary across the site.
2 For more detailed descriptions of the subsurface conditions, reference should be made to the borehole logs attached to **Appendix A.**
3 Observed up to termination depths in all boreholes.

Table 3-2 Approximate Depths/RLs to Top of each Unit at each Borehole Location

	BH Surface RL		Top of Unit 1 TOPSOIL/FILL	Top of Unit 2 Silty CLAY	Top of Unit 3 SANDSTONE		BH Termination [3]
BH ID	(m AHD) [1]	Approx. Depth (m BEGL) [1]	Approx. Depth (m BEGL) [1]	Approx. Depth (m BEGL) [1]	Approx. Depth (m BEGL) [1]	Approx. RL (m AHD) [1]	Approx. RL (m AHD) [1]
BH201	88.5	Surface	0.4	3.0	6.9	85.5	81.6
BH202	87.3	Surface	0.5	1.7	7.0	85.6	80.3
BH203	84.9	Surface	0.1	1.8	4.0	83.1	80.9
BH204	86.5	Surface	2.5	5.5	7.0	81.0	79.5
BH205	81.4	Surface	0.5	3.5	9.7	77.9	71.7
BH206	84.2	Surface	0.2	1.5	4.2	82.7	80.0
BH207	79.2	Surface	0.2	2.0	5.3	77.2	73.9
BH208	74.8	Surface	0.3	1.3	8.8	73.5	66.0
BH209	80.1	Surface	0.3	4.0	7.0	76.1	73.1
BH210	76.4	Surface	0.3	2.5	4.0	73.9	72.4
BH211	76.9	Surface	0.2	2.5	7.0	74.4	69.9
BH212	71.3	Surface	0.1	2.0	4.0	69.3	67.3

BH ID	BH Surface RL (m AHD) [1]	BH Surface RL Approx. Depth (m BEGL) [1]	Top of Unit 1 TOPSOIL/FILL Approx. Depth (m BEGL) [1]	Top of Unit 2 Silty CLAY Approx. Depth (m BEGL) [1]	Top of Unit 3 SANDSTONE Approx. Depth (m BEGL) [1]	Top of Unit 3 SANDSTONE Approx. RL (m AHD) [1]	BH Termination [3] Approx. RL (m AHD) [1]
BH213	67.3	Surface	0.2	4.5	7.0	62.8	60.3
BH214	61.4	Surface	0.6	3.2	6.8	58.2	54.6
BH215	60.8	Surface	0.3	4.8	7.0	56.0	53.8
BH216	61.6	Surface	0.1	3.2	7.0	58.4	54.6
BH217	58.8	Surface	0.3	4.6	6.2	54.2	52.6
BH218	61.1	Surface	0.1	3.2	7.0	57.9	54.1
BH219	58.2	Surface	0.4	1.9	7.0	56.3	51.2
BH220	56.9	Surface	0.3	3.8	4.0	53.1	52.9
BH221	57.5	Surface	0.5	2.0	7.0	55.5	50.5
BH222	58.4	Surface	0.2	4.0	5.8	54.4	52.6
BH223	57.9	Surface	0.1	2.0	7.0	55.9	50.9
BH224	56.8	Surface	0.2	3.5	7.0	53.3	49.8
BH225	55.6	Surface	0.2	1.6	4.0	54.0	51.6
BH226	54.3	Surface	0.2	3.2	4.0	51.1	50.3
BH227	62.1	Surface	0.3	1.0	2.1	61.1	60.0
BH228	59.1	Surface	0.8	3.2	4.0	55.9	55.1
BH229	60.0	Surface	0.6	1.6	4.0	58.4	56.0
BH230	66.4	Surface	0.3	2.5	4.0	63.9	62.4
BH301	75.1	Surface	0.6	3.5	4.0	71.6	71.1

Notes:

1 Approximate depth and level at the time of our investigation. Depths and levels may vary across the site.
2 For more detailed descriptions of the subsurface conditions, reference should be made to the borehole logs attached to **Appendix A.**
3 Unit 3 observed up to termination depths in all boreholes.

3.2 GROUNDWATER OBSERVATIONS

Groundwater seepage was not recorded on the majority of boreholes, however, minor seepage was recorded between 2.2m BEGL on BH217 and 6.8m BEGL on BH216.

No long term groundwater monitoring has been carried out as this was outside the scope of this investigation.

3.3 LABORATORY TEST RESULTS

Fourteen disturbed and six bulk soil samples were selected for laboratory testing to assess the following:

- Soil aggressivity (pH, Chloride and Sulfate content and electrical conductivity);
- Atterberg Limits and Linear Shrinkage;
- Emerson Class;
- Soil Moisture Content;
- California Bearing Ratio (CBR); and
- Dry Density/Optimum Moisture Content.

A summary of soil test results is provided in **Table 3-2** and **Table 3-3** below. Laboratory test certificates are presented in **Appendix B**.

The Atterberg Limits results on Unit 2 indicated these clays to be of medium to high plasticity and have a moderate to high potential for shrink /swell movements with changes in moisture content (Class M to H1).

The investigation indicated low permeability soils were present above the groundwater table. In accordance with Tables 6.4.2(C) and 6.5.2(C) of AS 2159:2009 'Piling – Design and Installation', the results of the pH, chloride and sulfate content and electrical conductivity of the soil, provided the following exposure classifications:

- 'Mild' for buried concrete structural elements; and
- 'Mild' for buried steel structural elements.

In accordance with Table 4.8.1 of AS3600-2009 'Concrete Structures' these soils would be classified as exposure classification 'A2' for concrete in sulfate soils.

Bulk sample results of the Unit 2 material were tested for compaction and four day soaked CBR, producing values ranging from 1% to 13% at a density of 98% of Standard Maximum Dry Density (SMDD).

Table 3-2 Summary of Soil Test Results

Test/ Sample ID		BH201_ 0.5-0.95	BH206_ 0.5-0.95	BH210_ 0.5-0.95	BH214_ 0.5-0.95	BH215_ 1.5-1.95	BH220_ 0.5-0.95	BH223_ 0.5-0.95	BH230_ 0.5-0.95	BH201_ 1.5-1.78	BH202_ 0.5-0.95	BH205_ 0.5-0.95	BH209_ 0.5-0.95	BH209_ 1.5-1.95	BH221_ 1.5-1.95
Unit		2	2	2	2	2	2	2	2	2	2	2	2	2	2
Material Description [1]		Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY
Aggressivity	pH	-	-	-	-	-	-	-	-	9.6	5.4	8.6	8.2	9.5	9.3
	Electrical Conductivity (µS/cm)	-	-	-	-	-	-	-	-	410	550	160	150	250	560
	Chloride Cl (mg/kg)	-	-	-	-	-	-	-	-	70	370	10	67	63	580
	Sulfate SO_4 (mg/kg)	-	-	-	-	-	-	-	-	160	250	60	78	12	97
Atterberg Limits	Liquid Limit (%)	63	52	57	45	36	42	47	-	-	-	-	-	-	-
	Plastic Limit (%)	21	19	21	15	16	17	19	-	-	-	-	-	-	-
	Plasticity Index (%)	42	33	36	30	20	25	28	-	-	-	-	-	-	-
Linear Shrinkage (%)		15.5	14.0	14.0	10.5	9.0	11	12.0	-	-	-	-	-	-	-
Moisture Content (%)		26.6	18.3	19.0	14.7	19.8	22.2	16.9	-	-	-	-	-	-	-
Emersion Class No.		5	-	-	-	-	2	5	3.3	-	-	-	-	-	-

Table 3-3 Summary of CBR Test Results

Test/ Sample ID	BH203_0.4-1.4	BH210_0.3-1.3	BH226_0.5-1.5	BH227_0.3-1.3	BH229_0.6-1.6	BH230_0.5-1.5
Unit	2	2	2	2	2	2
Material Description [1]	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY
CBR (4-day Soaked) (%)	2.0%	2.0%	5.0%	13.0%	1.0%	2.0%
Maximum Dry Density (t/m³)	1.84	1.78	1.75	2.02	1.86	1.85
Optimum Moisture Content (%)	14.6	16.6	17.7	9.5	14.4	14.5

Notes:

1. More detailed descriptions of the subsurface conditions at borehole locations are available on the borehole logs presented in **Appendix A**.

4 RECOMMENDATIONS

4.1 GEOTECHNICAL ISSUES

Based on the results of the investigation, we consider the following to be the main geotechnical issues for the proposed development:

- Presence of 'uncontrolled' fill on site and its unsuitability to support structural loads.
- Removal of trees which could result in an increase in swell movements in the vicinity of the trees and potentially cause damage to the proposed structures founded on shallow footings.
- Presence of natural clay with a moderate to high potential for shrink-swell movements with changes in moisture content.
- Extensive excavation and backfilling.
- Variable foundation conditions.
- Low CBR values for the clay subgrade.

4.2 SITE PREPARATION

Following removal of all vegetation and trees (including their root balls), demolition of the existing sheds, slabs and pavements, all grass, topsoil, root affected soils and any deleterious fill or contaminated soil should be stripped. Based on the results of the investigation, topsoil/root affected soil should be stripped to a nominal depth. We note that it is difficult to accurately assess the depth of topsoil and root affected soils in a 100mm diameter borehole. If considered to be an important contractual issue, we recommend that a number of shallow test pits be excavated across the site to more accurately confirm the topsoil/root affected soil stripping depth or alternatively a geotechnical inspection could be carried out after initial stripping to confirm the depth. Stripped topsoil and root affected soils should be stockpiled separately as they are considered unsuitable for reuse as engineered fill. We anticipate substantial cutting and filling will be required on the site, therefore, excavated natural clay stockpiled separately for reuse as engineered fill. These 'over-dry' clay soils will most likely need to be 'wetted up' in order to conform to the engineered fill specification

All existing fill on site, where encountered, will need to be stripped down to the surface of the underlying natural soils and stockpiled for reuse as engineered fill, if conforming to the fill specification provided in section below.

The proposed development will require the removal of trees. We note that the existing trees have likely caused localised 'drying out' of the surrounding clay soils. Removal of the trees will therefore lead to the recovery of the soil moisture content, resulting in differential swell movements in the vicinity of the trees and their root systems (which can extend for a significant distance from the trunk). The swell movements generated by the removal of the trees are in addition to the shrink-swell movements which can occur in the clay soils due to weather related natural moisture changes and by the reduction in surface evaporation subsequent to covering the site with the proposed new buildings and pavements.

It is likely that moisture equilibrium in the clay soils, following removal of the tree stumps and roots, could take long time to develop. In order to reduce the effects that removal of the trees will have on the proposed new structures and pavements, we strongly recommend they be removed as early as possible ahead of construction.

4.3 SITE CLASSIFICATION

The investigation results have indicated variable subsurface conditions, as well as variable soil reactivity across the site. The final site classifications will also be dependent on the following factors:

- The nature, height and age of proposed (site won and imported) fills;
- Level of earthworks control;
- The depth of proposed cuts;

- The depth of bedrock and groundwater if located within 1.5m depth below design surface level;
- The proximity of proposed trees, their configuration in relation to the proposed structures, and their mature heights;
- The presence of existing mature trees, and their configuration in relation to the proposed structures;
- The control and maintenance of drainage.

No details on the existing fill (i.e. placement method, compaction specification, density test records, etc.) have been provided to us. Notwithstanding, based on the results of our investigation, the material is not considered to be a "structural fill" (i.e. controlled fill or engineered fill), as defined in Clause 1.2.13 of AS3798-2007 'Guidelines on Earthworks for Commercial and Residential Developments'. Accordingly, we consider that this fill to be 'uncontrolled' and unsuitable as a bearing stratum under new footings and of 'moderate risk' (poor performance) under new pavements. The site under existing condition is considered to be Class 'P' in accordance with AS2870.

Where top soil/fill is striped and/or replaced with engineered controlled fill and/or natural silty clay exposed, then the site can be reclassified as Class H1 (eastern half, higher elevations) and Class M (western half, lower elevations). We note that abnormal moisture conditions could also exist after stripping of existing pavements, structures, and trees and vegetation resulting in a more severe Class H2. Reference should also be made to AS2870 for design, construction, performance criteria and maintenance precautions on Class H1 sites.

EI advises that in a strict sense AS2870 site classification does not apply to this development, but it is a useful guide in estimating foundation and shrink/swell movements that have the potential to occur at this site.

4.4 Excavation

Prior to any excavation commencing, we recommend that reference be made to the WorkCover Excavation Work Code of Practice – July 2015.

EI understand that the majority of the site would require excavations between <0.5m to 5.7m Below Existing Ground Level (BEGL) and back filling up to about 7m will be required to achieve design surface levels and the proposed basement beneath the activity block. Local deeper excavations may also be required for the pavements, footings, and service trenches.

Based on the borehole logs, the proposed earthworks excavations will therefore extend through fill, top soil, natural silty clay, and weathered bedrock. Soil profile could be excavated using buckets of large earthmoving Hydraulic Excavators, particularly if fitted with 'Tiger Teeth' with some moderate ripping. Excavation of sandstone bedrock may require large hydraulic excavators or bulldozers for effective production. Should bedrock of higher than low strength be encountered, rock hammers, hydraulic breakers, rock saws, ripping hooks or rotary grinders could be used, though productivity would be lower and equipment wear increased, and this should be allowed for. Such equipment would also be required for detailed excavation, such as services trenches in the rock, and for trimming of faces.

Groundwater seepage monitoring should be carried out during bulk excavation.

4.5 Groundwater Considerations

Groundwater seepage was not observed during drilling at any borehole location.

However, we expect some groundwater inflows into the excavation along the soil/rock interface and through any defects within the sandstone bedrock (such as jointing, and bending planes, etc.) particularly following a period of heavy rain.

We expect that any seepage that does occur will be able to be controlled by a conventional sump and pump system or gravity drainage systems.

4.6 EXCAVATION RETENTION

4.6.1 Temporary Batters

From a geotechnical perspective, it is critical to maintain the stability of the cut or fill batters during excavation and construction works.

Based on the encountered subsurface conditions, temporary batters of no steeper than 1 Vertical (V) to 1 Horizontal (H), may be feasible. The above temporary batters should remain stable provided that all surcharge loads, including construction loads, are kept at a distance of at least 'h' (where 'h' is the height of the batter in metres) from the crest of the batter. If steeper batters are to be used, then these must be supported by shotcrete and soil nail system designed by a suitable structural or geotechnical engineer. The stability of these batters can be assessed using computer slope stability analysis software such as Slope/W. We can complete such analysis, if commissioned to do so.

Where excavations are shallower than 1m, these may be vertically cut temporarily, given all surcharge loads, including construction loads, are kept at a distance of at least 'h' from the edge of the excavation.

Unsupported vertical cuts of the soil and weathered rock profile greater than 1m in depth are not recommended for this site as these carry the risk of potential slump failure especially after a period of wet weather. Slumping of the material may result in injury to personnel and/or damage to nearby structures/infrastructures and equipment.

Where batters are used, the space between the batters and the permanent retaining walls will need to be carefully backfilled to reduce future settlement of the backfill. Only light compaction equipment should be used for compaction behind retaining walls so that excessive lateral pressures are not placed on the walls. This will require the backfill to be placed in thin layers, say 100mm loose thickness, appropriate to the compaction equipment being used. The compaction specification for the backfill will depend on whether paving or structures are to be supported on the fill. If the fill is to support paved areas it should be compacted to a density of at least 98% of Standard Maximum Dry Density (SMDD) for granular fill materials, but if it is only to support landscaped areas of lower compaction specification, say 95% of SMDD, may be appropriate, provided the risk of future settlement and maintenance can be accepted. An alternative for backfill would also be to use a uniform granular material, such as crushed concrete of 30mm to 70mm in size, surrounded in a geofabric. We recommend that no footing or concrete slab should be founded on this fill.

4.6.2 Permanent Batters

Permanent fill batters or batters of existing soil/weathered bedrock, if required, should be no steeper than 1V:2H, but flatter batters in order of 1V:3H or flatter may be preferred to allow access for maintenance of vegetation. Surface erosion protection, for example, quick establishing grass or proprietary systems (such as those provided by Geofabrics Australasia or Global Synthetics) should be provided to the permanent batter slopes. Dish drains should also be provided along the crest and toe of all permanent batter slopes to intercept surface water run-off. Discharge should be piped to the stormwater system.

4.6.3 Retaining Walls

The following parameters may be used for static design of temporary and permanent retaining walls at the subject site:

- Cantilevered retaining walls are typically the most suitable to support the excavation up to about 5m high. However, walls with a height greater than 5m will require lateral restraints such as dead man anchors, to limit the deflection and damage to the structures beyond the crest.
- Cantilevered block retaining walls, such as low height walls in landscaped areas, can be designed using a triangular lateral earth pressure distribution and an active earth pressure coefficient (K_a) of 0.35 for the soil profile, assuming horizontal backfill surface. A bulk unit weight of 20kN/m^3 should be adopted for the soil profile.

- Cantilever walls, where the tops of which are restrained by the floor slabs of the permanent structure or which support movement sensitive elements, should be designed using a triangular lateral earth pressure distribution and an 'at rest' earth pressure coefficient, K_o of 0.6.
- The retaining walls should be designed as drained and measures are to be taken to provide complete and permanent drainage behind the walls. Subsurface drains should incorporate a non-woven geotextile filter fabric such as Bidim A34 to control subsoil erosion.
- All surcharge loading affecting the walls (including from construction equipment, construction loads, adjacent high level footings, etc.) should be adopted in the retaining wall design as an additional surcharge using an 'at rest' earth pressure coefficient, K_o, of 0.59;
- The passive lateral toe resistance for retaining walls founded in natural clay or weathered bedrock may be estimated using a 'passive' earth pressure coefficient (K_p) of 3.0 (but with a Factor of Safety of at least 2.0 to limit deformations), assuming horizontal ground in front of wall. If ground surface fall away from the toe of the proposed retaining wall, then the K_p value would reduce. In this case, further geotechnical advice should be sought.
- Retaining wall footings founded in natural silty clay or sandstone bedrock may be designed for a maximum allowable bearing pressure of 200kPa or 700kPa, respectively. On completion of excavating the retaining wall footings, a geotechnical engineer should carry out an inspection to confirm the foundation conditions.

4.7 EARTHWORKS

Earthworks recommendations provided in this report should be complemented by reference to AS3798-2007.

4.7.1 Subgrade Preparation

For areas which require cutting, bulk excavation will initially carried out as per **Section 4.4** below.

For areas which require filling, then the existing uncontrolled fill has to be fully removed and replaced with engineered fill as recommended below.

1. Remove the top layer of fill, and stockpile this separately. Such excavation may need to be carried out with the excavation sides battered at an angle of no steeper than 1 Vertical to 1 Horizontal. The new fill must be 'keyed-in' the sides of these batters.
2. The remaining existing fill should be fully excavated down to surface of the residual clay and replaced with engineered fill.
3. The exposed subgrade at the base of the excavation should be proof rolled with a smooth drum roller (say 12 tonne) used in static or non-vibratory mode of operation. Caution is required when proof rolling near existing structures, infrastructures and/or retaining walls. The purpose of the proof rolling is to detect any soft or heaving areas, and to allow for some further improvement in strength or compaction.
4. The final pass should be undertaken in the presence of a geotechnician or geotechnical engineer, to detect any unstable or soft subgrade areas, and to allow for some further improvement in compaction.
5. If dry conditions prevail at the time of construction then any exposed clayey fill subgrade may become desiccated or have shrinkage cracks prior to pouring any concrete slabs. If this occurs, the subgrade must be watered and rolled until the cracks disappear.
6. Unstable subgrade detected during proof rolling should be locally excavated down to a sound base and replaced with engineered fill or further advice should be sought. Any fill placed to raise site levels should also be engineered fill.

4.7.2 Engineered Fill Specifications

From a geotechnical perspective, the excavated granular fill, clayey fill, natural soils and weathered sandstone bedrock are considered suitable for reuse as engineered fill on condition that they are 'clean', free of organic matter and contain a maximum particle size of 150mm. All excavated granular fill, natural sand and gravel should be blended with the clayey soils to improve the workability of the latter soil type. Excavated low and medium strength sandstone may need to be crushed in order to meet the maximum particle size specification.

Engineered fill comprising the above mentioned material should be compacted in maximum 300mm thick loose layers using a large pad-foot roller (say, at least 17 tonnes deadweight) to a density ratio strictly between 98% and 102% of SMDD and at a moisture content within 2% of SOMC. We note that Section 6.2.2 of AS3798-2007 states "the maximum particle size of any rocks or other lumps within the layer, after compaction, generally should not exceed two-thirds of the compacted layer thickness."

Based on the laboratory test results, we expect that moisture conditioning (i.e. 'drying out' or 'wetting up') will be required to conform to the above specification. For the clay soils removed from the vicinity of the existing trees, we expect that they will require 'wetting up'.

4.7.2.1 Edge Compaction

We recommend that the engineered fill layers extend a horizontal distance of at least 1m beyond the design geometry. The roller must extend over the edge of each placed layer in order to seal the batter surface. On completion of filling, the excess under-compacted edge fill should be trimmed back to the design geometry.

The 'tying in' of engineered fill to temporary cut batter slopes can be achieved by locally benching the cut slopes in no greater than 0.4m high steps. This can be carried out progressively as the height of engineered fill increases.

4.7.2.2 Services Trenches

Backfilling of service trenches must be carried out using engineered fill in order to reduce post-construction settlements. Due to the reduced energy output of the rollers that can be placed in trenches, backfilling should be carried out in maximum 150mm thick loose layers and compacted using a trench roller, a pad foot roller attachment fitted to an excavator, and/or a vertical rammer compactor (also known as a 'Wacker Packer'). Due to the reduced loose layer thickness, the maximum particle size of the backfill material should also be reduced to 75mm. The compaction specification provided above is applicable.

4.7.3 Density Testing

Density tests should be regularly carried out on the engineered fill to confirm the above specifications are achieved, as outlined below:

- The frequency of density testing for general engineered fill should be at least one test per layer per 2500m^2 or one test per 500m^3 distributed reasonably evenly throughout the full depth and area, or 3 tests per lot (as defined in Clause 1.2.8 of AS3798-2007), whichever requires the most tests (assumes maximum 300mm thick loose layers).
- The frequency of density testing for trench backfill should be at least one test per two layers per 40 linear metres (assumes maximum 150mm thick loose layers).

Based on the large scale nature of the proposed earthworks, we recommend that Level 1 control of fill placement and compaction in accordance with AS3798-2007 be carried out, including for the trench backfill. Due to a potential conflict of interest, the GITA should be directly engaged by the Client or their representative, and not by the earthworks contractor or sub-contractors.

4.7.4 Site Drainage

The clay subgrade at the site is expected to undergo substantial loss in strength when wet as evident from the low CBR values. Furthermore, the clay subgrade is expected to have a moderate to high potential for shrink-swell movements with changes in moisture content. Therefore, it is important to provide good and effective site

drainage both during construction and for long-term site maintenance. The principle aim of the drainage is to promote run-off and reduce ponding. A poorly drained clay subgrade may become untrafficable when wet. The earthworks should be carefully planned and scheduled to maintain good cross-falls during construction.

During construction of the fill, platform runoff should be enhanced by providing suitable falls to reduce ponding of water on the surface of the fill. Ponding of water may lead to softening of the fill and subsequent delays in the earthworks program. We recommend that if soil softening occurs, the subgrade be over-excavated to below the affected soil, and then replaced with engineered fill as specified above.

4.8 FOUNDATIONS

The site under existing condition is considered to be Class 'P' in accordance with AS2870.

However, where top soil/fill is striped and/or replaced with engineered controlled fill and/or natural silty clay exposed, then the site can be reclassified as Class H1. We note that abnormal moisture conditions could also exist after stripping of existing pavements, structures, and trees and vegetation resulting in a more severe Class H2. Conventional shallow footings may be designed based on Class H1 site. This footing system should be designed by engineering principles to resist the potential shrink/swell movements, which are normally 40-60 mm (free surface movements) in Class H1 clay sites in accordance to AS2870. The presence of trees should also be taken into considerations. The guidelines given in AS2870 for a Class H1 site may also be of assistance in designing the footings.

The most competent foundation stratum at the site is the sandstone bedrock in view of the reactivity of the residual clays and moderate depths to the bedrock, we recommend the major structures be supported on piled footings founded into bedrock. However, the option of high level footings founded into residual clay is also provided.

A stiffened raft or shallow pad and strip footings may be founded in the residual clay of at least very stiff strength or controlled fill, with a maximum allowable bearing pressures of 200kPa or 100kPa, respectively. The footing system should be designed by engineering principles to resist the potential shrink/swell movements, which are normally 40mm to 60mm (free surface movements) in Class H1 sites in accordance to AS2870. If shallow footings are to be used, the building should be well articulated.

At least the initial stages of footing excavation should be inspected by a geotechnical engineer to ascertain that recommended foundation material has been reached and to check initial assumptions about foundation conditions and possible variations that may occur between borehole locations.

Alternatively, the pile footings may be founded uniformly into the bedrock. The bedrock levels below the proposed major structures expected as follow:

Santnivas: The depth to bedrock levels will vary from about 0.3m to the east to about 6.8m towards west, below the proposed surface level RL 84.82m.

Mandir: The depth to bedrock levels will vary from about 0.5m to the east and about 7.0m towards west, below the proposed surface level RL 80.5m.

Activity Block: The depth to bedrock levels will vary from about 1m within the eastern portion to about 6m towards the west, below the proposed surface level RL 62.7m.

Given the size of proposed structures such as Santnivas, Mandir, and Activity block, it is recommended that all these structures be uniformly founded within the sandstone bedrock of similar strength of at least Unit 3 or better to provide uniform support and reduce the potential for differential settlements.

- Footings founded into sandstone of at least very low strength, may be design for a maximum bearing capacity of 700kPa.
- Should higher bearing capacity be required (such as 1000kPa), bored piers will be required to reach the low strength sandstone or better Bored piers may be proportioned for an allowable bearing pressure (ABP) of 1000kPa when founded with a nominal socket of about 0.3m into the sandstone of at least low strength.

- Should higher bearing capacity is required (such as 1500kPa) for the 'Mandir', the piles must be extended into slightly weathered sandstone bedrock, subject to inspection and confirmation by a geotechnical engineer.
- An allowable shaft adhesion (ASA) of equivalent to 10% of the above ABP values may be adopted for design of pier sockets, in compression, through the sandstone. For uplift or tension, the aforementioned ASA value should be halved. The shaft adhesion values are recommended on condition that cleanliness and roughness of pier sockets and bases are achieved. For piers socketed into the deeper sandstone, large capacity drilling rigs with rock augers would have to be used.

Geotechnical inspections of foundations are recommended to determine that the required socket lengths and founding material have been achieved and to determine any variations that may occur between the boreholes and inspected locations.

4.9 Pavement Design

The design of new pavements will depend on subgrade preparation, subgrade drainage, the nature and composition of fill excavated or imported to the site, as well as vehicle loadings and use. Various alternative types of construction could be used for the pavements. Concrete construction would undoubtedly be the best in areas where heavy vehicles manoeuvre such as trucks turning and manoeuvring. Flexible pavements may have a lower initial cost, but maintenance will be higher. These factors should be considered when making the final choice.

Based on the laboratory test results, we recommend that the proposed new flexible pavements be designed for a CBR value of 2% for the compacted clay subgrade or an equivalent coefficient of subgrade reaction of 20kPa/mm (500mm plate).

Based on Local Street, a presumptive Design Equivalent Standard Axles (DESA) of $8x10^3$ ESAs has been adopted based on a 40 year design life. This design ESA and design life has been selected based on Table 12.2 and pavement thickness design has been based on Figure 12.2 of the Austroads Guide to Pavement Technology; Part 2: Pavement Structural Design Publication No. AGPT02-12 dated February 2012.

The following preliminary pavement thickness composition in **Table 4-1** below may be adopted for the access roads and vehicle parking area:

Table 4-1 Preliminary Pavement Thickness Design

Pavement Type	Pavement Thickness (mm)
Asphaltic Concrete – AC10 (Gap Graded Mix)	35*
Base Course – DGB20	100
Sub-Base Course – DGS40	100
Select Fill Layer – Crushed Sandstone	150
Total pavement thickness	**385**

**Note that in accordance with Austroads 2012, thin bituminous surfacing of <40mm may be considered to contribute to the required total thickness of granular material.*

4.9.1 Select Fill Layer

The inclusion of a select fill layer comprising crushed sandstone immediately below design subgrade level would (1) reduce shrink-swell effects, and (2) provide a suitable working platform during construction, particularly during inclement weather.

The select fill layer must comprise a good quality, well graded, granular crushed sandstone (maximum particle size of 75mm) with a four day soaked CBR value of at least, say 10%. All crushed sandstone engineered fill should be compacted in maximum 250mm thick loose layers using a large roller to at least 100% of SMDD.

4.9.2 Base-course and Sub-base Layers

Base course should be crushed rock such as DGB20 to RMS QA specification 3051 (2013) unbound base and compacted to at least 100% of SMDD. Sub-base course should be crushed rock to RMS QA specification 3051 (2013) unbound base, ripped/crushed sandstone with CBR greater than 40%, maximum particle size of 60mm, well graded and Plastic Index less than 10. Sub-base material should be compacted to an average of no less than 100% of SMDD, but with a minimum acceptance value of 98% of SMDD.

4.9.3 Density Testing

We recommend that proof rolling of exposed subgrade should be carried out as described in Section above. In situ density tests be completed on select fill layer above subgrade level to confirm that at least 100% Standard Maximum Dry Density (SMDD) has been achieved. If the existing fill is removed and replaced with imported fill, the CBR of the imported material may be taken into account. These design values should be confirmed by inspection and Dynamic Cone Penetration (DCP) testing of the subgrade following proof rolling.

4.9.4 Subsoil Drainage

Careful attention to subsurface and surface drainage is required in view of the effect of moisture on the clay soils. Pavement levels will need to be graded to promote rapid removal of surface water so ponding does not occur on the surface of pavements. The drainage trenches should be excavated with a uniform longitudinal fall to appropriate discharge points so as to reduce the risk of water ponding. The capacity of the stormwater collection system from the pavement should be checked and upgraded if necessary. In order to protect the pavement edge, subsoil drains should be provided along the perimeter of all proposed new external pavement areas, particularly in those areas of cut, with invert levels of at least 200mm below subgrade level.

The long-term successful performance of the pavements is dependent on the satisfactory completion of the earthworks. In order to achieve this, the quality assurance programme should not be limited to routine compaction density testing only. Other important factors associated with the earthworks includes subgrade preparation, selection of fill materials, control of moisture content and drainage, etc.

5 RECOMMENDATIONS FOR FURTHER GEOTECHNICAL SERVICES

Below is a summary of the previously recommended additional work that needs to be carried out:

- Should higher bearing pressures be required, additional cored boreholes assessing the depth and quality of the underlying sandstone bedrock is recommended;
- Proof rolling inspection by a geotechnician or geotechnical engineer;
- Density Testing of engineered fill;
- Classification of all excavated material transported off site;
- Geotechnical inspections of foundations.

6 STATEMENT OF LIMITATIONS

This report has been prepared for the exclusive use of BAPS Australia who is the only intended beneficiary of EI's work. The scope of the investigation carried out for the purpose of this report is limited to those agreed with BAPS Australia

No other party should rely on the document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised in similar investigations by reputable members of the geotechnical industry in Australia as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section of this report must be read in conjunction with the whole of this report, including its appendices and attachments.

The conclusions presented in this report are based on a limited investigation of conditions, with specific sampling and test locations chosen to be as representative as possible under the given circumstances.

EI's professional opinions are reasonable and based on its professional judgment, experience, training and results from analytical data. EI may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified by EI.

EI's professional opinions contained in this document are subject to modification if additional information is obtained through further investigation, observations, or validation testing and analysis during construction. In some cases, further testing and analysis may be required, which may result in a further report with different conclusions.

We draw your attention to the document "Important Information", which is included in **Appendix C** of this report. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be. The document is not intended to reduce the level of responsibility accepted by EI, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

Should you have any queries regarding this report, please do not hesitate to contact EI.

7 REFERENCES

AS1170.4:2007, *Structural Design Actions, Part 4: Earthquake Actions in Australia*, Standards Australia.

AS1726:1993, *Geotechnical Site Investigations*, Standards Australia.

AS2159:2009, *Piling – Design and Installation*, Standards Australia.

AS2870:2011, *Residential slabs and footings,* Standards Australia

AS3600:2009, *Concrete Structures,* Standards Australia

AS3798:2007, *Guidelines on earthworks for commercial and residential developments,* Standards Australia

Excavation Work Code of Practice – July 2015 – WorkCover NSW,

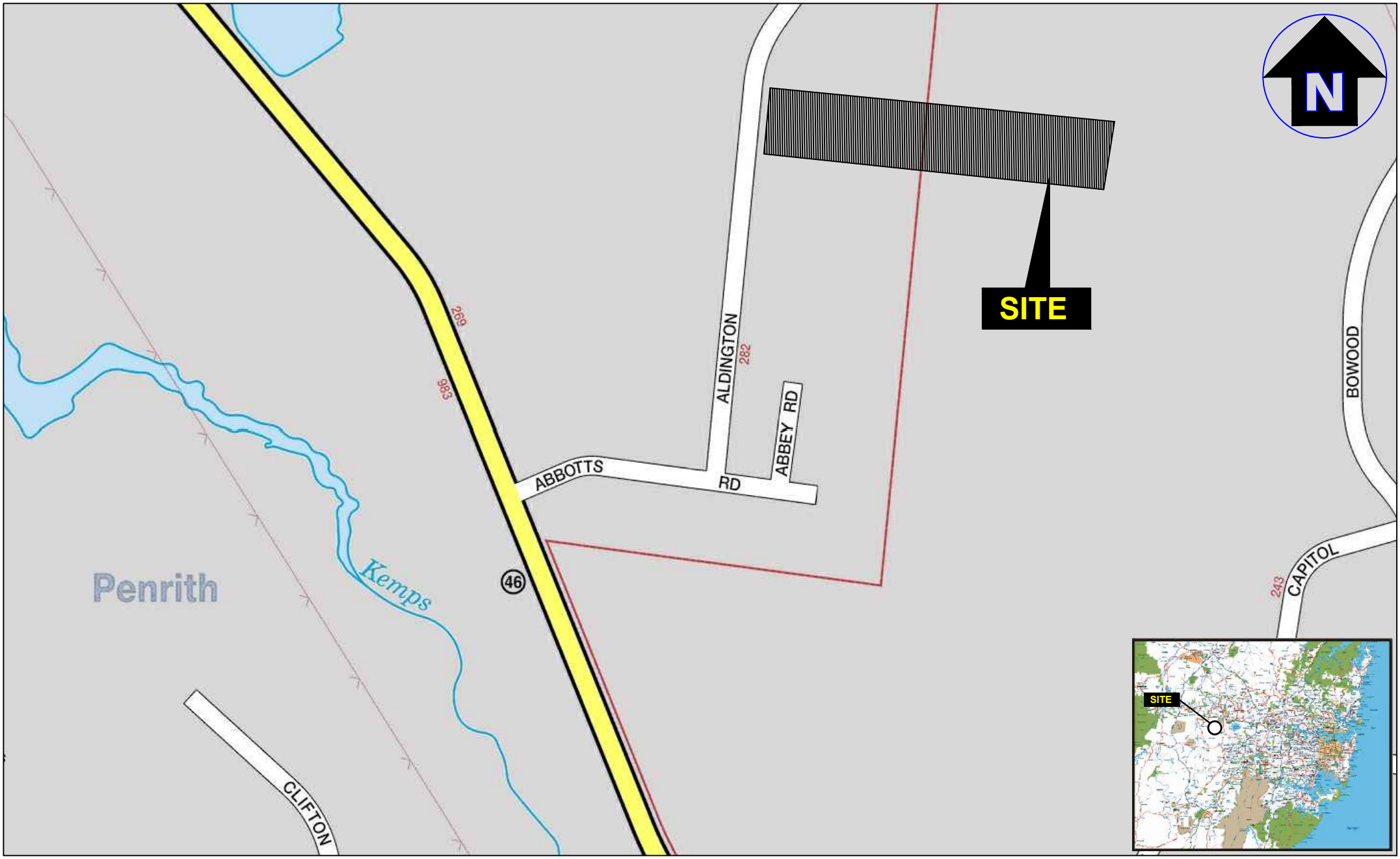
NSW Department of Finance and Service, Spatial Information Viewer, maps.six.nsw.gov.au.

NSW Department of Mineral Resources (1983) Sydney 1:100,000 Geological Series Sheet 9130 (Edition 1). Geological Survey of New South Wales, Department of Mineral Resources.

8 ABBREVIATIONS

AHD	Australian Height Datum
AS	Australian Standard
BEL	Bulk Excavation Level
BEGL	Below Existing Ground Level
BH	Borehole
CBR	California Bearing Ratio
DBYD	Dial Before You Dig
DP	Deposited Plan
EI	EI Australia
GI	Geotechnical Investigation
NATA	National Association of Testing Authorities, Australia
RL	Reduced Level
SMDD	Standard Maximum Dry Density
SPT	Standard Penetration Testing
T-C	Tungsten-Carbide

FIGURES

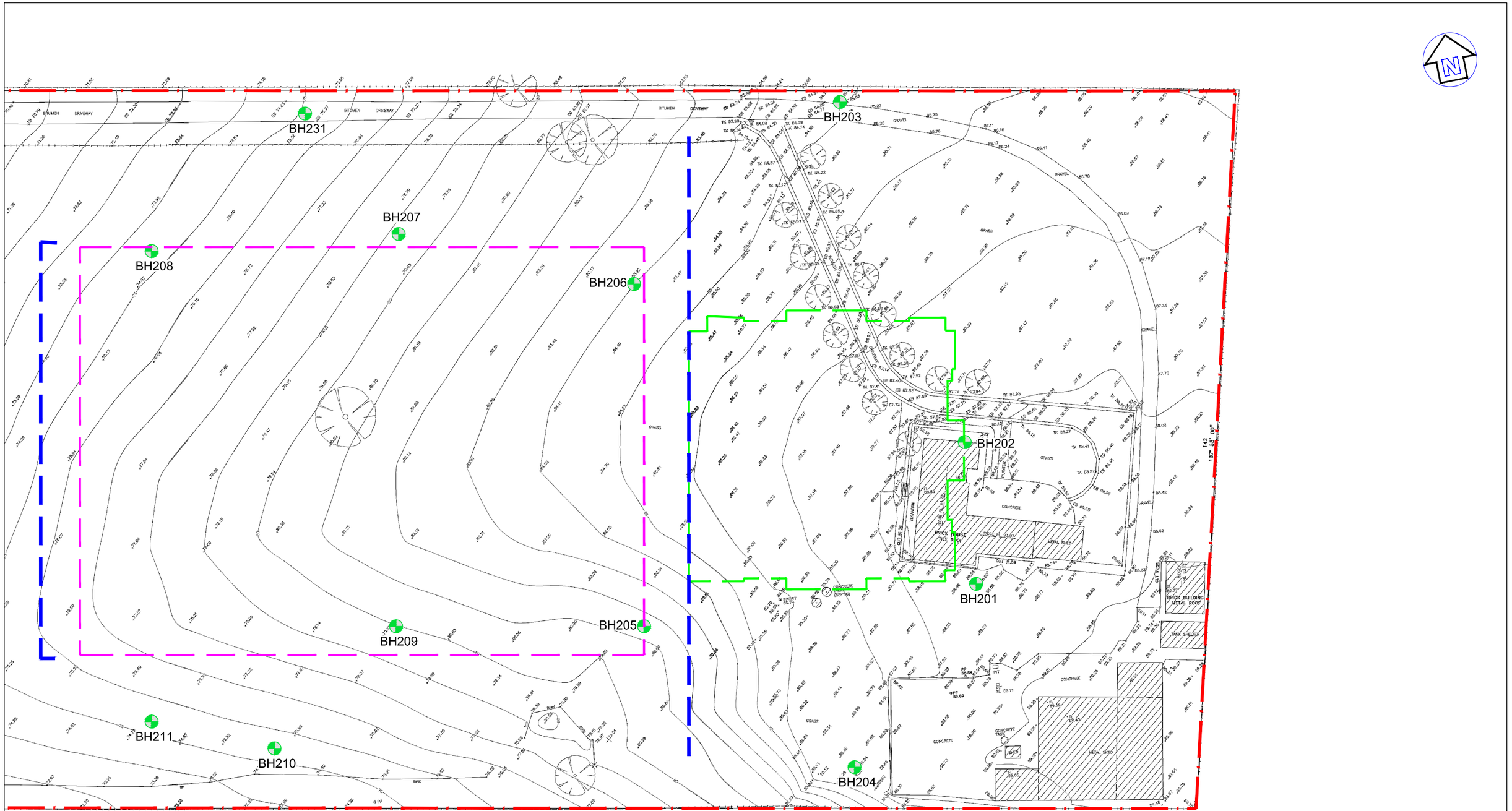


eiaustralia Contamination | Remediation | Geotechnical	Drawn:	FY	**BAPS Australia** Geotechnical Investigation 230-242 Aldington Road, Kemps Creek, NSW Site Locality Plan
	Approved:	JP	
	Date:	22-09-17	
	Scale:	Not To Scale	

Figure: 1

Project: E23529.G03

Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088



Map Source: CitiSurv Pty Ltd; Plot Filr: 9987-DET, Issue A, Dated 18-12-15

LEGEND

- Approximate Site Boundary
- Approximate Retaining Wall
- Approximate Mandir Boundary (Proposed Finished Surface Level = 80.54m)
- Approximate Santnivas Boundary (Proposed Finished Surface Level = 84.82m)
- Approximate Borehole Location

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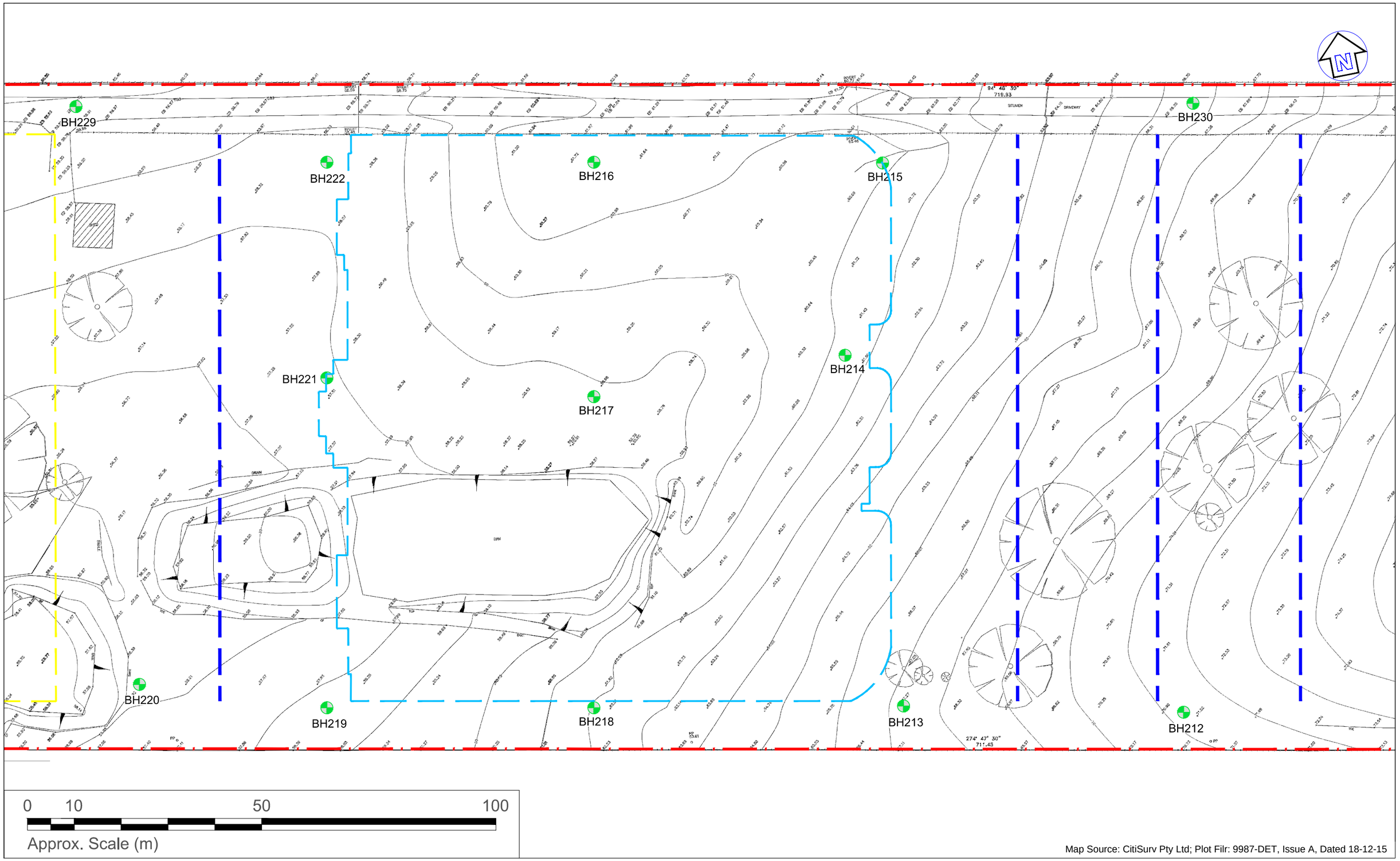
Borehole Location Plan

Figure: 2A

Project: E23529.G03



Map Source: CitiSurv Pty Ltd; Plot Filr: 9987-DET, Issue A, Dated 18-12-15

LEGEND

- Approximate Site Boundary
- Approximate Retaining Wall
- Approximate Auditorium (Sanha) Hall & Youth Centre (Proposed Finished Surface Level = 62.7m)
- Approximate Borehole Location

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Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

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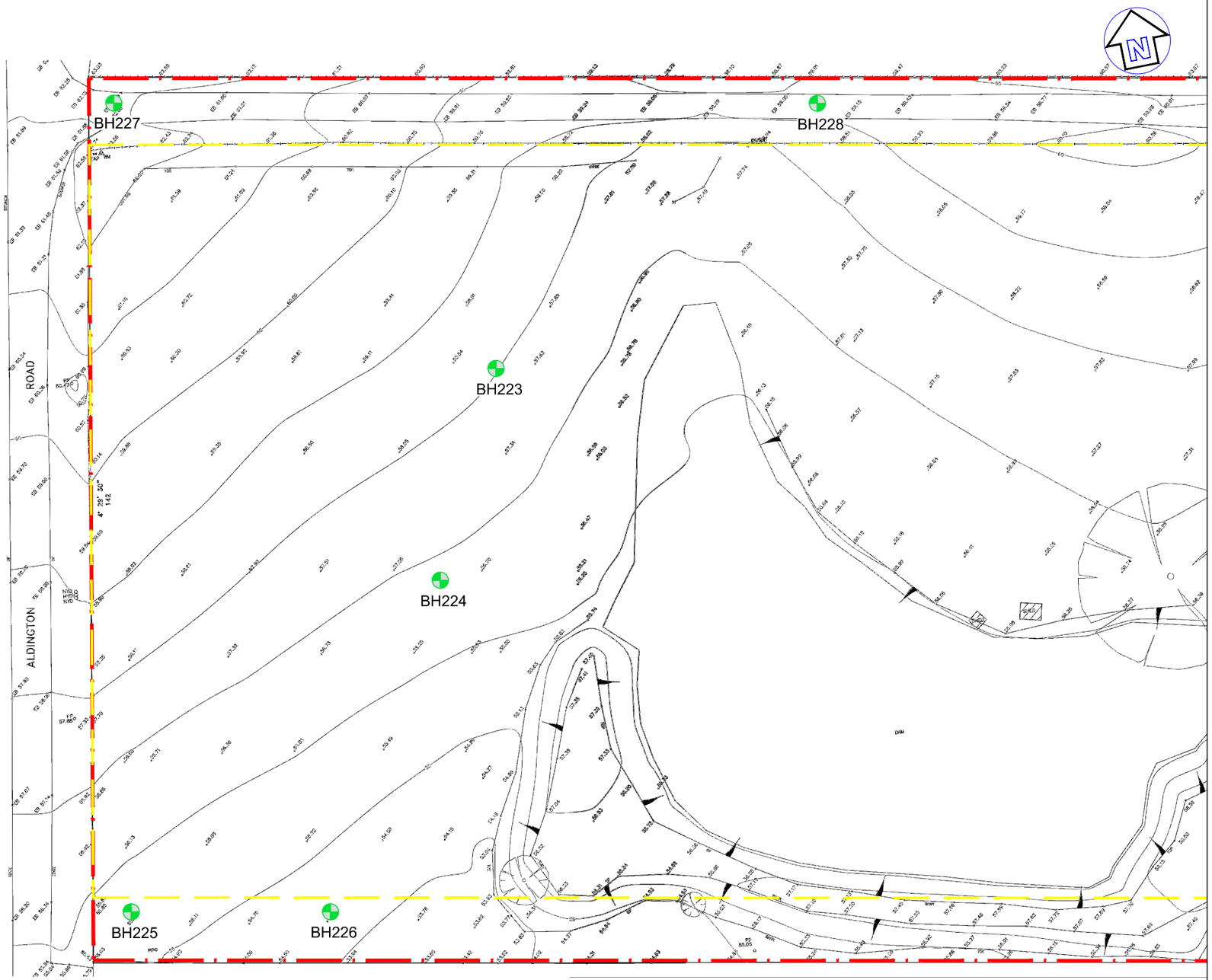
Borehole Location Plan

Figure: 2B

Project: E23529.G03



0 10 50 100

Approx. Scale (m)

Map Source: CitiSurv Pty Ltd; Plot Filr: 9987-DET, Issue A, Dated 18-12-15

LEGEND

- Approximate Site Boundary
- Approximate Retaining Wall
- Approximate Landscaped Garden Boundary (Proposed Finished Surface Level = 59.6m)
- Approximate Borehole Location

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Ph (02) 9516 0722 Fax (02) 9518 5088

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Borehole Location Plan

Figure: 2C

Project: E23529.G03

APPENDIX A

BOREHOLE LOGS AND EXPLANATORY NOTES

BOREHOLE: BH201

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	28/8/17
Position	Refer to Figure 2A	Surface RL	88.50 m AHD	Date Completed	28/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 28/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	88.50				-	TOPSOIL; Silty SAND; fine grained, pale brown, trace fine to medium, sub-angular gravel, trace low plasticity, pale brown clay, trace rootlets.	D	-	TOPSOIL
				0.40	BH201_03-0.4 E							
				88.10	0.30-0.40 m SPT 0.50-0.95 m 1,4,4 N=8 BH201_0.5-0.95 0.50 m PP =230-240 kPa			CH	Silty CLAY: high plasticity, orange-brown, mottled pale brown, trace fine, sub-angular gravels.	M (>PL)		RESIDUAL SOIL
			1	*1.20*								
				87.30	BH201_1.0-1.1 E 1.00-1.10 m			CL	From 1.2 m, low plasticity, pale brown, trace fine grained, brown sand, trace fine to medium, sub-angular gravels.			
				1.50								
				87.00	SPT 1.50-1.78 m 12,23/130mm HB N>23 BH201_1.5-1.78 1.50 m PP =280->500 kPa				From 1.5 m, grading into brown, extremely weathered, extremely low strength sandstone.	M (<PL)	VSt	
			2									
			3	*3.00*								
	VL			85.50	SPT 3.00-3.10 m 6/100mm HB N=SPT BH201_3.0-3.1			-	SANDSTONE; fine to medium grained, brown, distinctly weathered, very low strength.			BEDROCK
			4		BH201_4.0-4.1 D 4.00-4.10 m							
				4.50								
	M			84.00	BH201_4.5-4.6 D 4.50-4.60 m				From 4.5 m, low strength, trace ironstone bands.	-	-	
			5		BH201_5.0-5.1 D 5.00-5.10 m							
			6		BH201_6.0-6.2 D 6.00-6.20 m							
				6.90								
			7						Hole Terminated at 6.90 m Backfilled with drilling spoil.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH202

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	28/8/17
Position	Refer to Figure 2A	Surface RL	87.30 m AHD	Date Completed	28/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 28/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	87.30				-	TOPSOIL; Silty SAND; fine grained, dark brown, trace fine to medium, sub-angular gravel, trace medium plasticity, dark brown clay, trace rootlets.	M	-	TOPSOIL
				0.50	BH202_0.4-0.5 E 0.40-0.50 m							
				86.80	SPT 0.50-0.95 m 2,3,3 N=6			CI-CH	Silty CLAY; medium to high plasticity, orange-brown, mottled yellow-brown, trace fine, sub-angular gravel.	M (>PL)	VSt	RESIDUAL SOIL
			1		BH202_0.5-0.95 0.50 m							
				1.30	PP =250-260 kPa							
				86.00	BH202_0.9-1.0 E 0.90-1.00 m			CL	From 1.3 m, low plasticity, grading into extremely weathered, grey sandstone.	M (<PL)	H	
				1.70	SPT 1.50-1.80 m 8,23/150mm HB N>23			-	SANDSTONE; fine to medium grained, brown, distinctly weathered, very low strength.			
	VL		2	85.60	BH202_1.5-1.7 1.50 m							
				2.20	PP >500 kPa							
				85.10	BH202_1.7-1.8				From 2.2 m - 2.7 m, very low to low strength.			
					BH202_2.4-2.6 D 2.40-2.60 m							
				2.70					From 2.7 m, with some medium to high plasticity, brown clay bands.			
				84.60								
				3.00					From 3.0 m, very low to low strength.			
			3	84.30	BH202_3.0-3.2 D 3.00-3.20 m							
				4.00					From 4.0 m, low strength, trace ironstone bands.			
	L		4	83.30	BH202_4.0-4.2 D 4.00-4.20 m					-	-	
			5		BH202_5.0-5.2 D 5.00-5.20 m							
	L-M		6		BH202_6.0-6.2 D 6.00-6.20 m							
	L											
			7	*7.00*	BH202_6.9-7.0 D 6.90-7.00 m				Hole Terminated at 7.00 m Backfilled with drilling spoil.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH203

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	28/8/17
Position	Refer to Figure 2A	Surface RL	84.90 m AHD	Date Completed	28/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 28/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	0.10 84.80				-	ASPHALT PAVEMENT; 100 mm thick.	-	-	PAVEMENT
				0.40 84.50	BH203_0.2-0.3 E 0.20-0.30 m BH203_0.4-1.4 CBR 0.40-1.40 m SPT 0.50-0.95 m 2,3,5 N=8			- CI-CH	FILL; Silty SAND; fine to medium grained, dark brown, trace fine to medium, sub-angular gravel, with some medium plasticity, dark brown clay. Silty CLAY; medium to high plasticity, orange-brown, trace fine, sub-angular gravel.	M M (>PL)	- VSt - H	FILL RESIDUAL SOIL
			1	1.10 83.80	BH203_0.5-0.95 0.50 m PP =400-400 kPa				From 1.1 m, pale grey, mottled orange-brown.			
				1.50 83.40	BH203_1.0-1.2 E 1.00-1.20 m SPT 1.50-1.95 m			CL	From 1.5 m, low plasticity, grading into fine grained, yellow-brown, extremely weathered sandstone.	M (<PL)	H	
	VL		2	1.80 83.10	10,16,25 N=41 BH203_1.5-1.8 1.50 m PP >500 kPa BH203_1.8-1.95			-	SANDSTONE; fine to medium grained, brown, mottled dark grey, distinctly weathered, very low to low strength.	-	-	BEDROCK
			3	3.50								
	L			81.40	BH203_3.5-3.6 D 3.50-3.60 m				From 3.5 m, low strength.			
			4	4.00	BH203_3.9-4.0 D 3.90-4.00 m				Hole Terminated at 4.00 m Backfilled with drilling spoil.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH204

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	28/8/17
Position	Refer to Figure 2A	Surface RL	86.50 m AHD	Date Completed	29/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 29/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	86.50				-	FILL; Silty SAND; fine grained, dark brown, with some fine to medium, sub-angular gravel, trace coarse, sub-angular gravel, trace brick and concrete fragments.	M	-	FILL/ TOPSOIL
			1		SPT 0.50-0.95 m 4,3,6 N=9 BH204_0.5-0.6 E 0.50-0.60 m BH204_0.5-0.95							
					BH204_1.3-1.4 E 1.30-1.40 m SPT 1.50-1.95 m 3,6,3 N=9 BH204_1.5-1.95							
			2	2.50								
				84.00	BH204_2.5-3.5 CBR 2.50-3.50 m			CI-CH	Silty CLAY; medium to high plasticity, dark brown, with some fine grained, brown sand.		VSt	RESIDUAL SOIL
			3	3.00								
				83.50	SPT 3.00-3.45 m 8,8,15 N=23 BH204_3.0-3.1 E 3.00-3.10 m BH204_3.0-3.45 3.00 m PP >500 kPa			CL	From 3.0 m, low plasticity, pale brown.	M (>PL)	H	
				3.20								
				83.30					From 3.2 m, grading into extremely weathered sandstone, interbedded with dark grey shale, trace ironstone bands.			
			4									
					SPT 4.50-4.95 m 8,15,16 N=31 BH204_4.5-4.95							
			5									
				5.50								
	VL			81.00				-	SANDSTONE; fine to medium grained, grey-dark grey, distinctly weathered, very low strength.			BEDROCK
			6	6.00	BH204_5.9-6.0 D 5.90-6.00 m							
	L			80.50					From 6.0 m, dark grey, low strength.	-	-	
			7	7.00	BH204_6.9-7.0 D 6.90-7.00 m				Hole Terminated at 7.00 m Backfilled with drilling spoil.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH205

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Project	Proposed BAPS Temple			Sheet	1 OF 2
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	28/8/17
Position	Refer to Figure 2A	Surface RL	81.40 m AHD	Date Completed	28/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 28/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	81.40				-	TOPSOIL; Silty CLAY; high plasticity, pale brown, trace fine, sub-angular gravel, with some rootlets.	M	-	TOPSOIL
				0.50								
				80.90	SPT 0.50-0.95 m 0,0,1 N=1 BH205_0.5-0.6 E 0.50-0.60 m BH205_0.5-0.95 0.50 m PP =140-150 kPa			CI-CH	Silty CLAY; medium to high plasticity, pale brown, trace fine, sub-angular gravel.	M (>PL)	VSt	RESIDUAL SOIL
			1									
				1.50	BH205_1.4-1.5 E 1.40-1.50 m							
				79.90	SPT 1.50-1.95 m 18,26,22 N=48 BH205_1.5-1.95 1.50 m PP >500 kPa			CL	From 1.5 m, low plasticity, grading into fine grained, pale brown, extremely weathered sandstone, trace ironstone gravels.	M (<PL)	H	
	-		2									
			3		SPT 3.00-3.35 m 12,18,10/50mm HB N>28 BH205_3.0-3.35 3.00 m							
				3.50								
	VL			77.90	PP >500 kPa BH205_3.5-3.6 D 3.50-3.60 m			-	SANDSTONE; fine to medium grained, pale brown-pale grey, distinctly weathered, very low strength.			BEDROCK
				4.00								
			4	77.40					From 4.0 m, grey, low strength.			
			5							-	-	
	L											
			6		BH205_6.0-6.5 D 6.00-6.50 m							
				6.50								
	M			74.90					From 6.5 m, low to medium strength.			
				6.85								
			7						Continued as Cored Borehole			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH205

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Project	Proposed BAPS Temple			Sheet	2 OF 2
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	28/8/17
Position	Refer to Figure 2A	Surface RL	81.40 m AHD	Date Completed	28/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 28/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (EL 0.03, VL 0.1, L 0.3, M 1, H 3, VH 10, EH)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm) (10, 30, 100, 300, 1000, 3000)
				0							
				1							
				2							
				3							
				4							
				5							
				6							
					6.85		Continuation from non-cored borehole				
NMLC	95% RETURN	100	35 (65)	7	74.55		SANDSTONE; fine to medium grained, dark grey, distinctly weathered, with some iron indurated bands, interbedded with dark grey, distinctly weathered, low strength shale.	DW		6.90: DS Fe SN 20 mm, extremely weathered 6.96: DS Fe SN 10 mm, extremely weathered 7.05: DS Clay 5 mm 7.15: DS Clay 5 mm 7.38: DS Fe SN 30 mm, extremely weathered 7.47: DZ Clay 130 mm, extremely weathered 7.63: DS Clay 5 mm 7.81: DS Clay 20 mm 7.85: JT 90° PR RF Fe SN 8.13-8.32: DZ Fe SN extremely weathered	
				8	*8.50* 72.90		From 8.5 m, low to medium strength, trace iron indurated bands, with frequent shale bands.	SW		8.44: JT 60° PR RF Fe SN 8.68: JT 60° PR RF Fe VNR 8.88-9.03: DZ 150 mm, extremely weathered	
				9	*9.71*					9.44: DS 30 mm, extremely weathered	
				10	71.69		Hole Terminated at 9.71 m Backfilled with drilling spoil.				

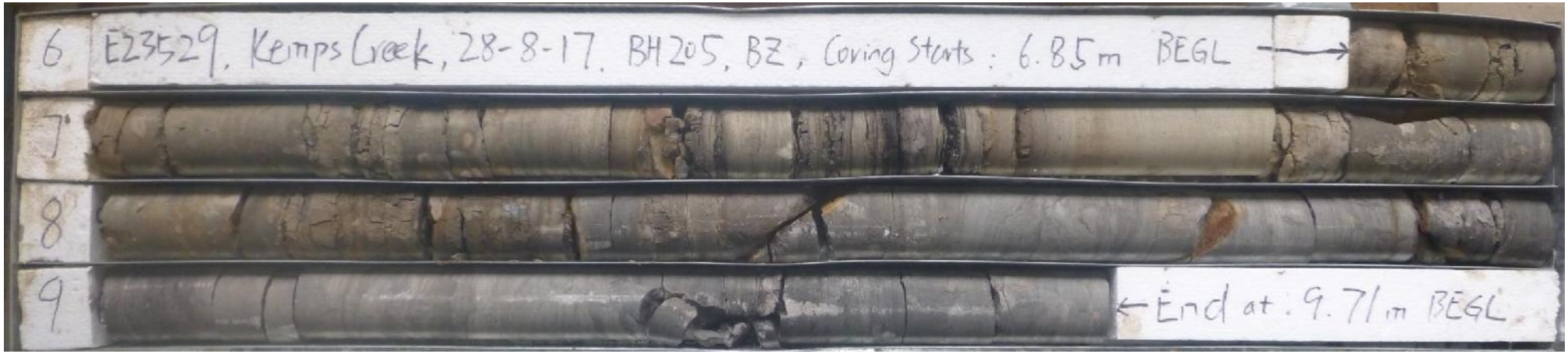
This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BH205

Project: Proposed BAPS Temple
Location: 230-242 Aldington Road, Kemps Creek, NSW
Position: Refer to Figure 2A
Job No. : E23529.G03
Client: BAPS Australia

Surface RL: 88.5 m AHD
Inclination: -90°
Box: 1 of 1
Hole Depth: 9.71 m

Depth Range: 6.85 m to 9.71 m
Contractor: Geosense Drilling Pty Ltd
Drill Rig: Hanjin DB8
LOGGED: BZ DATE: 28/8/17
CHECKED: JZ DATE: 21/9/17



BOREHOLE: BH206

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	29/8/17
Position	Refer to Figure 2A	Surface RL	84.20 m AHD	Date Completed	29/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 29/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	▽	0	84.20				-	TOPSOIL; Silty CLAY; low plasticity, brown, with some fine grained, brown sand and some rootlets.	M	-	TOPSOIL
				0.20	BH206_0.1-0.2 E							
				84.00	0.10-0.20 m			CH	Silty CLAY; high plasticity, orange-brown, mottled dark grey and yellow-brown, trace fine to medium, sub-angular ironstone gravel.			RESIDUAL SOIL
					SPT 0.50-0.95 m							
					3,6,6							
					N=12							
					BH206_0.5-0.6 E					M (>PL)	St	
	-		1		0.50-0.60 m							
					BH206_0.5-0.95							
				1.50								
				82.70	SPT 1.50-1.52 m			-	SANDSTONE; fine to medium grained, dark grey, brown, distinctly weathered, very low to low strength.			BEDROCK
					6/20mm HB							
					N=SPT							
			2		BH206_1.5-1.52							
				2.50								
	L			81.70	BH206_2.5-2.6 D				From 2.5 m, low strength, with some ironstone bands.	-	-	
					2.50-2.60 m							
			3									
				3.80								
	M			80.40	BH206_3.8-4.0 D				From 3.8 m, medium strength.			
			4		3.80-4.00 m							
				4.20								
									Hole Terminated at 4.20 m TC-bit refusal. Backfilled with drilling spoil.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH207

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	29/8/17
Position	Refer to Figure 2A	Surface RL	79.20 m AHD	Date Completed	29/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 29/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	79.20				-	TOPSOIL; Silty CLAY; low plasticity, brown, with some fine grained, brown sand and some rootlets.	M	-	TOPSOIL
				0.20	BH207_0.1-0.2 E 0.10-0.20 m							
				79.00				CI	Silty CLAY; medium plasticity, orange-brown, mottled yellow-brown, trace fine to medium, sub-angular iron indurated gravel.			RESIDUAL SOIL
					SPT 0.50-0.95 m 2,4,6 N=10							
				1.00	BH207_0.5-0.95 0.50 m							
			1	78.20	PP =500-510 kPa			CL	From 1.0 m, low plasticity, grading into extremely weathered, extremely low strength sandstone.	M (<PL)	H	
					BH207_0.7-0.8 E 0.70-0.80 m							
				1.50								
				77.70	SPT 1.50-1.95 m 3,6,12 N=18				From 1.5 m, pale grey, trace ironstone bands.			
				2.00	BH207_1.5-1.95							
	L		2	77.20	BH207_2.0-2.5 D 2.00-2.50 m			-	SANDSTONE; fine to medium grained, dark brown, distinctly weathered, very low strength, sandstone, with some ironstone bands.			BEDROCK
			3									
				3.50								
				75.70					From 3.5 m, low strength.	-	-	
			4									
				4.50								
				74.70	BH207_4.5-4.6 D 4.50-4.60 m				From 4.5 m, dark grey.			
	M				BH207_4.8-5.0 D 4.80-5.00 m							
			5									
	H			5.30	BH207_5.2-5.3 D 5.20-5.30 m				Hole Terminated at 5.30 m TC-bit refusal. Backfilled with drilling spoil.			
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH208

Project	Proposed BAPS Temple			Sheet	1 OF 2
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	29/8/17
Position	Refer to Figure 2A	Surface RL	74.80 m AHD	Date Completed	29/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 29/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	74.80				-	TOPSOIL; Silty CLAY; low plasticity, brown, with some fine to medium grained, brown sand, with some rootlets.	M	-	TOPSOIL
				0.30 74.50 *0.50*				CI	Silty CLAY; medium plasticity, dark brown, mottled pale brown, trace fine to medium, sub-angular iron indurated gravel.	M (<PL)	H	RESIDUAL SOIL
				74.30	SPT 0.50-0.95 m 4,7,8 N=15 BH208_0.5-0.95				From 0.5 m, orange-brown, mottled dark grey.			
			1	*1.10* 73.70 *1.34*	BH208_1.2-1.3 D 1.20-1.30 m			CL	From 1.1 m, low plasticity, grading into fine grained, brown, extremely weathered sandstone.			
									Continued as Cored Borehole			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH208

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Project	Proposed BAPS Temple			Sheet	2 OF 2
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	29/8/17
Position	Refer to Figure 2A	Surface RL	74.80 m AHD	Date Completed	29/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 29/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD (SCR)	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH $Is_{(50)}$ MPa (EL 0.03, VL 0.1, L 0.3, M 1, H 3, VH 10, EH 10)	DEFECT DESCRIPTION & Additional Observations	AVERAGE DEFECT SPACING (mm) (10, 30, 100, 300, 1000, 3000)
				0							
				1							
					1.34		Continuation from non-cored borehole				
NMLC	95% RETURN				73.46 1.50		SANDSTONE; fine to medium grained, pale grey, distinctly weathered, low to medium strength, with some ironstone bands.	DW		1.47: DZ Clay 830 mm, extremely weathered	
					73.30		From 1.5 m - 2.3 m, extremely weathered, extremely low strength.				
				2							
					2.30						
		100	12 (17)		72.50		From 2.3 m, with some ironstone bands.			2.47: DZ 210 mm, extremely weathered	
										2.86: DZ Clay 560 mm	
				3							
					3.54					3.43: JT 80° UN RF Fe SN	
					71.26		From 3.54 m - 5.1 m, extremely weathered, extremely low to very low strength.			3.54: DZ Clay 1560 mm, extremely weathered 3.56: DS 40 mm, extremely weathered	
		100	76 (94)	4							
				5						5.10: DZ 300 mm, extremely weathered	
					5.30						
					69.50		From 5.3 m, very low strength.				
					5.70						
		100	54 (70)		69.10		From 5.7 m - 6.2 m, medium strength.			5.82: DS 5 mm, extremely weathered	
				6						6.17: CS Fe SN	
					6.60					6.48: CS Fe SN	
					68.20	× ×	SILTSTONE; dark grey, distinctly weathered to slightly weathered, low strength.	DW - SW			
				7		× ×				7.13: JT 30° PR RF CN 7.20: DS Clay 5 mm 7.20: DZ 300 mm, extremely weathered	
		100	33 (68)			× ×					
				8		× ×				7.80: DZ 200 mm, extremely weathered	
						× ×				8.18: JT 30° PR RF CN	
						× ×				8.35: JT 80° PR RF CN	
						× ×				8.60: JT 70° UN RF CN	
					8.81	× ×					
					65.99		Hole Terminated at 8.81 m Backfilled with drilling spoil.				
				9							
				10							

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

CORE PHOTOGRAPH OF BOREHOLE: BH208

Project: Proposed BAPS Temple
Location: 230-242 Aldington Road, Kemps Creek, NSW
Position: Refer to Figure 2A
Job No. : E23529.G03
Client: BAPS Australia

Surface RL: 74.8 m AHD
Inclination: -90°
Box: 2 of 2
Hole Depth: 8.81 m

Depth Range: 1.34 m to 8.81 m
Contractor: Geosense Drilling Pty Ltd
Drill Rig: Hanjin DB8
LOGGED: BZ DATE: 29/8/17
CHECKED: JZ DATE: 21/9/17

BOREHOLE: BH209

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	30/8/17
Position	Refer to Figure 2A	Surface RL	80.10 m AHD	Date Completed	30/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 30/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	80.10	BH209_0.1-0.2 E 0.10-0.20 m			-	TOPSOIL; Silty CLAY; low plasticity, dark brown, with some fine grained, dark brown sand and some rootlets.	M (<PL)	-	TOPSOIL
				0.30								
				79.80				CL	CLAY; low plasticity, brown, with some fine grained, brown sand, trace fine, sub-angular gravel.			RESIDUAL SOIL
				0.50								
				79.60	SPT 0.50-0.95 m 3,7,5 N=12 BH209_0.5_0.95				From 0.5 m, low plasticity.			
			1		BH209_0.7-0.8 E 0.70-0.80 m							
				1.50								
				78.60	SPT 1.50-1.95 m 10,13,14 N=27 BH209_1.5-1.95				From 1.5 m, grading into fine grained, pale brown, extremely weathered sandstone, trace iron indurated gravels.			
			2							M (<PL)	H	
			3		SPT 3.00-3.45 m 6,12,16 N=28 BH209_3.0-3.45							
				3.30								
				76.80					From 3.3 m, pale grey, extremely weathered material.			
				4.00								
			4	76.10				-	SANDSTONE; fine to medium grained, grey, distinctly weathered, very low strength, trace ironstone bands.			BEDROCK
					SPT 4.50-4.70 m 23,10/50mm HB N>10 BH209_4.5-4.7							
				5.00								
	L		5	75.10	BH209_5.0-5.1 D 5.00-5.10 m				From 5.0m, low strength.	-	-	
			6		BH209_6.0-6.1 D 6.00-6.10 m							
				7.00								
			7		BH209_6.9-7.0 D 6.90-7.00 m				Hole Terminated at 7.00 m Backfilled with drilling spoil.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH210

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	30/8/17
Position	Refer to Figure 2A	Surface RL	76.40 m AHD	Date Completed	30/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 30/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	VL	GWNE during or after auger drilling	0	76.40	BH210_0.1-0.2 E 0.10-0.20 m			-	TOPSOIL; Silty CLAY; low plasticity, dark brown, with some fine grained sand, trace fine to medium, sub-angular gravel, trace rootlets.	M (<PL)	-	TOPSOIL
				0.30								
				76.10	BH210_0.3-1.3 CBR 0.30-1.30 m			CH	Silty CLAY; high plasticity, brown, trace fine to medium, sub-angular iron indurated gravels.			RESIDUAL SOIL
				0.50								
				75.90	SPT 0.50-0.95 m 3,3,3 N=6				From 0.5 m, pale brown, mottled pale grey, trace fine to medium, sub-angular iron indurated gravel.	M (>PL)		
			1		BH210_0.5-0.95 0.50 m PP =280-400 kPa							
					BH210_0.8-0.9 E 0.80-0.90 m						H	
				1.50								
				74.90	SPT 1.50-1.95 m 8,15,26 N=41			CL	From 1.5 m, low plasticity, grading into extremely weathered, extremely low strength sandstone, with some ironstone bands.	M (<PL)		
			2		BH210_1.5-1.95 1.50 m PP >500 kPa							
				2.50								
				73.90				-	SANDSTONE; fine to medium grained, grey and yellow brown, distinctly weathered, very low strength.			BEDROCK
				3.00								
	L		3	73.40	SPT 3.00-3.15 m 16/150mm HB N=SPT BH210_3.0-3.15				From 3.0m, low strength.	-	-	
				4.00								
			4						Hole Terminated at 4.00 m Backfilled with drilling spoil.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH211

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	30/8/17
Position	Refer to Figure 2A	Surface RL	76.90 m AHD	Date Completed	30/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 30/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	76.90				-	TOPSOIL; Silty CLAY; low plasticity, dark brown, with some fine grained, dark brown sand and some rootlets.	M (<PL)	-	TOPSOIL
				0.20	BH211_0.1-0.2 E 0.10-0.20 m							
				76.70				CI	Silty CLAY; medium plasticity, brown, with some fine grained, brown sand, trace fine to medium, sub-angular gravel.		VSt	RESIDUAL SOIL
			1		SPT 0.50-0.95 m 2,3,4 N=7 BH211_0.5-0.95 0.50 m PP =420-450 kPa BH211_0.7-0.8 E 0.70-0.80 m					M (<PL)		
				1.50								
	-			75.40	SPT 1.50-1.95 m 8,12,16 N=28 BH211_1.5-1.95			CL	From 1.5m, low plasticity, grading into extremely weathered bedrock.		H	
			2									
				2.50								
				74.40				-	SANDSTONE; fine to medium grained, dark grey, distinctly weathered, interbedded with shale, low strength.			BEDROCK
			3		SPT 3.00 m 0/0mm HB BH211_3.0 BH211_3.0-3.2 D 3.00-3.20 m							
				4.00								
	VL		4	72.90					From 4.0 m, dark grey, distinctly weathered, low to medium strength sandstone.			
			5		BH211_5.0-5.2 D 5.00-5.20 m					-	-	
	L		6									
				7.00								
			7		BH211_6.9-7.0 D 6.90-7.00 m				Hole Terminated at 7.00 m Backfilled with drilling spoil.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH212

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	30/8/17
Position	Refer to Figure 2B	Surface RL	71.30 m AHD	Date Completed	30/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 30/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	0.10 71.20	BH212_0.1-0.2 E 0.10-0.20 m			- CI	TOPSOIL; Silty CLAY; low plasticity, dark brown, with some fine grained, brown sand, some fine to medium, sub-angular gravel and some rootlets.	M <PL - D	-	TOPSOIL RESIDUAL SOIL
					BH212_0.5-0.6 E 0.50-0.60 m BH212_0.5-0.95 0.50 m PP >500 kPa BH212_0.5-1.5 CBR 0.50-1.50 m				Silty CLAY; medium plasticity, brown, trace fine to medium, sub-angular gravel.	M (<PL)	H	
			1	1.50 69.80	BH212_1.5-1.95			CL	From 1.5 m, low plasticity, grading into fine grained, grey, extremely weathered, extremely low strength sandstone, with some ironstone bands.			
			2	2.00 69.30				-	SANDSTONE; fine to medium grained,brown, distinctly weathered, very low strength.			BEDROCK
			3	3.00 68.30	BH212_3.0-3.45				From 3.0 m, brown, with some ironstone bands and some clay.	-	-	
				3.60 67.70					From 3.6 m, very low to low strength.			
	L		4	3.80 67.50 4.00	BH212_3.8-4.0 D 3.80-4.00 m				From 3.8m, dark grey, distinctly weathered, low strength.			
									Hole Terminated at 4.00 m Backfilled with drilling spoil.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH213

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	30/8/17
Position	Refer to Figure 2B	Surface RL	67.30 m AHD	Date Completed	30/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 30/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	67.30				-	TOPSOIL; Silty CLAY; low plasticity, dark brown, with some fine to medium grained, dark brown sand and some rootlets.	M (<PL)	-	TOPSOIL
				0.20	BH213_0.1-0.2 E							
				67.10	0.10-0.20 m			CI	Silty CLAY; medium plasticity, dark brown, trace fine to medium grained, dark brown sand, trace fine to medium, sub-angular iron indurated gravel.	- D	VSt	RESIDUAL SOIL
					SPT 0.50-0.95 m 5,5,8 N=13							
					BH213_0.5-0.6 E 0.50-0.60 m							
			1		BH213_0.5-0.95 0.50 m PP >500 kPa							
					SPT 1.50-1.95 m 8,11,11 N=22							
					BH213_1.5-1.95							
			2	2.00								
	-			65.30	BH213_2.0-2.1 D 2.00-2.10 m			CL	From 2.0 m, low plasticity, grading into fine grained, dark grey, extremely weathered sandstone.	M (<PL)	H	
				3.00								
			3	64.30	SPT 3.00-3.45 m 5,7,8 N=15				From 3.0 m, with some ironstone bands.			
					BH213_3.0-3.45							
			4									
				4.50								
	VL			62.80	SPT 4.50-4.70 m 17,8/50mm HB			-	SANDSTONE; fine to medium grained, dark grey, distinctly weathered, very low to low strength.			BEDROCK
				4.70								
				62.60	N>8 BH213_4.5-4.7				From 4.7 m, low strength.			
			5									
	L									-	-	
			6									
				7.00								
			7		BH213_6.9-7.0 D 6.90-7.00 m				Hole Terminated at 7.00 m Backfilled with drilling spoil.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH214

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	30/8/17
Position	Refer to Figure 2B	Surface RL	61.40 m AHD	Date Completed	30/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 30/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	61.40				-	TOPSOIL; Silty CLAY; low plasticity, dark brown, with some fine grained, dark brown sand and some rootlets.	M	-	TOPSOIL
					BH214_0.3-0.4 E 0.30-0.40 m							
				0.60	SPT 0.50-0.95 m							
				60.80	5,8,6 N=14			CI	Silty CLAY; medium plasticity, yellow-brown, mottled red-brown, with some fine to medium, sub-angular iron indurated gravel.			RESIDUAL SOIL
			1		BH214_0.5-0.6 0.50 m PP >500 kPa BH214_0.6-0.95 BH214_1.0-1.1 E 1.00-1.10 m							
	-			*1.70*	SPT 1.50-1.95 m							
				59.70	8,10,13 N=23			CL	From 1.7 m, low plasticity, grading into fine grained, grey, extremely weathered sandstone.	M (<PL)	H	
			2		BH214_1.5-1.95							
			3		SPT 3.00-3.30 m							
				3.20	10,25/150mm HB							
AD/T		GWNE during or after auger drilling		58.20	N>25 BH214_3.0-3.3			-	SANDSTONE; fine to medium grained, dark grey, distinctly weathered, very low strength, trace ironstone bands.			BEDROCK
			4		BH214_4.0-4.1 D 4.00-4.10 m							
	VL				SPT 4.50-4.95 m 6,11,17 N=28 BH214_4.5-4.95					-	-	
			5	*5.30*								
				56.10					From 5.3 m, low strength.			
					BH214_5.5-5.6 D 5.50-5.60 m							
	L		6		SPT 6.00-6.03 m 10/30mm HB N=SPT BH214_6.0-6.03							
				6.70								
	M			54.70	BH214_6.7-6.8 D 6.70-6.80 m				From 6.7 m, low to medium strength.			
			7						Hole Terminated at 6.80 m TC-bit refusal. Backfilled with drilling spoil.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH215

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	30/8/17
Position	Refer to Figure 2B	Surface RL	60.80 m AHD	Date Completed	30/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 30/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	60.80				-	TOPSOIL; Silty CLAY; low to medium plasticity, brown, with some fine grained, brown sand and some rootlets.	M	-	TOPSOIL
				0.30	BH215_0.1-0.2 E 0.10-0.20 m							
				60.50				CH	Silty CLAY; high plasticity, orange-brown, mottled pale grey, trace fine to medium, sub-angular ironstone gravel.			RESIDUAL SOIL
					SPT 0.50-0.95 m 1,1,2 N=3						S	
			1		BH215_0.5-0.95 0.50 m PP =180-200 kPa							
					BH215_0.8-0.9 E 0.80-0.90 m						F	
				1.50								
				59.30	SPT 1.50-1.95 m 2,3,2 N=5			CI	From 1.5m, medium plasticity, grey and brown, trace of ironstone gravels.			
			2		BH215_1.5-1.95 1.50 m PP =200-200 kPa							
	-	▽								M (>PL)		
				3.00								
			3	57.80	SPT 3.00-3.45 m 2,3,4 N=7				From 3.0 m, some fine to medium, sub-angular iron indurated gravel.		St	
					BH215_3.0-3.45							
AD/T			4									
				4.50								
				56.30	SPT 4.50-4.68 m 6,8/30mm HB N>8				From 4.5 m, grading into dark grey, extremely weathered, extremely low to very low strength shale.			
				4.80								
			5	56.00	BH215_4.5-4.68			-	SANDSTONE; fine to medium grained, dark grey, distinctly weathered, very low to low strength, trace ironstone bands.			BEDROCK
	VL											
				6.00	BH215_5.9-6.0 D					-	-	
			6	54.80	5.90-6.00 m				From 6.0 m, low strength.			
	L											
				6.80								
	M			54.00	BH215_6.8-7.0 D				From 6.8 m, low to medium strength.			
			7	7.00	6.80-7.00 m				Hole Terminated at 7.00 m Backfilled with drilling spoil.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH216

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	30/8/17
Position	Refer to Figure 2B	Surface RL	61.60 m AHD	Date Completed	30/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 30/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	0.10 61.50				-	TOPSOIL; Silty CLAY; low plasticity, brown, with some fine grained, brown sand and some rootlets.	M <PL - D	-	TOPSOIL
					BH216_0.3-0.4 E 0.30-0.40 m SPT 0.50-0.95 m 3,4,5 N=9 BH216_0.5-0.95 0.50 m PP =480-500 kPa BH216_0.9-1.0 E 0.90-1.00 m			CH	Silty CLAY; high plasticity, brown, mottled orange-brown and grey, trace fine to medium, sub-angular iron indurated gravel.	M (>PL)	VSt	RESIDUAL SOIL
				0.80 60.80				CL	From 0.8 m, low plasticity, yellow-brown.			
			1	1.50 60.10					From 1.5 m, grading into fine grained, pale brown and pale grey, extremely weathered sandstone.	M (<PL)	H	
	-		2		SPT 1.50-1.95 m 11,16,18 N=34 BH216_1.5-1.95 1.50 m PP >500 kPa							
			3	3.20 58.40	SPT 3.00-3.35 m 11,12,6/50mm HB N>18 BH216_3.0-3.35			-	SANDSTONE; fine to medium grained, dark grey, distinctly weathered, very low strength, interbedded with siltstone.			BEDROCK
AD/T			4									
	VL		5	4.80 56.80	BH216_4.8-5.0 D 4.80-5.00 m				From 4.8 m, very low to low strength.	-	-	
				5.50 56.10	BH216_5.5-5.7 D 5.50-5.70 m				From 5.5 m, low strength.			
	L		6									
				6.50 55.10					From 6.5 m, low to medium strength.			
	M	▽	7	7.00	BH216_6.8-7.0 D 6.80-7.00 m				Hole Terminated at 7.00 m Backfilled with drilling spoil.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH217

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	30/8/17
Position	Refer to Figure 2B	Surface RL	58.80 m AHD	Date Completed	30/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 30/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	▽	0	58.80				-	TOPSOIL; Silty CLAY; high plasticity, dark brown, with some fine to medium grained, brown sand and some rootlets, trace fine to medium, sub-angular gravel.	M (<PL)	-	TOPSOIL
				0.30	BH217_0.2-0.3 E							
				58.50	0.20-0.30 m			CH	Silty CLAY; high plasticity, brown, trace fine to medium, sub-angular iron indurated gravel.			RESIDUAL SOIL
					SPT 0.50-0.95 m 1,2,3 N=5							
			1		BH217_0.5-0.95 0.50 m PP =180-200 kPa						St	
					BH217_0.8-0.9 E 0.80-0.90 m							
					SPT 1.50-1.95 m 3,3,3 N=6					M (>PL)		
			2		BH217_1.5-1.95 1.50 m PP =100-120 kPa						F	
			3		SPT 3.00-3.45 m 5,6,9 N=15							
				3.40								
				55.40	BH217_3.0-3.45 3.00 m PP =220-320 kPa				From 3.4 m, grading into dark grey, extremely weathered, with some ironstone bands.			
			4							M (<PL)	VSt	
				4.60	SPT 4.50-4.52 m 5/20mm HB N=SPT							
				54.20	BH217_4.5-4.52			-	SANDSTONE; fine to medium grained, dark grey, distinctly weathered, very low to low strength, interbedded with sandstone.			BEDROCK
	VL		5							-	-	
				6.00								
	L		6	52.80	BH217_6.0-6.2 D				From 6.0 m, low strength.			
				6.20	6.00-6.20 m							
									Hole Terminated at 6.20 m TC-bit refusal. Backfilled with drilling spoil.			
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH218

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	31/8/17
Position	Refer to Figure 2B	Surface RL	61.10 m AHD	Date Completed	31/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 31/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	0.10 61.00	BH218_0.0-0.1 E 0.00-0.10 m			- CI	TOPSOIL; Silty SAND; fine to medium grained, brown, trace dry, brown clay, trace fine to medium, sub-angular gravel, with some rootlets.	D	-	TOPSOIL
												RESIDUAL SOIL
			1		SPT 0.50-0.95 m 5,6,6 N=12 BH218_0.5-0.6 E 0.50-0.60 m BH218_0.5-0.95 0.50 m PP >500 kPa				Silty CLAY; medium plasticity, brown, mottled grey, trace fine to medium, sub-angular iron indurated gravel.	M (<PL)		
				1.50 59.60	SPT 1.50-1.95 m 6,9,10 N=19 BH218_1.5_1.95 1.50 m PP >600 kPa			CL	From 1.5 m, low plasticity, pale brown, mottled orange-brown and grey.		H	
				1.80 59.30					From 1.8 m, pale grey, mottled orange-brown.			
			2	2.20 58.90					From 2.2 m, grading into dark grey, extremely weathered material.	D		
			3	3.20 57.90	SPT 3.00-3.25 m 12,20/100mm HB N>20 BH218_3.0-3.25			-	SANDSTONE; fine to medium grained, dark grey, distinctly weathered, very low strength, trace iron staining, interbedded with siltstone.			BEDROCK
	VL			4.00 57.10	BH218_4.0-4.5 D 4.00-4.50 m				From 4.0 m, very low to low strength.			
			4	4.50 56.60					From 4.5 m, low strength, trace ironstone bands.			
	L		5							-	-	
			6	6.00 55.10	BH218_6.0-7.0 D 6.00-7.00 m				From 6.0 m, low to medium strength.			
	M			7.00								
			7						Hole Terminated at 7.00 m Borehole left open.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH219

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	31/8/17
Position	Refer to Figure 2B	Surface RL	58.20 m AHD	Date Completed	31/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 31/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE during or after auger drilling	0	58.20				-	TOPSOIL; Silty CLAY; low to medium plasticity, dark brown, with some fine to medium grained, brown sand, trace fine to medium, sub-angular gravel and some rootlets.	M (<PL)	-	TOPSOIL
				0.40	BH219_0.2-0.3 E 0.20-0.30 m							
				57.80	SPT 0.50-0.95 m 2,3,3 N=6			CH	Silty CLAY; high plasticity, brown, mottled orange-brown and grey, trace fine to medium, sub-angular iron indurated gravel, trace rootlets.			RESIDUAL SOIL
			1		BH219_0.5-0.95 0.50 m PP =350-560 kPa BH219_0.9-1.0 E 0.90-1.00 m					M (>PL)	H	
				1.60	SPT 1.50-1.95 m							
				56.60	2,3,6 N=9			CL	From 1.6 m, low plasticity, grading into grey, extremely weathered material.			
				1.90	BH219_1.5-1.95							
			2	56.30				-	SANDSTONE; fine to medium grained, dark grey, distinctly weathered, very low strength, interbedded with siltstone.			BEDROCK
				3.00								
	VL		3	55.20	BH219_3.0-3.2 D 3.00-3.20 m				From 3.0 m, low strength.			
			4									
					BH219_4.5-4.7 D 4.50-4.70 m					-	-	
	L		5									
			6									
				6.50								
	M			51.70					From 6.5 m, low to medium strength.			
				7.00	BH219_6.8-7.0 D 6.80-7.00 m							
			7						Hole Terminated at 7.00 m Borehole left open.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH220

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	31/8/17
Position	Refer to Figure 2B	Surface RL	56.90 m AHD	Date Completed	31/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 31/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	▽	0	56.90				-	TOPSOIL; Silty CLAY; high plasticity, dark brown, trace fine to medium, sub-angular gravel, trace rootlets.	M (>PL)	-	TOPSOIL
				0.30 56.60				CI	Silty CLAY; medium plasticity, dark brown, mottled grey and orange-brown, trace fine to medium, sub-angular iron indurated gravel.			RESIDUAL SOIL
			1		SPT 0.50-0.95 m 2,2,2 N=4 BH220_0.5-0.95 0.50 m PP =170-200 kPa					M (>PL)	St	
					SPT 1.50-1.95 m 2,2,2 N=4 BH220_1.5-1.95 1.50 m PP =150-160 kPa							
			2								VSt	
			3	*3.20* 53.70	SPT 3.00-3.45 m 7,11,16 N=27 BH220_3.0-3.45 3.00 m PP =400-450 kPa			CL	From 3.2 m, low plasticity, grading into dark grey, extremely weathered, some ironstone bands.	M (<PL)	H	
				3.80 53.10 *4.00*	BH220_3.8-4.0 D 3.80-4.00 m				SANDSTONE: fine to medium grained, dark grey, distinctly weathered, very low strength.	-	-	BEDROCK
			4						Hole Terminated at 4.00 m Backfilled with drilling spoil.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH221

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	31/8/17
Position	Refer to Figure 2B	Surface RL	57.50 m AHD	Date Completed	31/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 31/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0	57.50				-	TOPSOIL: Silty CLAY; high plasticity, dark brown, trace fine to medium grained, brown sand, some rootlets.	M	-	TOPSOIL
					BH221_0.2-0.3 E 0.20-0.30 m							
				0.50								
				57.00	SPT 0.50-0.95 m 3,5,12 N=17 BH221_0.5-0.95 0.50 m PP =470-530 kPa BH221_0.9-1.0 E 0.90-1.00 m			CI-CH	Silty CLAY: medium to high plasticity, brown mottled orange-brown, trace fine to medium, sub-angular iron indurated gravels, trace rootlets.	M (>PL)	H	RESIDUAL SOIL
			1									
	L			*1.50*								
				56.00	SPT 1.50-1.95 m 6,15,16 N=31 BH221_1.5-1.95 1.50 m PP >500 kPa			CL	From 1.5m, low plasticity, grading into extremely weathered, dark grey sandstone.	M (<PL)		
			2	*2.00*								
				55.50				-	SANDSTONE: fine to medium grained, grey, distinctly weathered, very low strength, interbedded with shale.			BEDROCK
				3.00								
AD/T		GWNE	3	54.50	SPT 3.00-3.01 m 6/10mm HB BH221_3.0-3.2				From 3.0m, low strength with ironstone bands.			
			4							-	-	
	M		5		BH221_5.0-5.1 D 5.00-5.10 m							
			6		BH221_5.9-6.0 D 5.90-6.00 m							
				7.00								
			7		BH221_6.9-7.0 D 6.90-7.00 m				Hole Terminated at 7.00 m Borehole left open.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH222

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	31/8/17
Position	Refer to Figure 2B	Surface RL	58.40 m AHD	Date Completed	31/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 31/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	VL		0	58.40 *0.20*	BH222_0.1-0.2 E 0.10-0.20 m			-	TOPSOIL: Silty CLAY; high plasticity, dark brown, trace fine to medium, brown sand, some rootlets.	M	-	TOPSOIL
				58.20				CH	Silty CLAY: high plasticity, brown mottled orange-brown, trace fine to medium, sub-angular, iron indurated gravels, trace rootlets.			RESIDUAL SOIL
					SPT 0.50-0.95 m 1,2,2 N=4 BH222_0.5-0.95 0.50 m PP =130-140 kPa BH222_0.7-0.8 E 0.70-0.80 m						St	
			1		SPT 1.50-1.95 m 4,4,5 N=9 BH222_1.5-1.95 1.50 m PP =200-250 kPa					M (>PL)		
			2								VSt	
			3	*3.00*								
				55.40	SPT 3.00-3.45 m 6,6,8 N=14 BH222_3.0-3.45			CI	From 3.0m, some fine to medium, sub-angular, iron indurated gravels, grading into extremely weathered material.	M (<PL)	H	
	L		4	*4.00*								
				54.40				-	SANDSTONE: fine to medium grained, grey and yellow-brown, distinctly weathered, very low strength.			BEDROCK
					SPT 4.50-4.67 m 9,5/20mm HB N=5/20mm							
				4.80								
	M	▽	5	53.60 *5.00*	BH222_4.5-4.67				From 4.8m, dark grey, distinctly weathered, low to medium strength.	-	-	
				53.40	BH222_5.0-5.2				From 5.0m, medium strength.			
				5.80	BH222_5.6_5.8							
			6						Hole Terminated at 5.80 m TC-bit refusal. Backfilled with drilling spoil.			
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH223

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	31/8/17
Position	Refer to Figure 2C	Surface RL	57.90 m AHD	Date Completed	31/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 31/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L	GWNE	0	0.10 57.80				-	TOPSOIL: Silty CLAY; medium plasticity. brown, some fine to medium grained, brown sand, some rootlets.	M	-	TOPSOIL
								CI	Silty CLAY: medium plasticity, brown mottled pale grey and orange-brown, trace fine to medium grained, sub-angular, iron indurated gravels.			RESIDUAL SOIL
					SPT 0.50-0.95 m 3,5,7 N=12 BH223_0.5-0.95 0.50 m PP =450-500 kPa					M (>PL)	H	
			1									
				1.50 56.40	SPT 1.50-1.95 m 3,5,20 N=25 BH223_1.5-1.8 1.50 m PP >500 kPa BH223_1.8-1.95			CL	From 1.5m, some iron indurated gravels.	M (<PL)		
				1.80 56.10 2.00 55.90					From 1.8m, grading into extremely weathered, dark grey material.			
			2					-	SANDSTONE: fine to medium grained, grey, distinctly weathered, very low strength, interbedded with dark grey shale.			BEDROCK
				3.00 54.90	SPT 3.00-3.10 m 12 HB BH223_3.0-3.1				From 3.0, low strength.			
	M		3									
			4		BH223_4.0-4.5 D 4.00-4.50 m					-	-	
			5									
				5.50 52.40	BH223_5.5-6.0 D 5.50-6.00 m				From 5.5, low to medium strength.			
			6	6.00 51.90					From 6.0, medium strength.			
				7.00	BH223_6.8-7.0 D 6.80-7.00 m				Hole Terminated at 7.00 m Target Depth Reached.			
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH224

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	31/8/17
Position	Refer to Figure 2C	Surface RL	56.80 m AHD	Date Completed	31/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 31/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L	▽	0	56.80 *0.20* 56.60				-	TOPSOIL: Silty CLAY; medium plasticity, dark brown, some fine to medium grained brown sands, some rootlets.	M	-	TOPSOIL
					SPT 0.50-0.95 m 2,2,3 N=5 BH224_0.5-0.95 0.50 m PP =480-600 kPa			CH	Silty CLAY: high plasticity, pale brown mottled orange-brown, trace fine to medium, sub-angular, iron indurated gravels.	M (>PL)		RESIDUAL SOIL
			1	*1.50*								
				55.30	SPT 1.50-1.95 m 5,8,10 N=18 BH224_1.5-1.95 1.50 m			CI	From 1.5m, pale brown and pale grey, some ironstone bands.	M (>PL)	H	
			2									
			3	*3.00* 53.80 *3.50*	SPT 3.00-3.42 m 15,16,16 N=32/270mm BH224_3.0-3.42				From 3.0m, grading into extremely weathered, dark grey bedrock, some ironstone bands.			
	M	▽		53.30				-	SANDSTONE: fine to medium grained, grey, distinctly weathered, very low to low strength, interbedded with shale.	-	-	BEDROCK
			4									
					BH224_4.5-4.7 D 4.50-4.70 m							
			5		BH224_5.0-6.0 D 5.00-6.00 m							
			6									
			7	*7.00*					Hole Terminated at 7.00 m Target Depth Reached.			
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH225

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	31/8/17
Position	Refer to Figure 2C	Surface RL	55.60 m AHD	Date Completed	31/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 31/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L	GWNE	0	55.60				-	TOPSOIL: Silty CLAY: medium to high plasticity, dark brown, some fine to medium grained, brown sand, some rootlets.	M	-	TOPSOIL
				0.20								
				55.40				CH	Silty CLAY: high plasticity, orange-brown mottled pale brown & pale grey, trace fine to medium, sub-angular, iron indurated gravels.	M (>PL)	H	RESIDUAL SOIL
					SPT 0.50-0.95 m 2,2,3 N=5 BH225_0.5-0.95 0.50 m							
			1		PP =480-530 kPa							
				1.20	CBR:0.5-1.5 CBR 0.50-1.50 m							
				54.40				CL	From 1.2m, low plasticity.	M (<PL)		
				1.50								
				1.60	SPT 1.50-1.60 m 6 BH225_1.5-1.6							
				54.00				-	From 1.5m, trace ironstone bands, grading into extremely weathered bedrock.			BEDROCK
			2						SANDSTONE: fine to medium grained, dark grey, distinctly weathered, very low strength.			
			3							-	-	
				3.50								
	M			52.10					From 3.5m, very low to low strength, some ironstone bands.			
				4.00	BH225_3.8-4.0 D 3.80-4.00 m							
			4						Hole Terminated at 4.00 m Target Depth Reached.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH226

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	31/8/17
Position	Refer to Figure 2C	Surface RL	54.30 m AHD	Date Completed	31/8/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 31/8/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L	GWNE	0	54.30 *0.20*				-	TOPSOIL: Silty CLAY: high plasticity, dark brown, trace fine to medium grained, brown sand, some rootlets.	M	-	TOPSOIL
				54.10				CH	Silty CLAY: high plasticity, brown mottled orange brown & pale grey, trace fine to medium, sub-angular, iron indurated gravels.			RESIDUAL SOIL
			1		SPT 0.50-0.95 m 1,1,2 N=3 BH226_0.5-0.95 0.50 m PP =180-190 kPa CBR:0.5-1.5 CBR 0.50-1.50 m					M (>PL)	St	
					SPT 1.50-1.95 m 3,3,5 N=8 BH226_1.5-1.95 1.50 m PP =300-330 kPa							
				1.80 52.50					From 1.8m, pale grey mottled yellow-brown and orange-brown.		VSt	
			2	*2.60* 51.70				Cl	From 2.6m, low plasticity, grading into extremely weathered material.	M (<PL)		
			3	*3.20*	SPT 3.00-3.10 m 8							
				51.10	BH226_3.0-3.05 BH226_3.05-3.10			-	SANDSTONE: fine to medium grained, grey and brown, distinctly weathered, very low strength.	-	-	BEDROCK
				3.80 50.50	BH226_3.8-4.0 D 3.80-4.00 m				From 3.8m, interbedded with dark grey shale.			
			4	*4.00*					Hole Terminated at 4.00 m Target Depth Reached.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH227

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	1/9/17
Position	Refer to Figure 2C	Surface RL	62.10 m AHD	Date Completed	1/9/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 1/9/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L	GWNE	0	62.10				-	TOPSOIL: Silty CLAY: medium plasticity, brown some fine to medium brown sand, trace fine to medium, sub-angular gravels.	M to D	-	TOPSOIL
				0.30 61.80	CBR:0.3-1.3 CBR 0.30-1.30 m SPT 0.50-0.77 m 2,8 HB N=8/120mm BH227_0.5-0.77			CL-CI	Silty CLAY: low to medium plasticity, brown mottled pale grey, some fine to medium grained, brown sand, some fine to medium, sub-angular, iron indurated gravels.	M (<PL)	H	RESIDUAL SOIL
			1	1.00 61.10				-	SANDSTONE: fine to medium grained, yellow and brown, distinctly weathered, very low strength, some ironstone bands.			BEDROCK
	M				BH227_1.5-1.6 D 1.50-1.60 m					-	-	
			2	2.00 60.10	BH227_2.0-2.1 D 2.00-2.10 m				From 2.0m, low to medium strength.			
									Hole Terminated at 2.10 m TC-bit refusal. Backfilled with drilling spoil.			
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH228

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	1/9/17
Position	Refer to Figure 2C	Surface RL	59.10 m AHD	Date Completed	1/9/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 1/9/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L	GWNE	0	59.10				-	TOPSOIL: Silty CLAY; high plasticity, dark brown mottled red-brown, some fine to medium, sub-angular, igneous gravels.	M	-	TOPSOIL
				0.80	SPT 0.50-0.95 m 3,4,5 N=9							
			1	58.30	BH228_0.5-0.8 BH228_0.8-0.95 0.80 m PP =200-210 kPa CBR:0.8-1.8 CBR 0.80-1.80 m SPT 1.50-1.95 m 2,3,3 N=6			CH	Silty CLAY: high plasticity, pale grey mottled orange-brown, trace fine to medium grained, sub-angular, iron indurated gravels.	M (>PL)	St to VSt	RESIDUAL SOIL
			2	*2.20*	BH228_1.5-1.95 1.50 m PP =220-230 kPa							
				56.90				CI	From 2.2m, medium plasticity, orange-brown.			
				2.80								
				56.30				CL	From 2.8m, low plasticity, brown.	M (<PL)		
			3	*3.20*	SPT 3.00-3.45 m 12,16,23 N=39							
	M			55.90	BH228_3.0-3.45			-	SANDSTONE: fine to medium grained, grey and brown, distinctly weathered, very low strength.	-	-	BEDROCK
				3.80								
				55.30	Bh228_3.8-4.0 D 3.80-4.00 m				From 3.8m, low strength.			
			4	*4.00*					Hole Terminated at 4.00 m Target Depth Reached.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH229

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	1/9/17
Position	Refer to Figure 2B	Surface RL	60.00 m AHD	Date Completed	1/9/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 1/9/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L	GWNE	0	60.00				-	FILL: Silty SAND; fine to medium grained, dark brown and brown, trace medium to high plasticity, dark brown clay, foul odour.	M	-	FILL
				0.60	SPT 0.50-0.95 m 2,3,7 N=10 BH229_0.6-0.95 0.60 m PP =230-240 kPa CBR:0.6-1.6 CBR 0.60-1.60 m			CH CL	Silty CLAY: high plasticity, orange-brown mottled brown, trace fine to medium grained, sub-angular, iron indurated gravels.	M (>PL)	VSt	RESIDUAL SOIL
			1	59.40 0.80 59.20					From 0.8m, low plasticity, grading into extremely weathered bedrock.	M (<PL)	H	
				1.60	SPT 1.50-1.95 m 6,16,18 N=34 BH229_1.6-1.95 1.60 m PP =500-600 kPa			-	SANDSTONE: fine to medium grained, grey, distinctly weathered, very low strength.			BEDROCK
			2	58.40						-	-	
				3.00								
			3	57.00	BH229_3.0-4.0 D 3.00-4.00 m				From 3.0m, very low to low strength.			
				4.00								
			4						Hole Terminated at 4.00 m Target Depth Reached.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH230

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	1/9/17
Position	Refer to Figure 2B	Surface RL	66.40 m AHD	Date Completed	1/9/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 1/9/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L	GWNE	0	66.40				-	FILL: Silty SAND; fine to medium grained, dark brown, trace high plasticity, dark brown clay, trace fine to medium grained, sub-angular gravels.	M	-	FILL
				0.30								
				66.10				CH	Silty CLAY: high plasticity, yellow-brown mottled dark grey, some fine to medium grained, brown sand, trace fine to medium grained, sub-angular gravels.	M (>PL)		RESIDUAL SOIL
			1		SPT 0.50-0.95 m 2,3,6 N=9 BH230_0.5-0.95 0.50 m PP =500-600 kPa CBR:0.5-1.5 CBR 0.50-1.50 m							
				1.50							H	
				64.90	SPT 1.50-1.95 m 6,8,10 N=18 BH230_1.5-1.95			CL	From 1.5m, low plasticity, grading into extremely weathered bedrock, some fine to medium grained, brown sand, some ironstone bands.	M (<PL)		
			2	*2.50*								
				63.90				-	SANDSTONE: fine to medium, grained, grey, distinctly weathered, very low strength.			BEDROCK
				3.00								
	M		3	63.40	BH230_3.0-4.0 D 3.00-4.00 m				From 3.0, very low to low strength.	-	-	
				4.00								
			4						Hole Terminated at 4.00 m Target Depth Reached.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH231

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Project	Proposed BAPS Temple			Sheet	1 OF 1
Location	230-242 Aldington Road, Kemps Creek NSW			Date Started	1/9/17
Position	Refer to Figure 2A	Surface RL	75.10 m AHD	Date Completed	1/9/17
Job No.	E23529.G03	Contractor	Geosense Drilling Pty Ltd	Logged BZ	Date: 1/9/17
Client	BAPS Australia	Drill Rig	Hanjin DB8	Checked JP	Date: 21/9/17
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	L	GWNE	0	75.10				-	FILL: Silty SAND; fine to medium grained, dark brown sand, trace high plasticity. dark brown clay, trace fine to medium grained, sub-angular gravels.	M	-	FILL
				0.60	SPT 0.50-0.95 m 2,3,5 N=8 BH231_0.6-0.95			CH	Silty CLAY: high plasticity, yellow-brown mottled pale grey, some fine to medium grained, yellow-brown sand, trace fine to medium grained, sub-angular, iron indurated gravels.	M (>PL)	VSt	RESIDUAL SOIL
			1	74.50	0.60 m PP =240-250 kPa			CI	From 1.0m, medium plasticity.			
				1.00								
				74.10								
				1.50								
				73.60	SPT 1.50-1.95 m 3,6,10 N=16 BH231_1.5-1.95			CL	From 1.5m, low plasticity, pale grey, some ironstone bands.			
			2							M (<PL)	H	
			3		SPT 3.00-3.45 m 8,12,16 N=28 BH231_3.0-3.45				From 3.2m, orange-brown.			
				3.20								
				71.90								
				3.50					From 3.5m, grading into extremely weathered, pale grey sandstone.			
				71.60								
				4.00	BH231_3.8-4.0 D 3.80-4.00 m							
			4						Hole Terminated at 4.00 m Target Depth Reached.			
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EXPLAINATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT LOGS

DRILLING/EXCAVATION METHOD

HA	Hand Auger	**RD**	Rotary blade or drag bit	**NQ**	Diamond Core - 47 mm
DTC	Diatube Coring	**RT**	Rotary Tricone bit	**NMLC**	Diamond Core - 52 mm
NDD	Non-destructive digging	**RAB**	Rotary Air Blast	**HQ**	Diamond Core - 63 mm
AS*	Auger Screwing	**RC**	Reverse Circulation	**HMLC**	Diamond Core - 63 mm
AD*	Auger Drilling	**PT**	Push Tube	**BH**	Tractor Mounted Backhoe
***V**	V-Bit	**CT**	Cable Tool Rig	**EX**	Tracked Hydraulic Excavator
***T**	TC-Bit, e.g. AD/T	**JET**	Jetting	**EE**	Existing Excavation
ADH	Hollow Auger	**WB**	Washbore or Bailer	**HAND**	Excavated by Hand Methods

PENETRATION RESISTANCE

L	**Low Resistance**	Rapid penetration/ excavation possible with little effort from equipment used.
M	**Medium Resistance**	Penetration/ excavation possible at an acceptable rate with moderate effort from equipment used.
H	**High Resistance**	Penetration/ excavation is possible but at a slow rate and requires significant effort from equipment used.
R	**Refusal/Practical Refusal**	No further progress possible without risk of damage or unacceptable wear to equipment used.

These assessments are subjective and are dependent on many factors, including equipment power and weight, condition of excavation or drilling tools and experience of the operator.

WATER

Water level at date shown

Partial water loss

Water inflow

Complete Water Loss

GWNE	GROUNDWATER NOT OBSERVED - Observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave-in of the borehole/ test pit.
GWNO	GROUNDWATER NOT ENCOUNTERED - Borehole/ test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/ test pit been left open for a longer period.

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-2004
4,7,11 N=18 seating	4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm
30/80mm	Where practical refusal occurs, the blows and penetration for that interval are reported
RW	Penetration occurred under the rod weight only
HW	Penetration occurred under the hammer and rod weight only
HB	Hammer double bouncing on anvil
Sampling	
DS	Disturbed Sample
BDS	Bulk disturbed Sample
GS	Gas Sample
WS	Water Sample
U63	Thin walled tube sample - number indicates nominal sample diameter in millimetres
Testing	
FP	Field Permeability test over section noted
FVS	Field Vane Shear test expressed as uncorrected shear strength (sv= peak value, sr= residual value)
PID	Photoionisation Detector reading in ppm
PM	Pressuremeter test over section noted
PP	Pocket Penetrometer test expressed as instrument reading in kPa
WPT	Water Pressure tests
DCP	Dynamic Cone Penetrometer test
CPT	Static Cone Penetration test
CPTu	Static Cone Penetration test with pore pressure (u) measurement

ROCK CORE RECOVERY

TCR=Total Core Recovery

$$= \frac{Length\ of\ core\ recovered}{Length\ of\ core\ run} \times 100$$

SCR=Solid Core Recovery (%)

$$= \frac{\sum Length\ of\ cylindrical\ core\ recovered}{Length\ of\ core\ run} \times 100$$

RQD = Rock Quality Designation (%)

$$= \frac{\sum Axial\ lengths\ of\ core > 100mm}{Length\ of\ core\ run} \times 100$$

MATERIAL BOUNDARIES

———— = Inferred Boundary

– – – – – – – – – = Probable Boundary

– ? – ? – ? – ? – ? – = Possible Boundary

METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT LOGS

	FILL		ORGANIC SOILS (OL, OH or Pt)		CLAY (CL, CI or CH)
	COUBLES or BOULDERS		SILT (ML or MH)		SAND (SP or SW)
	GRAVEL (GP or GW)	Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay			

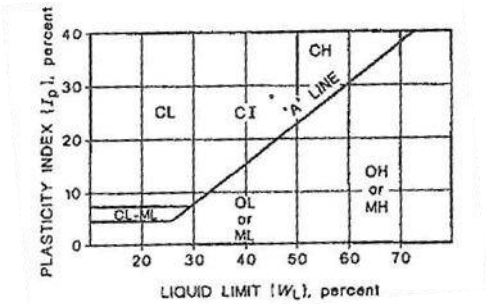
CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS1726 – 1993, (Amdt1 – 1994 and Amdt2 – 1994), Appendix A. Material properties are assessed in the field by visual/tactile methods.

PARTICLE SIZE CHARACTERISTICS

Major Division	Sub Division	Particle Size
BOULDERS		>200 mm
COBBLES		63 to 200 mm
GRAVEL	Coarse	20 to 63 mm
	Medium	6 to 20 mm
	Fine	2 to 6 mm
SAND	Coarse	0.6 to 2 mm
	Medium	0.2 to 0.6 mm
	Fine	0.075 to 0.2mm
SILT		0.002 to 0.075 mm
CLAY		<0.002 mm

PLASTICITY PROPERTIES



USCS SYMBOLS

Major Divisions		Symbol	Description
COARSE GRAINED SOILS More than 50% by dry mass less than 63mm is greater than 0.075mm	More than 50% of coarse grains are >2.mm	GW	Well graded gravel and gravel-sand mixtures, little or no fines.
		GP	Poorly graded gravel and gravel-sand mixtures, little or no fines.
		GM	Silty gravel, gravel-sand-silt mixtures.
		GC	Clayey gravel, gravel-sand-clay mixtures.
	More than 50% of coarse grains are <2 mm	SW	Well graded sand and gravelly sand, little or no fines.
		SP	Poorly graded sand and gravelly sand, little or no fines.
		SM	Silty sand, sand-silt mixtures.
		SC	Clayey sand, sandy-clay mixtures.
FINE GRAINED SOILS More than 50% by dry mass less than 63mm is less than 0.075mm	Liquid Limit less < 50%	ML	Inorganic silts of low plasticity, very fine sands, rock flour, silty or clayey fine sands.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		OL	Organic silts and organic silty clays of low plasticity.
	Liquid Limit > than 50%	MH	Inorganic silts of high plasticity.
		CH	Inorganic clays of high plasticity.
		OH	Organic clays of medium to high plasticity.
		PT	Peat muck and other highly organic soils.

MOISTURE CONDITION

Symbol	Term	Description
D	Dry	Sands and gravels are free flowing. Clays & Silts may be brittle or friable and powdery.
M	Moist	Soils are darker than in the dry condition & may feel cool. Sands and gravels tend to cohere.
W	Wet	Soils exude free water. Sands and gravels tend to cohere.

Moisture content of cohesive soils may also be described in relation to plastic limit (WP) or liquid limit (WL) [» much greater than, > greater than, < less than, « much less than].

CONSISTENCY

Symbol	Term	Undrained Shear Strength
VS	Very Soft	0. to 12 kPa
S	Soft	12 to 25 kPa
F	Firm	25 to 50 kPa
St	Stiff	50 to 100 kPa
VSt	Very Stiff	100 to 200 kPa
H	Hard	Above 200 kPa

DENSITY

Symbol	Term	Density Index %	SPT "N" #
VL	Very Loose	< 15	0 to 4
L	Loose	15 to 35	4 to 10
MD	Medium Density	35 to 65	10 to 30
D	Dense	65 to 85	30 to 50
VD	Very Dense	Above 85	Above 50

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.
SPT correlations are not stated in AS1726 – 1993, and may be subject to corrections for overburden pressure and equipment type.

MINOR COMPONENTS

Term	Assessment Guide	Proportion by Mass
Trace	Presence just detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: ≤ 5% Fine grained soil: ≤15%
Some	Presence easily detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: 5 - 12% Fine grained soil: 15 - 30%

TERMS FOR ROCK MATERIAL STRENGTH AND WEATHERING

CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS1726 – 1993, (Amdt1 – 1994 and Amdt2 – 1994), Appendix A. Material properties are assessed in the field by visual/ tactile methods.

STRENGTH

Symbol	Term	Point Load Index, $Is_{(50)}$ (MPa) #	Field Guide
EL	Extremely Low	< 0.03	Easily remoulded by hand to a material with soil properties.
VL	Very Low	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm can be broken by finger pressure.
L	Low	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	1 to 3	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.
VH	Very High	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

 # Rock Strength Test Results

▼ Point Load Strength Index, $Is_{(50)}$, Axial test (MPa)

● Point Load Strength Index, $Is_{(50)}$, Diametral test (MPa)

Relationship between rock strength test result ($Is_{(50)}$) and unconfined compressive strength (UCS) will vary with rock type and strength, and should be determined on a site-specific basis. UCS is typically 10 to 30 x $Is_{(50)}$, but can be as low as 5 MPa.

ROCK MATERIAL WEATHERING

Symbol		Term	Field Guide
RS		Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
EW		Extremely Weathered	Rock is weathered to such an extent that it has soil properties - i.e. it either disintegrates or can be remoulded, in water.
DW	HW	Distinctly Weathered	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores. In some environments it is convenient to subdivide into Highly Weathered and Moderately Weathered, with the degree of alteration typically less for MW.
	MW		
SW		Slightly Weathered	Rock slightly discoloured but shows little or no change of strength relative to fresh rock.
FR		Fresh	Rock shows no sign of decomposition or staining.

ABBREVIATIONS AND DESCRIPTIONS FOR ROCK MATERIAL AND DEFECTS

CLASSIFICATION AND INFERRED STRATIGRAPHY

Rock is broadly classified and described in Borehole Logs using the preferred method given in AS1726 – 1993, (Amdt1 – 1994 and Amdt2 – 1994), Appendix A. Material properties are assessed in the field by visual/ tactile methods.

ROCK MATERIAL DESCRIPTION

Layering

Term	Description
Massive	No layering apparent
Poorly Developed	Layering just visible; little effect on properties
Well Developed	Layering (bedding, foliation, cleavage) distinct; rock breaks more easily parallel to layering

Structure

Term	Spacing (mm)
Thinly laminated	<6
Laminated	6 – 20
Very thinly bedded	20 – 60
Thinly bedded	60 – 200
Medium bedded	200 – 600
Thickly bedded	600 – 2,000
Very thickly bedded	> 2,000

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT TYPES

Defect Type	Abbr.	Description
Joint	JT	Surface of a fracture or parting, formed without displacement, across which the rock has little or no tensile strength. May be closed or filled by air, water or soil or rock substance, which acts as cement.
Bedding Parting	BP	Surface of fracture or parting, across which the rock has little or no tensile strength, parallel or sub-parallel to layering/ bedding. Bedding refers to the layering or stratification of a rock, indicating orientation during deposition, resulting in planar anisotropy in the rock material.
Foliation	FL	Repetitive planar structure parallel to the shear direction or perpendicular to the direction of higher pressure, especially in metamorphic rock, e.g. Schistosity (SH) and Gneissosity.
Contact	CO	The surface between two types or ages of rock.
Cleavage	CL	Cleavage planes appear as parallel, closely spaced and planar surfaces resulting from mechanical fracturing of rock through deformation or metamorphism, independent of bedding.
Sheared Seam/ Zone (Fault)	SS/SZ	Seam or zone with roughly parallel almost planar boundaries of rock substance cut by closely spaced (often <50 mm) parallel and usually smooth or slickensided joints or cleavage planes.
Crushed Seam/ Zone (Fault)	CS/CZ	Seam or zone composed of disoriented usually angular fragments of the host rock substance, with roughly parallel near-planar boundaries. The brecciated fragments may be of clay, silt, sand or gravel sizes or mixtures of these.
Decomposed Seam/ Zone	DS/DZ	Seam of soil substance, often with gradational boundaries, formed by weathering of the rock material in places.
Infilled Seam	IS	Seam of soil substance, usually clay or clayey, with very distinct roughly parallel boundaries, formed by soil migrating into joint or open cavity.
Schistocity	SH	The foliation in schist or other coarse grained crystalline rock due to the parallel arrangement of platy or prismatic mineral grains, such as mica.
Vein	VN	Distinct sheet-like body of minerals crystallised within rock through typically open-space filling or crack-seal growth.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT SHAPE AND ROUGHNESS

Shape	Abbr.	Description	Roughness	Abbr.	Description
Planar	Pl	Consistent orientation	Polished	Pol	Shiny smooth surface
Curved	Cu	Gradual change in orientation	Slickensided	SL	Grooved or striated surface, usually polished
Undulating	Un	Wavy surface	Smooth	S	Smooth to touch. Few or no surface irregularities
Stepped	St	One or more well defined steps	Rough	RF	Many small surface irregularities (amplitude generally <1mm). Feels like fine to coarse sandpaper
Irregular	Ir	Many sharp changes in orientation	Very Rough	VR	Many large surface irregularities, amplitude generally >1mm. Feels like very coarse sandpaper

Orientation: **Vertical Boreholes –** The dip (inclination from horizontal) of the defect.
Inclined Boreholes – The inclination is measured as the acute angle to the core axis.

ABBREVIATIONS AND DESCRIPTIONS FOR DEFECT COATING

Coating	Abbr.	Description
Clean	CN	No visible coating or infilling
Stain	SN	No visible coating but surfaces are discoloured by staining, often limonite (orange-brown)
Veneer	VNR	A visible coating of soil or mineral substance, usually too thin to measure (< 1 mm); may be patchy

DEFECT APERTURE

Aperture	Abbr.	Description
Closed	CL	Closed.
Open	O	Without any infill material.
Infilled	-	Soil or rock i.e. clay, talc, pyrite, quartz, etc.

APPENDIX B

LABORATORY CERTIFICATES

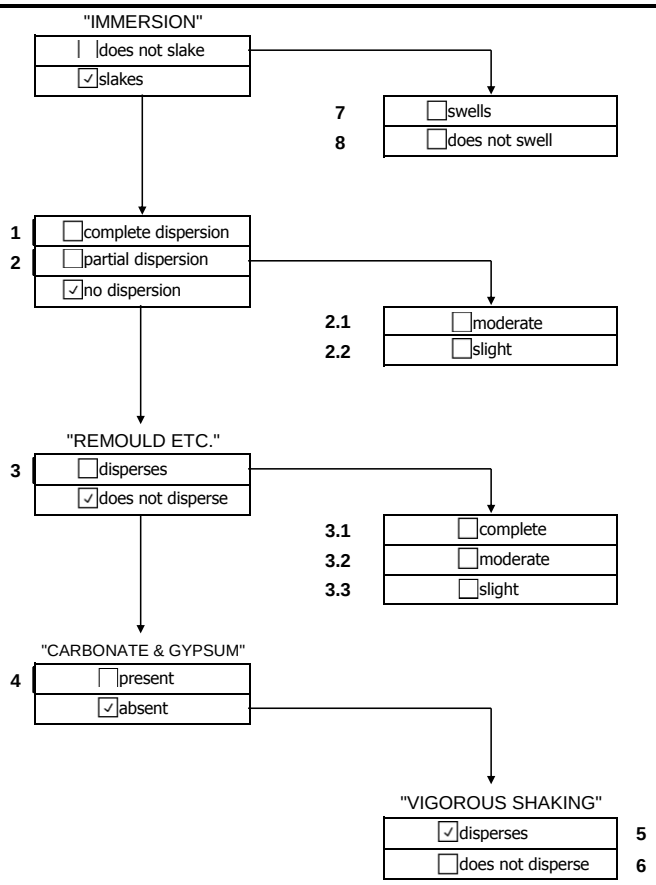
EMERSON CLASS REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH201 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S26981-ECT
Job No:	S17355	**Lab No:**	S26981

Test Procedure: ☑ AS1289 3.8.1 Soil classification tests - Dispersion - Determination of Emerson class number of a soil

Sampling: Sampled by Client **Date Sampled:** Unknown

Preparation: Prepared in accordance with the test method



Water Type	**Distilled**
Water Source	**Lab**
Water Temperature (°c)	**20.8**

RESULT:

Emerson Class No. **5**

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NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd

13/09/2017

Date:

MACQUARIE GEOTECH
Macquarie Geotechnical
U8 10 Bradford Street
Alexandria NSW 2015

MOISTURE CONTENT TEST REPORT

Client:	EI Australia Pty Ltd	**Job No:**	S17355
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Report No:**	S26981-MC
Project:	230 Aldington Rd, Kemps Creek (E23529)		

Test Procedure:

- ☑ AS 1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (Standard method).
- ☐ AS4133 1.1.1 Rock moisture content tests - Determination of the moisture content of rock - Oven drying method (standard method)
- ☐ RMS T120 Moisture content of road construction materials (Standard method)
- ☐ RMS T262 Determination of moisture content of aggregates (Standard method)

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		

Sample No.	Source	Sample Description	Moisture Content %
S26981	BH201 0.5-0.95m	silty CLAY	**26.6**
S26982	BH201 3.0-3.1m	gravelly sandy CLAY	**11.7**
S26983	BH201 4.5-4.6m	gravelly sandy CLAY	**8.1**
S26984	BH202 1.5-1.8m	gravelly sandy CLAY	**12.2**
S26985	BH202 4.0-4.2m	Rock Chips	**6.4**
S26986	BH202 6.0-6.2m	Rock Chips	**8.8**
S26988	BH204 5.9-6.0m	Rock Chips	**10.1**
S26989	BH205 3.5-3.6m	gravelly sandy CLAY	**13.5**
S26990	BH206 0.5-0.95m	sandy silty CLAY	**18.3**
S26991	BH206 3.8-4.0m	sandy Rock Chips	**6.4**
S26992	BH207 4.5-4.6m	sandy Rock Chips	**9.1**
S26993	BH207 4.8-5.0m	sandy Rock Chips	**8.9**
S26994	BH209 5.0-5.1m	sandy Rock Chips	**9.6**
S26995	BH210 0.5-0.95m	silty CLAY	**19.0**
S26997	BH211 3-3.2m	Rock Chips	**6.5**
S26998	BH211 5-5.2m	Rock Chips	**8.8**
S26999	BH213 4.5-4.95m	clayey Rock Chips	**11.1**
S27000	BH214 0.5-0.95m	silty CLAY	**14.7**
S27001	BH214 5.5-5.6m	Rock Chips	**9.4**
S27002	BH215 1.5-1.95m	silty CLAY	**19.8**
S27003	BH216 3-3.5m	silty CLAY	**13.3**
S27004	BH216 5.5-5.7m	Rock Chips	**7.5**
S27005	BH217 6-6.2m	Rock Chips	**9.5**
S27006	BH218 4-4.5m	Rock Chips	**10.2**
S27007	BH219 3-3.2m	Rock Chips	**8.6**

Notes:

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd

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Macquarie Geotechnical
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Alexandria NSW 2015

SOIL CLASSIFICATION REPORT

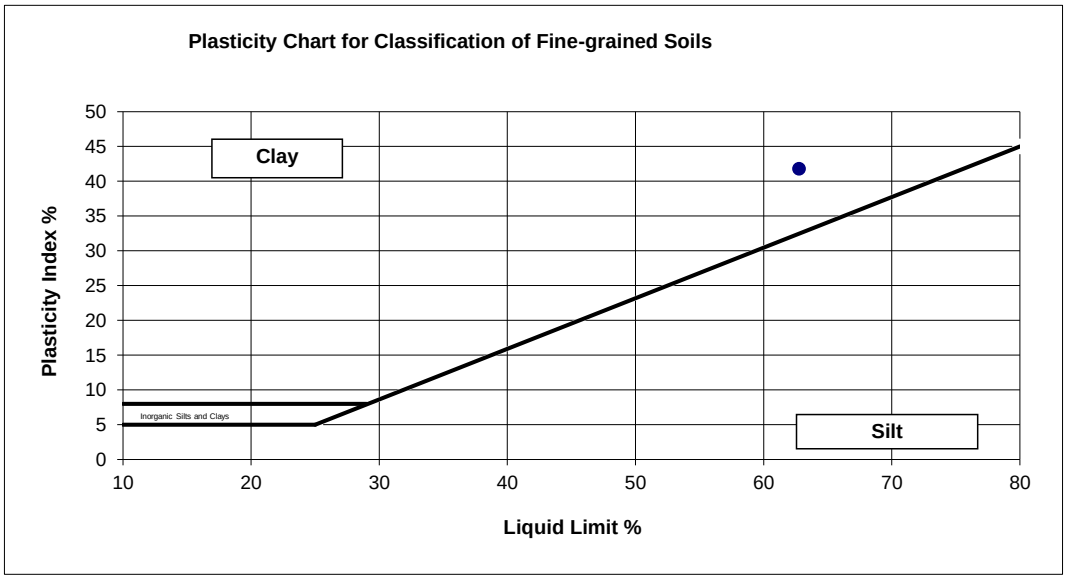
Client:	EI Australia Pty Ltd	**Source:**	BH201 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S26981-PI
Job No:	S17355	**Lab No:**	S26981

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☐ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☑ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☑ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	63	**Linear Shrinkage (%):**	15.5
Plastic Limit (%):	21	**Plastic Index:**	42



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

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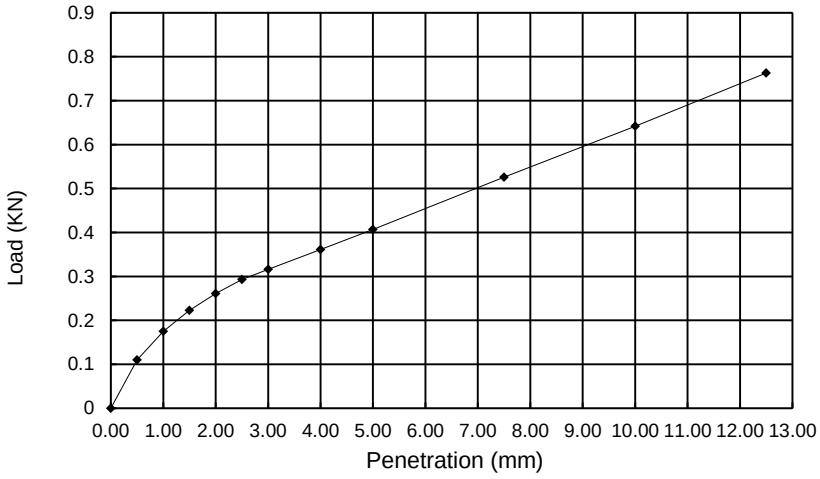
CALIFORNIA BEARING RATIO REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH203 0.4-1.4m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No.:**	S26987-CBR
Job No.:	S17355	**Lab No.:**	S26987

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used	Standard	Dry Density				
Maximum Dry Density t/m^3	1.84	At Compaction	1.84 t/m^3	100.0 % Comp.		
Optimum Moisture Content %	14.6	After Soaking	1.77 t/m^3	96.0 % Comp.		
No. of Layers	3	Moisture Content				Moisture Ratio (%)
Blows per Layer	53	At Compaction		%	14.6	100
Drop of Rammer mm	300	After Soaking		%	18.8	129
Mass of Rammer kg	2.7	After Penetration (Top 30mm)		%	25.4	174
Surcharge Used kg	4.5	After Penetration (Entire Depth)		%	17.2	118
% Ret. 19mm Sieve	0	Swell After 4 Days Soaking		%	4.3	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 2.0 % at 2.5 mm Penetration

Notes:

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

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DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

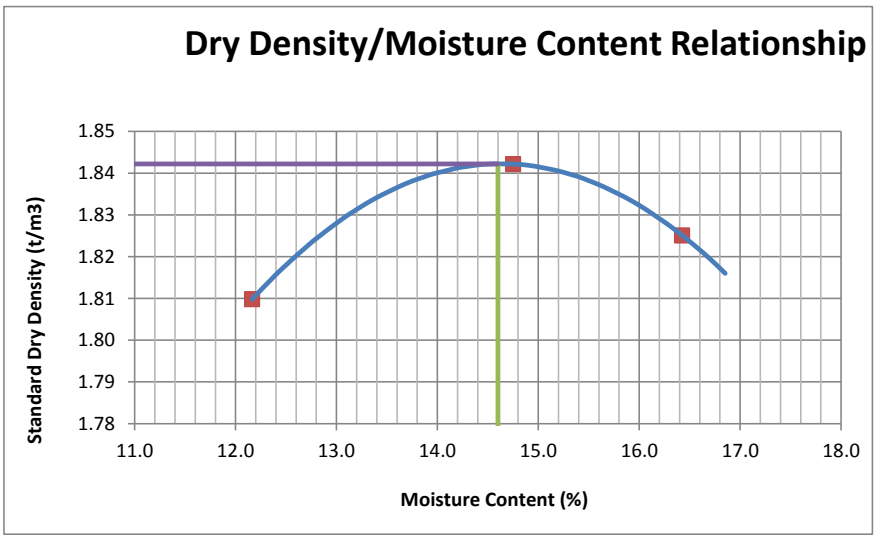
Client:	EI Australia Pty Ltd	**Source:**	BH203 0.4-1.4m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S26987-MDD
Job No:	S17355	**Lab No:**	S26987

Test Procedure:

☑ AS1289.5.1.1 Determination of the dry density/moisture content relation of a soil using standard compactive effort

☑ AS1289.2.1.1 Determination of the moisture content of a soil - Oven drying method (Standard method)

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Maximum Dry Density (t/m^3)	1.842
Optimum Moisture Content (%)	14.6
Percentage Oversize on 19mm sieve (%)	0
Percentage Oversize on 37.5mm sieve (%)	0

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SOIL CLASSIFICATION REPORT

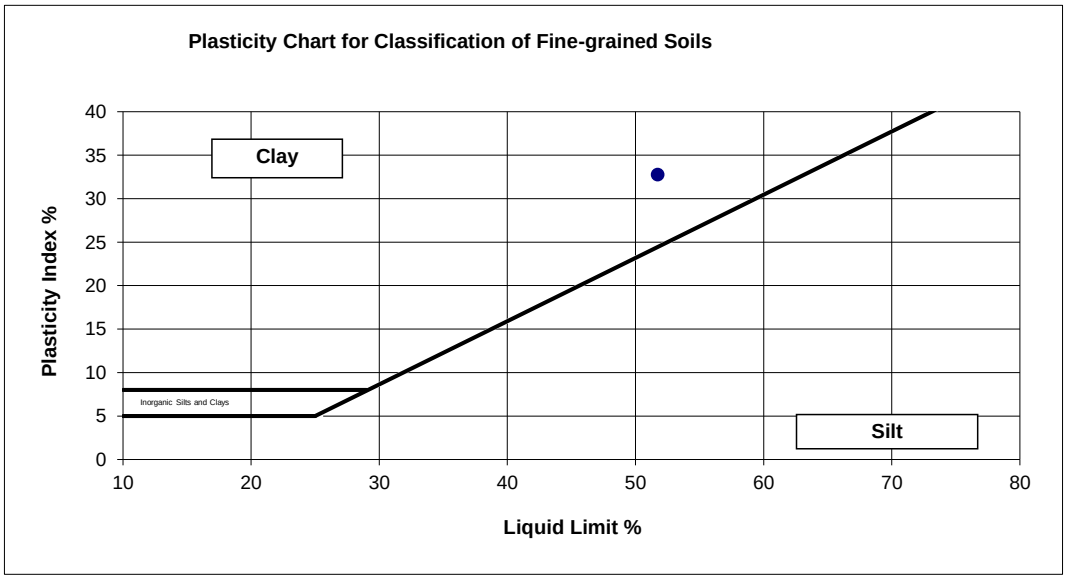
Client:	EI Australia Pty Ltd	**Source:**	BH206 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	sandy silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S26990-PI
Job No:	S17355	**Lab No:**	S26990

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☐ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☑ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☑ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	52	**Linear Shrinkage (%):**	14.0
Plastic Limit (%):	19	**Plastic Index:**	33



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Linear

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SOIL CLASSIFICATION REPORT

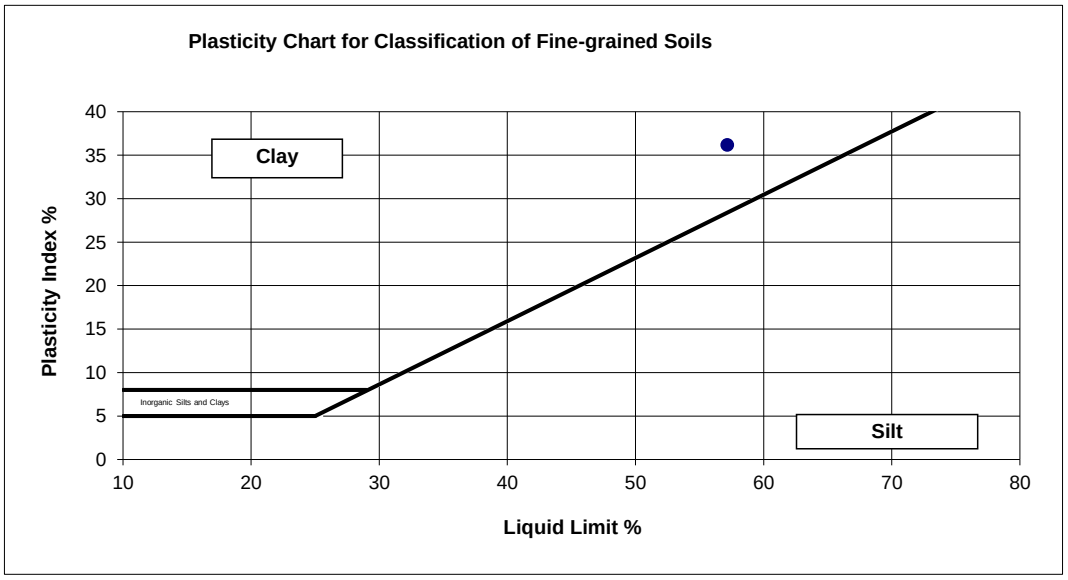
Client:	EI Australia Pty Ltd	**Source:**	BH210 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S26995-PI
Job No:	S17355	**Lab No:**	S26995

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☐ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☑ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☑ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	57	**Linear Shrinkage (%):**	14.0
Plastic Limit (%):	21	**Plastic Index:**	36



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

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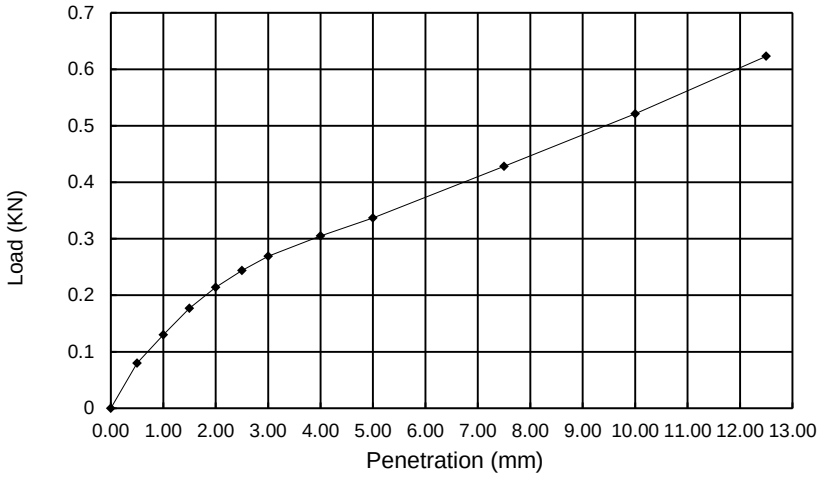
CALIFORNIA BEARING RATIO REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH210 0.3-1.3m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No.:**	S26996-CBR
Job No.:	S17355	**Lab No.:**	S26996

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used	Standard	Dry Density			
Maximum Dry Density t/m^3	1.78	At Compaction	1.77 t/m^3	100.0	% Comp.
Optimum Moisture Content %	16.6	After Soaking	1.69 t/m^3	95.0	% Comp.

No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	16.6	100
Drop of Rammer	mm	300	After Soaking	%	21.5	130
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	29.4	177
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	20.3	123
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking	%	5.5	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 2.0 % at 2.5 mm Penetration

Notes:

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

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Date:

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DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

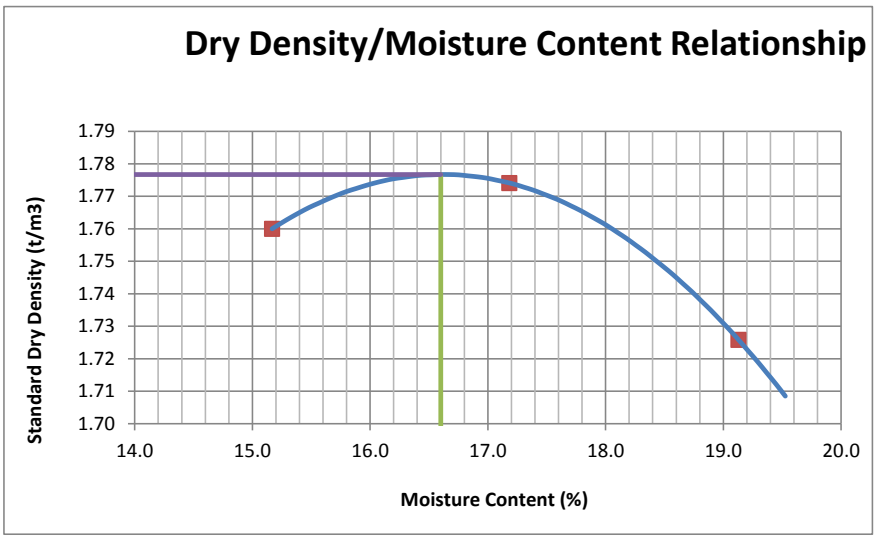
Client:	EI Australia Pty Ltd	**Source:**	BH210 0.3-1.3m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S26996-MDD
Job No:	S17355	**Lab No:**	S26996

Test Procedure:

☑ AS1289.5.1.1 Determination of the dry density/moisture content relation of a soil using standard compactive effort

☑ AS1289.2.1.1 Determination of the moisture content of a soil - Oven drying method (Standard method)

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Maximum Dry Density (t/m^3)	1.777
Optimum Moisture Content (%)	16.6
Percentage Oversize on 19mm sieve (%)	0
Percentage Oversize on 37.5mm sieve (%)	0

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Alexandria NSW 2015

SOIL CLASSIFICATION REPORT

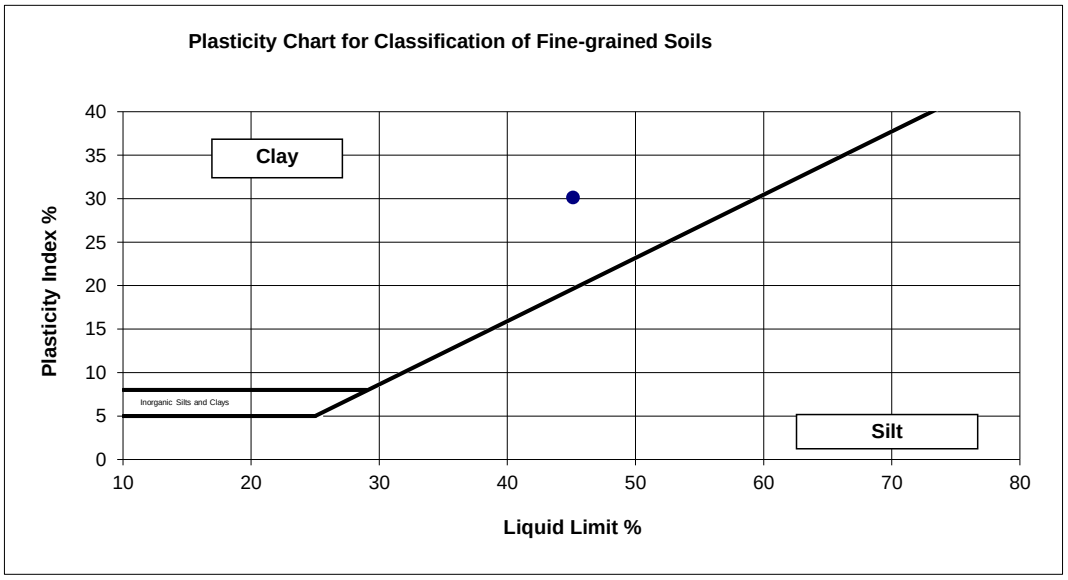
Client:	EI Australia Pty Ltd	**Source:**	BH214 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27000-PI
Job No:	S17355	**Lab No:**	S27000

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☐ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☑ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☑ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	45	**Linear Shrinkage (%):**	10.5
Plastic Limit (%):	15	**Plastic Index:**	30



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

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SOIL CLASSIFICATION REPORT

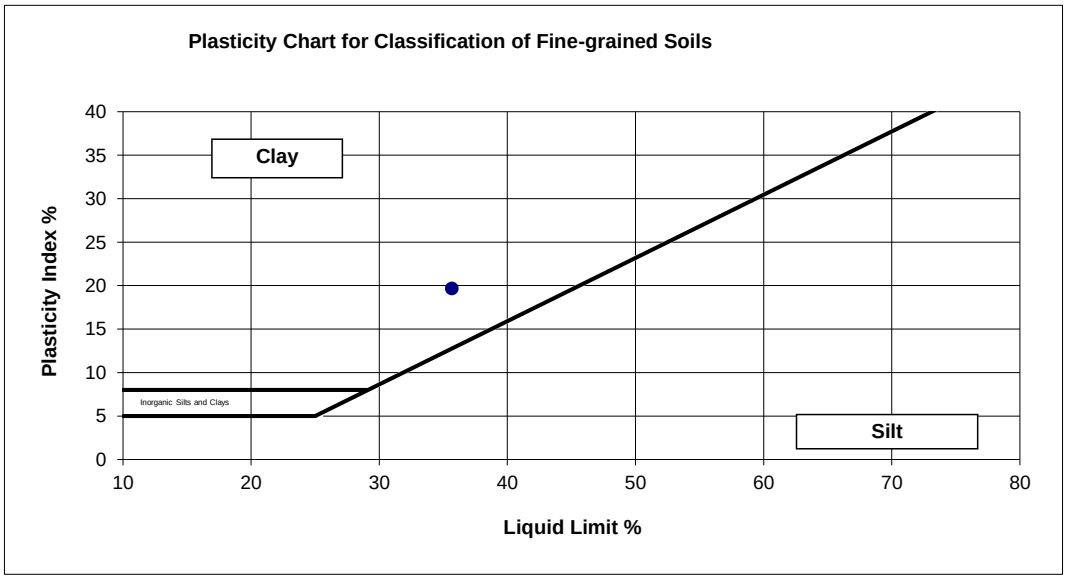
Client:	EI Australia Pty Ltd	**Source:**	BH215 1.5-1.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27002-PI
Job No:	S17355	**Lab No:**	S27002

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☑ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☑ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	36	**Linear Shrinkage (%):**	9.0
Plastic Limit (%):	16	**Plastic Index:**	20



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

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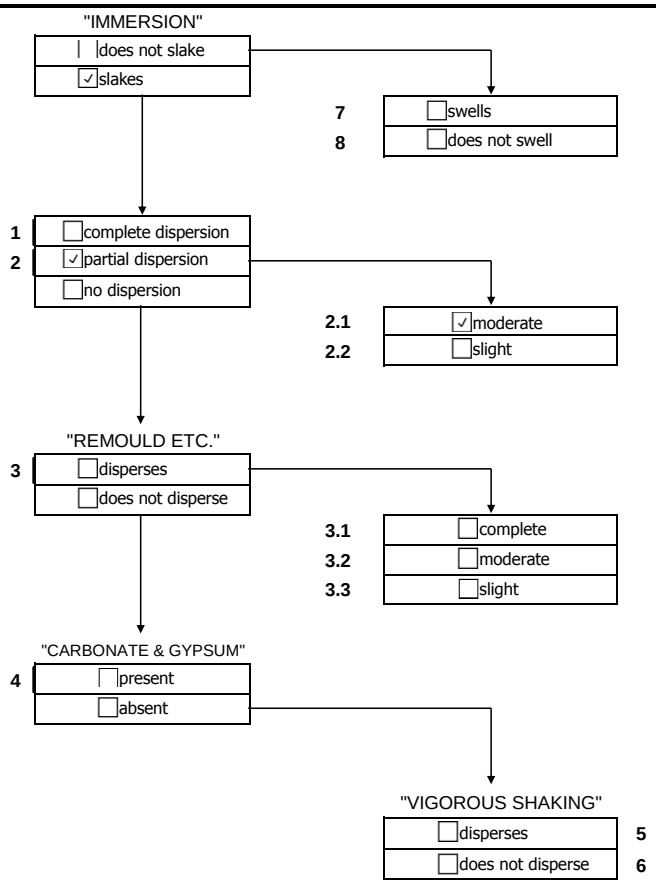
EMERSON CLASS REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH220 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27008-ECT
Job No:	S17355	**Lab No:**	S27008

Test Procedure: ☑ AS1289 3.8.1 Soil classification tests - Dispersion - Determination of Emerson class number of a soil

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Water Type	**Distilled**
Water Source	**Lab**
Water Temperature (°c)	**21.4**

RESULT:

Emerson Class No. **2**

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd

15/09/2017

Date:

MACQUARIE GEOTECH
Macquarie Geotechnical
U8 10 Bradford Street
Alexandria NSW 2015

MOISTURE CONTENT TEST REPORT

Client:	EI Australia Pty Ltd	**Job No:**	S17355
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Report No:**	S27008-MC
Project:	230 Aldington Rd, Kemps Creek (E23529)		

Test Procedure:

- ☑ AS 1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (Standard method).
- ☐ AS4133 1.1.1 Rock moisture content tests - Determination of the moisture content of rock - Oven drying method (standard method)
- ☐ RMS T120 Moisture content of road construction materials (Standard method)
- ☐ RMS T262 Determination of moisture content of aggregates (Standard method)

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		

Sample No.	Source	Sample Description	Moisture Content %
S27008	BH220 0.5-0.95m	silty CLAY	**22.2**
S27009	BH221 3-3.2m	Rock Chips	**10.9**
S27010	BH221 5-5.1m	Rock Chips	**10.1**
S27011	BH222 5-5.2m	Rock Chips	**5.7**
S27012	BH223 0.5-0.95m	silty CLAY	**16.9**
S27013	BH223 3-3.1m	sandy silty CLAY	**10.5**
S27014	BH224 4.5-4.7m	Rock Chips	**8.7**
S27015	BH225 3.8-4m	Rock Chips	**7.0**

Notes:

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SOIL CLASSIFICATION REPORT

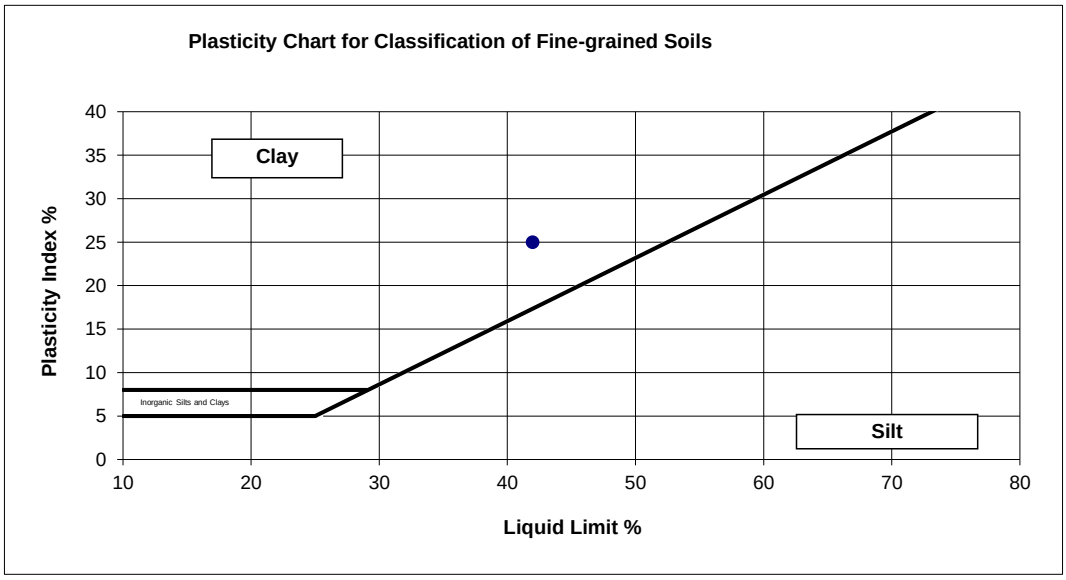
Client:	EI Australia Pty Ltd	**Source:**	BH220 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27008-PI
Job No:	S17355	**Lab No:**	S27008

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☐ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☑ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☑ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	42	**Linear Shrinkage (%):**	11.0
Plastic Limit (%):	17	**Plastic Index:**	25



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

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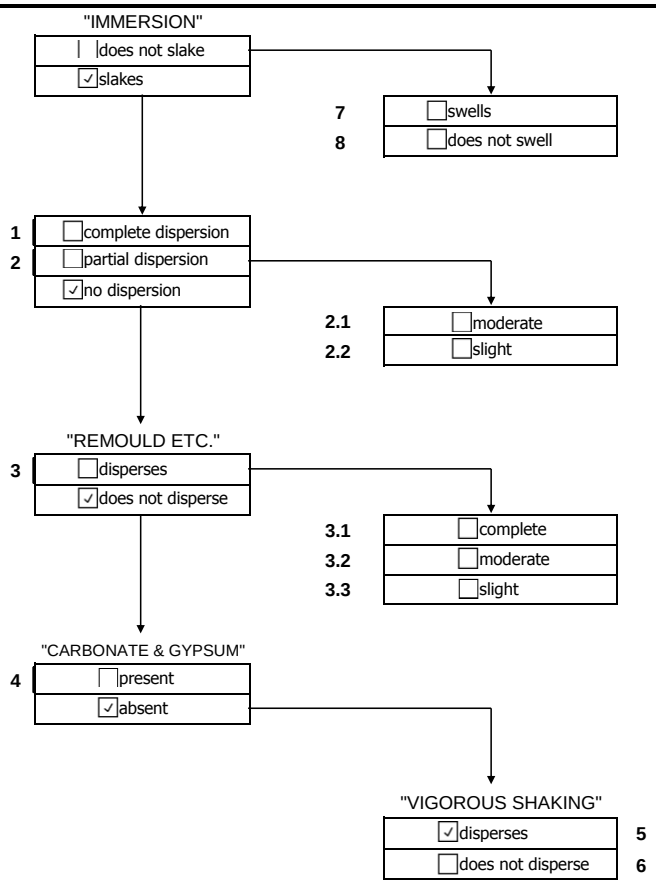
EMERSON CLASS REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH223 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27012-ECT
Job No:	S17355	**Lab No:**	S27012

Test Procedure: ☑ AS1289 3.8.1 Soil classification tests - Dispersion - Determination of Emerson class number of a soil

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Water Type	**Distilled**
Water Source	**Lab**
Water Temperature (°c)	**19**

RESULT:

Emerson Class No.	**5**

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SOIL CLASSIFICATION REPORT

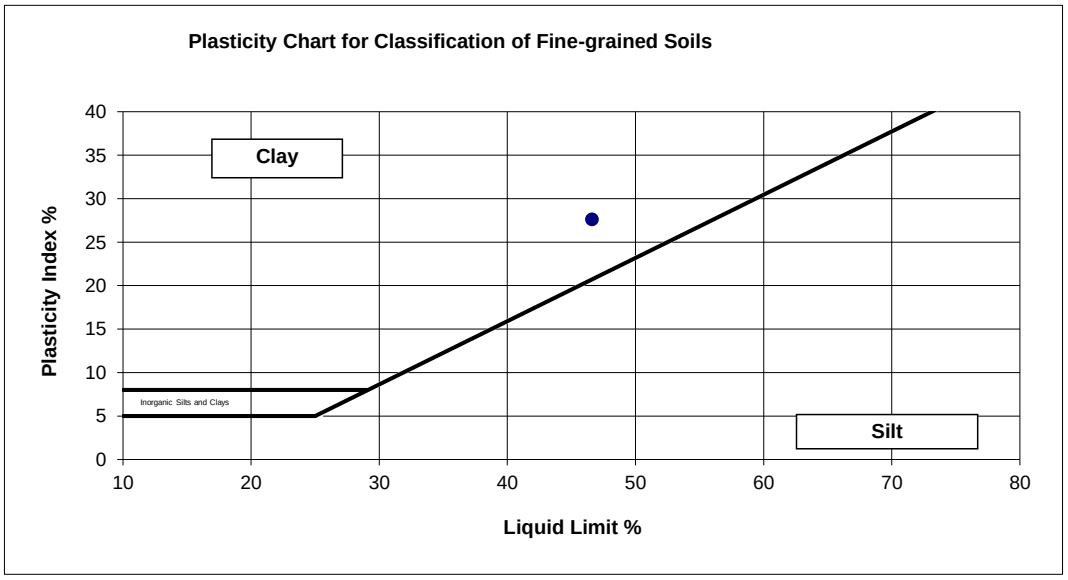
Client:	EI Australia Pty Ltd	**Source:**	BH223 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27012-PI
Job No:	S17355	**Lab No:**	S27012

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☑ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☑ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	47	**Linear Shrinkage (%):**	12.0
Plastic Limit (%):	19	**Plastic Index:**	28



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Linear

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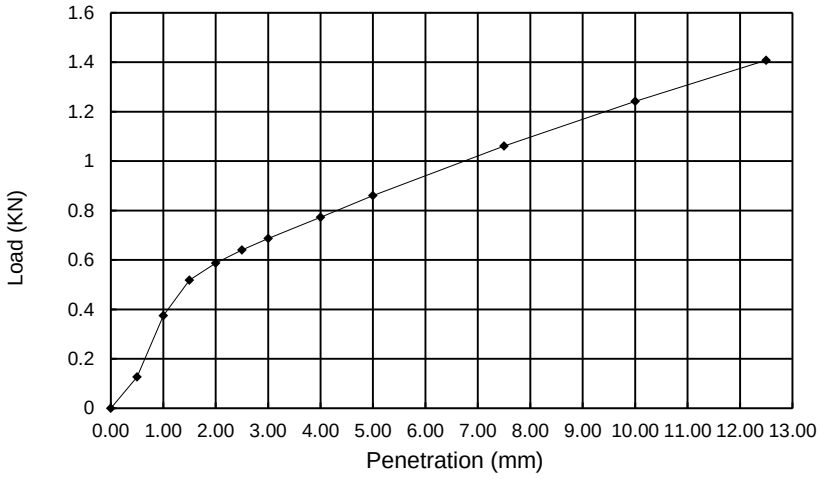
CALIFORNIA BEARING RATIO REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH226 0.5-1.5m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No.:**	S27016-CBR
Job No.:	S17355	**Lab No.:**	S27016

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used	Standard	Dry Density			
Maximum Dry Density t/m^3	1.75	At Compaction	1.75 t/m^3	100.0	% Comp.
Optimum Moisture Content %	17.7	After Soaking	1.72 t/m^3	99.0	% Comp.

No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	17.6	100
Drop of Rammer	mm	300	After Soaking	%	20.1	113
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	24.4	138
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	18.8	106
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking	%	1.7	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 5.0 % at 2.5 mm Penetration

Notes:

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DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

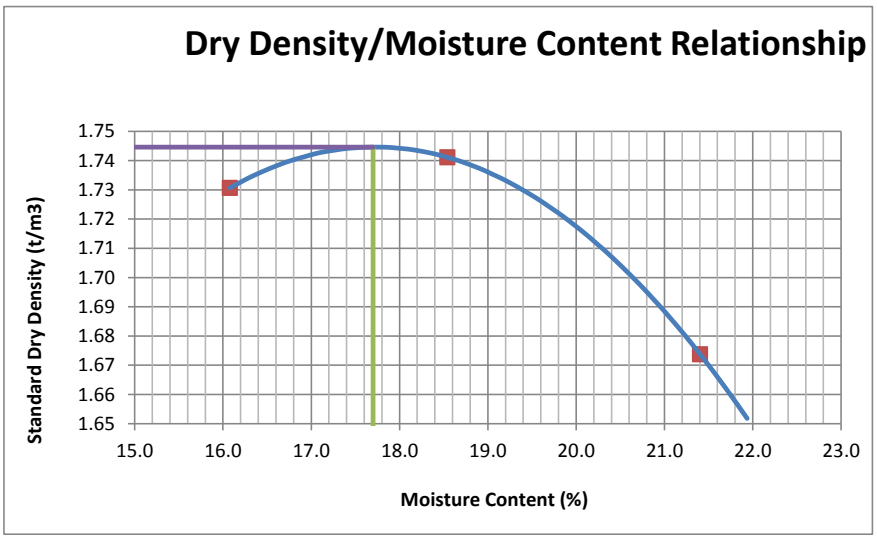
Client:	EI Australia Pty Ltd	**Source:**	BH226 0.5-1.5m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27016-MDD
Job No:	S17355	**Lab No:**	S27016

Test Procedure:

☑ AS1289.5.1.1 Determination of the dry density/moisture content relation of a soil using standard compactive effort

☑ AS1289.2.1.1 Determination of the moisture content of a soil - Oven drying method (Standard method)

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Maximum Dry Density (t/m^3)	1.745
Optimum Moisture Content (%)	17.7
Percentage Oversize on 19mm sieve (%)	0
Percentage Oversize on 37.5mm sieve (%)	0

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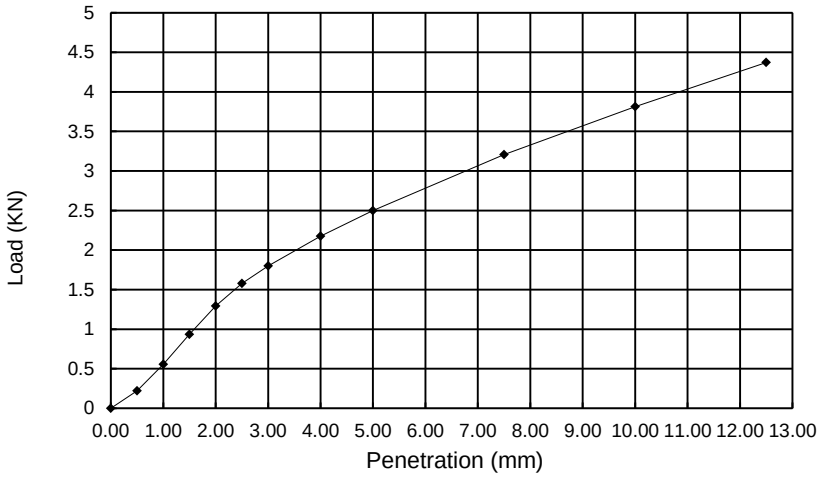
CALIFORNIA BEARING RATIO REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH227 0.3-1.3m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	sandy gravelly CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No.:**	S27017-CBR
Job No.:	S17355	**Lab No.:**	S27017

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used	Standard	Dry Density				
Maximum Dry Density t/m^3	2.02	At Compaction	2.02 t/m^3	100.0 % Comp.		
Optimum Moisture Content %	9.5	After Soaking	2.00 t/m^3	99.0 % Comp.		
No. of Layers	3	Moisture Content				Moisture Ratio (%)
Blows per Layer	53	At Compaction		%	9.5	100
Drop of Rammer mm	300	After Soaking		%	12.9	135
Mass of Rammer kg	2.7	After Penetration (Top 30mm)		%	14.1	148
Surcharge Used kg	4.5	After Penetration (Entire Depth)		%	11.9	125
% Ret. 19mm Sieve	2	Swell After 4 Days Soaking		%	1.0	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 13.0 % at 2.5 mm Penetration

Notes:

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DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

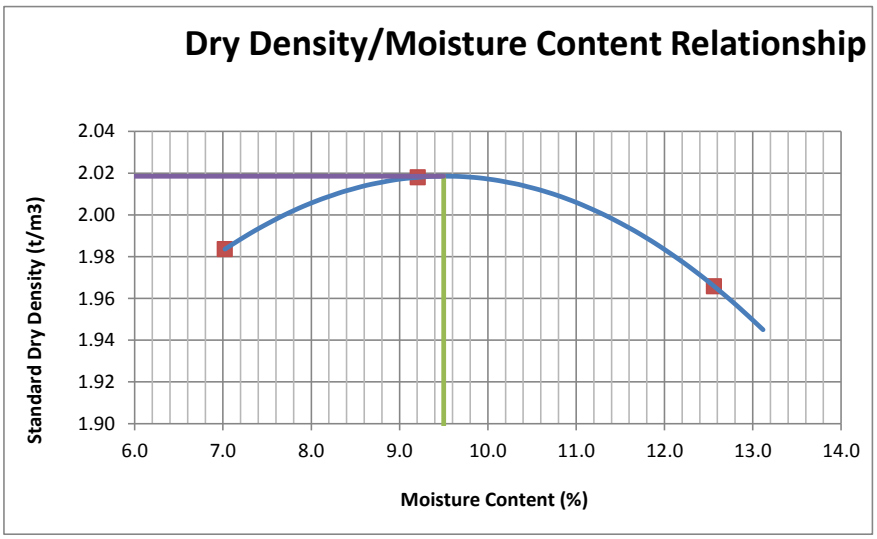
Client:	EI Australia Pty Ltd	**Source:**	BH227 0.3-1.3m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	sandy gravelly CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27017-MDD
Job No:	S17355	**Lab No:**	S27017

Test Procedure:

☑ AS1289.5.1.1 Determination of the dry density/moisture content relation of a soil using standard compactive effort

☑ AS1289.2.1.1 Determination of the moisture content of a soil - Oven drying method (Standard method)

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Maximum Dry Density (t/m^3)	2.019
Optimum Moisture Content (%)	9.5
Percentage Oversize on 19mm sieve (%)	2
Percentage Oversize on 37.5mm sieve (%)	1

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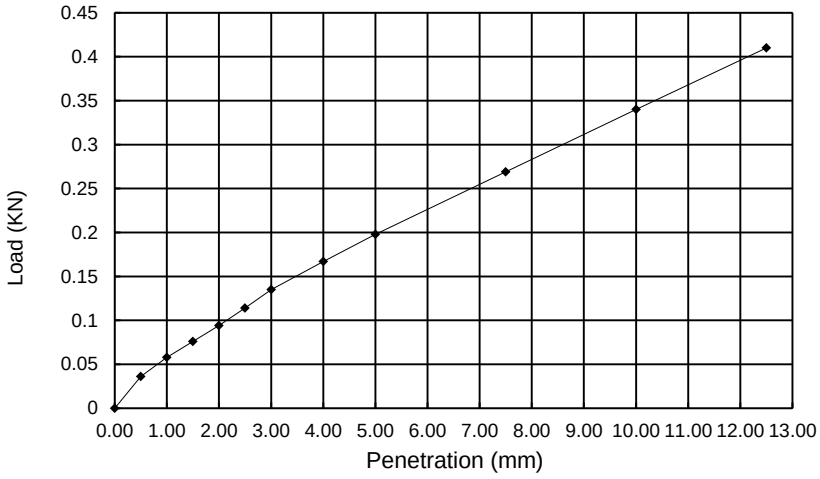
CALIFORNIA BEARING RATIO REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH229 0.6-1.6m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No.:**	S27018-CBR
Job No.:	S17355	**Lab No.:**	S27018

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used	Standard	Dry Density			
Maximum Dry Density t/m^3	1.86	At Compaction	1.86 t/m^3	100.0	% Comp.
Optimum Moisture Content %	14.4	After Soaking	1.75 t/m^3	94.0	% Comp.

No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	14.4	100
Drop of Rammer	mm	300	After Soaking	%	20.3	141
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	29.0	201
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	19.3	134
% Ret. 19mm Sieve		1	Swell After 4 Days Soaking	%	6.3	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 1.0 % at 2.5 mm Penetration

Notes:

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Date:

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DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

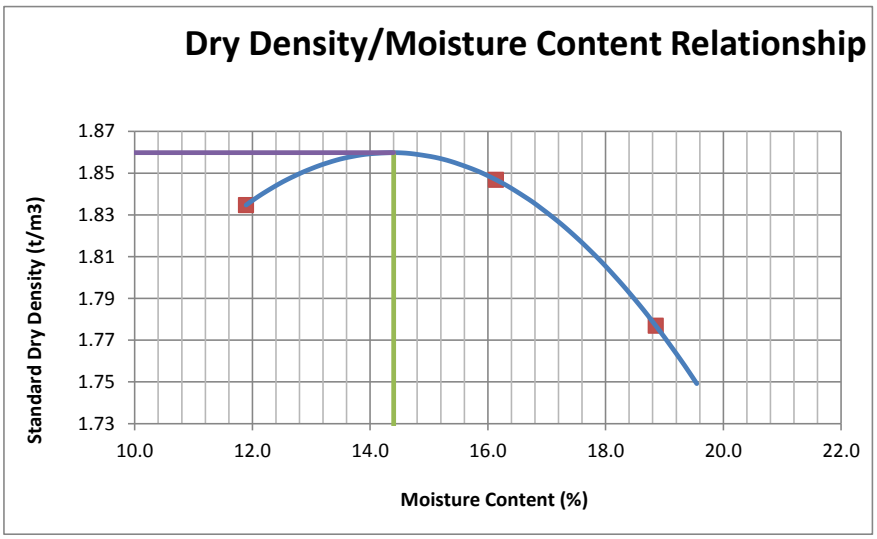
Client:	EI Australia Pty Ltd	**Source:**	BH229 0.6-1.6m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27018-MDD
Job No:	S17355	**Lab No:**	S27018

Test Procedure:

☑ AS1289.5.1.1 Determination of the dry density/moisture content relation of a soil using standard compactive effort

☑ AS1289.2.1.1 Determination of the moisture content of a soil - Oven drying method (Standard method)

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Maximum Dry Density (t/m^3)	1.860
Optimum Moisture Content (%)	14.4
Percentage Oversize on 19mm sieve (%)	1
Percentage Oversize on 37.5mm sieve (%)	0

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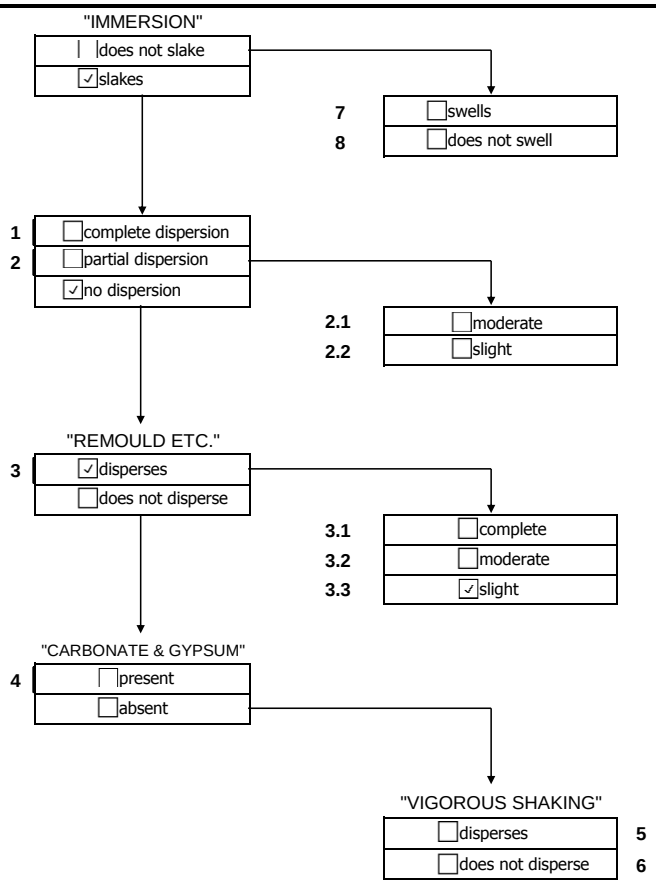
EMERSON CLASS REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH230 0.5-0.95m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	gravelly silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27019-ECT
Job No:	S17355	**Lab No:**	S27019

Test Procedure: ☑ AS1289 3.8.1 Soil classification tests - Dispersion - Determination of Emerson class number of a soil

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Water Type	**Distilled**
Water Source	**Lab**
Water Temperature (°c)	**18.9**

RESULT:

Emerson Class No. **3.3**

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

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Date:

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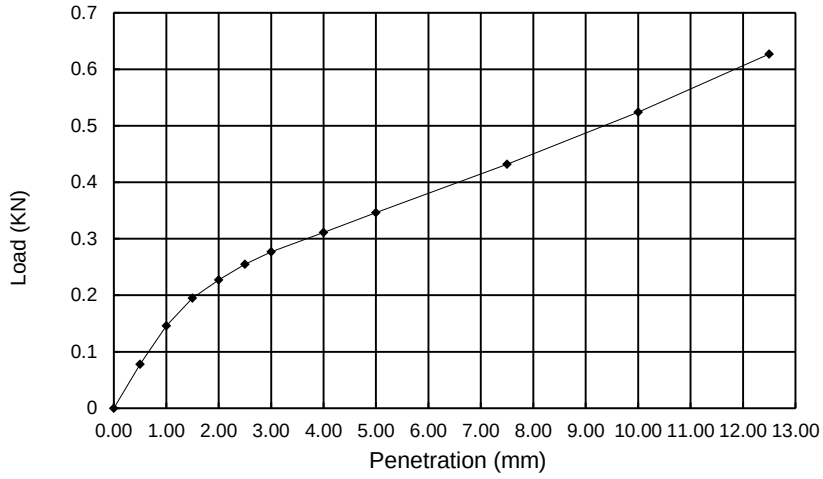
CALIFORNIA BEARING RATIO REPORT

Client:	EI Australia Pty Ltd	**Source:**	BH230 0.5-1.5m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No.:**	S27020-CBR
Job No.:	S17355	**Lab No.:**	S27020

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used	Standard	Dry Density			
Maximum Dry Density t/m^3	1.85	At Compaction	1.84 t/m^3	100.0	% Comp.
Optimum Moisture Content %	14.5	After Soaking	1.77 t/m^3	96.0	% Comp.

No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	14.5	100
Drop of Rammer	mm	300	After Soaking	%	17.8	123
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	26.1	180
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	17.1	118
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking	%	4.4	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 2.0 % at 2.5 mm Penetration

Notes:

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DRY DENSITY / OPTIMUM MOISTURE CONTENT REPORT

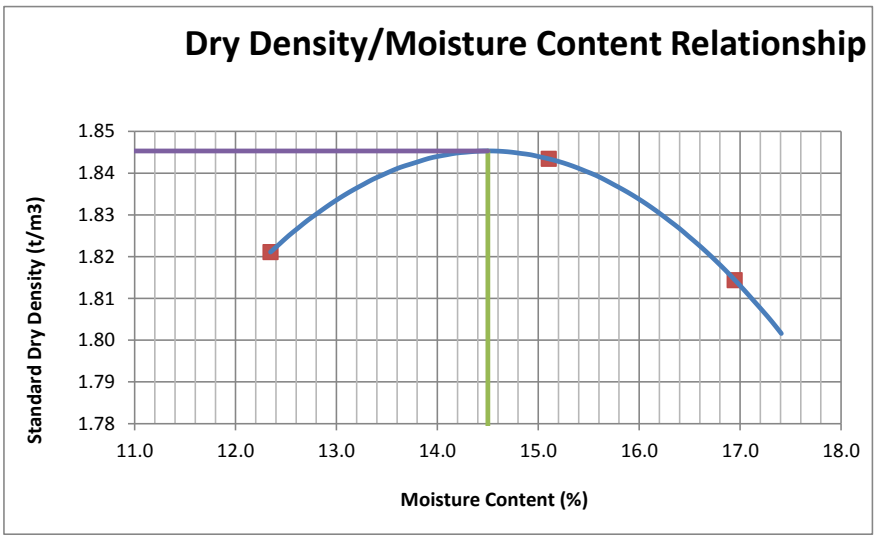
Client:	EI Australia Pty Ltd	**Source:**	BH230 0.5-1.5m
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Sample Description:**	silty CLAY
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27020-MDD
Job No:	S17355	**Lab No:**	S27020

Test Procedure:

☑ AS1289.5.1.1 Determination of the dry density/moisture content relation of a soil using standard compactive effort

☑ AS1289.2.1.1 Determination of the moisture content of a soil - Oven drying method (Standard method)

Sampling:	Sampled by Client	**Date Sampled:**	Unknown
Preparation:	Prepared in accordance with the test method		



Maximum Dry Density (t/m^3)	1.845
Optimum Moisture Content (%)	14.5
Percentage Oversize on 19mm sieve (%)	0
Percentage Oversize on 37.5mm sieve (%)	0

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POINT LOAD STRENGTH INDEX REPORT

Client:	EI Australia Pty Ltd	**Moisture Content Condition:**	As Received
Address:	Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009	**Storage History:**	Core Boxes
Project:	230 Aldington Rd, Kemps Creek (E23529)	**Report No:**	S27546-PL
Job No:	S17355	**Date Tested:**	20/09/2017

Test Procedure: ☑ AS4133 4.1 Rock strength tests - Determination of point load strength index

Sampling: Sampled by Client **Date Sampled:** 28-29/08/17

Preparation: Prepared in accordance with the test method

Sample Number	Sample Source	Sample Description	Test Type	Average Width (mm)	Platen Separation (mm)	Failure Load (kN)	Point Load Index Is (MPa)	Point Load Index $Is_{(50)}$ (MPa)	Failure Mode
S27546	BH205 7.05-7.14m	Siltstone	Diametral	-	50.0	0.05	0.02	0.02	1
			Axial	52.0	32.0	1.87	0.88	0.85	1
S27547	BH205 8.53-8.63m	Siltstone	Diametral	-	48.0	0.57	0.25	0.24	1
			Axial	52.0	29.0	0.93	0.48	0.46	1
S27548	BH205 9.24-9.31m	Siltstone	Diametral	-	49.0	0.47	0.20	0.19	1
			Axial	51.0	19.0	0.88	0.71	0.61	1
S27549	BH208 4.19-4.26m	Siltstone	Diametral	-	49.0	0.12	0.05	0.05	1
			Axial	53.0	31.0	0.05	0.02	0.02	3
S27550	BH208 5.85-5.95m	Siltstone	Diametral	-	49.0	1.81	0.75	0.74	1
			Axial	52.0	33.0	0.91	0.41	0.40	1
S27551	BH208 6.86-6.94m	Siltstone	Diametral	-	48.0	0.12	0.05	0.05	1
			Axial	54.0	15.0	0.23	0.22	0.18	1
S27552	BH208 8.23-8.3m	Siltstone	Diametral	-	48.0	0.18	0.08	0.07	1
			Axial	51.0	24.0	0.27	0.17	0.16	3
			Diametral						
			Axial						
			Diametral						
			Axial						
			Diametral						
			Axial						

Failure Modes

1 - Fracture through fabric of specimen oblique to bedding, not influenced by weak planes.

2 - Fracture along bedding.

3 - Fracture influenced by pre-existing plane, microfracture, vein or chemical alteration.

4 - Chip or partial fracture.

Authorised Signatory:

Chris Lloyd

20/09/2017

Date

NATA Accredited Laboratory Number: 14874

MACQUARIE GEOTECH

Macquarie Geotechn
U8 10 Bradford Street
Alexandria NSW

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Bryan Zheng
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	bryan.zheng@eiaustralia.com.au
Project	**E23529 - 230 Aldington Rd Kemps Creek**
Order Number	**E23529**
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE170270 R0**
Date Received	14/9/2017
Date Reported	19/9/2017

COMMENTS

Accredited for compliance with ISO/IEC 17025- Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Ly Kim Ha
Organic Section Head

Shane McDermott
Inorganic/Metals Chemist

Snezana Kostoska
2IC Inorganics Chemist

pH in soil (1:5) [AN101] Tested: 18/9/2017

PARAMETER	UOM	LOR	BH201_1.5-1.78 SOIL - 28/8/2017 SE170270.001	BH202_0.5-0.95 SOIL - 28/8/2017 SE170270.002	BH205_0.5-0.95 SOIL - 28/8/2017 SE170270.003	BH209_0.5-0.95 SOIL - 29/8/2017 SE170270.004	BH209_1.5-1.95 SOIL - 30/8/2017 SE170270.005
pH	pH Units	-	9.6	5.4	8.6	8.2	9.5

PARAMETER	UOM	LOR	BH221_1.5-1.95 SOIL - 31/8/2017 SE170270.006
pH	pH Units	-	9.3

Conductivity and TDS by Calculation - Soil [AN106] Tested: 18/9/2017

PARAMETER	UOM	LOR	BH201_1.5-1.78 SOIL - 28/8/2017 SE170270.001	BH202_0.5-0.95 SOIL - 28/8/2017 SE170270.002	BH205_0.5-0.95 SOIL - 28/8/2017 SE170270.003	BH209_0.5-0.95 SOIL - 29/8/2017 SE170270.004	BH209_1.5-1.95 SOIL - 30/8/2017 SE170270.005
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	410	550	160	150	250

PARAMETER	UOM	LOR	BH221_1.5-1.95 SOIL - 31/8/2017 SE170270.006
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	560

Soluble Anions (1:5) in Soil by Ion Chromatography [AN245] Tested: 18/9/2017

PARAMETER	UOM	LOR	BH201_1.5-1.78 SOIL - 28/8/2017 SE170270.001	BH202_0.5-0.95 SOIL - 28/8/2017 SE170270.002	BH205_0.5-0.95 SOIL - 28/8/2017 SE170270.003	BH209_0.5-0.95 SOIL - 29/8/2017 SE170270.004	BH209_1.5-1.95 SOIL - 30/8/2017 SE170270.005
Chloride	mg/kg	0.25	70	370	10	67	63
Sulfate	mg/kg	5	160	250	60	78	12

PARAMETER	UOM	LOR	BH221_1.5-1.95 SOIL - 31/8/2017 SE170270.006
Chloride	mg/kg	0.25	580
Sulfate	mg/kg	5	97

Moisture Content [AN002] Tested: 18/9/2017

PARAMETER	UOM	LOR	BH201_1.5-1.78 SOIL - 28/8/2017 SE170270.001	BH202_0.5-0.95 SOIL - 28/8/2017 SE170270.002	BH205_0.5-0.95 SOIL - 28/8/2017 SE170270.003	BH209_0.5-0.95 SOIL - 29/8/2017 SE170270.004	BH209_1.5-1.95 SOIL - 30/8/2017 SE170270.005
% Moisture	%w/w	0.5	9.6	17	17	12	11

PARAMETER	UOM	LOR	BH221_1.5-1.95 SOIL - 31/8/2017 SE170270.006
% Moisture	%w/w	0.5	14

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl2) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN245	Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

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APPENDIX C

IMPORTANT INFORMATION

Important Information

SCOPE OF SERVICES

The geotechnical report ("the report") has been prepared in accordance with the scope of services as set out in the contract, or as otherwise agreed, between the Client And EI Australia ("EI"). The scope of work may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

RELIANCE ON DATA

EI has relied on data provided by the Client and other individuals and organizations, to prepare the report. Such data may include surveys, analyses, designs, maps and plans. EI has not verified the accuracy or completeness of the data except as stated in the report. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations ("conclusions") are based in whole or part on the data, EI will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to EI.

GEOTECHNICAL ENGINEERING

Geotechnical engineering is based extensively on judgment and opinion. It is far less exact than other engineering disciplines. Geotechnical engineering reports are prepared for a specific client, for a specific project and to meet specific needs, and may not be adequate for other clients or other purposes (e.g. a report prepared for a consulting civil engineer may not be adequate for a construction contractor). The report should not be used for other than its intended purpose without seeking additional geotechnical advice. Also, unless further geotechnical advice is obtained, the report cannot be used where the nature and/or details of the proposed development are changed.

LIMITATIONS OF SITE INVESTIGATION

The investigation programme undertaken is a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions. The data derived from the site investigation programme and subsequent laboratory testing are extrapolated across the site to form an inferred geological model, and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Despite investigation, the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. The engineering logs are the subjective interpretation of subsurface conditions at a particular location and time, made by trained personnel. The actual interface between materials may be more gradual or abrupt than a report indicates.

SUBSURFACE CONDITIONS ARE TIME DEPENDENT

Subsurface conditions can be modified by changing natural forces or man-made influences. The report is based on conditions that existed at the time of subsurface exploration. Construction operations adjacent to the site, and natural events such as floods, or ground water fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report. EI should be kept appraised of any such events, and should be consulted to determine if any additional tests are necessary.

VERIFICATION OF SITE CONDITIONS

Where ground conditions encountered at the site differ significantly from those anticipated in the report, either due to natural variability of subsurface conditions or construction activities, it is a condition of the report that EI be notified of any variations and be provided with an opportunity to review the recommendations of this report. Recognition of change of soil and rock conditions requires experience and it is recommended that a suitably experienced geotechnical engineer be engaged to visit the site with sufficient frequency to detect if conditions have changed significantly.

REPRODUCTION OF REPORTS

 Where information from the accompanying report is to be included in contract documents or engineering specification for the project, the entire report should be included in order to minimize the likelihood of misinterpretation from logs.

REPORT FOR BENEFIT OF CLIENT

The report has been prepared for the benefit of the Client and no other party. EI assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of EI or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and obtain independent advice in relation to such matters.

OTHER LIMITATIONS

EI will not be liable to update or revise the report to take into account any events or emergent circumstances or fact occurring or becoming apparent after the date of the report.