



**REPORT**  
**TO**  
**TKD ARCHITECTS**  
**ON**  
**GEOTECHNICAL INVESTIGATION**  
**FOR**  
**PROPOSED SCHOOL BUILDINGS AND CAR PARK**  
**AT**  
**CURL CURL NORTH PUBLIC SCHOOL,**  
**PLAYFAIR ROAD, CURL CURL, NSW**

**1 May 2018**  
**Ref: 29816ZHRpt Rev2**



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**BOREHOLE LOGS 1 TO 13 INCLUSIVE**

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**FIGURE 2: BOREHOLE LOCATION PLAN**

**REPORT EXPLANATION NOTES**

**ENVIROLAB SERVICES REPORT NO: 159442**



## **1 INTRODUCTION**

This report presents the results of a geotechnical investigation for the proposed school buildings and car park at Curl Curl North Public School, Playfair Road, Curl Curl, NSW. A site location plan is presented as Figure 1. The investigation was commissioned by Mr Alex Kibble of TKD Architects by signed 'Acceptance of Proposal' form, dated 26 September 2016. The commission was on the basis of our proposal (Ref P43445ZH, dated 23 September 2016).

We previously investigated the site for a similar, but different development. The original development has been revised and we have updated our previous report to address the geotechnical issues associated with the site and the new development proposal.

We have been provided with the following:

1. A site survey plan (Drawing Name: 15728detail, Rev 2, dated 25 October 2016) prepared by CMS Surveyors;
2. Architectural drawings (Drawing Nos. 161029.AR.DA2 [1101<sup>P7</sup>, 2001<sup>P3</sup>, 2002<sup>P4</sup>, 2003<sup>P3</sup>, 2004<sup>P4</sup>, 2005<sup>P3</sup>, 2006<sup>P4</sup>, 3001<sup>P3</sup> and 3101<sup>P3</sup>]) prepared by TKD Architects; and
3. An undated letter (Job No. 16-207) prepared by Woolacotts, indicating that the maximum working column load for the proposed buildings could be up 2,000kN.

Based on the provided architectural drawings, several two storey school buildings are proposed at the site. An on-grade car park is proposed at the southern end of the site. The ground finished floor levels (FFLs) of the proposed buildings will be between reduced levels (RL) 5.9m and RL10.3m. To achieve these levels, ground surface levels will need to be raised by up to approximately 1.9m. We assume that the proposed car park surface will be constructed at, or close to, existing grade.

The purpose of the investigation was to obtain geotechnical information on subsurface conditions at thirteen nominated borehole locations, and based on the results obtained, to present our comments and recommendations on earthworks, retaining walls, footings, on-grade floor slabs, external pavements, earthquake design parameters and durability.

We were also commissioned to carry out a Preliminary Environmental Site Assessment. This work was carried out by our environmental section, Environmental Investigation Services (EIS), who prepared a report (Ref E29816KFrpt). This geotechnical report must be read in conjunction with the EIS report.



## **2 INVESTIGATION PROCEDURE**

Prior to the commencement of the fieldwork, a 'Dial Before You Dig' (DBYD) search was undertaken and the borehole locations were electromagnetically scanned by a specialist sub-contractor for buried services.

The fieldwork was carried out on 4 October 2016 and 11 December 2016 and comprised the auger drilling of thirteen boreholes (BH1 to BH13) using our track mounted drill rigs to depths of either 6.45m (BH1 and BH3 to BH13) or 7.5m (BH2) below existing grade. The borehole locations were drilled as close as practical to the nominated locations shown on the annotated site plan attached to the provided Woolacotts letter.

The borehole locations which are shown on the attached Figure 2, were set out by tape measurements off existing surface features. The surface RLs shown on the borehole logs were estimated by interpolation between spot levels shown on the provided survey and are therefore approximate. The survey datum is the Australian Height Datum (AHD). Figure 2 is based on the provided survey plan.

The nature and composition of the subsurface soil profile was assessed by logging the materials recovered during drilling. The density and strength of the subsoil profile were assessed from the Standard Penetration Test (SPT) 'N' values, augmented by hand penetrometer readings carried out on cohesive samples. Groundwater observations were made in each borehole during the fieldwork. Further details of the methods and procedures employed in the investigation are presented in the attached Report Explanation Notes.

Our engineering geologist (Andrew Frost) and geotechnical engineer (David Fisher) were present on a full-time basis during the fieldwork to set out the borehole locations, direct the electromagnetic scanning, nominate the testing and sampling and prepare the attached borehole logs. The Report Explanation Notes define the logging terms and symbols used.

Selected soil samples were returned to NATA registered laboratories (Soil Test Services Pty Ltd [STS] and Envirolab Services Pty Ltd) for Standard compaction and four day soaked CBR, soil pH, chloride, sulphate and resistivity testing. The test results are summarised in the attached STS Table A and Table B. The Envirolab Services Pty Ltd 'Certificate of Analysis' is attached to this report.



### **3 RESULTS OF THE INVESTIGATION**

#### **3.1 Site Description**

The site is located in relatively flat to gently sloping topography, which grades down to the south at approximately 1° to 2°. Greendale Creek is located approximately 150m to the south of the site. The site is bounded by Abbott and Playfair Roads to the south and west, respectively.

At the time of the fieldwork, the central portion of the site was occupied by several one and two storey brick buildings and weatherboard demountable buildings, all of which appeared to be in generally good external condition, based on a cursory inspection. The buildings were surrounded by asphaltic concrete (AC) pavements and concrete pathways. Grass covered and synthetic grass playing fields occupied the northern and southern portions of the site, with numerous medium sized trees located around the perimeter of the site.

The neighbouring properties to the north were occupied by two, two storey brick houses and a pool and were set back at least 1m from the common boundary. The neighbouring properties located off the northern end of the eastern site boundary were occupied by several one and two storey weatherboard, fibro and brick houses, which were set back at least 7m from the common boundary. The neighbouring properties located off the southern end of the eastern site boundary were occupied by several brick houses, which were set back at least 2m from the common boundary.

Ground surface levels across the site boundaries were similar.

#### **3.2 Subsurface Conditions**

The 1:100,000 Geological Map of Sydney indicates the site is underlain by Quaternary alluvial and estuarine sediments comprising '*Silty to peaty quartz sand, silt and clay*' associated with nearby Greendale Creek.

Generally, the boreholes encountered surficial sandy fill overlying alluvial soils comprising predominantly sand, clayey sand and silty sand. Bedrock was not encountered within the maximum 7.5m depth of this investigation. Reference should be made to the attached borehole logs for details at each specific location. A summary of the encountered subsurface characteristics is presented below:



### ***Pavements***

In BH5, a 50mm thick AC wearing surface underlain by a 50mm thick igneous gravel basecourse layer was encountered.

### ***Fill***

Fill comprising silty sand was encountered below the AC pavement in BH5 and from the surface in the remaining boreholes and extended down to depths between 0.1m (BH7, BH8 and BH13) and 0.4m (BH1, BH5, BH6). The fill was often grass or mulch covered.

### ***Alluvial Soils***

Alluvial soils comprising sand, silty sand and clayey sand, with occasional sandy clay (BH10 and BH13) and silty clay (BH12 and BH13) bands, were encountered below the fill and extended down to the borehole termination depths.

The sands, silty sands and clayey sands were assessed to be predominantly loose and medium dense. The sandy clay and silty clay bands were of low and medium plasticity and of stiff and very stiff strength.

### ***Groundwater***

BH2 and BH4 were 'dry' during and on completion of drilling.

In the remaining boreholes, groundwater seepage was observed during drilling at depths between 1.2m (BH12) and 5.8m (BH3). Groundwater was measured on completion of drilling in BH1, BH3 and BH5 to BH13 at depths between 1.2m (BH12) and 6.2m (BH3). Groundwater was also measured at depths of 3.1m (BH1) and 2.4m (BH8), 1 and 3 hours, respectively, after the completion of drilling. Groundwater levels may not have stabilised within the short observation period. No long term groundwater monitoring was carried out.

## **3.3 Laboratory Test Results**

The four day soaked CBR test carried out on a sample of alluvial silty sand from BH10 resulted in a value of 25% when compacted to 99% of Standard Maximum Dry Density (SMDD) and surcharged with 4.5kg.

The soil pH test results were between 4.9 and 5.3, which indicate the samples tested to be acidic. The sulphate and chloride test results were all less than or equal to 36mg/kg, which indicates low sulphate and chloride contents. The resistivity test results were high.



## **4 COMMENTS AND RECOMMENDATIONS**

### **4.1 Earthworks**

All earthworks recommendations should be complemented by reference to AS3798-2007 'Guidelines on earthworks for commercial and residential developments'.

#### **4.1.1 Site & Subgrade Preparation**

Within the proposed development footprint and following demolition of existing structures (where required) and pavements, all trees (including their root balls) should be removed and all grass, topsoil and root-affected soil and any deleterious or contaminated existing fill should be stripped. Stripped topsoil, if present, and root affected soils should be stockpiled separately as they are not suitable for reuse as engineered fill. They may, however, be reused for landscaping purposes. Reference should be made to the EIS report for guidance on the offsite disposal of soil.

The above stripping works may be completed using buckets fitted to a hydraulic excavator.

Following site stripping, we recommend that the soil subgrade over the proposed building and pavement footprints be proof rolled with at least six passes of a static smooth drum roller of at least 12 tonnes deadweight. The final pass of proof rolling should be carried out under the direction of an experienced geotechnical engineer for the detection of any unstable areas.

Where site levels need to be raised, then engineered fill must be used.

#### **4.1.2 Engineered Fill**

Engineered fill should comprise a well graded granular material, such as imported crushed sandstone, and should be compacted in maximum 200mm thick loose layers to achieve a minimum density ratio of at least 98% of SMDD. All engineered fill materials must be 'clean', free of organic matter and contain a maximum particle size not exceeding 75mm.

The compaction specification may be relaxed to a minimum density ratio of 95% of SMDD, if the engineered fill is within grass or landscaped garden areas.

All engineered fill should be retained or alternatively, battered to a permanent slope no steeper than 1 Vertical (V) in 2 Horizontal (H). A flatter batter to 1V in 3H or even 1V in 4H may be preferred in



order to facilitate maintenance. All permanent fill batter slopes must be protected from erosion by quickly establishing a vegetative cover, applying a reinforced shotcrete facing etc.

Where space permits, we recommend that engineered fill extend a horizontal distance of at least 1m beyond the design fill embankment slope so that adequate edge compaction can be achieved. On completion of filling any excess fill can be trimmed off.

Backfilling of service trenches must also 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 100mm thick loose layers and compacted using a trench roller or a roller attachment fitted to an excavator. Due to the reduced loose layer thickness, the maximum particle size of the backfill material should also reduce to 40mm. The compaction specifications provided above are applicable, unless there is a stricter contract specification.

Density tests should be carried out on the engineered fill to confirm the above specification is achieved. The frequency of density testing for engineered fill should be as per the requirements outlined in Table 8.1 of AS3798. We recommend Level 2 control of fill compaction be adhered to on this site. Due to a potential conflict of interest, the geotechnical testing authority (GTA) should be directly engaged by TKD Architects (or their representative) and not by the earthworks contractor or sub-contractors.

We note that compaction of engineered fill behind retaining walls is very difficult. The use of a single sized durable gravel, such as “blue metal” gravel or crushed concrete gravel (free of fines and less than 10% brick), do not require significant compactive effort. Such material should be nominally compacted using a hand operated vibrating plate (sled) compactor in 200mm thick loose layers. A non-woven geotextile filter fabric such as Bidim A34 should be placed as a separation layer immediately above the cut batter slope to control subsoil erosion. Provided the gravel backfill is placed as recommended above, density testing of the gravel backfill would not be required. The geotextile should then be wrapped over the surface of the gravel backfill and capped with at least a 0.3m thick compacted layer of clayey engineered fill to reduce surface water infiltration.

## **4.2 Retaining Walls**

The major consideration in the selection of earth pressures for the design of retaining walls is the need to limit deformations. If retaining walls are proposed, the following characteristic earth pressure coefficients and subsoil parameters may be adopted for a static design.



- For allowable bearing pressure recommendations, refer to Section 4.3 below.
- For free-standing cantilever walls which are retaining areas where minor movements can be tolerated (i.e. landscaped or garden bed areas), a triangular lateral earth pressure distribution may be adopted with an 'active' earth pressure coefficient,  $K_a$ , of 0.33, for the soil profile assuming a horizontal backfill surface.
- For cantilever walls where the tops are restrained by the permanent structure or which retain areas where movements are to be reduced or for propped walls, a triangular lateral earth pressure distribution should be adopted with an 'at rest' earth pressure coefficient,  $K_o$ , of 0.6, for the soil profile assuming a horizontal backfill surface.
- A bulk unit weight of  $20\text{kN/m}^3$  should be adopted for the soil profile.
- Any surcharge affecting the walls (eg. traffic loading, adjacent building footings, construction loads, inclined backfill surface etc) should be taken into account in the wall design using the appropriate earth pressure coefficient from above.
- The retaining walls should be designed as drained and measures taken to provide complete and permanent drainage of the ground behind the walls. Subsurface drains should incorporate a non-woven geotextile fabric (eg. Bidim A34) to act as a filter against subsoil erosion.
- Lateral toe restraint may be achieved by the resistance of the ground in front of the walls. For embedment depth design, a triangular lateral earth pressure distribution should be assumed with a 'passive' earth pressure coefficient,  $K_p$ , of 3 for the soil profile, assuming horizontal ground in front of the walls. We note that significant movement is required in order to mobilise the full passive pressure of the soil. We therefore recommend that a factor of safety of 2 be adopted in order to reduce such movement. All localised excavations in front of the wall, such as for buried services, footings etc, must be taken into account in the embedment depth design.

#### **4.3 Footings**

Based on the provided column loads, we recommend that the proposed buildings be supported on piled footings. Suitable pile types include cfa (continuous flight auger) piles or steel (helix) screw piles.

Piles founded in medium dense sand at depth of 3.6m below existing grade may be designed for a maximum allowable end bearing pressure of 600kPa. The relatively low end bearing pressure is due to the presence of shallow groundwater. For cfa piles, an allowable shaft adhesion value of 5kPa is applicable.



Care must be taken not to surcharge the loose sands and very stiff clays which were encountered at depths of 5.6m (BH10), 6.2m (BH12) and 6.4m (BH13).

We assume that the piling contractor who installs the piles would be responsible for certifying the load capacity of the piles.

We note that the piling contractor may require a working platform, prior to the commencement of piling. The design of such a platform depends on the loading from the piling rig and the platform material used, as well as the subgrade material properties. Therefore, the working platform design cannot be completed until the platform material is selected and a specific piling rig nominated. We can complete a working platform design at the appropriate time, if requested.

#### **4.4 Earthquake Design Parameters**

Based on the investigation results and in accordance with AS1170.4–2007, a Hazard Factor (Z) of 0.08 is applicable for the site, together with a subsoil Class C<sub>e</sub>.

#### **4.5 On-Grade Floor Slabs**

Slab-on-grade construction is feasible for the proposed buildings, where we expect sands or granular engineered fill to be exposed at design subgrade level. The design parameters recommended in Section 4.6 below are appropriate.

The on-grade floor slabs should be isolated from the walls, columns and footings of the proposed buildings. Joints in the concrete on-grade floor slab should be designed to accommodate shear forces but not bending moments by using dowelled or keyed joints.

#### **4.6 External Pavements**

Based on the investigation results, we recommend that the proposed car park pavement be designed on the basis of a CBR value of 10% or a Short Term Young's Modulus of 35MPa. This recommended CBR value is less than the laboratory test result, but takes into account the potential variability of the sandy soils at the site (i.e. silty sands, sands and clayey sands) and the potential to encounter existing fill at design subgrade level.

We recommend that all base course materials (flexible pavements) and sub-base materials (rigid pavements) comprise DGB20 in accordance with RMA Specification D&C 3051 unbound base.



The DGB20 material should be compacted in maximum 200mm thick loose layers using a large smooth drum roller to at least 98% of Modified Maximum Dry Density (MMDD). We recommend that all sub-base materials (flexible pavements only) comprise DGS40 in accordance with RMA Specification D&C 3051 unbound sub-base. The DGS40 material should be compacted in maximum 200mm thick loose layers using a large smooth drum roller to at least 95% of MMDD. Adequate moisture conditioning to within 2% of Modified Optimum Moisture Content (MOMC) should be provided during placement so as to reduce the potential for material breakdown during compaction.

Density tests should be regularly carried out on the granular pavement materials to confirm the above specifications are achieved. The frequency of density testing should be as per the requirements outlined in Table 8.1 of AS3798. Level 2 testing of fill compaction is the minimum permissible in AS3798-2007. The GTA should be directly engaged by TKD Architects (or their representative) and not by the earthworks contractor or sub-contractors.

#### **4.7 Durability**

Based on the Envirolab Services test results, concrete and steel piles should be designed for a 'moderate' and 'mild' exposure classification, respectively, in accordance with AS2159–2009.

#### **4.8 Further Geotechnical Input**

We summarise below the recommended additional geotechnical input that needs to be carried out:

- Proof rolling of subgrade.
- Density testing of all engineered fill, sub-base and base course materials.

### **5 GENERAL COMMENTS**

The recommendations presented in this report include specific issues to be addressed during the construction phase of the project. In the event that any of the construction phase recommendations presented in this report are not implemented, the general recommendations may become inapplicable and JK Geotechnics accept no responsibility whatsoever for the performance of the structure where recommendations are not implemented in full and properly tested, inspected and documented.



The long term successful performance of floor slabs and pavements is dependent on the satisfactory completion of the earthworks. In order to achieve this, the quality assurance program should not be limited to routine compaction density testing only. Other critical factors associated with the earthworks may include subgrade preparation, selection of fill materials, control of moisture content and drainage, etc. The satisfactory control and assessment of these items may require judgment from an experienced engineer. Such judgment often cannot be made by a technician who may not have formal engineering qualifications and experience. In order to identify potential problems, we recommend that a pre-construction meeting be held so that all parties involved understand the earthworks requirements and potential difficulties. This meeting should clearly define the lines of communication and responsibility.

Occasionally, the subsurface conditions between the completed boreholes may be found to be different (or may be interpreted to be different) from those expected. Variation can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact this office.

This report provides advice on geotechnical aspects for the proposed civil and structural design. As part of the documentation stage of this project, Contract Documents and Specifications may be prepared based on our report. However, there may be design features we are not aware of or have not commented on for a variety of reasons. The designers should satisfy themselves that all the necessary advice has been obtained. If required, we could be commissioned to review the geotechnical aspects of contract documents to confirm the intent of our recommendations has been correctly implemented.

A waste classification will need to be assigned to any soil excavated from the site prior to offsite disposal. Subject to the appropriate testing, material can be classified as Virgin Excavated Natural Material (VENM), General Solid, Restricted Solid or Hazardous Waste. Analysis takes seven to 10 working days to complete, therefore, an adequate allowance should be included in the construction program unless testing is completed prior to construction. If contamination is encountered, then substantial further testing (and associated delays) should be expected. We strongly recommend that this issue is addressed prior to the commencement of excavation on site.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. If there is any change in the proposed development described in this report then all recommendations should be



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**TABLE A**  
**FOUR DAY SOAKED CALIFORNIA BEARING RATIO TEST REPORT**

|                  |                               |                     |            |
|------------------|-------------------------------|---------------------|------------|
| <b>Client:</b>   | JK Geotechnics                | <b>Ref No:</b>      | 29816ZH    |
| <b>Project:</b>  | Proposed School Building      | <b>Report:</b>      | A          |
| <b>Location:</b> | Playfair Road, Curl Curl, NSW | <b>Report Date:</b> | 23/12/2016 |
|                  |                               | <b>Page 1 of 1</b>  |            |

|                                         |                       |
|-----------------------------------------|-----------------------|
| BOREHOLE NUMBER                         | 10                    |
| DEPTH (m)                               | 0.20 - 1.00           |
| Surcharge (kg)                          | 4.5                   |
| Maximum Dry Density (t/m <sup>3</sup> ) | 1.75 STD              |
| Optimum Moisture Content (%)            | 11.6                  |
| Moulded Dry Density (t/m <sup>3</sup> ) | 1.73                  |
| Sample Density Ratio (%)                | 99                    |
| Sample Moisture Ratio (%)               | 97                    |
| Moisture Contents                       |                       |
| Insitu (%)                              | 5.5                   |
| Moulded (%)                             | 11.2                  |
| After soaking and                       |                       |
| After Test, Top 30mm(%)                 | 15.8                  |
| Remaining Depth (%)                     | 15.1                  |
| Material Retained on 19mm Sieve (%)     | 0                     |
| Swell (%)                               | 0.0                   |
| <b>C.B.R. value:</b>                    | @5.0mm penetration 25 |

**NOTES:**

- Refer to appropriate Borehole logs for soil descriptions
- Test Methods :
  - (a) Soaked C.B.R. : AS 1289 6.1.1
  - (b) Standard Compaction : AS 1289 5.1.1
  - (c) Moisture Content : AS 1289 2.1.1
- Date of receipt of sample:16/12/16



NATA Accredited Laboratory  
Number:1327

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Authorised Signature / Date  
(A. Talikondra)

*A. Talikondra* 23/12/16

All services provided by STS are subject to our standard terms and conditions. A copy is available on request.

Reference No: 29816ZH  
Project: Proposed School Building



**TABLE B**  
**SUMMARY OF SOIL CHEMISTRY TEST RESULTS**  
**SOIL pH, RESISTIVITY, SULPHATE AND CHLORIDE**

| Borehole Number | Sample Depth (m) | Sample Description   | pH Units | Restivity (ohm. cm) | Sulphate (mg/kg) | Chloride (mg/kg) |
|-----------------|------------------|----------------------|----------|---------------------|------------------|------------------|
| BH3             | 6.0 - 6.45       | ALLUVIAL Clayey Sand | 4.9      | 34,000              | 25               | <10              |
| BH4             | 3.0 - 3.45       | ALLUVIAL Clayey Sand | 5.0      | 31,000              | 36               | <10              |
| BH8             | 4.5 - 4.95       | ALLUVIAL Clayey Sand | 4.9      | 40,000              | 20               | <10              |
| BH12            | 0.5 - 0.95       | ALLUVIAL Silty Sand  | 5.3      | 45,000              | 10               | <10              |



BOREHOLE LOG

Borehole No.  
**1**  
1/1

| <b>Client:</b> TKD ARCHITECTS                                                   |         |     |                   |                 |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
|---------------------------------------------------------------------------------|---------|-----|-------------------|-----------------|-----------|-------------|----------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------|---------------------------|-----------------------------------------|-------------|
| <b>Project:</b> PROPOSED SCHOOL BUILDING                                        |         |     |                   |                 |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
| <b>Location:</b> CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW   |         |     |                   |                 |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
| <b>Job No.</b> 29816ZH <b>Method:</b> SPIRAL AUGER <b>R.L. Surface:</b> ≈ 10.7m |         |     |                   |                 |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
| <b>Date:</b> 4-10-16      JK205 <b>Datum:</b> AHD                               |         |     |                   |                 |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
| <b>Logged/Checked by:</b> A.F/A.J.H                                             |         |     |                   |                 |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
| Groundwater<br>Record                                                           | SAMPLES |     |                   | Field Tests     | Depth (m) | Graphic Log | Unified<br>Classification                                | DESCRIPTION                                                                      | Moisture<br>Condition/<br>Weathering | Strength/<br>Rel. Density | Hand<br>Penetrometer<br>Readings (kPa.) | Remarks     |
|                                                                                 | ES      | U50 | DB                |                 |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
| AFTER<br>1 HR<br>ON<br>COMPLET-<br>ION                                          |         |     |                   |                 | 0         |             |                                                          | FILL: Silty sand, fine to medium grained, brown, trace of roots and root fibres. | D                                    |                           |                                         | GRASS COVER |
|                                                                                 |         |     |                   | N = 14<br>6,8,6 |           |             | SP                                                       | SAND: fine to medium grained, light grey.                                        |                                      | MD                        |                                         | ALLUVIAL    |
|                                                                                 |         |     |                   |                 | 1         |             |                                                          |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     |                   | N = 7<br>3,3,4  |           |             |                                                          | as above,<br>but fine to coarse grained, orange brown, trace of silt fines.      | M                                    | L                         |                                         |             |
|                                                                                 |         |     |                   |                 | 2         |             |                                                          |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     |                   | N = 17<br>8,9,8 |           |             |                                                          | as above,<br>but trace of clay fines.                                            |                                      | MD                        |                                         |             |
|                                                                                 |         |     |                   |                 | 3         |             |                                                          |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     |                   | 4               |           | SC          | CLAYEY SAND: fine to coarse grained, red brown and grey. |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     | N = 13<br>4,6,7   |                 |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     |                   | 5               |           |             |                                                          |                                                                                  | W                                    |                           |                                         |             |
|                                                                                 |         |     |                   | 6               |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     | N = 29<br>6,10,19 |                 |           |             |                                                          |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     |                   |                 |           |             |                                                          | END OF BOREHOLE AT 6.45m                                                         |                                      |                           |                                         |             |
|                                                                                 |         |     |                   |                 | 7         |             |                                                          |                                                                                  |                                      |                           |                                         |             |



BOREHOLE LOG

Borehole No.  
**2**  
1/2

| <b>Client:</b> TKD ARCHITECTS                                                   |         |     |                    |                  |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
|---------------------------------------------------------------------------------|---------|-----|--------------------|------------------|-----------|-------------|-----------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------|---------------------------|-----------------------------------------|-------------|
| <b>Project:</b> PROPOSED SCHOOL BUILDING                                        |         |     |                    |                  |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
| <b>Location:</b> CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW   |         |     |                    |                  |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
| <b>Job No.</b> 29816ZH <b>Method:</b> SPIRAL AUGER <b>R.L. Surface:</b> ≈ 11.2m |         |     |                    |                  |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
| <b>Date:</b> 4-10-16      JK205 <b>Datum:</b> AHD                               |         |     |                    |                  |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
| <b>Logged/Checked by:</b> A.F/A.J.H                                             |         |     |                    |                  |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
| Groundwater<br>Record                                                           | SAMPLES |     |                    | Field Tests      | Depth (m) | Graphic Log | Unified<br>Classification                           | DESCRIPTION                                                                      | Moisture<br>Condition/<br>Weathering | Strength/<br>Rel. Density | Hand<br>Penetrometer<br>Readings (kPa.) | Remarks     |
|                                                                                 | ES      | U50 | DB                 |                  |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
| DRY ON<br>COMPLETION                                                            |         |     |                    |                  | 0         |             |                                                     | FILL: Silty sand, fine to medium grained, brown, trace of roots and root fibres. | D                                    |                           |                                         | GRASS COVER |
|                                                                                 |         |     |                    | N = 5<br>2,2,3   | 1         |             | SP                                                  | SAND: fine to medium grained, light grey brown.                                  | D                                    | L                         |                                         | ALLUVIAL    |
|                                                                                 |         |     |                    |                  |           |             | as above,<br>but orange brown, trace of silt fines. |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     |                    | N = 14<br>3,6,8  | 2         |             |                                                     | M                                                                                | MD                                   |                           |                                         |             |
|                                                                                 |         |     |                    |                  | 3         |             |                                                     |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     |                    | N = 17<br>12,9,8 |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     |                    | 4                |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     | N = 23<br>10,13,10 | 5                |           |             | SC                                                  | CLAYEY SAND: fine to coarse grained, grey brown and red brown.                   |                                      |                           |                                         |             |
|                                                                                 |         |     |                    | 6                |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     | N = 23<br>8,12,11  |                  |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |
|                                                                                 |         |     |                    | 7                |           |             |                                                     |                                                                                  |                                      |                           |                                         |             |



BOREHOLE LOG

Borehole No.  
**2**  
2/2

|                                                                                 |         |     |    |    |             |           |             |                           |                                                                |                                      |                           |                                         |         |
|---------------------------------------------------------------------------------|---------|-----|----|----|-------------|-----------|-------------|---------------------------|----------------------------------------------------------------|--------------------------------------|---------------------------|-----------------------------------------|---------|
| <b>Client:</b> TKD ARCHITECTS                                                   |         |     |    |    |             |           |             |                           |                                                                |                                      |                           |                                         |         |
| <b>Project:</b> PROPOSED SCHOOL BUILDING                                        |         |     |    |    |             |           |             |                           |                                                                |                                      |                           |                                         |         |
| <b>Location:</b> CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW   |         |     |    |    |             |           |             |                           |                                                                |                                      |                           |                                         |         |
| <b>Job No.</b> 29816ZH <b>Method:</b> SPIRAL AUGER <b>R.L. Surface:</b> ≈ 11.2m |         |     |    |    |             |           |             |                           |                                                                |                                      |                           |                                         |         |
| <b>Date:</b> 4-10-16      JK205 <b>Datum:</b> AHD                               |         |     |    |    |             |           |             |                           |                                                                |                                      |                           |                                         |         |
| <b>Logged/Checked by:</b> A.F/A.J.H                                             |         |     |    |    |             |           |             |                           |                                                                |                                      |                           |                                         |         |
| Groundwater<br>Record                                                           | SAMPLES |     |    |    | Field Tests | Depth (m) | Graphic Log | Unified<br>Classification | DESCRIPTION                                                    | Moisture<br>Condition/<br>Weathering | Strength/<br>Rel. Density | Hand<br>Penetrometer<br>Readings (kPa.) | Remarks |
|                                                                                 | ES      | U50 | DB | DS |             |           |             |                           |                                                                |                                      |                           |                                         |         |
|                                                                                 |         |     |    |    |             |           |             | SC                        | CLAYEY SAND: fine to coarse grained, grey brown and red brown. | M                                    | MD                        |                                         |         |
|                                                                                 |         |     |    |    |             | 8         |             |                           | END OF BOREHOLE AT 7.5m                                        |                                      |                           |                                         |         |
|                                                                                 |         |     |    |    |             | 9         |             |                           |                                                                |                                      |                           |                                         |         |
|                                                                                 |         |     |    |    |             | 10        |             |                           |                                                                |                                      |                           |                                         |         |
|                                                                                 |         |     |    |    |             | 11        |             |                           |                                                                |                                      |                           |                                         |         |
|                                                                                 |         |     |    |    |             | 12        |             |                           |                                                                |                                      |                           |                                         |         |
|                                                                                 |         |     |    |    |             | 13        |             |                           |                                                                |                                      |                           |                                         |         |
|                                                                                 |         |     |    |    |             | 14        |             |                           |                                                                |                                      |                           |                                         |         |



BOREHOLE LOG

Borehole No.  
**3**  
1/1

| <b>Client:</b> TKD ARCHITECTS                                                   |         |     |    |                   |           |             |                                                                             |                                                                        |                                      |                           |                                         |             |
|---------------------------------------------------------------------------------|---------|-----|----|-------------------|-----------|-------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------|---------------------------|-----------------------------------------|-------------|
| <b>Project:</b> PROPOSED SCHOOL BUILDING                                        |         |     |    |                   |           |             |                                                                             |                                                                        |                                      |                           |                                         |             |
| <b>Location:</b> CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW   |         |     |    |                   |           |             |                                                                             |                                                                        |                                      |                           |                                         |             |
| <b>Job No.</b> 29816ZH <b>Method:</b> SPIRAL AUGER <b>R.L. Surface:</b> ≈ 10.3m |         |     |    |                   |           |             |                                                                             |                                                                        |                                      |                           |                                         |             |
| <b>Date:</b> 4-10-16      JK205 <b>Datum:</b> AHD                               |         |     |    |                   |           |             |                                                                             |                                                                        |                                      |                           |                                         |             |
| <b>Logged/Checked by:</b> A.F/A.J.H                                             |         |     |    |                   |           |             |                                                                             |                                                                        |                                      |                           |                                         |             |
| Groundwater<br>Record                                                           | SAMPLES |     |    | Field Tests       | Depth (m) | Graphic Log | Unified<br>Classification                                                   | DESCRIPTION                                                            | Moisture<br>Condition/<br>Weathering | Strength/<br>Rel. Density | Hand<br>Penetrometer<br>Readings (kPa.) | Remarks     |
|                                                                                 | ES      | U50 | DB |                   |           |             |                                                                             |                                                                        |                                      |                           |                                         |             |
| <div>▲</div> <div>▼</div> <div>ON<br/>COMPLETION</div>                          |         |     |    |                   | 0         |             |                                                                             | FILL: Silty sand, fine to medium grained, brown, trace of root fibres. | D                                    |                           |                                         | GRASS COVER |
|                                                                                 |         |     |    | N = 7<br>2,4,3    | 1         |             | SP                                                                          | SAND: fine to medium grained, light grey.                              | M                                    | L                         |                                         | ALLUVIAL    |
|                                                                                 |         |     |    | N = 5<br>1,2,3    | 2         |             | as above,<br>but fine to coarse grained, orange brown, trace of silt fines. |                                                                        |                                      |                           |                                         |             |
|                                                                                 |         |     |    | N = 12<br>4,6,8   | 3         |             | SC                                                                          | CLAYEY SAND: fine to coarse grained, orange brown.                     |                                      | MD                        |                                         |             |
|                                                                                 |         |     |    | N = 22<br>8,10,12 | 4         |             | as above,<br>but grey brown.                                                |                                                                        |                                      |                           |                                         |             |
|                                                                                 |         |     |    | N = 33<br>7,13,20 | 5         |             |                                                                             |                                                                        |                                      |                           |                                         |             |
|                                                                                 |         |     |    | 6                 |           |             | W                                                                           | D                                                                      |                                      |                           |                                         |             |
|                                                                                 |         |     |    |                   | 7         |             |                                                                             | END OF BOREHOLE AT 6.45m                                               |                                      |                           |                                         |             |



BOREHOLE LOG

Borehole No.

4

1/1

Client:TKD ARCHITECTS

Project:PROPOSED SCHOOL BUILDING

Location:CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW

Job No. 29816ZH

Date: 4-10-16

Method: SPIRAL AUGER  
JK205

Logged/Checked by: A.F/A.J.H

R.L. Surface: ≈ 8.6m

Datum: AHD

| Groundwater<br>Record | SAMPLES |     |    |    | Field Tests      | Depth (m) | Graphic Log | Unified<br>Classification | DESCRIPTION                                                                                 | Moisture<br>Condition/<br>Weathering | Strength/<br>Rel. Density | Hand<br>Penetrometer<br>Readings (kPa.) | Remarks     |
|-----------------------|---------|-----|----|----|------------------|-----------|-------------|---------------------------|---------------------------------------------------------------------------------------------|--------------------------------------|---------------------------|-----------------------------------------|-------------|
|                       | ES      | U50 | DB | DS |                  |           |             |                           |                                                                                             |                                      |                           |                                         |             |
| DRY ON<br>COMPLETION  |         |     |    |    |                  | 0         |             |                           | FILL: Silty sand, fine to medium grained, brown, trace of root fibres.                      | D                                    |                           |                                         | GRASS COVER |
|                       |         |     |    |    | N = 6<br>2,3,3   | 1         |             | SP                        | SAND: fine to medium grained, light grey.                                                   | M                                    | L                         |                                         | ALLUVIAL    |
|                       |         |     |    |    | N = 4<br>3,2,2   | 2         |             |                           | as above,<br>but fine to coarse grained, yellow brown, trace of silt fines.                 |                                      |                           |                                         |             |
|                       |         |     |    |    | N = 13<br>4,6,7  | 3         |             | SC                        | CLAYEY SAND: fine to coarse grained, orange brown, red brown and grey, trace of silt fines. |                                      | MD                        |                                         |             |
|                       |         |     |    |    | N = 20<br>5,8,12 | 4         |             |                           |                                                                                             |                                      |                           |                                         |             |
|                       |         |     |    |    | N = 16<br>6,7,9  | 6         |             |                           |                                                                                             |                                      |                           |                                         |             |
|                       |         |     |    |    | 7                |           |             | END OF BOREHOLE AT 6.45m  |                                                                                             |                                      |                           |                                         |             |

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**BOREHOLE LOG**

Borehole No.  
**5**  
1/1

| <b>Client:</b> TKD ARCHITECTS                                                   |         |     |                 |                 |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
|---------------------------------------------------------------------------------|---------|-----|-----------------|-----------------|-----------|-------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------|-----------------------------------------|----------|
| <b>Project:</b> PROPOSED SCHOOL BUILDING                                        |         |     |                 |                 |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
| <b>Location:</b> CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW   |         |     |                 |                 |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
| <b>Job No.</b> 29816ZH <b>Method:</b> SPIRAL AUGER <b>R.L. Surface:</b> ≈ 8.14m |         |     |                 |                 |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
| <b>Date:</b> 4-10-16 <b>JK205</b> <b>Datum:</b> ahd                             |         |     |                 |                 |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
| <b>Logged/Checked by:</b> A.F/A.J.H                                             |         |     |                 |                 |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
| Groundwater<br>Record                                                           | SAMPLES |     |                 | Field Tests     | Depth (m) | Graphic Log | Unified<br>Classification | DESCRIPTION                                                                                                                                                           | Moisture<br>Condition/<br>Weathering | Strength/<br>Rel. Density | Hand<br>Penetrometer<br>Readings (kPa.) | Remarks  |
|                                                                                 | ES      | U50 | DB              |                 |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
| <div>ON<br/>COMPLETION</div>                                                    |         |     |                 |                 | 0         |             | -                         | ASPHALTIC CONCRETE: 50mm.t<br>FILL: Gravel, fine to medium grained igneous, dark grey.                                                                                | M                                    |                           |                                         |          |
|                                                                                 |         |     |                 | N = 12<br>4,6,6 |           |             | SP                        | FILL: Silty sand, fine to medium grained, brown.<br>SAND: fine to medium grained, light grey.                                                                         | M                                    | MD                        |                                         | ALLUVIAL |
|                                                                                 |         |     |                 |                 | 1         |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
|                                                                                 |         |     |                 | N = 8<br>3,4,4  |           |             |                           |                                                                                                                                                                       |                                      | L                         |                                         |          |
|                                                                                 |         |     |                 |                 | 2         |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
|                                                                                 |         |     |                 | N = 7<br>2,2,5  |           |             | SC                        | as above,<br>but fine to coarse grained, orange brown, trace of silt fines.<br>CLAYEY SAND: fine to coarse grained, light grey and orange brown, trace of silt fines. |                                      |                           |                                         |          |
|                                                                                 |         |     |                 |                 | 3         |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
|                                                                                 |         |     | N = 13<br>5,6,7 |                 |           |             |                           |                                                                                                                                                                       | MD                                   |                           |                                         |          |
|                                                                                 |         |     |                 | 4               |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
|                                                                                 |         |     |                 | 5               |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |
|                                                                                 |         |     | N = 7<br>3,3,4  |                 |           |             |                           |                                                                                                                                                                       | W                                    |                           |                                         |          |
|                                                                                 |         |     |                 | 6               |           |             |                           |                                                                                                                                                                       |                                      | L                         |                                         |          |
|                                                                                 |         |     |                 |                 |           |             |                           | END OF BOREHOLE AT 6.45m                                                                                                                                              |                                      |                           |                                         |          |
|                                                                                 |         |     |                 | 7               |           |             |                           |                                                                                                                                                                       |                                      |                           |                                         |          |



BOREHOLE LOG

Borehole No.  
**6**  
1/1

| <b>Client:</b> TKD ARCHITECTS                                                  |         |     |                 |                  |           |             |                           |                                                                        |                                      |                           |                                         |             |
|--------------------------------------------------------------------------------|---------|-----|-----------------|------------------|-----------|-------------|---------------------------|------------------------------------------------------------------------|--------------------------------------|---------------------------|-----------------------------------------|-------------|
| <b>Project:</b> PROPOSED SCHOOL BUILDING                                       |         |     |                 |                  |           |             |                           |                                                                        |                                      |                           |                                         |             |
| <b>Location:</b> CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW  |         |     |                 |                  |           |             |                           |                                                                        |                                      |                           |                                         |             |
| <b>Job No.</b> 29816ZH <b>Method:</b> SPIRAL AUGER <b>R.L. Surface:</b> ≈ 8.9m |         |     |                 |                  |           |             |                           |                                                                        |                                      |                           |                                         |             |
| <b>Date:</b> 4-10-16 <b>JK205</b> <b>Datum:</b> AHD                            |         |     |                 |                  |           |             |                           |                                                                        |                                      |                           |                                         |             |
| <b>Logged/Checked by:</b> A.F/A.J.H                                            |         |     |                 |                  |           |             |                           |                                                                        |                                      |                           |                                         |             |
| Groundwater<br>Record                                                          | SAMPLES |     |                 | Field Tests      | Depth (m) | Graphic Log | Unified<br>Classification | DESCRIPTION                                                            | Moisture<br>Condition/<br>Weathering | Strength/<br>Rel. Density | Hand<br>Penetrometer<br>Readings (kPa.) | Remarks     |
|                                                                                | ES      | U50 | DB              |                  |           |             |                           |                                                                        |                                      |                           |                                         |             |
| <div>ON<br/>COMPLETION<br/>▼</div>                                             |         |     |                 |                  | 0         |             |                           | FILL: Silty sand, fine to medium grained, brown, trace of root fibres. | D                                    |                           |                                         | GRASS COVER |
|                                                                                |         |     |                 | N = 4<br>3,2,2   | 1         |             | SP                        | SAND: fine to medium grained, light grey and brown.                    | M                                    | VL                        |                                         | ALLUVIAL    |
|                                                                                |         |     |                 |                  |           |             |                           | as above,<br>but orange brown, trace of silt fines.                    |                                      | L                         |                                         |             |
|                                                                                |         |     |                 | N = 7<br>3,3,4   | 2         |             | SC                        | CLAYEY SAND: fine to coarse grained, orange brown.                     |                                      |                           |                                         |             |
|                                                                                |         |     |                 |                  |           |             |                           |                                                                        |                                      |                           |                                         |             |
|                                                                                |         |     |                 | N = 8<br>4,5,3   | 3         |             |                           |                                                                        |                                      |                           |                                         |             |
|                                                                                |         |     |                 | N = 16<br>10,8,8 | 4         |             |                           |                                                                        |                                      |                           |                                         |             |
|                                                                                |         |     |                 | 5                |           |             |                           |                                                                        |                                      |                           |                                         |             |
|                                                                                |         |     | N = 11<br>6,5,6 | 6                |           |             |                           |                                                                        |                                      |                           |                                         |             |
|                                                                                |         |     |                 | 7                |           |             |                           | END OF BOREHOLE AT 6.45m                                               |                                      |                           |                                         |             |



Borehole No.
7
1/1

BOREHOLE LOG

Client: TKD ARCHITECTS
Project: PROPOSED SCHOOL BUILDING
Location: CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW
Job No. 29816ZH
Date: 11-12-16
Method: SPIRAL AUGER JK305
R.L. Surface: ≈ 7.3m
Datum: AHD
Logged/Checked by: A.F/A.J.H

| Groundwater Record | SAMPLES |     |    | Field Tests     | Depth (m) | Graphic Log | Unified Classification | DESCRIPTION                                                                                                                  | Moisture Condition/ Weathering | Strength/ Rel. Density | Hand Penetrometer Readings (kPa.) | Remarks                 |
|--------------------|---------|-----|----|-----------------|-----------|-------------|------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------|-----------------------------------|-------------------------|
|                    | ES      | U50 | DB |                 |           |             |                        |                                                                                                                              |                                |                        |                                   |                         |
|                    |         |     |    |                 | 0         | XXXX        | SM                     | FILL: Silty sand, fine to medium grained, brown and light grey.<br>SILTY SAND: fine to medium grained, light grey and brown. | M<br>M                         | MD                     |                                   | GRASS COVER<br>ALLUVIAL |
|                    |         |     |    | N = 11<br>4,6,5 | 1         |             |                        |                                                                                                                              |                                |                        |                                   |                         |
|                    |         |     |    | N = 13<br>4,6,7 | 2         |             | SC                     | CLAYEY SAND: fine to coarse grained, light brown, with silt fines.                                                           |                                |                        |                                   |                         |
|                    |         |     |    | N = 15<br>7,8,7 | 3         |             |                        | as above,<br>but light grey and orange brown.                                                                                |                                |                        |                                   |                         |
|                    |         |     |    | N = 16<br>7,8,8 | 4         |             |                        | CLAYEY SAND: fine to coarse grained, light grey and light orange brown.                                                      |                                |                        |                                   |                         |
|                    |         |     |    |                 | 5         |             |                        |                                                                                                                              |                                |                        |                                   |                         |
|                    |         |     |    | N = 18<br>9,9,9 | 6         |             | SP                     | SAND: fine to coarse grained, light grey, trace of silt.                                                                     | W                              |                        |                                   | NO SPT SAMPLE RECOVERED |
|                    |         |     |    |                 |           |             |                        | END OF BOREHOLE AT 6.45m                                                                                                     |                                |                        |                                   |                         |
|                    |         |     |    |                 | 7         |             |                        |                                                                                                                              |                                |                        |                                   |                         |

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BOREHOLE LOG

Borehole No.
9
1/1

Client: TKD ARCHITECTS
Project: PROPOSED SCHOOL BUILDING
Location: CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW
Job No. 29816ZH
Date: 11-12-16
Method: SPIRAL AUGER JK305
R.L. Surface: ≈ 6.5m
Datum: AHD
Logged/Checked by: A.F/A.J.H.

| Groundwater Record | SAMPLES |     |    |    | Field Tests      | Depth (m) | Graphic Log | Unified Classification                                           | DESCRIPTION                                                                                                                       | Moisture Condition/ Weathering | Strength/ Rel. Density | Hand Penetrometer Readings (kPa.) | Remarks                 |
|--------------------|---------|-----|----|----|------------------|-----------|-------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------|-----------------------------------|-------------------------|
|                    | ES      | U50 | DB | DS |                  |           |             |                                                                  |                                                                                                                                   |                                |                        |                                   |                         |
| ON COMPLETION      |         |     |    |    |                  | 0         |             | SP                                                               | FILL: Silty sand, fine to medium grained, dark brown and light grey.<br>SAND: fine to medium grained, light grey and light brown. | M                              | MD                     |                                   | ALLUVIAL                |
|                    |         |     |    |    | N = 13<br>6,7,6  |           |             |                                                                  |                                                                                                                                   |                                |                        |                                   |                         |
|                    |         |     |    |    |                  | 1         | SM          | SILTY SAND: fine to medium grained, light brown and brown.       |                                                                                                                                   |                                |                        |                                   |                         |
|                    |         |     |    |    | N = 9<br>4,4,5   |           | SC          | CLAYEY SAND: fine to coarse grained, light grey and light brown. |                                                                                                                                   | L                              |                        |                                   |                         |
|                    |         |     |    |    |                  | 2         |             |                                                                  |                                                                                                                                   |                                |                        |                                   |                         |
|                    |         |     |    |    | N = 18<br>8,9,9  |           |             |                                                                  |                                                                                                                                   | MD                             |                        |                                   |                         |
|                    |         |     |    |    |                  | 3         |             |                                                                  |                                                                                                                                   |                                |                        |                                   |                         |
|                    |         |     |    |    | N = 18<br>8,9,9  |           |             |                                                                  |                                                                                                                                   |                                |                        |                                   |                         |
|                    |         |     |    |    |                  | 4         |             |                                                                  |                                                                                                                                   |                                |                        |                                   |                         |
|                    |         |     |    |    | N = 12<br>10,8,4 |           |             |                                                                  |                                                                                                                                   |                                |                        |                                   |                         |
|                    |         |     |    |    |                  | 5         |             |                                                                  |                                                                                                                                   |                                |                        |                                   |                         |
|                    |         |     |    |    |                  | 6         |             |                                                                  |                                                                                                                                   |                                |                        |                                   | NO SPT SAMPLE RECOVERED |
|                    |         |     |    |    |                  | 7         |             |                                                                  | END OF BOREHOLE AT 6.45m                                                                                                          |                                |                        |                                   |                         |



BOREHOLE LOG

Borehole No.
10
1/1

Client: TKD ARCHITECTS
Project: PROPOSED SCHOOL BUILDING
Location: CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW
Job No. 29816ZH
Date: 11-12-16
Method: SPIRAL AUGER JK305
R.L. Surface: ≈ 6.3m
Datum: AHD
Logged/Checked by: A.F/A.J.H

| Groundwater Record | SAMPLES |     |    |                  | Field Tests      | Depth (m) | Graphic Log | Unified Classification                                     | DESCRIPTION                                                                         | Moisture Condition/ Weathering | Strength/ Rel. Density | Hand Penetrometer Readings (kPa.) | Remarks     |
|--------------------|---------|-----|----|------------------|------------------|-----------|-------------|------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------|------------------------|-----------------------------------|-------------|
|                    | ES      | U50 | DB | DS               |                  |           |             |                                                            |                                                                                     |                                |                        |                                   |             |
| ON COMPLETION      |         |     |    |                  |                  | 0         |             | SM                                                         | FILL: Silty sand, fine to medium grained, brown.                                    | M                              |                        |                                   | MULCH COVER |
|                    |         |     |    |                  | N = 14<br>5,7,7  |           |             |                                                            | SILTY SAND: fine to medium grained, brown and light grey.                           | M                              | MD                     |                                   | ALLUVIAL    |
|                    |         |     |    |                  |                  | 1         |             |                                                            | as above, but dark brown and brown, trace of clay fines.                            |                                |                        |                                   |             |
|                    |         |     |    |                  | N = 13<br>6,6,7  |           |             | SC                                                         | CLAYEY SAND: fine to coarse grained, brown and orange brown, with sandy clay bands. |                                |                        |                                   |             |
|                    |         |     |    |                  |                  | 2         |             |                                                            |                                                                                     |                                |                        |                                   |             |
|                    |         |     |    |                  | N = 16<br>4,6,10 |           |             |                                                            | as above, but light grey and brown.                                                 |                                |                        |                                   |             |
|                    |         |     |    |                  |                  | 3         |             |                                                            |                                                                                     |                                |                        |                                   |             |
|                    |         |     |    |                  | N = 16<br>7,8,8  |           |             |                                                            |                                                                                     | W                              |                        |                                   |             |
|                    |         |     |    |                  |                  | 4         |             | SM                                                         | SILTY SAND: fine to coarse grained, light grey.                                     |                                |                        |                                   |             |
|                    |         |     |    |                  |                  | 5         |             |                                                            |                                                                                     |                                |                        |                                   |             |
|                    |         |     |    |                  |                  |           | CL          | SANDY CLAY: low to medium plasticity, light grey and grey. | MC>PL                                                                               | VSt                            |                        |                                   |             |
|                    |         |     |    | N = 20<br>6,8,12 |                  |           |             |                                                            |                                                                                     |                                | 310<br>300<br>280      |                                   |             |
|                    |         |     |    |                  |                  |           |             |                                                            | END OF BOREHOLE AT 6.45m                                                            |                                |                        |                                   |             |
|                    |         |     |    |                  |                  | 7         |             |                                                            |                                                                                     |                                |                        |                                   |             |



BOREHOLE LOG

Borehole No.
11
1/1

Client: TKD ARCHITECTS
Project: PROPOSED SCHOOL BUILDING
Location: CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW
Job No. 29816ZH
Date: 11-12-16
Method: SPIRAL AUGER JK305
R.L. Surface: ≈ 5.1m
Datum: AHD
Logged/Checked by: A.F/A.J.H

| Groundwater Record | SAMPLES |     |    |    | Field Tests       | Depth (m) | Graphic Log | Unified Classification | DESCRIPTION                                                                                                             | Moisture Condition/ Weathering | Strength/ Rel. Density | Hand Penetrometer Readings (kPa.) | Remarks     |
|--------------------|---------|-----|----|----|-------------------|-----------|-------------|------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------|-----------------------------------|-------------|
|                    | ES      | U50 | DB | DS |                   |           |             |                        |                                                                                                                         |                                |                        |                                   |             |
| <br>ON COMPLETION  |         |     |    |    |                   | 0         |             | SP                     | FILL: Silty sand, fine to medium grained, brown and dark brown.                                                         | M                              |                        |                                   | MULCH COVER |
|                    |         |     |    |    | N = 17<br>6,7,10  |           |             | SM                     | SAND: fine to medium grained, light grey and light brown.<br>SILTY SAND: fine to medium grained, light brown and brown. | M                              | MD                     |                                   | ALLUVIAL    |
|                    |         |     |    |    | N = 11<br>4,5,6   |           |             | SP                     | SAND: fine to medium grained, light grey and light orange brown, with silt fines.                                       |                                |                        |                                   |             |
|                    |         |     |    |    | N = 24<br>7,12,12 |           |             |                        |                                                                                                                         |                                |                        |                                   |             |
|                    |         |     |    |    | N = 19<br>5,8,11  |           |             |                        |                                                                                                                         |                                |                        |                                   |             |
|                    |         |     |    |    | N = 25<br>6,13,12 |           |             |                        |                                                                                                                         |                                |                        |                                   |             |
|                    |         |     |    |    |                   | 7         |             |                        | END OF BOREHOLE AT 6.45m                                                                                                |                                |                        |                                   |             |



BOREHOLE LOG

Borehole No.  
**12**  
1/1

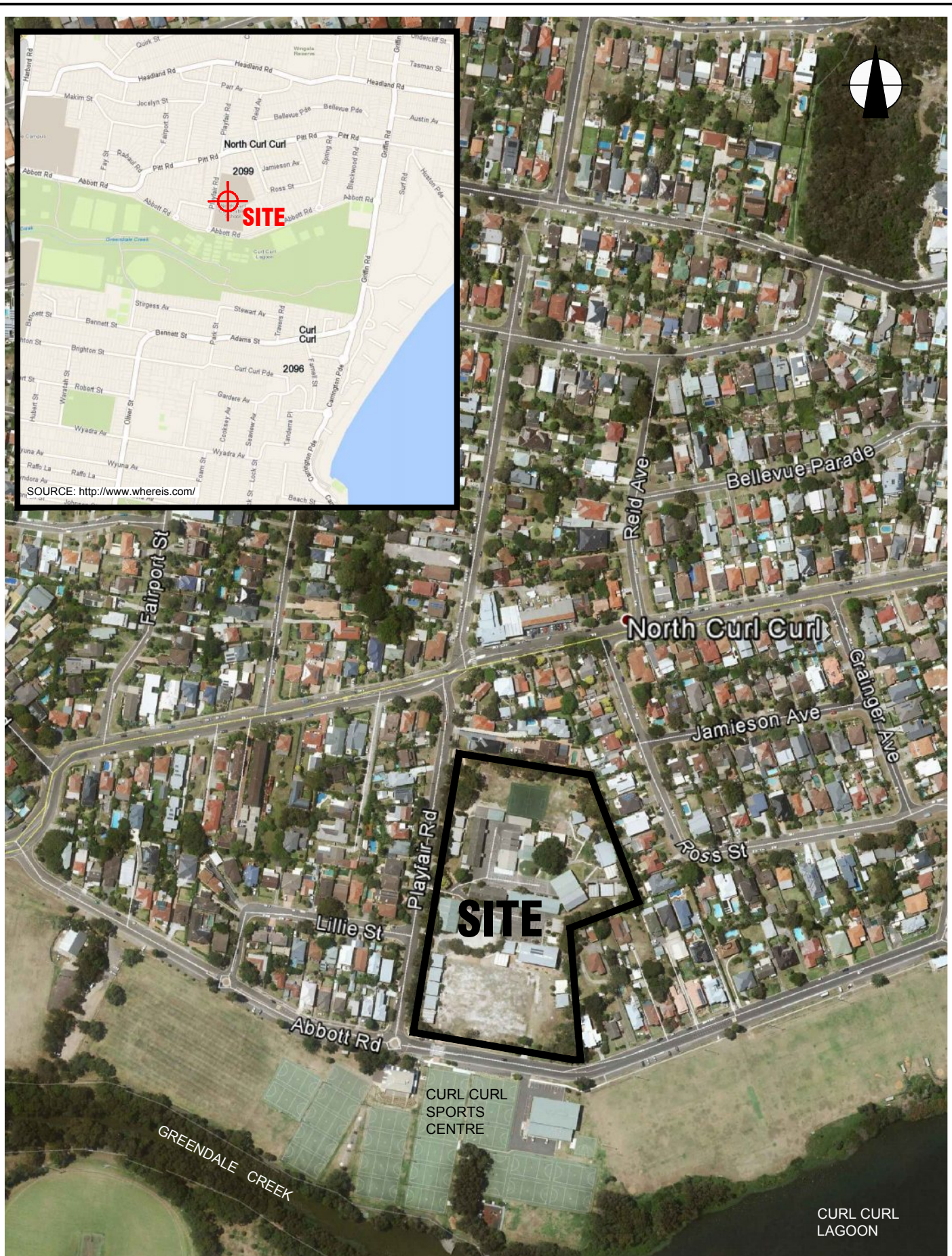
| <b>Client:</b> TKD ARCHITECTS                                                  |         |     |                  |                    |           |             |                           |                                                                                      |                                      |                           |                                         |          |
|--------------------------------------------------------------------------------|---------|-----|------------------|--------------------|-----------|-------------|---------------------------|--------------------------------------------------------------------------------------|--------------------------------------|---------------------------|-----------------------------------------|----------|
| <b>Project:</b> PROPOSED SCHOOL BUILDING                                       |         |     |                  |                    |           |             |                           |                                                                                      |                                      |                           |                                         |          |
| <b>Location:</b> CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW  |         |     |                  |                    |           |             |                           |                                                                                      |                                      |                           |                                         |          |
| <b>Job No.</b> 29816ZH <b>Method:</b> SPIRAL AUGER <b>R.L. Surface:</b> ≈ 4.7m |         |     |                  |                    |           |             |                           |                                                                                      |                                      |                           |                                         |          |
| <b>Date:</b> 11-12-16 <b>JK305</b> <b>Datum:</b> AHD                           |         |     |                  |                    |           |             |                           |                                                                                      |                                      |                           |                                         |          |
| <b>Logged/Checked by:</b> A.F/A.J.H                                            |         |     |                  |                    |           |             |                           |                                                                                      |                                      |                           |                                         |          |
| Groundwater<br>Record                                                          | SAMPLES |     |                  | Field Tests        | Depth (m) | Graphic Log | Unified<br>Classification | DESCRIPTION                                                                          | Moisture<br>Condition/<br>Weathering | Strength/<br>Rel. Density | Hand<br>Penetrometer<br>Readings (kPa.) | Remarks  |
|                                                                                | ES      | U50 | DB               |                    |           |             |                           |                                                                                      |                                      |                           |                                         |          |
| <div>ON<br/>COMPLET-<br/>ION</div>                                             |         |     |                  |                    | 0         |             | SM                        | FILL: Silty sand, fine to medium grained, brown and light grey.                      | M                                    |                           |                                         | ALLUVIAL |
|                                                                                |         |     |                  | N = 12<br>5,6,6    |           |             |                           | SILTY SAND: fine to medium grained, brown and light brown, trace of clay fines.      | M                                    | MD                        |                                         |          |
|                                                                                |         |     |                  |                    | 1         |             |                           |                                                                                      |                                      |                           |                                         |          |
|                                                                                |         |     |                  | N = 8<br>5,5,3     |           |             |                           | SILTY SAND: fine to coarse grained, light grey and light brown, trace of clay fines. | W                                    | L                         |                                         |          |
|                                                                                |         |     |                  |                    | 2         |             |                           |                                                                                      |                                      |                           |                                         |          |
|                                                                                |         |     |                  | N = 25<br>12,11,14 |           |             |                           |                                                                                      |                                      | MD                        |                                         |          |
|                                                                                |         |     |                  | 3                  |           |             |                           |                                                                                      |                                      |                           |                                         |          |
|                                                                                |         |     |                  |                    | 4         |             | SC                        | CLAYEY SAND: fine to coarse grained, light grey and light orange brown.              |                                      |                           |                                         |          |
|                                                                                |         |     | N = 22<br>5,8,14 |                    | 5         |             |                           |                                                                                      |                                      |                           |                                         |          |
|                                                                                |         |     |                  |                    | 6         |             | CL                        | SILTY CLAY: medium plasticity, grey.                                                 | MC>PL                                | VSt                       | 280<br>240                              |          |
|                                                                                |         |     | N = 8<br>7,4,4   |                    |           |             |                           | END OF BOREHOLE AT 6.45m                                                             |                                      |                           |                                         |          |
|                                                                                |         |     |                  |                    | 7         |             |                           |                                                                                      |                                      |                           |                                         |          |



BOREHOLE LOG

Borehole No.  
**13**  
1/1

| <b>Client:</b> TKD ARCHITECTS                                                  |         |     |    |                                      |           |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |
|--------------------------------------------------------------------------------|---------|-----|----|--------------------------------------|-----------|-------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------|-----------------------------------------|----------|
| <b>Project:</b> PROPOSED SCHOOL BUILDING                                       |         |     |    |                                      |           |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |
| <b>Location:</b> CURL CURL NORTH PUBLIC SCHOOL, PLAYFAIR ROAD, CURL CURL, NSW  |         |     |    |                                      |           |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |
| <b>Job No.</b> 29816ZH <b>Method:</b> SPIRAL AUGER <b>R.L. Surface:</b> ≈ 4.6m |         |     |    |                                      |           |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |
| <b>Date:</b> 11-12-16 <b>JK305</b> <b>Datum:</b> AHD                           |         |     |    |                                      |           |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |
| <b>Logged/Checked by:</b> A.F/A.J.H                                            |         |     |    |                                      |           |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |
| Groundwater<br>Record                                                          | SAMPLES |     |    | Field Tests                          | Depth (m) | Graphic Log | Unified<br>Classification | DESCRIPTION                                                                                                                                                                     | Moisture<br>Condition/<br>Weathering | Strength/<br>Rel. Density | Hand<br>Penetrometer<br>Readings (kPa.) | Remarks  |
|                                                                                | ES      | U50 | DB |                                      |           |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |
| ON<br>COMPLET-<br>ION                                                          |         |     |    | N = 15<br>6,7,8                      | 0         |             | SM                        | FILL: Silty sand, fine to medium grained, brown and light brown.<br>SILTY SAND: fine to medium grained, dark brown.<br>SILTY SAND: fine to medium grained, light grey and grey. | M<br>M                               | MD                        |                                         | ALLUVIAL |
|                                                                                |         |     |    |                                      | 1         |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |
|                                                                                |         |     |    | N = 6<br>4,3,3                       | 2         |             | CL                        | SANDY CLAY: low to medium plasticity, light grey and grey.                                                                                                                      | MC>PL                                | (St)                      |                                         |          |
|                                                                                |         |     |    | N > 20<br>12,20/<br>150mm<br>REFUSAL | 3         |             | SP                        | SAND: fine to coarse grained, light grey and grey, trace of silt fines.                                                                                                         | W                                    | D                         |                                         |          |
|                                                                                |         |     |    | N = 18<br>10,10,8                    | 4         |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |
|                                                                                |         |     |    |                                      | 5         |             | SC                        | CLAYEY SAND: fine to coarse grained, light grey and grey, with silt.                                                                                                            |                                      | MD                        |                                         |          |
|                                                                                |         |     |    | N = 9<br>8,5,4                       | 6         |             | SM                        | SILTY SAND: fine to coarse grained, light grey and light red brown.                                                                                                             |                                      | L                         |                                         |          |
|                                                                                |         |     |    |                                      | 6.45      |             | CL                        | SILTY CLAY: medium plasticity, grey.                                                                                                                                            | MC>PL                                | VSt                       | 230<br>240                              |          |
|                                                                                |         |     |    |                                      | 7         |             |                           |                                                                                                                                                                                 |                                      |                           |                                         |          |



AERIAL IMAGE SOURCE: GOOGLE EARTH PRO 7.1.5.1557  
AERIAL IMAGE ©: 2015 GOOGLE INC.

Title:

## SITE LOCATION PLAN

Location:

CURL CURL NORTH PUBLIC SCHOOL  
CURL CURL, NSW

Report No:

29816ZH

Figure No:

1

This plan should be read in conjunction with the JK Geotechnics report.

# JK Geotechnics

