NSW DEPARTMENT OF COMMERCE

PRELIMINARY GEOTECHNICAL INVESTIGATION
AREAS B & D PRISON HOSPITAL
LONG BAY CORRECTIONAL COMPLEX, MALABAR

E12723.3-BC

4 July 2005

Coffey

E12723.3-BC
4 July 2005

NSW Department of Commerce
Level 13, McKell Building
2-24 Rawson Place
SYDNEY NSW 2000

Attention: Mr Peter Shun

Dear Sir,

RE: PRELIMINARY GEOTECHNICAL INVESTIGATION
AREAS B & D PRISON HOSPITAL
LONG BAY CORRECTIONAL COMPLEX, MALABAR

Coffey Geosciences Pty Ltd (Coffey) is pleased to present the results of the geotechnical investigation undertaken for the proposed Prison Hospital and drainage works located in Areas B & D at Long Bay Correctional Facility, Malabar. If you wish to discuss any aspect of the report please contact Mr Peter Waddell or the undersigned on 9911 1000.

For and on behalf of

COFFEY GEOSCIENCES PTY LTD

MULIADI MERRY

Senior Geotechnical Engineer

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1. INTRODUCTION

This report details the results of the Stages 1 and 2 geotechnical investigations undertaken by Coffey Geosciences Pty Ltd (Coffey) for a proposed Prison Hospital development and drainage works in Areas B & D of the Long Bay Correctional Centre, Malabar.

The Stage 1 investigation work was undertaken for the NSW Department of Commerce generally in accordance with our proposal (Reference No: E12723/2-AE), dated 26 May 2004 while the Stage 2 investigation was carried out in general accordance with our proposal (Reference No: E12723/4-AE), dated 2 May 2005.

The current preliminary geotechnical investigation was undertaken concurrently with a Stage 2 Environmental Site Assessment, also by Coffey. For details of the environmental site assessment, reference should be made to the Stage 2 Environmental Site Assessment Report E12723.3- AS.

The objectives of the study were to provide information on subsurface conditions, a geotechnical model, discussion and recommendations on relevant geotechnical aspects including:

- A general description of the geology and geomorphology;
- Advice from local authorities on susceptibility to 100 year ARI flooding;
- Preliminary subsurface data;
- Suitability of excavated materials for re-use as fill for engineering and landscaping purposes;
- Preliminary recommendations on footing type, bearing capacities of foundation, earthworks and pavement design; and
- Advice on the need to line a stormwater detention basin.

Our overview of the relevant geotechnical investigation reports for Areas B and D that were prepared by others, is included in this report. Responses to Tasks 3, 4, 5, 6, 7 and 9 that were requested by the Contractors who are bidding for the construction works are also provided (Note that details of the tasks requested in presented in Section 6 of this report).

2. DETAILS OF PROPOSED DEVELOPMENT

It is understood that the new development will comprise:

- A new Long Bay Prison Hospital in Area B for the Department of Corrective Services (DCS). The hospital will comprise a mix of one and two storey buildings and yards set within a 6m high wall. The development will involve the relocation of the existing maintenance and storage facilities, which currently occupy the site of the proposed hospital.
- A new Forensic Hospital in Area D for the Corrections Health Services (CHS). The forensic hospital, like the prison hospital, will comprise a mix of one and two storey buildings and yards set within a 6m high wall. The development will also include a new building to house administration, stores and a pharmacy.
- A combined stormwater detention basin / playing field to be located in the southern part of Area D.
- Two stormwater detention basins in Area D.

- Construction of new roads and a car park.

At the time of the investigation and preparation of this report, the precise location and nature of the development had not been finalised. Area B covers an area of approximately 2.6Ha and Area D covers an area of approximately 7.9Ha. The location of these areas within the Long Bay Correctional Complex and a site locality plan is provided on Figure 1.

3. FIELD INVESTIGATIONS

3.1 Stage 1 Investigation

The Stage 1 field investigation was undertaken as a combined geotechnical and environmental assessment and comprised:

- Drilling of 17 boreholes (identified as CBH8, CBH25 to CBH32, CBH58 to CBH64 and CBH71) in Area B with the aid of a truck mounted drilling rig (see Figure 2);
- Collection of soil samples from eight hand auger holes (identified as HA14 to HA21) in Area D (see Figure 3);
- Drilling of 17 boreholes (identified as CBH9, CBH10, CBH12, CBH13 to CBH24, CBH65) in Area D with the aid of a truck mounted drilling rig; and
- Installation of groundwater wells into 5 of the boreholes (identified as CBH10/MW1, CBH11/MW2, CBH13/MW3, CBH14/MW4, CBH19/MW5) in Area D.

For the boreholes drilled using a truck mounted drill rig, Standard Penetration tests (SPT's) were undertaken at regular depth intervals to assess the engineering properties of the soils and to obtain samples. Disturbed auger samples were also obtained for laboratory testing purposes.

As part of the preliminary geotechnical investigation, coring of the bedrock was undertaken following the drilling, sampling and in-situ testing of the soil profile, in three of the boreholes. One of the geotechnical boreholes was located in Area B, with the other two located in Area D. The depth of the geotechnical boreholes ranged from 6m to 8.1m.

For the environmental assessment, the boreholes were generally taken 0.5m into natural soil or earlier V-bit refusal. Selected boreholes were extended to V-bit refusal to assess deeper subsurface condition and the presence of groundwater. These boreholes were also used in the geotechnical assessment. The depth of the environmental boreholes ranged from 0.1m to 6.5m.

The truck mounted drilling was undertaken between 25 October and 3 November 2004. The hand auger boreholes were drilled on 12 October 2004. The fieldwork was undertaken in the full time presence of a staff member from Coffey, who located the holes, nominated the sampling and testing and prepared field logs of the materials encountered. Ground surface levels at the test locations have been interpolated from survey data provided by NSW Department of Commerce.

Engineering borehole logs are included in Appendix A, along with Explanation Sheets defining the terms and symbols used in their preparation.

3.2 Stage 2 Investigation

The Stage 2 investigation was carried between 10 and 18 March 2005 and comprised the extension of four environmental borehole locations in Area B (refer to CBH76, CBH91, CBH94 and CBH122 on Figure 2) and

five locations in Area D (refer to CBH99, CBH100, CBH105, CBH108 and CBH109) to bedrock and the coring of the bedrock for approximately 2m to 3m. Geotechnical logging of the boreholes and rock cores obtained was subsequently carried out.

Drilling in soils was carried out using solid flight augers to the refusal depth of a tungsten carbide bit and then rock was cored using a triple tube core barrel.

Standard Penetration Tests were carried out at selected depth intervals as drilling progressed in soils for strength assessment and for obtaining samples for logging purposes.

Rock cores obtained from the borehole drilling were photographed and the photographs are with the borehole logs. Upon completion of the fieldwork the boreholes were backfilled with cuttings.

The field investigation was observed by a Coffey geotechnical engineer who located the boreholes by measuring from existing site features and logged the boreholes. Ground surface levels at the test locations have been interpolated from survey data provided by NSW Department of Commerce.

The engineering borehole logs of the boreholes are presented in Appendix A, along with Explanation Sheets defining the terms and symbols used in their preparation.

4. LABORATORY TESTING

Samples obtained during the Stage 1 investigation were taken to our NATA registered laboratory for testing. The following range of tests were undertaken:

- Soaked California bearing Ratio (CBR) – 2 tests
- Soil chemistry agressivity (pH, sulphate and chloride) – 2 tests
- Soil pre-planting assessment suite of tests – 2 suites

The results or the laboratory testing are presented in Appendix C.

Representative rock core samples obtained during the borehole drilling in the Stage 2 Investigation were designated for Point Load Strength Index (PLI) testing for estimates of rock strength. The results of the PLI testing are presented in the borehole logs and in Appendix C.

5. OVERVIEW OF RELEVANT GEOTECHNICAL INFORMATION

Overview of the existing geotechnical investigation reports for Areas B and D that were prepared by others was carried out.

The relevant documents for Area B that were overviewed are as follows:

- Report dated 19 June 1987 on geotechnical investigation at Katingal area (Reference No: 5070JS);
- Report dated 25 August 1987 on further geotechnical investigations at the special purposes prison area (Reference No: 5212JS);
- Report dated January 1990 on geotechnical investigation at the industries building and warehouse area (Reference No: 89241);
- Report dated July 1986 on foundation investigation for Tower No. 10 (Reference No: L86016); and
- Report dated January 1981 on site investigation for Secure Oval (Reference No: 412 113).

The relevant documents for Area D that were overviewed include the following:

- Report dated 19 June 1987 on geotechnical investigation at Katingal area (Reference No: 5070JS);
- Report dated March 1986 on site investigation for the entrance roads and car park (Reference No: SSI/9508);
- Report dated 19 December 1991 on geotechnical investigations for the stormwater drainage works (Reference No: 01-GG982A);
- Report dated February 2002 on geotechnical investigation for Halfway House (Reference No: 02-GH22A);
- Report dated June 1981 on supplementary foundation investigation for the ward and administration blocks (Reference No: 31181);
- Report dated October 1979 on foundation investigation for the ward and administration blocks (Reference No: 39241-1); and
- Report dated December 1979 on supplementary foundation investigation for the ward and administration blocks.

Relevant geotechnical information from the reports was used in the preparation of this report as supplementary data to the Stages 1 and 2 investigations. Our overview results are presented in Section 7. Boreholes from previous investigations, by other consultants, were referenced in preparation of this report and copies of the engineering logs are provided in Appendix B.

6. TASKS REQUESTED BY PROPONENTS

The contractors who are bidding for the construction works at Areas B and B (referred to as “Proponents”) have requested a series of additional tasks to be carried out, as summarised below:

Task 1. All environmental boreholes within the site boundary of the proposed Forensic Hospital to be assessed for geotechnical purposes as well.

Task 2. A portion of samples to be analysed for PCBs in areas where TPH and PAHs have previously been found.

Task 3. Provide recommendations on allowable bearing pressures of the soil layers above the bedrock and estimates of likely settlements.

Task 4. Provide advice on depth and detail of engineered fill which may be used to bridge over filled ground and provide 100 kPa allowable bearing capacity for raft slabs / strip footings.

Task 5. Provide CBR values in the areas of proposed roadways, together with recommendations on design parameters for rigid and flexible pavements.

Task 6. Provide recommendations on design parameters for rigid and flexible retaining walls.

Task 7. Provide recommendation on Earthquake Site Factor.

Task 8. Provide recommendation on erosion potential soil parameters.

Task 9. Carry out CBR tests at similar locations to those proposed for the boreholes and test pits over the whole site, including the site of the proposed Forensic Hospital.

Clarifications of Tasks 1 and 2 are provided as part of the Stage 2 Environmental Site Assessment (refer to our Report E12723.3- AS, dated 23 February 2005) and our responses to Tasks 3 to 9 (except Task 8) are provided in Sections 9.4 and 9.7 to 9.11. Response to Task 8 will be provided in an addendum letter upon the completion of the Emerson Class Number testing (which is still in progress at the time of the reporting).

7. RESULTS OF INVESTIGATION

7.1 Site Description

The site is located at Long Bay Correctional Complex, Malabar. Area B is located towards the south-eastern corner of the site. Area D is located near the south-western boundary of the site and includes the maximum security hospital and front of Long Bay Correctional Complex which faces Anzac Parade. These areas are identified in Figure 1.

The site generally slopes upwards towards the east, with Area D being the lowest lying part of the site. The level of the site at the site boundaries is typically consistent with the levels of surrounding land.

7.1.1 Area B

Area B is rectangular in shape with an area of approximately 2.6Ha. The main features of Area B at the time of the investigation are shown on Figure 2 and included:

- A workshop for maintenance of vehicles and plant in the centre of Area B.
- A plant nursery with a number of greenhouses in the south-eastern corner of Area B;
- A fenced area for the temporary storage of waste located between the maintenance stores and nursery;
- A number of concrete lined storage bays located towards the south-eastern corner of Area B for storage of dry material such as aggregate, sand, woodchip, bricks etc; and
- A number of other workshop / storage buildings.

7.1.2 Area D

Area D is irregular in shape with an area of approximately 7.9Ha. The main features of Area D at the time of the investigation are shown on Figure 3 and included:

- A playing field in the south eastern corner of Area D. This area is relatively flat and appears to be used as a soccer field;
- The Long Bay Correctional Centre Hospital, located to the north-west of the soccer field. The hospital comprises a number of hospital buildings, a paved recreation area and some landscaped areas. The area is surrounded by a wall; and
- The remainder of the Area D was vacant and grass covered. A vegetated fill stockpile is located to the immediate south-west of the hospital. The fill appeared to comprise soil and building rubble. A small pond is located to south-west of the stockpile. Some sandstone bedrock outcrops were observed near the pond.

7.2 Geological Setting

Reference to the Sydney 1:100,000 Geological Series Sheet 9130 (Edition 1) 1983, indicates that the site is underlain by Botany Basin Quaternary deposits and then Triassic Period Hawkesbury Sandstone. The quaternary deposits are described as comprising medium to fine grained sand with podsols. The Hawkesbury Sandstone generally comprises fine to coarse grained quartzose sandstone deposited in 1m to 3m thick beds and lenses. There are two dykes orientated west-northwest to east-southeast in the area. Previous geotechnical investigations carried out by others have identified the presence of the dykes within the site area.

7.3 Subsurface Conditions

For details of the conditions encountered in the boreholes, reference should be made to the engineering logs. Areas B and D are not adjacent and encountered differing subsurface conditions and are therefore discussed separately in the following sections.

7.3.1 Area B

Seventeen boreholes were carried out during the Stage 1 investigation within Area B, while another four cored boreholes were drilled during the Stage 2 investigation. Another twelve boreholes, from previous investigations by other consultants were also located within the area. Figure 2 shows the locations of the geotechnical tests carried out by Coffey and others in Area B.

In summary, the boreholes encountered pavement materials, fill, dune deposits, and minor depths of residual soils over sandstone bedrock. A summary of the Area B subsurface strata units encountered is provided in Table 1.

The top of sandstone levels is highest in the north-eastern corner at approximately RL42m AHD. The rock levels fall in a southerly direction to approximately RL39m AHD over a length of about 110m. A sharper drop-off in the rock levels was observed in a south-easterly direction which falls from RL42m AHD to RL39m AHD over a length of about 70m and in a south-westerly direction over a length of 50m. Inferred top of sandstone contours based on the borehole data are shown on Figure 2A. However, it should be noted that the sandstone bedrock surface could possibly include cliffs and benches.

TABLE 1: SUMMARY OF AREA B SUBSURFACE STRATA UNITS

Strata Unit	Description
Pavement Materials	A flexible pavement with total thickness was encountered in CBH8. No pavement materials were encountered in CBH25, CBH26, CBH32, CBH61 or CBH71. Concrete pavements 150mm to 200mm thick were encountered at the remaining borehole locations. Pavement was also observed at CBH76, CBH94 and CBH122. Ranges in thickness from 0.2m to 0.6m.
Fill	Sand, coke, building rubble, sandstone rubble, and gravely sand. Ranges in thickness from 0m to 2.1m.
Dune Deposits	Sand – fine to medium grained, loose to medium dense, becoming medium dense to dense near the soil / rock interface. Ranges in thickness from 0m to 2.4m.
Residual Soil	Silty clay – hard. Only encountered in two boreholes. Ranges in thickness from 0m to 1.5m.

TABLE 1: SUMMARY OF AREA B SUBSURFACE STRATA UNITS (CONTINUED)

Strata Unit	Description
Bedrock	Sandstone was cored in CBH8, CBH76, CBH91, CBH94 and CBH122, and was inferred from V bit refusal in nine of the remaining sixteen current investigation boreholes. Encountered at depths ranging from 0.2m to 1.45m. The sandstone in CBH8 was low strength in the upper 1m and then high strength. The sandstone in the other cored boreholes (CBH76, CBH91, CBH94 and CBH122) was observed to be generally of medium strength with bands of low and high strength rock. In previous boreholes, the sandstone was highly to moderately weathered in the upper 0.4m to 2.5m of the strata unit.

Our current investigation did not detect the presence of dykes on Area B; however, an igneous dyke was encountered during the previous site investigations carried out by other consultants at the special purposes prison area (refer to Report Reference No: 5212JS, dated 25 August 1987) and at Katingal Area (refer to Report Reference No: 5070S, dated 19 June 1987). The prison is located adjacent to Area B to the southwest and the Katingal area is located to the west. The dyke in the prison area was described to comprise medium to high plasticity, white clay, which extends to depths of up to 10.5m while the dyke in Katingal area was described to consist of medium plasticity, white to pale grey clay.

Groundwater was encountered within the boreholes during auger drilling at depths ranging from 0.8m to 2.4m below existing surface levels. The groundwater levels range from RL38.5 to RL41.5m AHD. Groundwater seepage was observed at RL38.9m AHD in CBH91.

7.3.2 Area D

Seventeen boreholes and eight hand auger holes were drilled within Area D during the Stage 1 investigation. Drilling of another five cored boreholes (refer to CBH99, CBH100, CBH105, CBH108 and CBH109 on Figure 3) was carried out during the Stage 2 investigation. Another eighty boreholes, from the previous investigations by other consultants were also located within the area. Figure 3 shows the locations of the geotechnical tests carried out by Coffey and others in Area D.

The results of the boreholes indicate the presence of an in-filled channel in the sandstone, commonly referred to as a Paleochannel. There are shallow depths to rock on either side of the Paleochannel with up to approximately 20m of fill, dune deposits and alluvium (along the southern area boundary) near the centre of the Paleochannel.

The sandstone levels range from approximately RL34m AHD away from the Paleochannel to approximately RL18m near the centre of the Paleochannel. Inferred top of sandstone contours are shown on Figure 3A.

A summary of the Area D subsurface strata units encountered is provided in Table 2.

TABLE 2: SUMMARY OF AREA D SUBSURFACE STRATA UNITS

Strata Unit	Description
Fill	Clayey sand, building rubble, silty sand, sandstone rubble, ash, plastic, cloth, organics, grass, brick pats, furniture, sandstone boulders, concrete slabs, timber, bricks and metal pipes. Ranges in thickness from 0m to 7.5m. Described in parts as being very loose, uncompacted and with many voids. The greatest depth of fill was encountered along the alignment of the Paleochannel, and deepened towards the south. A layer of topsoil in the order of 0.1m thick was observed at CBH105 and CBH109.
Dune Deposits	Sand – fine to medium grained, loose to medium dense. Noted as being very loose above the water table, in parts. Contains some cemented sand layers, noted as being very dense, or described as "Waterloo rock", "Coffee rock" or Indurated Sand. Ranges in thickness from 0m to 7.5m, with the greatest depths encountered along the Paleachannel alignment.
Peat / Alluvium	Sand, silty sand, sandy clay and silty clay with organics. With a variable consistency ranging from soft to hard and very loose to medium dense. With peat and clay layers. Ranges in thickness from 0m to 7.5m.
Residual Soil	Clay – stiff and very stiff, up to 3m thick. Only encountered at six locations in the current investigations and generally not differentiated from the alluvium on the previous investigation boreholes.
Bedrock	Sandstone was exposed on the surface in parts and was as deep as 20m or so near the alignment of the Paleochannel and the southern area boundary. The thickness of extremely to highly weathered sandstone varied from 0m in parts where exposed on the surface to greater than 5.5m. Medium to high strength, moderately weathered sandstone was noted in some of the cored boreholes below the upper extremely to highly weathered sandstone. Highly fractured to fragmented sandstone was observed in CBH99. Observations of the cores obtained from the Stage 2 investigation indicate that the strength of the sandstone is variable between the cored boreholes. Weaker and more fractured rock was observed in CBH99 and CBH105 within the Paleochannel while stronger rock was observed in the remaining cored boreholes.

The current geotechnical investigations carried out by Coffey and the previous investigations by others have not detected any intrusion rock in Area D; however, this does not preclude the presence of dykes on the site area.

Groundwater within the boreholes during auger drilling in the current boreholes at depths ranging from 2.0m to 3.6m below existing surface levels, where encountered. The groundwater levels range from RL28.9m AHD to RL33.8m AHD. Groundwater seepage was observed at depths ranging from RL30m AHD in CBH99 to

RL31.7m AHD in CBH100.

8. LABORATORY TEST RESULTS

For details of the laboratory test results, reference should be made to the test results certificates provided in Appendix C. The results, excluding the pre-planting assessment are summarised in Table 3.

TABLE 3: SUMMARY OF LABORATORY TEST RESULTS

Borehole	Depth (m)	Sample Description	FMC (%)	SOMC (%)	SMDD (t/m^3)	CBR (%)	pH	Sulphate (% H2O Sol)	Chloride
CBH8	0.6-1.6	(SP) Sand	5.6	11.0	1.81	20	-	-	-
CBH9	0.6-1.8	(SP) Sand	9.7	13.3	1.71	20	-	-	-
CBH8	1.0	(SP) Sand	-	-	-	-	5.5	0.002	0.001
CBH9	1.0	(SP) Sand	-	-	-	-	7.3	0.002	0.002

Note:
FMC Field Moisture Content
SOMC Optimum Moisture Content
SMDD Standard Maximum Dry Density
CBR California Bearing Ratio - 4 day soaked, 100%SMDD, SOMC, 4.5kg surcharge
pH Acididity

The pH results indicate that the soils are near neutral to slightly acidic. The sulphate and chloride test results indicate that the soil conditions are mild to non-aggressive to steel and concrete piles.

The results of the pre-planting assessment together with a summary and recommendations are provided on the report sheets by Sydney Environmental and Soil Laboratory, also included in Appendix C.

9. DISCUSSION AND RECOMMENDATIONS

9.1 Geological Model for Area B

Based on the results of the current preliminary investigation and the available boreholes from previous investigations, the geological model for Area B is presented in Table 4.

TABLE 4: GEOLOGICAL MODEL FOR AREA B

Strata Unit	Description	Approximate Unit Thickness (m)	Depth to Base of Unit (m)
1. Fill	Sand and rubble fill.	0 to 2.5	0 to 2.5
2. Dune Deposits	Sand – fine to medium grained, loose to medium dense, possible very loose and dense layers.	0 to 2.4	0 to 3

TABLE 4: GEOLOGICAL MODEL FOR AREA B (CONTINUED)

Strata Unit	Description	Approximate Unit Thickness (m)	Depth to Base of Unit (m)
3. Residual Soil	Clay – hard. Located in isolated pockets.	0 to 3	3.5
4. Bedrock	Sandstone – variable degree of weathering and generally can be divided into two sub-units: • Unit 4A – Low to Medium Strength, Highly to Moderately Weathered, Highly Fractured Sandstone (Class IV Sandstone*) • Unit 4B - Medium to High Strength, Moderately to Slightly Weathered, Slightly Fractured Sandstone (Class III Sandstone*)	-	Drilled to depths of up to 6m

Note:

* Rock class assessed in accordance with Pells et all (1998) "Foundations on Sandstone and Shale in the Sydney Region" Aust. Geomech. Jnl. Dec 1998.

Groundwater level – at or near the soil / rock interface but subject to fluctuations in response to seasonal effects and periods of wet weather.

9.2 Geological Model for Area D

Based on the results of the current preliminary investigation and the available boreholes from previous investigations, the geological model for Area D is dominated by the presence of an in-filled Paleochannel.

During the formation of the Paleochannel, there may have been a series of water falls along the alignment and the sides of the Paleochannel could have been steep, with a series of ledges, overhangs and detached boulders. Coarse sand, cobbles and boulders may be expected at the base of former water falls. With a rise of water levels the water in the lower sections of the gorge would stagnate and vegetation would form and be deposited to form peat layers. Alluvium would also be deposited. Subsequently, wind blown dune deposits, which are present on the site, would have also been deposited over the peat and alluvial layers, further in-filling the Paleochannel. Finally, building rubble and general fill would have been placed to complete the filling of the Paleochannel and to provide a near level surface.

The geological model for Area D is provided in Table 5.

TABLE 5: GEOLOGICAL MODEL FOR AREA D

Strata Unit	Description	Approximate Unit Thickness (m)	Depth to Base of Unit (m)
1. Fill	Uncontrolled sand, building rubble and domestic waste. The greatest thickness would be expected along the alignment of the Paleochannel, which is shown on Figure 3A. Expected to be poorly compacted and highly variable in composition.	0 to 7.5	0 to 7.5

TABLE 5: GEOLOGICAL MODEL FOR AREA D (CONTINUED)

Strata Unit	Description	Approximate Unit Thickness (m)	Depth to Base of Unit (m)
2. Dune Deposits	Sand – fine to medium grained, loose to medium dense, possible very loose and dense layers.	0 to 7.5	0 to 12
3. Peat / Alluvium	Sand, silty sand, sandy clay and silty clay with organics. With a variable consistency ranging from soft to hard and very loose to medium dense. With peat and clay layers.	0 to 7.5	Up to >20
4. Residual Soil	Clay – stiff and very stiff.	0 to 0.9	Up to >20
5. Bedrock	Sandstone – variable degree of weathering and strength and can be divided into three sub-units: • Unit 5A – Very Low to Low Strength, Highly Weathered, Fragmented to Highly Fractured Sandstone (Class V Sandstone*) • Unit 5B – Low to Medium Strength, Moderately Weathered, Highly Fractured Sandstone (Class IV Sandstone*) • Unit 5C – Medium to High Strength, Moderately to Slightly Weathered, Slightly Fractured Sandstone (Class III Sandstone*)	-	Drilled to depths of up to 15.1m

Note:

* Rock class assessed in accordance with Pells et all (1998) "Foundations on Sandstone and Shale in the Sydney Region" Aust. Geomech. Jnl. Dec 1998.

Perched groundwater may be expected at or near the soil rock interface. The Paleochannel could act as a local drainage line and may be expected to fluctuate in response to seasonal effects and periods of wet weather. Within the Paleochannel water may be expected within 3m of the current ground surface.

9.3 Proposed Development

At the time of the investigation and preparation of this report, the final details and position of the developments were not known and hence preliminary comments are provided herein.

9.4 Earthworks

Recommendations related to treatment of existing fill provided in this section would not apply if a piled foundation were selected.

The fill and residual soil should be able to be excavated using hydraulic excavators and tracked loaders. Large hydraulic excavators with the assistance with rock breakers will be required to excavate the sandstone. If vibration sensitive structures are within close proximity to the excavations it may be necessary to restrict the use of rock breakers, or use rock saws or milling heads to limit vibrations.

The Proponents have requested that advice on depth and detail of engineered fill, which may be used to bridge over filled ground and is capable of supporting an allowable bearing pressure of 100kPa for shallow footings or rafts (refer to Task 4). Our response to this request is provided in the paragraph below. Should raft slabs / strip footings not be adopted then the recommendation provided below is not applicable. Furthermore, if the required bearing pressure is less than 100kPa then the thickness of compacted fill may be less than 2m.

Due to the variability and uncontrolled nature of the existing filling on the site, should shallow footings or rafts are considered, it is recommended that the fill below the proposed buildings in Area B be removed since the fill extends to relatively shallow depths. Fill, loose sediments and alluvium extend to considerable depth within the Paleochannel in Area D. It is not considered feasible to remove the entire fill from all locations. A compacted fill layer not less than 2m thick could be formed to bridge over filled ground in areas where fill exists at depth to support pavements and floor slabs. It may be difficult to compact the lower layers of fill, although we anticipate that these layers would eventually form a bridging layer, which would enable the placement and compaction of the subsequent fill layers in accordance with an engineering specification. The compaction specification should be met after placing not more than 0.5m thickness of fill. If excessive heaving occurs, a tensile geofabric may be required prior to placing the bridging material. In Area D, where present in shallow depths, the fill should be excavated and re-compacted or replaced.

The fill materials in Area B may generally be suitable for re-use as structural fill although unsuitable materials such as organics and oversize materials would require separation and removal prior to reuse. The use of Area B fill materials will also depend on its environmental classification.

The fill materials in Area D appear to contain a high proportion of unsuitable and oversize materials, which would require separation and removal prior to reuse. It is recommended that reference be made to the individual logs in areas where reuse of the fill is being considered. The use of Area D fill materials will also depend on its contamination classification.

Where natural soils are proposed to be exposed, subgrade preparation of natural soils for foundation or pavement construction should include the following:

- Strip all fill and stockpile suitable materials for re-use, if required. Proof roll the exposed surface of natural material. Excavate localised soft spots and replace with suitable fill, compacted to a minimum dry density ratio of 98% Standard Compaction at a moisture content within ± 2% of Standard Optimum Moisture Content. If fill with low fines (< 5% silt and clay) is used it should be compacted to a minimum Density Index of 70%.
- Compact the exposed subgrade soils to a minimum dry density ratio of 98% Standard Compaction (or 70% Density Index).

In areas where fill is intended to be left in place (because removal of the fill is either not practicable or not desired by the proponent), other options could be considered such as partial removal of fill and replacement with compacted fill, modification of the in-situ soil or piled foundations. For the non-piling options consideration would need to be given to likely differential settlement.

Any new filling should be placed in layers (not exceeding 300 mm loose thickness) and compacted to a minimum dry density ratio of 98% Standard Compaction at a moisture content within ± 2% of Optimum Moisture Content or 70% Density Index for low fines material.

9.5 Dewatering

Groundwater levels were observed in Area B at depths ranging from 0.8m to 2.4m below the existing site

grade while relatively deeper groundwater levels at depths ranging from 2m to 3.6m were observed in Area D. It is not known whether the proposed developments will involve any basement excavations. Dewatering may be able to be achieved using excavated sumps; however, the saturated sands may prove to be unstable and in relatively deep excavations, it may be necessary to use spears points instead of sumps and submersible pumps.

9.6 Slope Stability Issues

Permanent batter slope angles within controlled filling or natural sands should be no steeper than 2H:1V for batter heights up to 3m. Fill batters should be overfilled and trimmed back to profile. Soil batters should be vegetated (or covered by shotcrete, stone pitching or similar) to reduce the risk of erosion. Sandstone batters could be cut near vertical but should be inspected by a suitably qualified engineer to assess whether flatter angles or support measures such as shotcrete or rock bolts are required.

9.7 Retaining Walls

In Task 6, the Proponents have requested that recommendations on design parameters for rigid and flexible retaining walls be provided. Where retaining walls are required to be constructed, the structures could be designed assuming the preliminary geotechnical design parameters provided in Table 6.

TABLE 6: PRELIMINARY GEOTECHNICAL DESIGN PARAMETERS FOR RETAINING STRUCTURES

Strata Unit	Unit Weight, γ (kN/m3)	Effective Cohesion, c' (kPa)	Friction Angle, ϕ' (degrees)	Elastic Modulus, E' (MPa)	Poisson's Ratio, ν	Active Earth Pressure Coefficient, Ka[1]	'At Rest' Earth Pressure Coefficient[2], Ko
Compacted Fill and Residual Soils	20	0	32	20	0.35	0.3	0.5
Class V Sandstone*	22	30	35	100	0.3	0.27	0.5
Class IV Sandstone*	22	200	35	1,000	0.3	0.27 [3]	- [3]
Class III Sandstone*	24	500	35	4,000	0.2	0.27 [3]	- [3]

Note:

* Rock class assessed in accordance with Pells et all (1998) "Foundations on Sandstone and Shale in the Sydney Region" Aust. Geomech. Jnl. Dec 1998.

1. Assume no wall friction.
2. Values provided assume a lateral movement of the wall of about 0.2% of the wall height is allowed to occur.
3. Values for better quality rock unit are dependent on the global effects of defects. Variability also occurs due to the in-situ stress environment and geometry of the excavation. For design parameters use should be made of the cohesion and friction angle parameters.

9.8 Foundations

9.8.1 Shallow Footings and Rafts

Our comments provided below serve as responses to Task 3 that was requested by the Proponents.

It is understood that the existing fill has not been placed in a controlled manner. Therefore, we consider that the fill will not be suitable as a bearing stratum to support the proposed building loads.

For lightly loaded structures, it may be possible to adopt shallow footings or a raft. However, with such foundations there is a greater potential for differential settlements, compared to rock foundations, which would require careful detailing of joints. To reduce the risk of adverse impacts from differential settlement it may be possible to adopt measures such as over-excavating the rock to a minimum of 0.6m below the footing level and replacing with compacted fill won from excavated sand or sandstone.

Shallow footings or edge and internal beams of a raft bearing on natural soils that are at least medium dense or compacted fill could be designed assuming an allowable bearing pressure of:

60B + 80D (kPa)

Where:

- B is the footing width in metres and the minimum footing width is 0.4m
- D is the depth of embedment in metres and the minimum embedment is 0.3m.

An elastic modulus of 20MPa should be assumed for estimates of settlements in medium dense sand or compacted fill and a lower elastic modulus of 5MPa should be adopted for very loose to loose sand.

9.8.2 Footings to Rock

In areas of shallow sandstone, strip and pad footings or bored piles should be suitable to support structural loads. Open bored piles should be feasible, however, cohesionless sands could be encountered and/or seepage could occur and provision for measures such as temporary liners, dewatering and cleaning of open bored piers will be required. Alternatively, continuous flight auger (CFA) piles or driven piles could be adopted, which do not require cleaning and dewatering.

Within the vicinity of the Paleochannel in Area D, where compressible alluvium occurs at depth and/or uncontrolled fill is left in-situ, it is recommended that all floor slabs be suspended and that all loads be taken to the sandstone bedrock using either driven or CFA piles. Note that the depths to rock may be highly variable and possibly in excess of 20m in places. Consideration may be given to relocation of buildings proposed over the Paleochannel, particularly the deeper sections. Where piling foundation is not preferred then other options could be considered such as complete or partial removal of fill and replacement with compacted fill or modification of the in-situ soil. However, for the non-piling options consideration will need to be given to likely differential settlement.

Table 7 presents parameters for the preliminary design of footings bearing on controlled fill, residual soil and sandstone. Note that the parameters for controlled fill are applicable only when all underlying fill is first removed. If a shallow foundation system is to be adopted within variable foundation strata, consideration will need to be given to likely differential settlement. As a guide to likely settlements it could be assumed that footings founding in sands or fill (and not underlain by highly compressible soils), with a working load of 100kPa, will settle approximately 1% of the minimum footing dimension (eg approximately 10mm for a 1m wide footing) while footing founding on sandstone with working load of 100kPa would have negligible settlement.

TABLE 7: PRELIMINARY ALLOWABLE FOOTING DESIGN PARAMETERS

Geotechnical Unit	Rock Class	Allowable End Bearing Pressure (kPa) (1)	Allowable Shaft Adhesion (kPa) (2)
Controlled Filling, Residual Sands	-	100	Nil
Sandstone	Class V	1,000	100
	Class IV	2,000	150
	Class III	3,500	350

Notes:

(1) Allowable bearing pressures assume a minimum embedment of 0.3m into the relevant material. The recommended end bearing pressures should result in settlement of <1% of minimum footing dimension.

(2) Shaft adhesion should only be assigned where piles are socketed at least 3 diameters into rock.

Where footings are designed to bear directly onto bedrock, the footing inspection and assessment requirements are provided in Table 8. Where the serviceability end-bearing pressure is greater than 2MPa, footing assessment should also include spoon testing (or cored boreholes) to assess whether defects below the base of the footing are within tolerable limits for the respective rock class.

TABLE 8: FOOTING INSPECTION AND ASSESSMENT REQUIREMENTS

Rock Unit	Testing Requirements
Class V and Class IV Sandstone Class III Sandstone with serviceability bearing pressures up to 2MPa	• Visual inspection of pad footings • Observation of piling and correlation with borehole information
Class III Sandstone with serviceability bearing pressures greater than 2MPa	• Visual inspection; and • Initial allowance for spoon testing 1/3 of all pad footings or coring of pier locations. • May be reduced if consistent conditions are exposed in early testing or if rock below founding levels can be inspected in lift shaft excavations.

9.9 Aggression to Concrete and Steel

The results of the chemical testing on the samples from 1.0m depth in CBH8 and CBH9 and reference to Tables 6.1 and 6.3 of the Australian Standard AS 2159-1995 “Piling – Design and Installation” indicates the samples tested can be considered mild to non-aggressive to concrete and steel.

9.10 Pavements

This section serves to provide responses to Tasks 5 and 9 that were requested by the Proponents.

A subgrade CBR of 14% was recommended by others where the sands observed in the industries building and warehouse area forms the pavement subgrade (refer to Report Reference No: 89241, dated January 1990). The sands were described as fine to medium grained, brown to grey brown sand, classified as “SP” under the Unified Soil Classification System. An estimated CBR of 14% was provided for fine grained sands observed in the ward and administration blocks (refer to Report Reference No: 39241-1 dated October 1979), compacted to 100% Standard Maximum Dry Density Ratio (SMDD).

As part of the Stage 2 investigation, two sand samples from CBH8 in Area B and CBH9 in Area D were tested

for compaction and CBR. The sands observed in CBH8 and CBH9 were of fine to medium grained and grey brown in colour, containing minor low plasticity fines, also classified as "SP" under the USCS. The test results indicated that the sands have a soaked CBR value of 20%.

Our visual assessment of the available soil samples obtained from the Stages 1 and 2 investigations indicates that the natural sands are variable in nature. Variable particle sizes, colour and proportion of fines were observed in the sands. Due to the variability in the grain size and fines content in the sands, we would expect that the CBR of the sands to be variable. On the basis of our observations of the sand samples the available laboratory test results, we estimate that the CBR would range from 10% to 20%. Provided earthworks are undertaken as indicated in Sectio 9.4 of this report, pavements could be designed assuming a CBR value of 10%, subject to confirmation by a geotechnical engineer during construction.

9.11 Earthquake Loading Factors

This section is to respond to Task 7 that was requested by the Proponents.

Australian Standard AS 1170.4-1993, *Minimum Design Loads on Structures – Part 4: Earthquake Loads*, indicates the site lies within a region with a combined acceleration coefficient and site factor (aS) of 0.08.

9.12 Soil Dispersion Potential

For assessment of soil dispersion potential, six disturbed samples from Area B and seven disturbed samples from Area D has been designated for Emerson Class Number testing. At the time of reporting, the testing is currently underway. An addendum letter will be issued to address Task 8 regarding soil dispersion potential.

9.13 Soil Pre-planting Assessment

For details of the results and recommendations for soil planting reference should be made to the soil pre-planting assessment results by Sydney Environmental and Soil Laboratory, which are provided in Appendix C. In summary the soils are suitable for planting provided treatment and additives as recommended on the test results sheets are followed.

10. LIMITATIONS AND FURTHER INVESTIGATION

The recommendations presented in this report are based on limited subsurface investigations. Ground conditions can change over relatively short distances and additional geotechnical advice may be required during construction to assess whether conditions are consistent with design assumptions. Coffey would be pleased to provide additional advice and construction stage services, if required.

The attached document entitled "Important Information about your Coffey Report" provides additional information on the uses and limitations of this report.

This report provides the results of a preliminary geotechnical investigation, which has been undertaken prior to the development location and details being finalised. Review of this report and further investigation is recommended once the final development details are known.

Complex subsurface geological conditions are present in Area D, related to the presence of a Paleochannel. Further investigation may be required depending on the proposed development, to assess piling conditions for driven or CFA piles, the quality of the sandstone, which is indicated to be highly variably, and to more accurately define the top of rock. Recommended additional investigation may include drilling and coring of the bedrock under proposed buildings, geophysical traverse lines to obtain continuous bedrock profiles along selected section lines.

For and on behalf of
COFFEY GEOSCIENCES PTY LTD

MULIADI MERRY
Senior Geotechnical Engineer

Information

Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of the subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Coffey Geosciences Pty Ltd ABN 057 056 335 516

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they have incorporated the report findings.

Data should not be separated from the report*

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

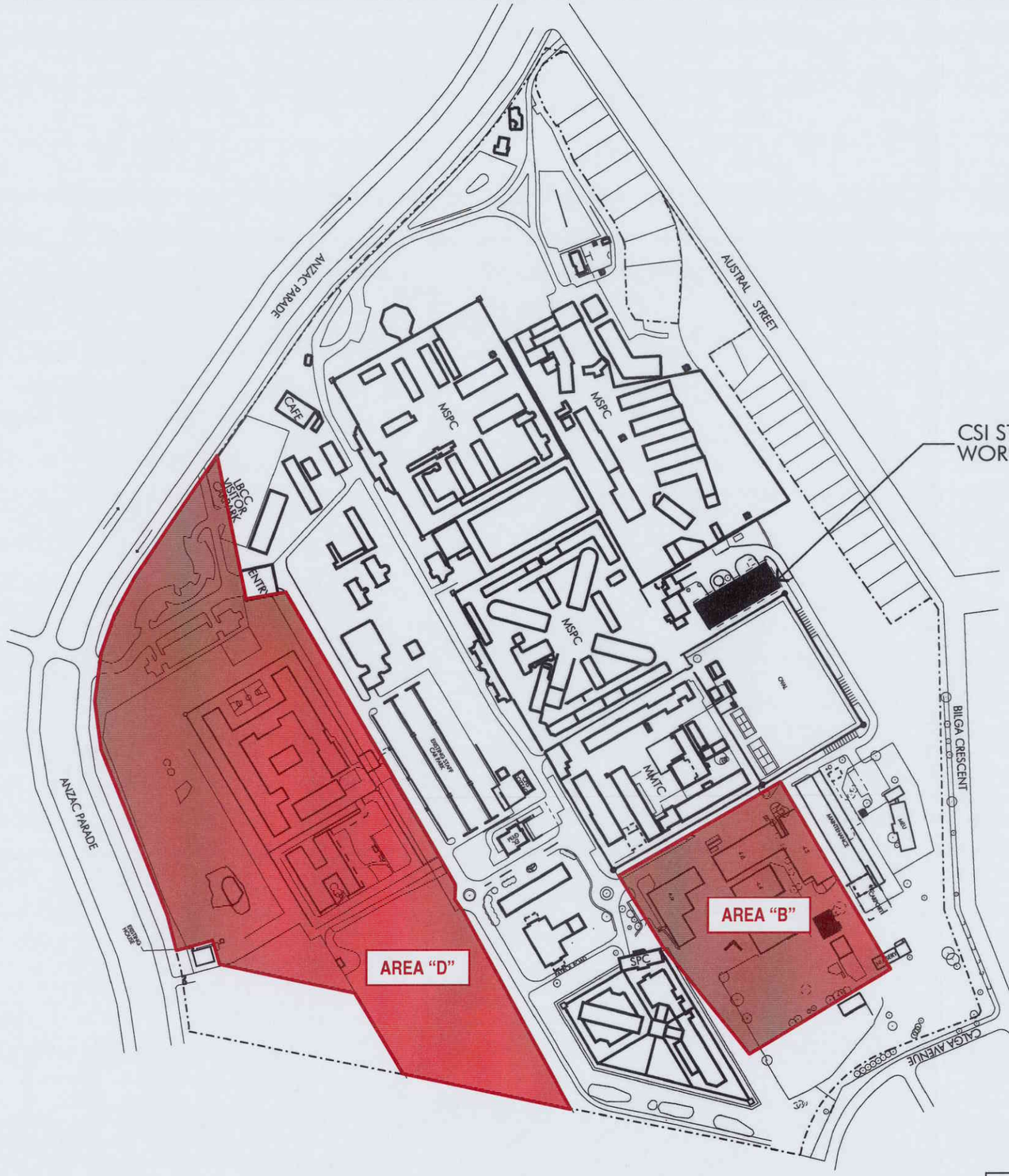
Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design toward construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

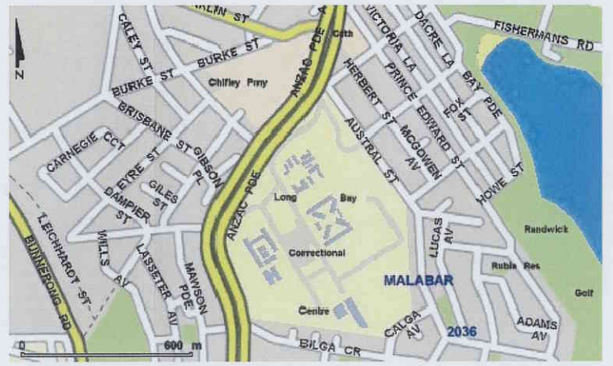
Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

** For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical Information in Construction Contracts" published by the Institution of Engineers Australia, National Headquarters, Canberra, 1987.*

20252 / 07-01





LOCATION PLAN

Coffey

Coffey Geosciences Pty Ltd ACN 056 335 516		Geotechnical I **Resources** I Environmental I **Technical** I Project Management	
Drawn	DFD/SW	NSW DEPARTMENT OF COMMERCE PRELIMINARY GEOTECHNICAL INVESTIGATION LONG BAY CORRECTIONAL CENTRE	FIGURE 1
Approved	DFD		
Date	4/7/05		
Scale	1:4000	SITE PLAN	Job no: E12723/3-BC

LEGEND

- BOREHOLE LOCATIONS

PREVIOUS INVESTIGATIONS

- DPWS1 - REPORT 01-GG 82A (1-14)
- DPWS2 - REPORT 02 GH 22A
- JK1 - REPORT 5212JS & 5070JS 9-14, 101-149, 16 & 17
- JK2 - REPORT 5070JS 1-8, 15 & 19
- PWD1 - REPORT 89241
- PWD2 - REPORT L86016
- PWD3 - REPORT 89241
- PWD4 - REPORT 90202
- PWD5 - REPORT 89141
- WS1- REPORT 81-M9 (12-14)
- WS2 - REPORT 81-M7
- DP - REPORT SSI/9508
- SP - REPORT 94-HS47
- GA1 - REPORT 39241 (1-24)
- GA2 - REPORT 31181 (25-35) AND TEST PITS (1-12)
- GA3 - REPORT 84627255 (1-11)

Coffey

Coffey Geosciences Pty Ltd ACN 056 335 516

Geotechnical | **Resources** | Environmental | **Technical** | Project Management

10 0 50

Scale (metres)

Revision	Description	Drawn	Approved	Date

Drawn	AJB/SW
Approved	DFD
Date	4/7/05
Scale	1:1000

DEPARTMENT OF COMMERCE
PRELIMINARY GEOTECHNICAL INVESTIGATION
LONG BAY CORRECTIONAL CENTRE
AREA "B" BOREHOLE LOCATIONS

FIGURE 2

Job no: E12723/3-BC

LEGEND

- BOREHOLE LOCATIONS
- TOP OF SANDSTONE CONTOUR

PREVIOUS INVESTIGATIONS

- DPWS1 - REPORT 01-GG 82A (1-14)
- DPWS2 - REPORT 02 GH 22A
- JK1 - REPORT 5212JS & 5070JS 9-14, 101-149, 16 & 17
- JK2 - REPORT 5070JS 1-8, 15 & 19
- PWD1 - REPORT 89241
- PWD2 - REPORT L86016
- PWD3 - REPORT 89241
- PWD4 - REPORT 90202
- PWD5 - REPORT 89141
- WS1- REPORT 81-M9 (12-14)
- WS2 - REPORT 81-M7
- DP - REPORT SSI/9508
- SP - REPORT 94-HS47
- GA1 - REPORT 39241 (1-24)
- GA2 - REPORT 31181 (25-35) AND TEST PITS (1-12)
- GA3 - REPORT 84627255 (1-11)

Coffey

Coffey Geosciences Pty Ltd ACN 056 335 516

Geotechnical | **Resources** | Environmental | **Technical** | Project Management

10 0 50

Scale (metres)

Revision	Description	Drawn	Approved	Date

Drawn	AJB/SW
Approved	DFD
Date	4/7/05
Scale	1:1000

DEPARTMENT OF COMMERCE
PRELIMINARY GEOTECHNICAL INVESTIGATION
LONG BAY CORRECTIONAL CENTRE
AREA "B" INFERRED TOP OF SANDSTONE CONTOURS

FIGURE 2A

Job no: E12723/3-BC

LEGEND

- BOREHOLE LOCATIONS
- HAND AUGER HOLE LOCATIONS
- MONITORING WELL LOCATIONS
- LANDUSE - OPEN SPACE/RECREATIONAL
- LANDUSE - COMMERCIAL INDUSTRIAL

PREVIOUS INVESTIGATIONS

- DPWS1 - REPORT 01-GG 82A (1-14)
- DPWS2 - REPORT 02 GH 22A
- JK1 - REPORT 5212JS & 5070JS 9-14, 101-149, **16 & 17**
- JK2 - REPORT 5070JS 1-8, **15 & 19**
- PWD1 - REPORT 89241
- PWD2 - REPORT L86016
- PWD3 - REPORT 89241
- PWD4 - REPORT 90202
- PWD5 - REPORT 89141
- WS1- REPORT 81-M9 (12-14)
- WS2 - REPORT 81-M7
- DP - REPORT SSI/9508
- SP - REPORT 94-HS47
- GA1 - REPORT 39241 (1-24)
- GA2 - REPORT 31181 (25-35) AND TEST PITS (1-12)
- GA3 - REPORT 84627255 (1-11)

Coffey Geosciences Pty Ltd ACN 056 335 516	Geotechnical | **Resources** | Environmental | **Technical** | Project Management		
Drawn	AJB/SW	DEPARTMENT OF COMMERCE PRELIMINARY GEOTECHNICAL INVESTIGATION LONG BAY CORRECTIONAL CENTRE AREA "D" BOREHOLE LOCATIONS	**FIGURE 3**
Approved	DFD		
Date	4/7/05		Job no: **E12723/3-BC**
Scale	1:2000		

Coffey

BARE SURFACE

APPROXIMATE LOCATION OF FORMER DAM (AEC D3)

FILL STOCKPILES (APPROX 2m HIGH) (AEC D2)

FILL

SANDSTONE OUTCROPS

POND (AEC D3)

AREA POTENTIALLY FILLED

AREA "D" BOUNDARY

LONG BAY HOSPITAL (AEC D1)

SPORTING FIELD - PATCHY GRASS (AEC D1)

ANZAC PARADE

BILGA CRESCENT

CBH2 CBH21 CBH23 CBH22 CBH11 MW2 CBH9 CBH100 CBH24 CBH18 HA15 CBH16 CBH99 CBH105 CBH12 HA17 HA18 HA19 CBH109 HA21 HA20 CBH19 MW5 CBH17 HA14 CBH14 MW4 CBH16 CBH13 MW3 CBH10 MW1 CBH65 CBH15

RL30 RL34 RL26 RL22 RL18

LEGEND

- BOREHOLE LOCATIONS
- HAND AUGER HOLE LOCATIONS
- MONITORING WELL LOCATIONS
- TOP OF SANDSTONE CONTOUR
- LANDUSE - OPEN SPACE/RECREATIONAL
- LANDUSE - COMMERCIAL INDUSTRIAL

PREVIOUS INVESTIGATIONS

- DPWS1 - REPORT 01-GG 82A (1-14)
- DPWS2 - REPORT 02 GH 22A
- JK1 - REPORT 5212JS & 5070JS 9-14, 101-140, 16 & 17
- JK2 - REPORT 5070JS 1-8, 15 & 19
- PWD1 - REPORT 89241
- PWD2 - REPORT L86016
- PWD3 - REPORT 89241
- PWD4 - REPORT 90202
- PWD5 - REPORT 89141
- WS1- REPORT 81-M9 (12-14)
- WS2 - REPORT 81-M7
- DP - REPORT SSI/9508
- SP - REPORT 94-HS47
- GA1 - REPORT 39241 (1-24)
- GA2 - REPORT 31181 (25-35) AND TEST PITS (1-12)
- GA3 - REPORT 84627255 (1-11)

20 0 100

Scale (metres)

Coffey Geosciences Pty Ltd ACN 056 335 516		Geotechnical | **Resources** | Environmental | **Technical** | Project Management	
Drawn	AJB/SW	DEPARTMENT OF COMMERCE PRELIMINARY GEOTECHNICAL INVESTIGATION LONG BAY CORRECTIONAL CENTRE AREA "D" INFERRED TOP OF SANDSTONE CONTOURS	**FIGURE 3A**
Approved	DFD		
Date	4/7/05		
Scale	1:2000		Job no: **E12723/3-BC**

APPENDIX A

ENGINEERING LOGS – AREA B

Soil Description

Explanation Sheet

Coffey

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil.

Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (USC) as shown in the table on the following page.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders		>200mm
Cobbles		63mm to 200mm
Gravel	coarse	20mm to 63mm
	medium	6mm to 20mm
	fine	2.36mm to 6mm
Sand	coarse	600μm to 2.36mm
	medium	200μm to 600μm
	fine	75μm to 200μm

MOISTURE CONDITION

Dry	Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.
Moist	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet	As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH su (kPa)	FIELD GUIDE
Very Soft	<12	A finger can be pushed well into the soil with little effort.
Soft	12 - 25	A finger can be pushed into the soil to about 25mm depth.
Firm	25 - 50	The soil can be indented about 5mm with the thumb, but not penetrated.
Stiff	50 - 100	The surface of the soil can be indented with the thumb, but not penetrated.
Very Stiff	100 - 200	The surface of the soil can be marked, but not indented with thumb pressure.
Hard	>200	The surface of the soil can be marked only with the thumbnail.
Friable	-	Crumbles or powders when scraped by thumb nail.

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)
Very Loose	Less than 15
Loose	15 - 35
Medium Dense	35 - 65
Dense	65 - 85
Very Dense	Greater than 85

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:	
		Coarse grained	Fine grained
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	<5%	<15%
With some	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	5% - 12%	15% - 30%

SOIL STRUCTURE

ZONING		CEMENTING	
Layers	Continuous across exposure or sample	Weakly cemented	Easily broken up by hand in air or water
Lenses	Discontinuous layers of lenticular shape	Moderately cemented	Effort is required to break up the soil by hand in air or water
Pockets	Irregular inclusions of differential material		

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material	Structure and fabric of parent rock visible
Residual soil	Structure and fabric of parent rock not visible

TRANSPORTED SOILS

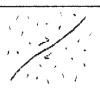
Aeolian soil	Deposited by wind
Alluvial soil	Deposited by stream and rivers
Colluvial soil	Deposited on slopes (transported downslope by gravity)
Fill	Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil	Deposited by lakes
Marine soil	Deposited in ocean basins, bays, beaches and estuaries

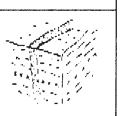
SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60mm and basing fractions on estimated mass)						USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of material less than 63mm is larger than 0.075mm	(A 0.075mm particle is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.0mm	CLEAN GRAVELS (Little or no fines)		Wide range in grain size and substantial amounts of all intermediate particle sizes.	GW	GRAVEL
					Predominantly one size or a range of sizes with more intermediate sizes missing.	GP	GRAVEL
			GRAVELS WITH FINES (Appreciable amount of fines)		Non-plastic fines (for identification procedures see ML below)	GM	SILTY GRAVEL
					Plastic fines (for identification procedures see CL below).	GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.0mm	CLEAN SANDS (Little or no fines)		Wide range in grain sizes and substantial amounts of all intermediate sizes missing.	SW	SAND
					Predominantly one size or a range of sizes with some intermediate sizes missing.	SP	SAND
			SANDS WITH FINES (Appreciable amount of fines)		Non-plastic fines (for identification procedures see ML below).	SM	SILTY SAND
					Plastic fines (for identification procedures on fractions <0.2mm below).	SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63mm is smaller than 0.075mm			IDENTIFICATION PROCEDURES ON FRACTIONS <0.2mm				
			DRY STRENGTH	DILATANCY	TOUGHNESS		
		SILTS AND CLAYS Liquid limit less than 50	None to Low	Quick to slow	None	ML	SILT
			Medium to high	None	Medium	CL	CLAY
			Low to medium	Slow to very slow	Low	OL	ORGANIC SILT
		SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to none	Low to medium	MH	SILT
			High	None	High	CH	CLAY
			Medium to high	None	Low to medium	OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS			Readily identified by colour, odour, spongy feel and frequently by fibrous texture			Pt	PEAT

* Low plasticity - Liquid Limit W_L less than 35%. Medium plasticity - W_L between 35% and 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2m in length	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.	

TERM	DEFINITION	DIAGRAM
SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter.	
TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planer to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

Rock Description

Explanation Sheet

Coffey

AS1726-1993 – The descriptive terms used by Coffey are given below. They are broadly consistent with Australian Standard AS1726-1993.

DEFINITIONS: Rock substance, defect and mass are defined as follows:

Substance	Effectively homogeneous material, may be isotropic or anisotropic.
Defect	Discontinuity or break in the continuity of a substance or substances.
Mass	Any body of material which is not effectively homogeneous. It can consist of two or more substances without defects, or one or more substances with one or more defects. In engineering terms rock substance is any naturally occurring aggregate of minerals and organic material which cannot be disintegrated or remoulded by hand in air or in water. Other material is described using soil descriptive terms.

SUBSTANCE DESCRIPTIVE TERMS:

ROCK NAME – Simple rock names are used rather than precise geological classification.

PARTICLE SIZE – Grain size terms for sandstone are:

Coarse grained	0.6mm to 2mm
Medium grained	0.2mm to 0.6mm
Fine grained	0.6mm (just visible) to 0.2mm

FABRIC – Terms for layering or penetrative fabric (eg. bedding, cleavage) are:

Massive	No layering or penetrative fabric
Poorly developed	Layering or fabric just visible. Little effect on properties.
Well developed	Layering or fabric distinct. Rock breaks more easily parallel to layering or fabic.

CLASSIFICATION OF WEATHERING PRODUCTS

Term	Abbreviation	Definition
Residual Soil	**RS**	Soil derived from the weathering of rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely Weathered	**XW**	Material is weathered to such an extent that it has soil properties, ie, it either disintegrates or can be remoulded, in water. Fabric of original rock still visible.
Distinctly Weathered	**DW**	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Slightly Weathered	**SW**	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh	**FR**	Rock shows no sign of decomposition or staining.

Note: *Where physical and chemical changes were caused by hot gases and liquids associated with igneous rocks the terms slightly altered (SA), distinctly altered (DA) and extremely altered (XA) may be used.*

ROCK SUBSTANCE STRENGTH TERMS

Term	Abbreviation	Point Load Index, I_S50 (MPa)	Field Guide to Strength
Very Low	**VL**	Less than 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low	**L**	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	**M**	0.3 to 1	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High	**H**	1 to 3	A piece of core 150mm long by 50mm diameter can not be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	**VH**	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High	**EH**	More than 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

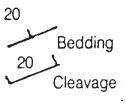
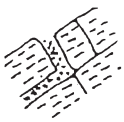
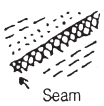
Notes:

1. *In anisotropic rocks the field guide to strength applies to the strength perpendicular to the anisotropy. High strength anisotropic rocks may break readily parallel to the planar anisotropy.*
2. *The term extremely low is not used as a rock substance strength term. The term is used in AS1726-1993 but the field guide to strength makes it clear that it is a soil in engineering terms.*
3. *The unconfined compressive strength to isotropic rocks and anisotropic rocks which do not fail parallel to the planar anisotropy is typically 10 to 25 times the point load index. The ratio may vary for different rock types and lower strength rocks often have lower ratios than higher strength rocks.*

Coffey

Rock Description Explanation Sheet

COMMON DEFECTS IN ROCK MASSES

Term	Definition	Diagram	Map Symbol	Graphic Log (Note 1)
Parting	A surface or crack across which the rock has little or no tensile strength. Parallel or sub parallel to layering (eg bedding) or a planar anisotropy in the rock substance (eg, cleavage). May be open or closed.			 (Note 2)
Joint	A surface or crack across which the rock has little or no tensile strength but which is not parallel or sub parallel to layering or planar anisotropy in the rock substance. May be open or closed.			 (Note 2)
Sheared Zone (Note 3)	Zone of rock substance with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge shaped blocks.			
Sheared Surface (Note 3)	A near planar, curved or undulating surface which is usually smooth, polished or slickensided.			
Crushed Seam (Note 3)	Seam with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock substance which may be more weathered than the host rock. The seam has soil properties.			
Infilled Seam	Seam of soil substance usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint. Infilled seams less than 1mm thick may be described as veneer or coating on joint surface.			
Extremely Weathered Seam	Seam of soil substance, often with gradational boundaries. Formed by weathering of the rock substance in places.			

Notes on defects:

1. *Borehole logs show the true dip of defects and face sketches and sections the apparent dip.*
2. *Partings and joints are not usually shown on the graphic log unless considered significant.*
3. *Sheared zones, sheared surfaces and crushed seams are faults in geological terms.*

DEFECT SHAPE TERMS

Planar	The defect does not vary in orientation
Curved	The defect has a gradual change in orientation
Undulating	The defect has a wavy surface
Stepped	The defect has one or more well defined steps
Irregular	The defect has many sharp changes in orientation

Note:
The assessment of defect shape is partly influenced by the scale of observation.

ROUGHNESS TERMS

Slickensided	Grooved or striated surface; usually polished
Polished	Shiny smooth surface
Smooth	Smooth to touch; few or no surface irregularities
Rough	Many small surfaxce irregularities (amplitude generally less than 1mm); feels like fine to coarse sand paper
Very rough	Many large surface irregularities (amplitude generally more than 1mm); feels like, or coarser than, very coarse sand paper

COATING TERMS

Clean	No visible coating
Stained	No visible coating but surfaces are discoloured
Veneer	A visible coating of soil or mineral too thin to measure; may be patchy
Coating	A visible coating up to 1mm thick . Thicker soil material is described using appropriate defect terms (eg, infilled seam). Thicker rock strength material is usually described as a vein

BLOCK SHAPE TERMS

Blocky	Approximately equidimensional
Tabular	Thickness much less than length or width
Columnar	Height much greater than cross section

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH8**

Sheet 1 of 2

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***25.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***25.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD/SG***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DCD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 41.9

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
V BIT		N							**ASPHALT:** 200mm thick.	D			PAVEMENT MATERIALS
				E					**SANDY GRAVEL:** Fine to medium grained, dark grey brown, fine to medium grained sand.	D			
				D									
				D	41	1		SP	**SAND:** Fine to medium grained, pale grey brown, low plasticity clay (<5%).	M	MD		AEOLIAN SANDS OR BEACH DEPOSIT
				SPT 5,5,5 N*=10									From 1-1.2m environmental sample.
				D									
				D	40	2		SP	**SAND:** Fine to medium grained, dark grey brown, low plasticity clay (<5%).				
			►	D									
				SPT 15,25,- N*=R				SP	**SAND:** Fine to medium grained, dark brown, low plasticity clay (<5%).	W	D		From 2.5-2.7m environmental sample.
				D	39	3			V-bit refusal at 3m on sandstone.				SANDSTONE
									Borehole CBH8 continued as cored hole				
					38	4							
					37	5							
					36	6							
					35	7							
					34	8							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit
*bit shown by suffix e.g.	ADT

support

M mud N nil

C casing

penetration 1 2 3 4

no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense


COFFEY
JOB NO E12723/3
CBH 8
3.0 — 6.0 M
START 3.0
3.12 NO CORE 0.18m 3.30
4
5
END 6.0
E12723/1 CBH8

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH8**

Sheet 2 of 2

Engineering Log - Cored Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***25.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***25.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD/SG***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model & mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 41.9

hole diameter: 100 mm Drilling fluid: | Northing: | bearing: - | datum: AHD

drilling information					material substance						rock mass defects		
method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
			41	1								
		▶	40	2								
			39	3		Continued from non-cored borehole						
						SANDSTONE:	HW					
						NO CORE:						
						SANDSTONE: Medium grained, banded pale grey and orange brown, indistinct bedding at 20°.	HW / MW		D 0.17 A 0.27			
			38	4								SM, 10°, PL, RO, carbonaceous CO, 1mm.
						SANDSTONE: Medium grained, pale grey banded grey and pale brown, distinctly cross bedding at 0° to 20°.				80		SM, 0°, PL, sandy clay, 4mm.
			37	5					D 1.51 A 2.07			PT, 0°-20°, PL, RO, clay VN.
						Trace carbonaceous flecks.						SM, 5°, PL, sandy clay, 3mm.
			36	6					D 1.02 A 1.59			SM, 10°, IR, carbonaceous, 4-2mm. PT, 0°, PL, carbonaceous CO, 1mm.
						CBH8 terminated at 6m						
			35	7								
			34	8								

CORED BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.5 Issue 3 Rev. 3

method
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

core-lift
casing used
barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material
no core recovered

water
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

planarity
PL planar
CU curved
UN undulating
ST stepped
IR irregular

roughness
VR very rough
RO rough
SO smooth
SL slickensided

coating
CN clean
SN stained
VN veneer
CO coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH25**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***28.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***28.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 40.8

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N	None observed	E	40.5	0.5			**FILL: CLAYEY SAND:** Fine to coarse grained, dark grey-black, low plasticity clay.	M			FILL
				D	40.0	1.0		SP	**SAND:** Fine to medium grained, pale grey-brown, low plasticity clay (<5%).		L		AEOLIAN DUNE OR BEACH DEPOSIT From 1-1.3m environmental sample.
				D SPT 5,5,9 N*=14	39.5	1.5		SP	**SAND:** Fine to medium grained, yellow-pale grey, low plasticity clay (<5%).		MD		
				D	39.0	2.0							From 2-2.2m environmental sample.
					38.5	2.5			Borehole CBH25 terminated at 2.25m				
					38.0	3.0							
					37.5	3.5							
					37.0	4.0							

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH26**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***28.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***28.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 39.9

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N	None observed	E					**FILL: CLAYEY SAND:** Fine to coarse grained, dark grey, low plasticity clay.	M			FILL
				D	39.5	0.5							
				E	39.0	1.0		SP	**SAND:** Fine to medium grained, pale brown, low plasticity clay (<5%).	W	L		AEOLIAN DUNE OR BEACH DEPOSIT
									Borehole CBH26 terminated at 1m				
					38.5	1.5							
					38.0	2.0							
					37.5	2.5							
					37.0	3.0							
					36.5	3.5							
					36.0	4.0							

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil
C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH27**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***28.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***28.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DPD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 41.5

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT		N							**CONCRETE:**				PAVEMENT MATERIAL
V BIT				E					**FILL: CLAYEY SAND:** Fine to coarse grained, brown, low plasticity clay.	D			FILL
				D	41.0	0.5							
				D				SP	**SAND:** Fine to medium grained, mottled yellow brown and dark brown, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
				SPT 5,5,9 N*=14	40.5	1.0							From 1-1.3m environmental sample.
				D	40.0	1.5							
			▶	E(D)				SP	**SAND:** Fine to medium grained, pale grey brown, low plasticity clay (<5%).				
					39.5	2.0			Borehole CBH27 terminated at 1.9m				
					39.0	2.5							
					38.5	3.0							
					38.0	3.5							
					37.5	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit
*bit shown by suffix e.g.	ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH28**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***28.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***28.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 42.8

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information							material substance					
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT		N							**CONCRETE:** 150mm thick.				PAVEMENT MATERIALS
V BIT				E	42.5	0.5			**FILL: CLAYEY SAND:** Fine to coarse grained, brown-orange brown, low plasticity clay. Traces of gravel fines (<5%).	M			FILL
				D									
				D	42.0	1.0		SP	**SAND:** Fine to medium grained, yellow and pale grey brown, low plasticity clay (<5%).		L		AEOLIAN DUNE OR BEACH DEPOSIT
				SPT 5,5,7 N*=12	41.5	1.5							From 1-1.2m environmental sample.
			None observed	D	41.0	2.0							
				D	40.5	2.5		CH	**SILTY CLAY:** Medium to high plasticity, pale grey-pale yellow, low liquid limit silt.		H		RESIDUAL
				SPT 25/100mm N*=R	40.0	3.0							From 2-2.6m environmental sample.
				D	39.5	3.5		SM	**SILTY CLAY:** Medium to high plasticity clay, pale yellow to pale grey, low liquid limit silt.		VSt		
				F	39.0	4.0			Borehole CBH28 terminated at 3.5m. Refusal on sandstone.				

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH29**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***28.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***28.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 42.5

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT		N							**CONCRETE:** 200mm thick.				PAVEMENT MATERIALS
V BIT				E					**FILL: CLAYEY SAND:** Fine to coarse grained, dark grey, low plasticity clay, waste building materials ie pieces crushed brick and gravel (<5%).	M			FILL
				D	42.0	0.5							
				D				SP	**SAND:** Fine to medium grained, orange-brown and dark brown, low plasticity clay (<5%), mild hydrocarbon odour.		L		AEOLIAN DUNE OR BEACH DEPOSIT NB: Oil film on inner layer of bag. From 1-1.3m environmental sample.
				SPT 5,7,10 N*=17	41.5	1.0							
				D									
			▶		41.0	1.5			Borehole CBH29 terminated at 1.45m				
					40.5	2.0							
					40.0	2.5							
					39.5	3.0							
					39.0	3.5							
					38.5	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

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Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH30**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***28.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***28.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DPD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 41.4

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
DT		N							**CONCRETE:** 150mm thick.	D			PAVEMENT MATERIAL
V BIT				E					**FILL: CLAYEY SAND:** Fine to coarse grained, dark grey-black, low plasticity clay.	M			FILL
				D	41.0	0.5							
				D	40.5	1.0		SP	**SAND:** Fine to medium grained, pale grey and dark grey, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT From 1-1.3m environmental sample.
				SPT 5,7,7 N*=14	40.0	1.5							
				D									
			▶	E	39.5	2.0		SP	**SAND:** Fine to medium grained, pale grey and dark grey, low plasticity clay (<5%).	W			
									Borehole CBH30 terminated at 2m				
					39.0	2.5							
					38.5	3.0							
					38.0	3.5							
					37.5	4.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

support
M mud N nil
C casing

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH31***

Sheet 1 of 1

Office Job No.: ***E12723/03***

Engineering Log - Borehole

Client: ***NSW Department Of Commerce*** Date started: ***28.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***28.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B*** Checked by: DPD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 42.6

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
DT		N			42.5				**CONCRETE:** 200mm thick.				PAVEMENT MATERIAL
V BIT			None observed	E					**FILL: CLAYEY SAND:** Fine to coarse grained, brown, low plasticity clay.	M			FILL
				D	42.0	0.5							
				D				SP	**SAND:** Fine to medium grained, pale yellow-grey, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
				E		1.0							
					41.5				Borehole CBH31 terminated at 1m. Refusal on sandstone.				
						1.5							
					41.0								
						2.0							
					40.5								
						2.5							
					40.0								
						3.0							
					39.5								
						3.5							
					39.0								
						4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH32**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***28.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***28.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 42.5

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
TC Bit		N		E					**FILL: CLAYEY SAND:** Fine to coarse grained, pale yellow brown and grey, low plasticity clay (<5%).	M			FILL
				D									
				D	42.0	0.5		SP	**SAND:** Fine to medium grained, pale grey-pale yellow, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
			▶	E	41.5	1.0							
									Borehole CBH32 terminated at 1.2m. Refusal on sandstone.				
					41.0	1.5							
					40.5	2.0							
					40.0	2.5							
					39.5	3.0							
					39.0	3.5							
					38.5	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

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Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH58**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***1.11.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***1.11.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

Coffey

drill model and mounting: Mitsi Truck | Easting: | slope: -90° | R.L. Surface: 42.8

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT		N	None observed						**CONCRETE:** 200mm thick.	D			PAVEMENT MATERIALS
V BIT				E	42.5			SP	**FILL: SAND:** Fine to coarse grained, pale grey and pale brown, low plasticity clay (<5%). Traces of gravel fines (<5%).	M			FILL
						0.5			Borehole CBH58 terminated at 0.3m. Refusal at 0.3m on unknown fill. Maybe crushed concrete?				
					42.0	1.0							
					41.5	1.5							
					41.0	2.0							
					40.5	2.5							
					40.0	3.0							
					39.5	3.5							
					39.0	4.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix e.g. ADT

support
M mud N nil
C casing

penetration 1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH59**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***1.11.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***1.11.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: Mitsi Truck | Easting: | slope: -90° | R.L. Surface: 42.8

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT		N	None observed						**CONCRETE:**				PAVEMENT MATERIALS
					42.5	0.5			Borehole CBH59 terminated at 0.2m. TC bit refusal at 0.2m on sandstone.				
					42.0	1.0							
					41.5	1.5							
					41.0	2.0							
					40.5	2.5							
					40.0	3.0							
					39.5	3.5							
					39.0	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH60**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***1.11.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***1.11.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: Mitsi Truck | Easting: | slope: -90° | R.L. Surface: 42.9

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT		N	None observed						**CONCRETE:**				PAVEMENT MATERIALS
					42.5	0.5			Borehole CBH60 terminated at 0.2m. TC bit refusal at 0.2m on sandstone.				
					42.0	1.0							
					41.5	1.5							
					41.0	2.0							
					40.5	2.5							
					40.0	3.0							
					39.5	3.5							
					39.0	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH61**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***1.11.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***1.11.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: Mitsi Truck | Easting: | slope: -90° | R.L. Surface: 42.1

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
TC Bit		N		E	42.0	0.5			**FILL: CLAYEY SAND:** Fine to coarse grained, grey brown, low plasticity clay.	M			FILL
			▶	E	41.5			SP	**SAND:** Fine to coarse grained, dark grey-black, low plasticity clay (<5%).	W			AEOLIAN SAND OR BEACH DEPOSIT
					41.0	1.0			Borehole CBH61 terminated at 0.9m due to H20 table.				
					40.5	1.5							
					40.0	2.0							
					39.5	2.5							
					39.0	3.0							
					38.5	3.5							
						4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH62**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***1.11.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***1.11.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: Mitsi Truck | Easting: | slope: -90° | R.L. Surface: 42.9

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT		N	None observed						**CONCRETE:** 200mm thick.	D			PAVEMENT MATERIALS
V BIT				E					**FILL: CLAYEY SAND:** Fine to medium grained, grey brown, low plasticity clay.	M			FILL
				E	42.5	0.5			Borehole CBH62 terminated at 0.5m. TC bit refusal on sandstone.				
					42.0	1.0							
					41.5	1.5							
					41.0	2.0							
					40.5	2.5							
					40.0	3.0							
					39.5	3.5							
					39.0	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil
C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH63***

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: ***E12723/03***

Client: ***NSW Department Of Commerce*** Date started: ***2.11.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***2.11.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B*** Checked by: DCD

drill model and mounting: Mitsi Truck | Easting: | slope: -90° | R.L. Surface: 42.7

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT		N	None observed		42.5				**CONCRETE:**	D			PAVEMENT MATERIALS
									SANDSTONE:	M			SANDSTONE
V BIT					42.0	0.5			Borehole CBH63 terminated at 0.25m on sandstone (no sample collected).				
					41.5	1.0							
					41.0	1.5							
					40.5	2.0							
					40.0	2.5							
					39.5	3.0							
					39.0	3.5							
						4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	*standard penetration test* (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH64**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***2.11.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***2.11.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B***

Checked by: DFD

drill model and mounting: Mitsi Truck | Easting: | slope: -90° | R.L. Surface: 42.9

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT		N	None observed						**CONCRETE:**	D			PAVEMENT MATERIALS
V BIT				E	42.5				**FILL: CLAYEY SAND:** Fine to coarse grained, dark grey brown, low plasticity clay.	M			FILL
						0.5			Borehole CBH64 terminated at 0.4m. Refusal at 0.4m on sandstone.				
					42.0	1.0							
					41.5	1.5							
					41.0	2.0							
					40.5	2.5							
					40.0	3.0							
					39.5	3.5							
					39.0	4.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

support
M mud N nil
C casing

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH71***

Sheet 1 of 1

Office Job No.: ***E12723/03***

Engineering Log - Borehole

Client: ***NSW Department Of Commerce*** Date started: ***3.11.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***3.11.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area B*** Checked by: DFD

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface: 40.1

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA		N	None observed	E	40.0			SP	**FILL: SANDY GRAVEL:** Fine to medium grained, brown-pale grey, fine to coarse grained sand. / **SAND:** Fine to medium grained, dark grey brown, low plasticity clay (<5%).	M	L		FILL / AEOLIAN DUNE OR BEACH DEPOSIT
				D									
				D		0.5		SP	**SAND:** Fine to medium grained, pale grey-pale brown, low plasticity clay (<5%).				
				E	39.5								
									Hand auger CBH71 terminated at 0.6m				
					39.0	1.0							
					38.5	1.5							
					38.0	2.0							
					37.5	2.5							
					37.0	3.0							
					36.5	3.5							
						4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit
*bit shown by suffix	
e.g.	ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH76**

Sheet 1 of 2

Office Job No.: **E12723/4**

Engineering Log - Borehole

Client: ***Department of Commerce***

Principal: ***Department of Corrective Services***

Project: ***Environmental/Geotechnical Investigation***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area B.***

Date started: ***11.3.2005***

Date completed: ***11.3.2005***

Logged by: ***SD/CW***

Checked by: ***MM***

drill model and mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 41.95

hole diameter: 125 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
DT / ADT		N	NONE OBSERVED	E					**BASE COURSE: CONCRETE**				PAVEMENT
									SUB BASE COURSE: GRAVELLY SAND: Fine to coarse grained, dark grey/brown, gravel is sandstone.	M			
				SPT 1,R,R N*=R	41	1		SM	**SILTY SAND**: Fine to medium sand, black, with some organic matter and roots.		VD		AEOLIAN SAND TC Bit Refusal at 0.9m on Sandstone.
									Borehole CBH76 continued as cored hole				
					40	2							
					39	3							
					38	4							
					37	5							
					36	6							
					35	7							
					34	8							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: M mud, C casing, N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense


COFFEY
Job Number: E12723/4
CBH76
Depth: 0.79m to 3.95m
E12723/4 CBH76
11305 0.95-3.95
START 0.95
F 3.95

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH76**

Sheet 2 of 2

Engineering Log - Cored Borehole

Office Job No.: **E12723/4**

Client: ***Department of Commerce***

Date started: ***11.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***11.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***SD/CW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area B.***

Checked by: ***MM***

drill model & mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 41.95

hole diameter: 125 mm | Drilling fluid: | Northing: | bearing: | datum: AHD

drilling information | **material substance** | **rock mass defects**

method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength (VL L M H VH EH)	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
						Continued from non-cored borehole						
		NONE OBSERVED	41	1		**SANDSTONE:** Coarse grained, pale grey and pale yellow brown, massive with some distinct laminations 0-20°.	MW/SW		D A 0.77 0.78	98		JT, 20°,PL,RO,CN JT,70°,PL,RO,CN JT,65°,IR,VRO,CN PT, 0-5°,PL,RO,CN
			40	2								
			39	3		grading to medium grained, becoming grey, massive, trace of carbonaceous material.	FR		D A 1.02 1.22			
			38	4					D A 0.76 0.89			
						CBH76 terminated at 3.95m						
			37	5								
			36	6								
			35	7								
			34	8								

method
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

core-lift
casing used; barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material; no core recovered

water
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

strength
VL very low; L low; M medium; H high; VH very high; EH extremely high

defect type
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

planarity
PL planar; CU curved; UN undulating; ST stepped; IR irregular

roughness
VR very rough; RO rough; SO smooth; SL slickensided

coating
CN clean; SN stained; VN veneer; CO coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH91**

Sheet 1 of 2

Office Job No.: **E12723/4**

Engineering Log - Borehole

Client: ***Department of Commerce***

Date started: ***10.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***10.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***SD/SG***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area B.***

Checked by: ***MM***

drill model and mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 39.50

hole diameter: 125 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADT		N		E + DUP5					**FILL: GRAVELLY SAND:** Fine to medium grained, grey, coal and ash sand and gravel.	D			FILL
								SM	**SILTY SAND:** Fine to medium sand, black, organics.	M	L		AEOLIAN SAND
								SP	**SAND:** Medium to coarse sand, pale brown, poorly graded, quartz sand.		MD		
				SPT 8,R,R N*=R	39.0	0.5			**SANDSTONE:** Very low strength, moderately weathered, pale grey and yellow, medium to coarse grained quartz sand.	W	VD		BEDROCK
					38.5	1.0			Borehole CBH91 continued as cored hole				
					38.0	1.5							
					37.5	2.0							
					37.0	2.5							
					36.5	3.0							
					36.0	3.5							
					35.5	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

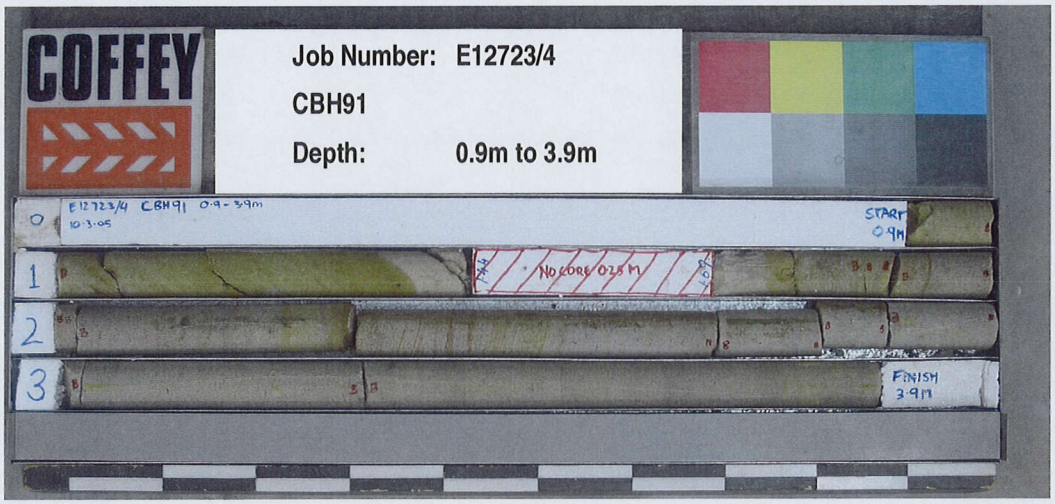
D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.4 AREA B&D PHASE 2 UPDATED.GPJ COFFEY.GDT 27.06.05

Form GEO 5.3 Issue 3 Rev 2


COFFEY
Job Number: E12723/4
CBH91
Depth: 0.9m to 3.9m
E12723/4 CBH91 0.9-3.9m
10.3.05
START
0.9M
NO CORE 0.25M
FINISH
3.9M

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH91***

Sheet 2 of 2

Engineering Log - Cored Borehole

Office Job No.: ***E12723/4***

Client: ***Department of Commerce*** Date started: ***10.3.2005***

Principal: ***Department of Corrective Services*** Date completed: ***10.3.2005***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***SD/SG***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area B.*** Checked by: ***MM***

drill model & mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 39.50

hole diameter: 125 mm | Drilling fluid: | Northing: | bearing: | datum: AHD

drilling information					material substance						rock mass defects		
method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
		▶	39.0	0.5		Continued from non-cored borehole						
NMLC			38.5	1.0		**SANDSTONE:** Coarse grained, pale orange brown and pale grey, massive.	MW		D 0.73 A 0.69			— JT, 40°, IR, RO, CN — JT, 50°, PL, RO, CN
			38.0	1.5		**NO CORE:** 1.44-1.69m.						— JT, 50°, PL, RO, CN
			37.5	2.0		**SANDSTONE:** Medium grained, pale grey banded pale orange brown, indistinctly laminated with some iron staining, 0-15 degrees, trace of carbonaceous flecks.	MW		D 0.5 A 0.63			— SM, 0°, clayey sand, 30mm thick — PT, 5°, PL, RO, VN
			37.0	2.5		becoming pale grey and massive	SW			84		— PT, 5°, PL, RO, iron stained clay VN
			36.5	3.0					D 0.44 A 0.59			
			36.0	3.5					D 0.21 A 0.13			
			35.5	4.0		CBH91 terminated at 3.9m						

CORED BOREHOLE E12723.4 AREA B&D PHASE 2 UPDATED.GPJ COFFEY.GDT 27.06.05

Form GEO 5.5 Issue 3 Rev. 3

method
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

core-lift
casing used; barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material; no core recovered

water
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

strength
VL very low; L low; M medium; H high; VH very high; EH extremely high

defect type
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

planarity
PL planar; CU curved; UN undulating; ST stepped; IR irregular

roughness
VR very rough; RO rough; SO smooth; SL slickensided

coating
CN clean; SN stained; VN veneer; CO coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH94**

Sheet 1 of 1

Office Job No.: **E12723/4**

Engineering Log - Borehole

Client: ***Department of Commerce***

Principal: ***Department of Corrective Services***

Project: ***Environmental/Geotechnical Investigation***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area B.***

Date started: ***10.3.2005***

Date completed: ***10.3.2005***

Logged by: ***SD***

Checked by: ***AJB***

drill model and mounting: MOLE 4WD | Easting: | slope: -90° | R.L. Surface: 40.50

hole diameter: 125 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADT		N	NONE OBSERVED						**CONCRETE:**				CONCRETE
				E	40			SM	**SILTY SAND:** Medium to coarse, black to dark grey, trace roots and organics.	M	VL		AEOLIAN SAND
				SPT 6,8,Hammer Bouncing N*=R		1		SP	**SAND:** Medium to coarse grained, pale brown to red-brown, poorly graded.		D-VD		
					39	2			Borehole CBH94 continued as cored hole				
					38	3							
					37	4							
					36	5							
					35	6							
					34	7							
					33	8							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense


COFFEY
Job Number: E12723/4
CBH94
Depth: 1.2m to 4.2m
CBH94 12-4-19
E12723/4
START 1.2m
NO CORE 0.22m
2
3
4
4.2m

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH94**

Sheet 1 of 1

Engineering Log - Cored Borehole

Office Job No.: **E12723/4**

Client: ***Department of Commerce*** Date started: ***10.3.2005***

Principal: ***Department of Corrective Services*** Date completed: ***10.3.2005***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***SD***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area B.*** Checked by: ***AJB***

drill model & mounting: MOLE 4WD | Easting: | slope: -90° | R.L. Surface: 40.50

hole diameter: 125 mm Drilling fluid: | Northing: | bearing: | datum: AHD

drilling information					material substance						rock mass defects		
method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering / alteration	estimated strength (VL L M H VH EH)	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
			40	1		Continued from non-cored borehole						
		NONE OBSERVED	39	2		**NO CORE**						
						SANDSTONE: Coarse grained, pale grey and pale yellow / brown, massive, with some dark grey siltstone clasts lenses.	MW		D 0.32 A 0.75	70		PT,15°,IR,VRO,Clay,VN JT,40°,IR,VRO,Clay,VN PT,10°,IR,VR,Clay VN XW,JM,10°,IR,Siltstone PT,15°,IR,RO,VN JT,30°,IR,RO,VN XW,SM,15-40°,IR,Siltstone
			38	3		**SANDSTONE:** Coarse grained, pale grey with red / brown and orange / brown, indistinctly laminated 0-20° trace siltstone laminae.			D 1.14 A 1.15			Closed JT,15°,ST,Clay CO
			37	4		**SANDSTONE:** Sandstone, medium grained, pale grey, distinctly laminated 0-20°, trace of carbonaceous laminae.	SW/Fr		D 0.52 A 0.89			SM,0°,PL,Sandy Clay,5mm
									D 0.57 A 0.61			PT,0-20°,PL,RO,Clay,VN/CO
			36	5		CBH94 terminated at 4.2m						
			35	6								
			34	7								
			33	8								

CORED BOREHOLE E12723.4 AREA B&D PHASE 2 UPDATED.GPJ COFFEY.GDT 30.06.05

Form GEO 5.5 Issue 3 Rev. 3

method
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

core-lift
casing used; barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material; no core recovered

water
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

strength
VL very low; L low; M medium; H high; VH very high; EH extremely high

defect type
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

planarity
PL planar; CU curved; UN undulating; ST stepped; IR irregular

roughness
VR very rough; RO rough; SO smooth; SL slickensided

coating
CN clean; SN stained; VN veneer; CO coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH122**

Sheet 1 of 2

Office Job No.: **E12723/4**

Engineering Log - Borehole

Client: ***Department of Commerce***

Date started: ***11.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***11.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***SG/SD***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area B.***

Checked by: ***MM***

drill model and mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 42.6

hole diameter: 125 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADT		N	NONE OBSERVED	E + DUPS					**BASE COURSE: CONCRETE:**				PAVEMENT
									SUB BASE COURSE: SAND: Medium to coarse grained, pale brown, quartz sand.	M			
								SP	**SAND:** Medium to coarse grained, yellow/brown, trace of silt.		L		AEOLIAN SAND
				SPT 2,3,4 N*=7	42				becoming pale brown with depth.				
						1			**SANDSTONE:** Soil strength, extremely weathered, medium to coarse grained, pale brown/grey and yellow.		VD		BEDROCK
									Borehole CBH122 continued as cored hole				
					41	2							
					40	3							
					39	4							
					38	5							
					37	6							
					36	7							
					35	8							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: M mud, C casing, N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense


COFFEY
Job Number: E12723/4
CBH122
Depth: 1.35m to 4.35m
E12723/4 11-05
CBH122
START
1.35M
NO CORE 0-1.7M
FINISH
4.35M

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH122***

Sheet 2 of 2

Engineering Log - Cored Borehole

Office Job No.: ***E12723/4***

Client: ***Department of Commerce*** Date started: ***11.3.2005***

Principal: ***Department of Corrective Services*** Date completed: ***11.3.2005***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***SG/SD***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area B.*** Checked by: ***MM***

Coffey

drill model & mounting: GEMCO TRUCK Easting: slope: -90° R.L. Surface: 42.6

hole diameter: 125 mm Drilling fluid: Northing: bearing: datum: AHD

drilling information | **material substance** | **rock mass defects**

method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength (VL L M H VH EH)	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness (particular / general)
			42	1		Continued from non-cored borehole						
NMLC		NONE OBSERVED	41	2		**NO CORE:** 1.35-1.52m.						
						SANDSTONE: Coarse grained, pale grey, massive.	SW		D 0.39 A 0.3			— JT, 70°, PL, RO, CN.
												— PT, 0-15°, CU, RO, VN clay.
			40	3		becoming pale yellow with carbonaceous laminae	HW/MW		D 0.17 A 0.17	79		— PT, 10°, ST, RO, CN.
						SHALE: Dark grey	SW/FR					— PT, 10°, IR, VRO, CO clay.
			39	4		**SANDSTONE:** Medium to coarse grained, banded pale grey and grey, distinctly laminated at 0 - 15 degrees, trace of carbonaceous laminae.			D 1.11 A 0.94			— JT, 90°, PL, RO, VN clay. PT, 0-15°, CU, RO, VN clay. PT, 0-15°, CU, RO, VN clay. JT, 70°, PL, RO, CN. PT, 0-15°, CU, RO, VN clay. PT, 0-15°, CU, RO, VN clay. PT, 0-15°, CU, RO, VN clay. PT, 0-15°, CU, RO, VN clay. PT, 0-15°, CU, RO, VN clay. PT, 0-15°, CU, RO, VN clay.
			38	5		CBH122 terminated at 4.35m			D 0.63 A 0.85			PT, 0-15°, CU, RO, VN clay.
			37	6								
			36	7								
			35	8								

CORED BOREHOLE E12723.4 AREA B&D PHASE 2 UPDATED.GPJ COFFEY.GDT 27.06.05

Form GEO 5.5 Issue 3 Rev. 3

method
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

core-lift
casing used
barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material
no core recovered

water
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

planarity
PL planar
CU curved
UN undulating
ST stepped
IR irregular

roughness
VR very rough
RO rough
SO smooth
SL slickensided

coating
CN clean
SN stained
VN veneer
CO coating

APPENDIX A

ENGINEERING LOGS – AREA D

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH9**

Sheet 1 of 2

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***25.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***25.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD/SG***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N		E					**FILL: CLAYEY SAND:** Fine to medium grained, dark grey brown, low plasticity clay (<5%), waste building materials (<5%).	M			FILL
				D	34								
				Bs		1		SP	**SAND:** Fine to medium grained, dark grey brown, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
				SPT 15,10,8 N*=18	33								From 1-1.25m environmental sample.
				Bs									
				D		2		SP	**SAND:** Fine to medium grained, pale yellow grey brown, low plasticity clay (<5%).				
				SPT 5,5,7 N*=12	32			SP	**SAND:** Fine to medium grained, pale grey white, low plasticity clay (<5%).		L		From 2.5-2.7m environmental sample.
			▶	D	31	3				W	L-MD		
				SPT 5,5,10 N*=15	30	4							From 4-4.2m environmental sample.
				D		5			V-bit refusal at 5.1m.				
									Borehole CBH9 continued as cored hole				
					29	6							
					28	7							
					27	8							
					26	9							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit
*bit shown by suffix e.g.	ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

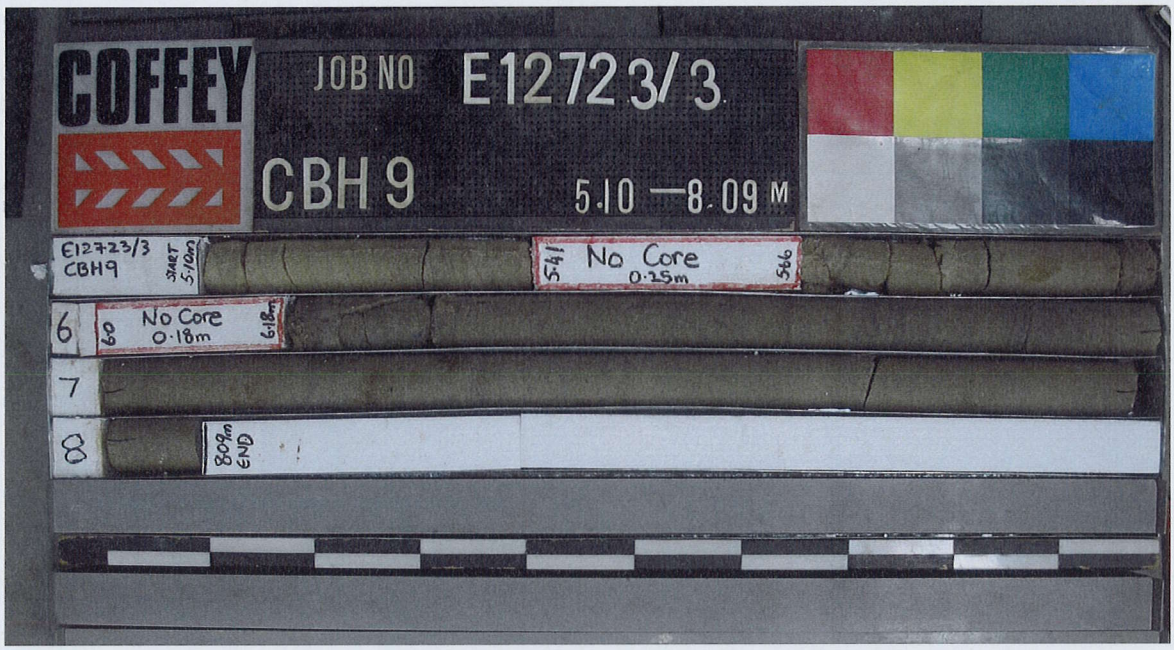
classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense


COFFEY
JOB NO E12723/3
CBH 9
5.10 — 8.09 M
E12723/3
CBH9
SHEET 5/10m
541 No Core 0.25m 566
6
8 No Core 0.18m 6.18m
7
8
8.09m END

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH9**

Sheet 2 of 2

Office Job No.: **E12723/03**

Engineering Log - Cored Borehole

Client: ***NSW Department Of Commerce***

Date started: ***25.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***25.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD/SG***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DCD

drill model & mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: 100 mm Drilling fluid: | Northing: | bearing: - | datum: AHD

drilling information					material substance						rock mass defects		
method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength (VL L M H VH EH)	$Is_{(50)}$ MPa (D- diametral, A- axial)	RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness (particular / general)
			34	1								
			33	2								
			32	3								
		▶	31	4								
			30	5		Continued from non-cored borehole						
			29	6		**SANDSTONE:** Medium grained, pale grey banded grey, indistinctly bedded.	MW					PT, 0°, IR, RO, sandy clay CO.
						NO CORE:						
						SANDSTONE: Medium grained, pale grey banded grey, indistinctly bedded.	MW		D 0.64 A 0.7			SM, 0°-10°, IR, clayey sand, 20mm (XW). XW SM, IR, clayey sand 15mm. PT, 0°, IR, RO, VN.
						NO CORE:						
			28	7		**SANDSTONE:** Medium grained, pale grey banded grey, indistinctly bedded.	MW			66		SM, 0°, PL, sandy clay, 10mm. SM, 0°, PL, sandy clay 20mm. JT, 70°, PL, VR, clayey sand CO (6.23-6.32m). Closed PT, 15°, PL.
						SANDSTONE: Medium grained, pale grey, indistinctly bedded to massive.			D 0.47 A 0.57			PT, 0°-20°, PL, RO, sandy clay CO and VN.
			27	8					D 0.55 A 0.77			
			26	9		CBH9 terminated at 8.09m						

method

DT	diatube
AS	auger screwing
AD	auger drilling
RR	roller/tricone
CB	claw or blade bit
NMLC	NMLC core
NQ, HQ, PQ	wireline core

core-lift

- casing used
- barrel withdrawn

graphic log/core recovery

- core recovered - graphic symbols indicate material
- no core recovered

water

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

weathering

FR	fresh
SW	slightly weathered
MW	moderately weathered
HW	highly weathered
XW	extremely weathered
DW	distinctly weathered (covers MW and HW)

strength

VL	very low
L	low
M	medium
H	high
VH	very high
EH	extremely high

defect type

JT	joint
PT	parting
SM	seam
SZ	sheared zone
SS	sheared surface
CS	crushed seam

planarity

PL	planar
CU	curved
UN	undulating
ST	stepped
IR	irregular

roughness

VR	very rough
RO	rough
SO	smooth
SL	slickensided

coating

CN	clean
SN	stained
VN	veneer
CO	coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH10 MW1***

Sheet 1 of 1

Engineering Log - Piezometer

Office Job No.: ***E12723/03***

Client: ***NSW Department Of Commerce*** Date started: ***25.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***25.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D*** Checked by: DCD

drill model & mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 35.7

hole diameter: 100mm | Northing: | bearing: - | datum: AHD

drilling information								material substance					
method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
V BIT		N		E						**FILL: TOPSOIL: SILTY SAND:** Fine to medium grained, dark grey-black, low liquid limit silt.	M		FILL
				D						**FILL: CLAYEY SAND:** Fine to medium grained, dark grey and dark brown, low plasticity clay.			
				D		35	1			**FILL: CLAYEY SAND:** Fine to medium grained, brown and grey and black and yellow, low plasticity clay.			From 1-1.2m environmental sample.
				SPT 4,5,10 N*=15		34	2						
			►	D							W		
				SPT 4,4,9 N*=13		33	3		SP	**SAND:** Fine to medium grained, dark brown, low plasticity clay (<5%).		L	AEOLIAN DUNE OR BEACH DEPOSIT From 2.5-2.7m environmental sample.
				D									
				D		32	4		SP	**SAND:** Fine to medium grained, dark brown and black, low plasticity clay (<5%).			
				SPT 5,4,5 N*=9									
				D		31	5			Borehole CBH10 MW1 terminated at 5m			
						30	6						
						29	7						
						28	8						

PIEZOMETER E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.10 Issue 3 Rev.0

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

C casing N nil

penetration

1 2 3 4 no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH11 MW2**

Sheet 1 of 1

Engineering Log - Piezometer

Office Job No.: **E12723/03**

Client: **NSW Department Of Commerce**

Date started: **26.10.2004**

Principal: **NSW Department Of Corrective Services**

Date completed: **26.10.2004**

Project: **Environmental/Geotechnical Investigation**

Logged by: **AD**

Borehole Location: **Long Bay Correctional Complex, Malabar, NSW, Area D**

Checked by: DED

drill model & mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 35.7

hole diameter: 100mm | Northing: | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
V BIT		N		E						**FILL: CLAYEY SAND:** Fine to coarse grained, grey and brown, low plasticity clay, sandstone boulders up to 120mm (<5%).	M		FILL
				D		35	1		SP	**SAND:** Fine to medium grained, pale yellow grey, low plasticity clay (<5%).		MD	AEOLIAN DUNE OR BEACH DEPOSIT
				D									From 1-1.3m environmental sample.
				SPT 6,9,13 N*=22									
				D		34	2		SP	**SAND:** Fine to medium grained, yellow and pale grey-white, low plasticity clay (<5%).		L	
				D									From 2.5-2.8m environmental sample.
				SPT 3,4,6 N*=10		33	3						
				D									
			▶	D		32	4		SP	**SAND:** Fine to medium grained, pale yellow grey, low plasticity clay (<5%).	W	MD	
				SPT 6,8,10 N*=18									
				D		31	5						
				SPT 2,6,8 N*=14		30	6		SC	**Sandy CLAY:** Medium to high plasticity, grey, fine to medium sand.	M/W	St	
										Borehole CBH11 MW2 terminated at 5.95m			
						29	7						
						28	8						

PIEZOMETER E12723.3.GPJ COFFEY.GDT 02.12.04

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

C casing N nil

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Form GEO 5.10 Issue 3 Rev.0

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH12**

Sheet 1 of 2

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***26.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***26.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD/SG***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DCD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
VBIT		N		E					**FILL: CLAYEY SAND:** Fine to coarse grained, dark brown-black, low plasticity clay, waste building materials ie bricks, tiles, plastic.	M			FILL
				D									
				D	34	1		SP	**SAND:** Fine to medium grained, dark brown, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
				SPT 5,8,10 N*=18									From 1-1.3m environmental sample.
				D	33								
				D		2		SP	**SAND:** Fine to medium grained, pale yellow grey, low plasticity clay (<5%).	W			
			▶										From 2.5-2.6m environmental sample.
				SPT 25 for 100mm N*=R	32				V-bit refusal.				
						3			Borehole CBH12 continued as cored hole				
					31								
						4							
					30								
						5							
					29								
						6							
					28								
						7							
					27								
						8							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2


COFFEY
JOB NO E12723/3
CBH12
2.85 — 7.00 M
E12723/3 CBH 12
285 START
3
4
5
6
327
NO CORE
1.65m
NO CORE.
512

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH12**

Sheet 2 of 2

Office Job No.: **E12723/03**

Engineering Log - Cored Borehole

Client: ***NSW Department Of Commerce***

Date started: ***26.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***26.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD/SG***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DFD

drill model & mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: 100 mm Drilling fluid: | Northing: | bearing: - | datum: AHD

drilling information					material substance						rock mass defects		
method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering / alteration	estimated strength (VL L M H VH EH)	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness (particular / general)
			34	1		Continued from non-cored borehole						
			33	2								
			32	3		**SANDSTONE:** Medium grained, pale brown.	XW		D 0.04 A 0.04			PT, 0°, PL, RO.
			31	4		**NO CORE:**						
			30	5								
			29	6		**SANDSTONE:** Medium grained, pale brown.	XW					XW SM, IR, clayey sand, 40mm.
												XW SM, IR, clayey sand, 40mm.
												JT, 60°, PL, RO, CO.
												SM, IR, sandy clay 40mm.
						SANDSTONE: Medium grained, pale grey, banded grey, indistinctly laminated 0°-20°.	MW		D 0.42 A 0.68	9		PT, 0°-20°, IR, RO, VN.
			28	7					D 0.44 A 0.28	59		PT, 10°, PL, RO, sandy clay CO.
												PT, 10°, IR, RO, carbonaceous VN.
												PT, 10°, PL, RO, carbonaceous CO.
												JT, 60°, IR, RO, CN (6.5-6.56m).
												JT, 60°, PL, RO, VN.
												JT, 30°, PL, RO, VN.
			27	8		CBH12 terminated at 7m						JT, 60°, PL, RO, VN.
												PT, 15°, PL, RO, carbonaceous VN.

method

DT	diatube
AS	auger screwing
AD	auger drilling
RR	roller/tricone
CB	claw or blade bit
NMLC	NMLC core
NQ, HQ, PQ	wireline core

core-lift

- casing used
- barrel withdrawn

graphic log/core recovery

- core recovered - graphic symbols indicate material
- no core recovered

water

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

weathering

FR	fresh
SW	slightly weathered
MW	moderately weathered
HW	highly weathered
XW	extremely weathered
DW	distinctly weathered (covers MW and HW)

strength

VL	very low
L	low
M	medium
H	high
VH	very high
EH	extremely high

defect type

JT	joint
PT	parting
SM	seam
SZ	sheared zone
SS	sheared surface
CS	crushed seam

planarity

PL	planar
CU	curved
UN	undulating
ST	stepped
IR	irregular

roughness

VR	very rough
RO	rough
SO	smooth
SL	slickensided

coating

CN	clean
SN	stained
VN	veneer
CO	coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH13 MW3***

Sheet 1 of 1

Engineering Log - Piezometer

Office Job No.: ***E12723/03***

Client: ***NSW Department Of Commerce*** Date started: ***26.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***26.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D*** Checked by: DFD

drill model & mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 36.1

hole diameter: 100mm | Northing: | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
V BIT		N		E		36				**FILL: CLAYEY SAND:** Fine to coarse grained, pale yellow brown, low plasticity clay (<5%).	M		FILL
				D									
				D			1		SP	**SAND:** Fine to medium grained, dark brown-black, low plasticity clay (<5%).		L	AEOLIAN DUNE OR BEACH DEPOSIT
				SPT 2,2,5 N*=7		35							From 1-1.3m environmental sample.
				D									
				D		34	2		SP	**SAND:** Fine to medium grained, pale yellow grey, low plasticity clay (<5%).			
				D					SP	**SAND:** Fine to medium grained, dark brown mottled black and grey, low plasticity clay (<5%).		VD	
				SPT 25 for 100mm N*=R								MD	From 2-2.61m environmental sample.
			►	D		33	3				W		
				SPT 5,8,9 N*=17		32	4						From 4-4.3m environmental sample.
				D									
				D		31	5		SP	**SAND:** Fine to medium grained, pale grey, low to intermediate plasticity clay.		L	
				SPT 3,4,6 N*=10									From 5.5-5.8m environmental sample.
						30	6			Borehole CBH13 MW3 terminated at 5.95m			
						29	7						
							8						

PIEZOMETER E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.10 Issue 3 Rev.0

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

C casing N nil

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH14 MW4**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Piezometer

Client: ***NSW Department Of Commerce***

Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DPD

drill model & mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: | Northing: | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
V BIT		N		E						**FILL: CLAYEY SAND:** Fine to coarse grained, black-dark brown, low plasticity clay (<5%), waste building materials (<5%).	M		FILL
				D		34	1						From 1-1.3m environmental sample.
				SPT 1,1,2 N*=3									
				D		33			SP	**SAND:** Fine to medium grained, dark brown and dark grey, low plasticity clay (<5%).		MD	AEOLIAN DUNE OR BEACH DEPOSIT
			▶	D			2				W		
				SPT 4,8,9 N*=17		32	3						*From 2.5-2.8m environmental sample.*
				D									
				D		31			SC	**Sandy CLAY:** Medium to high plasticity, grey brown and black, fine to medium grained sand.		VSt	
				SPT 3,4,5 N*=9			4						From 4-4.3m environmental sample.
				D		30				Borehole CBH14 MW4 terminated at 4.45m			
							5						
						29	6						
						28	7						
						27	8						

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: C casing; N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH15**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce*** Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D*** Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 35.5

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
V BIT		N	None observed	E					**FILL: CLAYEY SAND:** Fine to coarse grained, dark brown-black, low plasticity clay (<5%).	M			FILL
				D	35.0	0.5							
				D	34.5	1.0		SP	**SAND:** Fine to medium grained, yellow brown and pale grey, low plasticity clay (<5%).		L		AEOLIAN DUNE OR BEACH DEPOSIT From 1-1.3m environmental sample.
				SPT 2,3,2 N*=5									
					34.0	1.5							
				D									
					33.5	2.0							
									Borehole CBH15 terminated at 2m at v bit refusal.				
					33.0	2.5							
					32.5	3.0							
					32.0	3.5							
					31.5	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil
C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Form GEO 5.3 Issue 3 Rev.2 BOREHOLE E12723.3.GPJ COFFEY.GDT 02.12.04

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH16**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 35.5

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N		E					**FILL: CLAYEY SAND:** Fine to coarse grained, dark brown-black, low plasticity clay, waste building materials ie wire, steel, bricks (<5%).	M			FILL
				D	35.0	0.5							
				SPT 4,5,7 N*=12	34.5	1.0							From 1-1.3m environmental sample.
				D	34.0	1.5							
				D	33.5	2.0		SP	**SAND:** Fine to medium grained, dark grey-pale grey, low plasticity clay (<5%).		L		AEOLIAN DUNE OR BEACH DEPOSIT
				SPT 7,7,9 N*=16	33.0	2.5							From 2.5-2.8m environmental sample.
				D	32.5	3.0					MD		
			▶	D	32.0	3.5		SP	**SAND:** Fine to medium grained, grey brown, low plasticity clay (<5%).	W			
				E(D)									
					31.5	4.0			Borehole CBH16 terminated at 3.9m				

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	*pressuremeter*
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH17**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DCD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 35.0

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N		E					**FILL: CLAYEY SAND:** Fine to coarse grained, dark grey and brown, low plasticity clay, waste building material ie crushed bricks and concrete, wire, steel (<5%).	M			FILL
				D	34	1							
				SPT 9,8,4 N*=12									From 1-1.3m environmental sample.
				D									
				D	33	2			**FILL: CLAYEY SAND:** Fine to coarse grained, mottled red brown, grey brown and black, low to medium plasticity clay.				
				SPT 9,2,2 N*=4					**FILL: CLAYEY SAND:** Fine to coarse grained, mottled red, dark brown and orange brown, low to medium plasticity clay.				From 2.5-2.8m environmental sample.
				D	32	3							
			►	D				SP	**SAND:** Fine to medium grained, grey-brown and dark grey, low to medium plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
				SPT 6,6,9 N*=15	31	4							From 4-4.3m environmental sample.
				D	30	5		SP	**SAND:** Fine to medium grained, brown, low plasticity clay (<5%).	W			
					29	6							
					28	7			Borehole CBH17 terminated at 6.5m				
					27	8							

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	*pressuremeter*
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH18**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 34.6

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N		E	34.5				**FILL: CLAYEY SAND:** Fine to coarse grained, grey pale brown, low plasticity clay.	M			FILL
				D		0.5							
					34.0								
				D					**FILL: CLAYEY SAND:** Fine to coarse grained, grey and pale brown with mottled red brown sandstone pieces up to 50mm, low plasticity clay.				
				SPT 3,3,3 N*=6	33.5	1.0							From 1-1.3m environmental sample.
				D		1.5							
					33.0			SP	**SAND:** Fine to medium grained, grey brown and yellow, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
				D		2.0							
					32.5								
				E									
						2.5			Borehole CBH18 terminated at 2.4m				
					32.0								
						3.0							
					31.5								
						3.5							
					31.0								
						4.0							

method

AS	auger screwing*
AD	*auger drilling**
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit
*bit shown by suffix e.g.	ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH19 MW5**

Sheet 1 of 2

Engineering Log - Piezometer

Office Job No.: **E12723/03**

Client: **NSW Department Of Commerce**

Date started: **27.10.2004**

Principal: **NSW Department Of Corrective Services**

Date completed: **27.10.2004**

Project: **Environmental/Geotechnical Investigation**

Logged by: **AD**

Borehole Location: **Long Bay Correctional Complex, Malabar, NSW, Area D**

Checked by: DCD

drill model & mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 35.4

hole diameter: 100mm | Northing: | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
V BIT		N		E						**FILL: CLAYEY SAND:** Fine to coarse grained, dark brown and dark grey, low plasticity clay (<5%).	M		FILL
				D		35.0	0.5						
						34.5	1.0		SP	**SAND:** Fine to medium grained, grey, low plasticity clay (<5%).		MD	AEOLIAN DUNE OR BEACH DEPOSIT
				SPT 5,9,12 N*=21									From 1-1.3m environmental sample.
				D		34.0	1.5						
						33.5	2.0		SP	**SAND:** Fine to medium grained, yellow brown and dark brown, low plasticity clay (<5%).			
				D									
						33.0	2.5						From 2.5-2.8m environmental sample.
				SPT 5,7,10 N*=17									
			▶			32.5	3.0		SP	**SAND:** Fine to medium grained, pale grey brown and yellow brown, low plasticity clay (<5%).	W		
				D		32.0	3.5						
						31.5	4.0						

PIEZOMETER E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.10 issue 3 Rev.0

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

C casing N nil

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH19 MW5***

Sheet 2 of 2

Engineering Log - Piezometer

Office Job No.: ***E12723/03***

Client: ***NSW Department Of Commerce*** Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D*** Checked by: DFD

drill model & mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 35.4

hole diameter: 100mm | Northing: | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
V BIT		N		SPT 4,9,12 N*=21		31.0	4.5		SP	**SAND:** Fine to medium grained, pale grey brown and yellow brown, low plasticity clay (<5%). *(continued)*	W	MD	From 4-4.3m environmental sample.
				D		30.5	5.0						
						30.0	5.5			Borehole CBH19 MW5 terminated at 5.5m			
						29.5	6.0						
						29.0	6.5						
						28.5	7.0						
						28.0	7.5						
						27.5	8.0						

method

AS	auger screwing*
AD	auger drilling*
RR	*roller/tricone*
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

C casing N nil

penetration

1 2 3 4 no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressure meter
Bs	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH20***

Sheet 1 of 1

Office Job No.: ***E12723/03***

Engineering Log - Borehole

Client: ***NSW Department Of Commerce*** Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D*** Checked by: DCD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 35.2

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N	None observed	E	35.0	0.5			**FILL: CLAYEY SAND:** Fine to coarse grained, grey brown and dark brown and black, low plasticity clay.	M			FILL
				D	34.5	1.0			**FILL: SILTY SAND:** Fine to coarse grained, dark brown-black, low liquid limit silt.				From 1-1.3m environmental sample.
				SPT 2,2,3 N*=5	34.0	1.5							
				D									
				D	33.5	2.0		SP	**SAND:** Fine to medium grained, pale yellow grey, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
				D	33.0	2.5							From 2.5-2.8m environmental sample.
				SPT 4,7,9 N*=16	32.5	3.0							
				D	32.0	3.5							
					31.5	4.0			Borehole CBH20 terminated at 3.2m. Refusal at 3.2m on sandstone.				

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH21**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 35.6

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N	None observed	E	35.5	0.5			**FILL: CLAYEY SAND:** Fine to coarse grained, grey brown, low plasticity clay.	M			FILL
				D				SP	**SAND:** Fine to medium grained, grey and brown, low plasticity clay (<5%).		L		AEOLIAN DUNE OR BEACH DEPOSIT
				D	35.0	1.0							
				SPT 6,6,8 N*=14	34.5	1.5							From 1-1.3 environmental sample.
				D	34.0	2.0		SP	**SAND:** Fine to medium grained, yellow and pale grey, low plasticity clay (<5%).		MD		
				D	33.5	2.5							
				SPT 4,7,9 N*=16	33.0	3.0							From 2.5-2.8m environmental sample.
				D	32.5	3.5							
					32.0	4.0			Borehole CBH21 terminated at 3.25m. Refusal on sandstone at 3.25m.				

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH22**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: **NSW Department Of Commerce**

Date started: **27.10.2004**

Principal: **NSW Department Of Corrective Services**

Date completed: **27.10.2004**

Project: **Environmental/Geotechnical Investigation**

Logged by: **AD**

Borehole Location: **Long Bay Correctional Complex, Malabar, NSW, Area D**

Checked by: DFD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 34.0

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information							material substance					
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N		E					**FILL: CLAYEY SAND:** Fine to coarse grained, dark grey-black, low plasticity clay.	M			FILL
				D	33.5	0.5							
				D					**FILL: CLAYEY SAND:** Fine to coarse grained, yellow grey and brown, low plasticity clay.				
				SPT 10,10,14 N*=24	33.0	1.0							From 1-1.3m environmental sample.
				D	32.5	1.5							
				D				SP	**SAND:** Fine to medium grained, pale grey brown, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
				D	32.0	2.0							
				SPT 7,9,9 N*=18	31.5	2.5							From 2.5-2.8m environmental sample.
				D	31.0	3.0							
					30.5	3.5			Borehole CBH22 terminated at 3.3m				
					30.0	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit
*bit shown by suffix e.g.	ADT

support

M mud N nil
C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH23**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D***

Checked by: DCD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 32.7

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N	None observed	E	32.5	0.5			**FILL: CLAYEY SAND:** Fine to coarse grained, orange brown, low plasticity clay.	M			FILL
				D	32.0	1.0			**FILL: CLAYEY SAND:** *Fine to coarse grained,* brown, low plasticity clay, waste building materials ie steel, plastics, concrete (<5%).				From 1-1.3m environmental sample.
				D									
				SPT 4,4,6 N*=10	31.5	1.5							
				D	31.0	2.0			**FILL: CLAYEY SAND:** Fine to coarse grained, dark brown and yellow, low plasticity clay, waste building materials ie conjute paperwork, wire, bricks (<5%).				
				D	30.5	2.5							
				SPT 19,18,25/100mm N*=R	30.0								
					29.5	3.0			Borehole CBH23 terminated at 2.7m. Refusal on sandstone.				
					29.0	3.5							
						4.0							

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH24**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce*** Date started: ***27.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***27.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D*** Checked by: DCD

drill model and mounting: P160 Truck | Easting: | slope: -90° | R.L. Surface: 31.1

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N		E	31.0				**FILL: CLAYEY SAND:** Fine to medium grained, yellow grey brown, low plasticity clay, waste building materials ie terracotta, bricks, wire, plastic, concrete.	M			FILL
				D	30.5	0.5							
				D					**FILL: CLAYEY SAND:** Fine to coarse grained, grey brown, low plasticity clay. Traces of sandstone boulders up to 50mm (<5%).				
				SPT 2,2,3 N*=5	30.0	1.0							From 1-1.3m environmental sample.
				D	29.5	1.5							
				D	29.0	2.0		SC	**SAND:** Fine to medium grained, grey brown, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
									Borehole CBH24 terminated at 2.2m				
					28.5	2.5							
					28.0	3.0							
					27.5	3.5							
						4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil
C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	*environmental sample*
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH65***

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: ***E12723/03***

Client: ***NSW Department Of Commerce*** Date started: ***2.11.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***2.11.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Complex, Malabar, NSW, Area D*** Checked by: DFD

drill model and mounting: Mitsi Truck | Easting: | slope: -90° | R.L. Surface: 36.5

hole diameter: 100 mm | Northing | bearing: - | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
V BIT		N	None observed	E					**FILL: CLAYEY SAND:** Fine to coarse grained, brown to dark brown, low plasticity clay.	M			FILL
					36.0	0.5			***FILL: CLAYEY SAND:*** *Fine to coarse grained, pale grey/pale brown, low plasticity clay.*				
				SPT 4,6,7 N*=13	35.5	1.0							
					35.0	1.5		SP	**SAND:** Fine to medium grained, mottled pale grey, orange, brown, low plasticity clay (<5%).		MD		AEOLIAN DUNE OR BEACH DEPOSIT
					34.5	2.0							
				E	34.0	2.5							
									Borehole CBH65 terminated at 2.5m				
					33.5	3.0							
					33.0	3.5							
					32.5	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit
*bit shown by suffix e.g.	ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	*standard penetration test* (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.3.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH99***

Sheet 1 of 3

Office Job No.: ***E12723/4***

Engineering Log - Borehole

Client: ***Department of Commerce***

Date started: ***16.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***16.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Checked by: ***MM***

drill model and mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA		N		E	34	1			**FILL: SAND:** Fine grained, yellow, with some silt and clay.	D / M			FILL
ADT				SPT 12,14,23 N*=37	33	2			Grading to medium grained, becoming dark grey, with some coarse white sandstone gravel.				
				SPT 12,14,20 N*=34	32	3			**FILL: SANDY CLAY:** Mottled orange/grey.				
					31	4		SM	**SILTY SAND:** Fine grained, grey/brown, with some medium to coarse grained sandstone gravel.		D-VD		AEOLIAN SAND
			▶	SPT 12,22,Hammer Bouncing N*=R	30	5			with some clay.				
								SW	**SAND:** Fine to medium grained, yellow/brown.	W			
					29	6		MH	**CLAYEY SILT:** Low liquid limit, light grey/white, with some fine grained sand.		VSt		RESIDUAL SOILS
					28	7							
					27	8							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.4 AREA B&D PHASE 2 UPDATED.GPJ COFFEY.GDT 27.06.05

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH99**

Sheet 2 of 3

Office Job No.: **E12723/4**

Engineering Log - Borehole

Client: ***Department of Commerce***

Date started: ***16.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***16.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Checked by: ***MM***

drill model and mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADT		N			26	9		MH	**CLAYEY SILT:** Low liquid limit, light grey/white, with some fine grained sand. *(continued)*	W	VSt		RESIDUAL SOILS
								CH	**CLAY:** High plasticity, grey, with some silt, trace of carbonaceous lenses.				
				SPT 6,12,17 N*=29	25	10							
					24								
				SPT 10,10,15 N*=25		11							
					23								
				SPT		12							
				22/140mm N*=R	22	13			Borehole CBH99 continued as cored hole				
					21								
						14							
					20								
						15							
					19								
						16							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense


COFFEY
Job Number: E12723/4
CBH99
Depth: 12.1m to 15.1m
12
12.1
13
14
15
CBH99 TERMINATED 15.1m

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH99**

Sheet 3 of 3

Office Job No.: **E12723/4**

Engineering Log - Cored Borehole

Client: ***Department of Commerce***

Principal: ***Department of Corrective Services***

Project: ***Environmental/Geotechnical Investigation***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Date started: ***16.3.2005***

Date completed: ***16.3.2005***

Logged by: ***CFW***

Checked by: ***MM***

drill model & mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: 100 mm Drilling fluid: | Northing: | bearing: | datum: AHD

drilling information					material substance					rock mass defects		
method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
			26	9								
			25	10								
			24	11								
			23	12		Continued from non-cored borehole						
NMLC						**NO CORE:** 12.1-12.32m.						
			22	13		**SANDSTONE/SILTSTONE:** Fine grained, grey stained orange brown, indistinctly bedded, highly fractured.	HW		D 0.15 A 0.2	60		JT, IR,RO, 75°, SN orange JT, IR, RO, 75°, SN orange JT, IR, RO, 75°, SN orange
			21			**NO CORE:** 13.3-13.5m.						
				14		**SANDSTONE/SILTSTONE:** Fine grained, grey stained orange brown, indistinctly bedded, highly fractured.	HW		D 0.3 A 0.27 D 0.22 A 0.17	0 0		Typically recovered as a fine to coarse gravel and cobbles
			20			**NO CORE:** 14.6-15.1m.						
				15		CBH99 terminated at 15.1m						
			19	16								

method
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

core-lift
casing used; barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material; no core recovered

water
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

strength
VL very low; L low; M medium; H high; VH very high; EH extremely high

defect type
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

roughness
VR very rough; RO rough; SO smooth; SL slickensided

planarity
PL planar; CU curved; UN undulating; ST stepped; IR irregular

coating
CN clean; SN stained; VN veneer; CO coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH100**

Sheet 1 of 2

Office Job No.: **E12723/4**

Engineering Log - Borehole

Client: ***Department of Commerce***

Date started: ***16.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***16.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Checked by: ***MM***

drill model and mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA		N		E					**FILL: SANDY SILT:** Brown, with some angular/subangular medium grained gravel.	D			FILL 100mm thick topsoil and grass at surface. 30mm black plastic pipe discovered at 0.3m during hand augering.
					34	1				M			
ADT				SPT 7,8,8 N*=16					**FILL: CLAYEY SAND:** Fine to medium grained, yellow, with some coarse grained, extremely weathered sandstone gravel.				ALS D6, DUB D6
				SPT 13,20,18 N*=38	33	2		SW	**SAND:** Fine to medium grained, dark grey, mottled yellow, with some organic material.		D		AEOLIAN SAND
			▶		32	3			becoming light grey.	W	L		
				SPT 4,4,5 N*=9	31			SC	**CLAYEY SAND:** Fine to medium grained, clay is of medium plasticity.				RESIDUAL SOIL
						4			Borehole CBH100 continued as cored hole				
					30	5							
					29	6							
					28	7							
					27	8							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

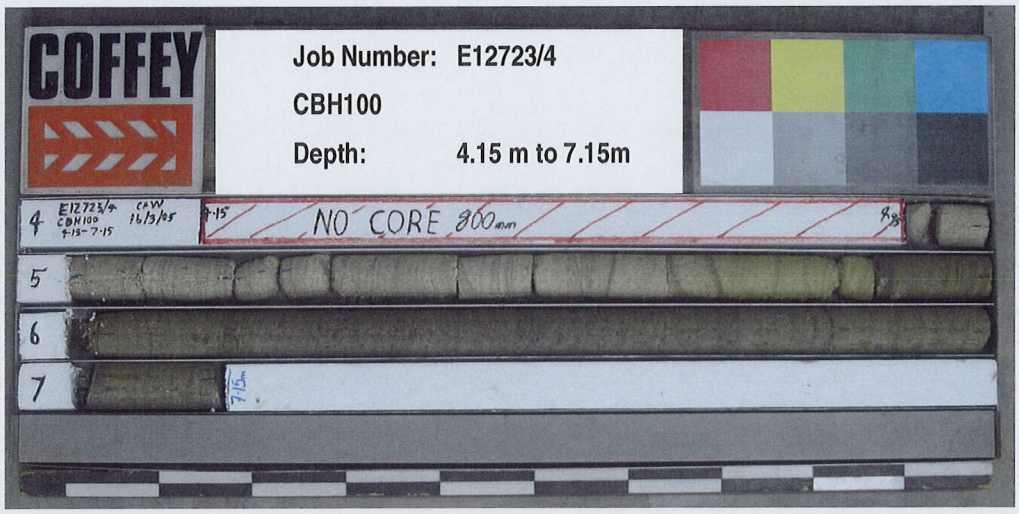
D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE E12723.4 AREA B&D PHASE 2 UPDATED.GPJ COFFEY.GDT 27.06.05

Form GEO 5.3 Issue 3 Rev.2


COFFEY
Job Number: E12723/4
CBH100
Depth: 4.15 m to 7.15m
4
E12723/4 CBH100 4-15-7-15 CAW 16/3/05
4-15
NO CORE 900mm
5
6
7
7.15m

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH100**

Sheet 2 of 2

Office Job No.: **E12723/4**

Engineering Log - Cored Borehole

Client: ***Department of Commerce***

Date started: ***16.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***16.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Checked by: ***MM***

drill model & mounting: GEMCO TRUCK | Easting: | slope: -90° | R.L. Surface: 34.5

hole diameter: 100 mm | Drilling fluid: | Northing: | bearing: | datum: AHD

drilling information					material substance					rock mass defects		
method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering / alteration	estimated strength (VL L M H VH EH)	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness (particular / general)
			34	1								
			33	2								
		▼	32	3								
			31	4		Continued from non-cored borehole						
NMLC			30	5		**NO CORE:** 4.1-4.95m.						
			29	6		**SANDSTONE:** Coarse grained, pale grey, some distinct cross bedding, 0-30°.	MW		D 0.22 A 0.19	80		JT, 40°, PL, RO, CN. JT, 0°, PL, RO, CN.
			28	7		Grading to medium to coarse grained, becoming grey, indistinct bedded at 0-20°, trace of carbonaceous material.			D 0.44 A 0.39 D 0.71 A 0.93			XW SM, 5°, PL, Clayey Sand, 10mm. PT, 0-20°, PL, RO, VN.
			27	8		CBH100 terminated at 7.15m						

CORED BOREHOLE E12723.4 AREA B&D PHASE 2 UPDATED.GPJ COFFEY.GDT 27.06.05

Form GEO 5.5 Issue 3 Rev. 3

method
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

core-lift
casing used; barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material; no core recovered

water
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

strength
VL very low; L low; M medium; H high; VH very high; EH extremely high

defect type
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

roughness
VR very rough; RO rough; SO smooth; SL slickensided

planarity
PL planar; CU curved; UN undulating; ST stepped; IR irregular

coating
CN clean; SN stained; VN veneer; CO coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH105***

Sheet 1 of 3

Office Job No.: ***E12723/4***

Engineering Log - Borehole

Client: ***Department of Commerce***

Date started: ***18.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***18.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Checked by: ***MM***

drill model and mounting: MOLE TRUCK | Easting: | slope: -90° | R.L. Surface: 35.1

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA / ADT		N		E	35	1			**TOPSOIL:** Dark brown, with some roots. **FILL: SAND:** Fine to medium grained, yellow/grey, with some subrounded coarse grained, highly weathered sandstone gravel.	M			FILL Topsoil and grass at surface. Tree roots at 1m.
				SPT 7,7,5 N*=12	34				**FILL: SILTY SAND:** Medium grained, brown/grey, with some subrounded, medium to coarse grained sandstone gravel, trace of subangular, fine and medium grained brown gravel.				
					33	2			**FILL: SAND:** Fine grained, grey, with some medium grained, moderately weathered white sandstone gravel and medium plasticity clay.				
			►	SPT 1,1,1 N*=2	32	3		MH	**SANDY SILT:** Medium to high plasticity, dark brown, sand medium to fine grained sand, with some roots and high plasticity clay.	W	VS-S		ALLUVIUM?
				SPT 7,7,5 N*=12	31	4		SP	**SAND:** Fine to medium grained, grey.		MD		AEOLIAN SAND
					30	5							
					29	6							
					28	7							
						8							

BOREHOLE E12723.4 AREA B&D PHASE 2 UPDATED.GPJ COFFEY.GDT 27.06.05

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***CBH105***

Sheet 2 of 3

Engineering Log - Borehole

Office Job No.: ***E12723/4***

Client: ***Department of Commerce*** Date started: ***18.3.2005***

Principal: ***Department of Corrective Services*** Date completed: ***18.3.2005***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.*** Checked by: ***MM***

drill model and mounting: MOLE TRUCK Easting: slope: -90° R.L. Surface: 35.1

hole diameter: 100 mm Northing bearing: datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADT / RR		N			27	9		SP	**SAND:** Fine to medium grained, grey. *(continued)*	W	MD		AEOLIAN SAND
					26	10							
					25	11		CL/CH	**SANDY CLAY:** Medium plasticity, white, fine to medium grained to coarse quartz sand.		VSt		RESIDUAL SOIL
					24	12							
					23								
									Borehole CBH105 continued as cored hole				
					22	13							
					21	14							
					20	15							
						16							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense


COFFEY
Job Number: E12723/4
CBH105
Depth: 12.3m to 14.3m
12
COMMENCE CORING 12.3
13
14
E12723/4 CBH105 12.3 - 14.3
21/3/05 CFW

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH105**

Sheet 3 of 3

Office Job No.: **E12723/4**

Engineering Log - Cored Borehole

Client: ***Department of Commerce***

Date started: ***18.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***18.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Checked by: ***MM***

drill model & mounting: MOLE TRUCK | Easting: | slope: -90° | R.L. Surface: 35.1

hole diameter: 100 mm Drilling fluid: | Northing: | bearing: | datum: AHD

drilling information					material substance						rock mass defects		
method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength (VL L M H VH EH)	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness (particular / general)
			27									
				9								
			26									
				10								
			25									
				11								
			24									
				12								
			23			Continued from non-cored borehole						
NMLC						NO CORE: 12.3-12.33m.	XW					PT, PL, SO, 30°.
						SANDSTONE: Fine grained, pale grey/brown, indistinctly bedded at 5°, occasional thin carbonaceous laminations.	HW		D 0.05 A 0.04			SM, 40mm gravel infill.
				13								
			22									JT, PL, SO, 70°.
										55		
									D 0.13 A 0.05			PT, PL, RO, CN.
						Grading to medium grained, pale grey/brown, cross bedded at 15 degrees.						PT, PL, RO, CN.
												PT, PL, RO, CN.
				14								PT, PL, RO, CN.
			21						D 0.09 A 0.11			Extremely Weathered Seam, 20mm.
												PT, PL, SO, CN.
												JT, PL, SO, VN clay.
						CBH105 terminated at 14.3m						PT, PL, SO, CN.
			20	15								
				16								

method
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

core-lift
casing used; barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material; no core recovered

water
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

strength
VL very low; L low; M medium; H high; VH very high; EH extremely high

defect type
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

planarity
PL planar; CU curved; UN undulating; ST stepped; IR irregular

roughness
VR very rough; RO rough; SO smooth; SL slickensided

coating
CN clean; SN stained; VN veneer; CO coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH108**

Sheet 1 of 2

Engineering Log - Borehole

Office Job No.: ***E12723/4***

Client: ***Department of Commerce*** Date started: ***14.3.2005***

Principal: ***Department of Corrective Services*** Date completed: ***14.3.2005***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.*** Checked by: ***MM***

drill model and mounting: MOLE TRUCK | Easting: | slope: -90° | R.L. Surface: 32.1

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADT		N	NONE OBSERVED		32				**FILL: SANDY SILT:** Brown, with some fragments of fibro sheeting.	D			FILL
					31	1		SC	**CLAYEY SAND:** Medium to coarse grained, pale yellow and grey, low to medium plasticity fines.	M	MD		RESIDUAL SOIL?
					30	2							
					29	3			Borehole CBH108 continued as cored hole				
					28	4							
					27	5							
					26	6							
					25	7							
						8							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

support
M mud N nil
C casing

penetration
1 2 3 4 no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense


COFFEY
Job Number: E12723/4
CBH108
Depth: 2.3m to 5.3m
E12723/4 CBH 108
2.30
NQ CORE
0-16
2.46
3
4
5
5.30
END

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH108**

Sheet 2 of 2

Office Job No.: **E12723/4**

Engineering Log - Cored Borehole

Client: ***Department of Commerce***

Principal: ***Department of Corrective Services***

Project: ***Environmental/Geotechnical Investigation***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Date started: ***14.3.2005***

Date completed: ***14.3.2005***

Logged by: ***CFW***

Checked by: ***MM***

drill model & mounting: MOLE TRUCK | Easting: | slope: -90° | R.L. Surface: 32.1

hole diameter: 100 mm | Drilling fluid: | Northing: | bearing: | datum: AHD

drilling information					material substance					rock mass defects		
method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering / alteration	estimated strength (VL L M H VH EH)	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness (particular / general)
			32									
				1								
			31									
				2								
			30			Continued from non-cored borehole						
						NO CORE: 2.3-2.46m.						
		NONE OBSERVED		3		**SANDSTONE:** Medium grained, pale grey, indistinctly laminated, 0-20°, occasional fine carbonaceous laminations.	SW		D A 0.59 0.73			PT, 3°, RO, CN, PL.
			29									PT, 3°, PL, RO, CN.
												PT, 20°, PL, RO, CN
				4					D A 0.53 0.59	90		PT, 0°, PL, RO, CN.
			28									PT, 0°, PL, RO, CN
						Grading to medium to coarse grained, grey/pale grey, distinctly laminated at 0-20°, trace of quartz nodules up to 5mm.	FR					CS, 5°, IR, 50mm (5.59m to 5.64m) fine gravel filled.
				5					D A 0.28 0.48			PT, 30°, RO, CN, 0mm.
			27									PT, 3°, RO, CN, 0mm.
									D A 0.49 0.53			PT, 3°, RO, CN, 0mm.
						CBH108 terminated at 5.3m						PT, 5°, RO, CN, 0mm.
				6								
			26									
				7								
			25									
				8								

method

DT	diatube
AS	auger screwing
AD	auger drilling
RR	roller/tricone
CB	claw or blade bit
NMLC	NMLC core
NQ, HQ, PQ	wireline core

core-lift

- casing used
- barrel withdrawn

graphic log/core recovery

- core recovered - graphic symbols indicate material
- no core recovered

water

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

weathering

FR	fresh
SW	slightly weathered
MW	moderately weathered
HW	highly weathered
XW	extremely weathered
DW	distinctly weathered (covers MW and HW)

strength

VL	very low
L	low
M	medium
H	high
VH	very high
EH	extremely high

defect type

JT	joint
PT	parting
SM	seam
SZ	sheared zone
SS	sheared surface
CS	crushed seam

planarity

PL	planar
CU	curved
UN	undulating
ST	stepped
IR	irregular

roughness

VR	very rough
RO	rough
SO	smooth
SL	slickensided

coating

CN	clean
SN	stained
VN	veneer
CO	coating

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH109**

Sheet 1 of 2

Engineering Log - Borehole

Office Job No.: **E12723/4**

Client: ***Department of Commerce***

Date started: ***14.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***14.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Checked by: ***MM***

drill model and mounting: MOLE TRUCK | Easting: | slope: -90° | R.L. Surface: 33.7

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
ADT		N	NONE OBSERVED		33			SW	**TOPSOIL: SAND:** Medium grained, dark grey, with some roots.	M	L		TOPSOIL
								SW	**SAND:** Medium grained, grey.				AEOLIAN SAND
									Borehole CBH109 continued as cored hole				
					32	1							
					31	2							
					30	3							
					29	4							
					28	5							
					27	6							
					26	7							
						8							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

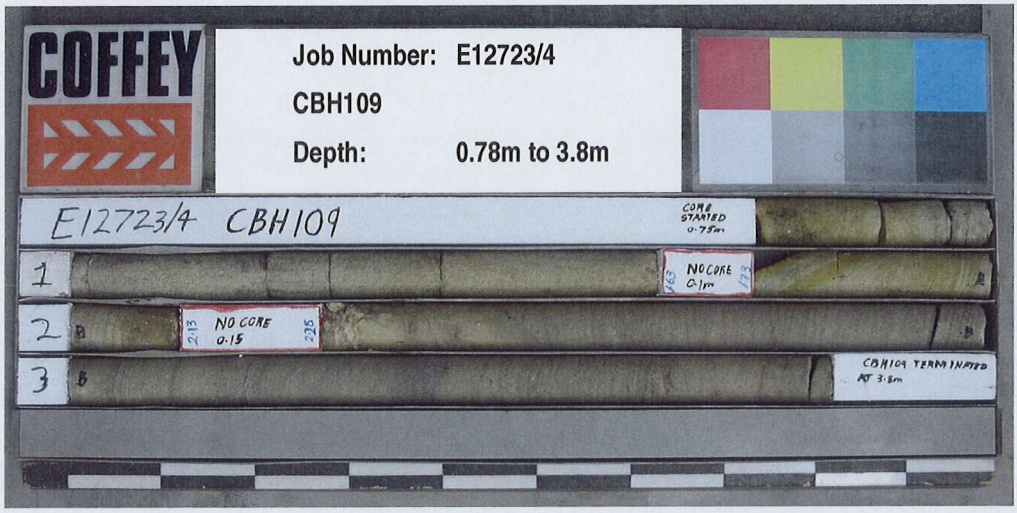
based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	*very loose*
L	loose
MD	medium dense
D	dense
VD	very dense


COFFEY
Job Number: E12723/4
CBH109
Depth: 0.78m to 3.8m
E12723/4 CBH109
CORE STARTED 0.78m
1
NO CORE 0.1m
2
NO CORE 0.15
3
CBH109 TERMINATED AT 3.8m

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH109**

Sheet 2 of 2

Engineering Log - Cored Borehole

Office Job No.: **E12723/4**

Client: ***Department of Commerce***

Date started: ***14.3.2005***

Principal: ***Department of Corrective Services***

Date completed: ***14.3.2005***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***CFW***

Borehole Location: ***Long Bay Correctional Facility, Malabar, NSW, Area D.***

Checked by: ***MM***

drill model & mounting: MOLE TRUCK | Easting: | slope: -90° | R.L. Surface: 33.7

hole diameter: 100 mm | Drilling fluid: | Northing: | bearing: | datum: AHD

drilling information | **material substance** | **rock mass defects**

method	core-lift	water	RL	depth metres	graphic log / core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength (VL L M H VH EH)	Is(50) MPa D- diametral A- axial	RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
			33			Continued from non-cored borehole						
NMLC		NONE OBSERVED		1		**SANDSTONE:** Coarse grained, pale grey and pale orange-brown, distinctly laminated 0-60°.	MW		D 0.07 A 0.12			
			32			**NO CORE:** 1.63-1.73m.			D 0.2 A 0.16			
				2		**SANDSTONE:** Coarse grained, pale grey and pale orange-brown, distinct laminated 0-60°.	MW					JT, 60°, PL, RO, CN.
						NO CORE: 2.13-2.28m.				82		SM, 0°, PL, Sandy Clay, 40mm.
						SANDSTONE: Medium grained, grey and pale grey, indistinct laminations 0-20°, trace of carbonaceous material and quartz nodules (5mm).	SW		D 0.77 A 0.68			PT, 0°, PL, RO, CN.
			31	3								JT, 0-20°, PL, RO, CN.
									D 0.23 A 0.62			PT, 15°, CU, RO, CN.
			30									PT, 0°, PL, RO, CN.
				4		CBH109 terminated at 3.8m						
			29	5								
			28	6								
			27	7								
			26	8								

method
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

core-lift
casing used
barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material
no core recovered

water
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

roughness
VR very rough
RO rough
SO smooth
SL slickensided

planarity
PL planar
CU curved
UN undulating
ST stepped
IR irregular

coating
CN clean
SN stained
VN veneer
CO coating

CORED BOREHOLE E12723.4 AREA B&D PHASE 2 UPDATED.GPJ COFFEY.GDT 27.06.05

Form GEO 5.5 Issue 3 Rev. 3

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***HA14***

Sheet 1 of 1

Office Job No.: ***E12723/03***

Engineering Log - Borehole

Client: ***NSW Department Of Commerce*** Date started: ***12.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***12.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Facility, Malabar NSW, Area D*** Checked by: DFD

Coffey

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface: 35.5

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA		N	None observed	E					**FILL: SILTY SAND:** Fine to coarse grained, dark grey brown, low liqiud limit silt (<5%).	M			FILL
								SP	**SAND:** Fine to medium grained, pale grey brown, low plasticity clay (<5%).		L		AEOLIAN DUNE OR BEACH DEPOSIT
				E	35.0	0.5							
					34.5	1.0			Borehole HA14 terminated at 0.5m				
					34.0	1.5							
					33.5	2.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: M mud, C casing, N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE HAND AUGERS - SITE D.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***HA15***

Sheet 1 of 1

Office Job No.: ***E12723/03***

Engineering Log - Borehole

Client: ***NSW Department Of Commerce*** Date started: ***12.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***12.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Facility, Malabar NSW, Area D*** Checked by: DAD

Coffey

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface: 31.8

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information							material substance					
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA		N	None observed	E					**FILL: SILTY SAND:** Fine to coarse grained, dark grey brown, low liqiud limit silt (<5%).	D			FILL
					31.5			SP	**SAND:** Fine to medium grained, pale grey brown to yellow, low plasticity clay (<5%).	M	L		AEOLIAN DUNE OR BEACH DEPOSIT
				E		0.5			Borehole HA15 terminated at 0.5m				
					31.0	1.0							
					30.5	1.5							
					30.0	2.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: M mud, C casing, N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE HAND AUGERS - SITE D.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **HA16**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: ***E12723/03***

Client: ***NSW Department Of Commerce*** Date started: ***12.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***12.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Facility, Malabar NSW, Area D*** Checked by: DFD

Coffey

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface: 35.2

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA		N	None observed	E	35.0			SP	**SILTY SAND:** Fine to medium grained, dark brown, low liquid limit silt.	M	L		AEOLIAN DUNE OR BEACH DEPOSIT
				E		0.5							
					34.5	1.0			Borehole HA16 terminated at 0.5m. Hand Auger refusal on Sandstone Bedrock.				
					34.0	1.5							
					33.5	2.0							

BOREHOLE HAND AUGERS - SITE D.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. ***HA17***

Sheet 1 of 1

Office Job No.: ***E12723/03***

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Date started: ***12.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***12.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Facility, Malabar NSW, Area D***

Checked by: DCD

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface: 32.8

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information								material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA		N	None observed	E	32.5			SP	**SAND:** Fine to medium grained, pale grey brown, low plasticity clay (<5%).	M	L		AEOLIAN DUNE OR BEACH DEPOSIT
				E		0.5							
					32.0	1.0			Borehole HA17 terminated at 0.5m. Hand Auger refusal on Sandstone Bedrock.				
					31.5	1.5							
					31.0	2.0							

BOREHOLE HAND AUGERS - SITE D.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **HA18**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: ***E12723/03***

Client: ***NSW Department Of Commerce*** Date started: ***12.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***12.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Facility, Malabar NSW, Area D*** Checked by: DFD

Coffey

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface: 33.7

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA		N	None observed	E	33.5			SP	**SAND:** Medium to coarse grained, pale grey brown, low plasticity clay (<5%).	M	L		AEOLIAN DUNE OR BEACH DEPOSIT
				E									
					33.0	0.5			Borehole HA18 terminated at 0.3m. Hand Auger refusal on Sandstone Bedrock.				
					32.5	1.0							
					32.0	1.5							
						2.0							

BOREHOLE HAND AUGERS - SITE D.GPJ COFFEY.GDT 01.12.04

Form GEO 5.3 Issue 3 Rev.2

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample *50mm diameter*
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **HA19**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **E12723/03**

Client: ***NSW Department Of Commerce***

Date started: ***12.10.2004***

Principal: ***NSW Department Of Corrective Services***

Date completed: ***12.10.2004***

Project: ***Environmental/Geotechnical Investigation***

Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Facility, Malabar NSW, Area D***

Checked by: DFD

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface: 34.3

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information								material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, *colour, secondary and minor components.*	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA		N	None observed	E				SP	**SAND:** Fine to coarse grained, dark grey brown, low plasticity clay (<5%).	M			AEOLIAN DUNE OR BEACH DEPOSIT
					34.0			SP	**SAND:** Fine to coarse grained, pale grey yellow brown, low plasticity clay (<5%).		L		
				E		0.5			Borehole HA19 terminated at 0.5m. Hand Auger refusal on Sandstone Bedrock.				
					33.5	1.0							
					33.0	1.5							
					32.5	2.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Form GEO 5.3 Issue 3 Rev.2 BOREHOLE HAND AUGERS - SITE D.GPJ COFFEY.GDT 01.12.04

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **HA20**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: ***E12723/03***

Client: ***NSW Department Of Commerce*** Date started: ***12.10.2004***

Principal: ***NSW Department Of Corrective Services*** Date completed: ***12.10.2004***

Project: ***Environmental/Geotechnical Investigation*** Logged by: ***AD***

Borehole Location: ***Long Bay Correctional Facility, Malabar NSW, Area D*** Checked by: DC D

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface: 33.0

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information								material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA		N	None observed	E				SP	**SAND:** Fine to coarse grained, grey brown, low plasticity clay (<5%).	M	L		AEOLIAN DUNE OR BEACH DEPOSIT
					32.5	0.5			Borehole HA20 terminated at 0.1m. Hand Auger refusal on Sandstone Bedrock.				
					32.0	1.0							
					31.5	1.5							
					31.0	2.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: M mud, N nil, C casing

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **HA21**

Sheet 1 of 1

Office Job No.: **E12723/03**

Engineering Log - Borehole

Client: ***NSW Department Of Commerce***

Principal: ***NSW Department Of Corrective Services***

Project: ***Environmental/Geotechnical Investigation***

Borehole Location: ***Long Bay Correctional Facility, Malabar NSW, Area D***

Date started: ***12.10.2004***

Date completed: ***12.10.2004***

Logged by: ***AD***

Checked by: DFD

Coffey

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface: 34.6

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA		N	None observed	E	34.5			SP	**SAND:** Fine to coarse grained, grey brown, low plasticity clay (<5%).	M	L		AEOLIAN DUNE OR BEACH DEPOSIT
				E									
					34.0	0.5			Borehole HA21 terminated at 0.2m. Hand Auger refusal on Sandstone Bedrock.				
					33.5	1.0							
					33.0	1.5							
						2.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

APPENDIX B – AREA B

OTHER CONSULTANTS ENGINEERING LOGS

PwDI-1

PUBLIC WORKS

GEOTECHNICAL CENTRE

BOREHOLE NO. 1

PROJECT: LONG BAY GOAL

LOCATION: PROPOSED WAREHOUSE

CONTRACTOR: GEOTECH CENTRE DRILLER: G.KELLY

DATE: 4.1.90

SURFACE RL:

RIG TYPE: GEMCO 210B

DEPTH (m)	WATER	BIT	SAMPLE OR TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION (Soil type, colour, consistency, grainsize, moisture, remarks)
0				FILL		FILL SAND Dark Brown, Loose & Damp .B
1		YEE	SPT 3,3,4 N = 7	SP (v)		SAND (Medium Grained) Brown, Loose & Damp
2			D			Grey Brown, Loose & Saturated END at 2.3
	4.1.90					Vee Bit Refusal on Extremely Weathered Sandstone
3						
4						
5						
6						
7						
8						
9						
10						

SAMPLE OR TEST

U . . . . . undisturbed

D . . . . . disturbed

SPT. . . . standard penetration test

CPT. . . . cone penetration test

v : visual

l : laboratory

WATER

Water table

Water inflow

DRILLING SUPERVISOR: O.FERGUSON

PROJECT ENGINEER: D.SARIAN

SHEET OF SHEETS

SCALE 1:50

LONG BAY1

PWD 1-2

PUBLIC WORKS | GEOTECHNICAL CENTRE

BOREHOLE NO. 2

PROJECT: LONG BAY GOAL
LOCATION: PROPOSED WAREHOUSE
CONTRACTOR: GEOTECH CENTRE DRILLER: G.KELLY

DATE: 4.1.90
SURFACE RL:
RIG TYPE: GEMCO 210B

DEPTH (m)	WATER	BIT	SAMPLE OR TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION (Soil type, colour, consistency, grainsize, moisture, remarks)
0				FILL		FILL SAND & COKE (19mm), SOME RUBBLE Dark Brown, Loose & Damp .8
1		VEE	SPT 3, 3, 4 N = 7	SP (v)		SAND (Medium Grained) Brown, Loose & Damp
2	4.1.90		D			Grey Brown. Loose & Saturated END at 2.1
						Vee Bit Refusal on Extremely Weathered Sandstone.
3						
4						
5						
6						
7						
8						
9						
10						

SAMPLE OR TEST
U . . . . . undisturbed
D . . . . . disturbed
SPT. . . . standard penetration test
CPT. . . . cone penetration test

V : Visual
L : laboratory

WATER
Water table
Water inflow

DRILLING SUPERVISOR O.FERGUSON
PROJECT ENGINEER: D.SARIAN
SHEET OF SHEETS LONG BAY2
SCALE 1:50

PWD1 - 3

PUBLIC WORKS

GEOTECHNICAL CENTRE

BOREHOLE NO. 3

PROJECT: LONG BAY GOAL

LOCATION: PROPOSED WAREHOUSE

CONTRACTOR: GEOTECH CENTRE DRILLER: G.KELLY

DATE: 4.1.90

SURFACE RL:

RIG TYPE: GEMCO 210B

DEPTH (m)	WATER	BIT	SAMPLE OR TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0				FILL		FILL SAND & COKE (19mm), SOME BUILDING RUBBLE. Dark Brown, Loose & Dry. .8
1		VEE	SPT 4,4,4 N = 8 D	SP (v)		SAND (Medium Grained) Brown, Loose & Damp Grey Brown, Loose & Saturated
2	4.1.90					END at 2.0 Vee Bit Refusal on Extrenmely Weathered Sandstone
3						
4						
5						
6						
7						
8						
9						
10						

SAMPLE OR TEST

U.....undisturbed

D.....disturbed

SPT....standard penetration test

CPT....cone penetration test

V : Visual

L : laboratory

WATER

Water table

Water inflow

DRILLING SUPERVISOR: O.FERGUSON

PROJECT ENGINEER: D.SARIAN

SHEET OF SHEETS LONG BAY3

SCALE 1:50

PWD1-4

PUBLIC WORKS

GEOTECHNICAL CENTRE

BOREHOLE NO. 4

PROJECT: LONG BAY GOAL

LOCATION: PROPOSED WAREHOUSE

CONTRACTOR: GEOTECH CENTRE DRILLER: G.KELLY

DATE: 4.1.90

SURFACE RL:

RIG TYPE: GEMCO 210B

DEPTH (m)	WATER	BIT	SAMPLE OR TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION (Soil type, colour, consistency, grainsize, moisture, remarks)
0				FILL		FILL Extremely Weathered Sandstone .5
				SP (v)		SAND, Light Brown, Loose & Damp .8
1		VEE	SPT 4,4,4 N = 8	SP (v)		SAND (Medium Grained) Grey Brown, Loose & Damp
			D			Loose & Saturated END at 1.7
	4.1.90					Vee Bit Refusal on Extremely Weathered Sandstone
2						
3						
4						
5						
6						
7						
8						
9						
10						

SAMPLE OR TEST

U . . . . . undisturbed
D . . . . . disturbed
SPT . . . standard penetration test
CPT . . . cone penetration test

V : visual
L : laboratory

WATER

Water table
Water inflow

DRILLING SUPERVISOR: O.FERGUSON
PROJECT ENGINEER: D.SARIAN
SHEET OF SHEETS
SCALE 1:50

LONG BAY4

PWD1-5

PUBLIC WORKS

GEOTECHNICAL CENTRE

BOREHOLE NO. 5

PROJECT: LONG BAY GOAL

LOCATION: PROPOSED WAREHOUSE

CONTRACTOR: GEOTECH CENTRE DRILLER: G.KELLY

DATE: 4.1.90

SURFACE RL:

RIG TYPE: GEMCO 210B

DEPTH (m)	WATER	BIT	SAMPLE OR TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0						VEE BIT REFUSAL ON MODERATELY WEATHERED SANDSTONE
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

SAMPLE OR TEST

U.....undisturbed

D.....disturbed

SPT....standard penetration test

CPT....cone penetration test

V : visual
L : laboratory

WATER

Water table

Water inflow

DRILLING SUPERVISOR: O.FERGUSON

PROJECT ENGINEER: D.SARIAN

SHEET OF SHEETS LONG BAY5

SCALE 1:50

PUBLIC WORKS DEPARTMENT
GEOMECHANICS LABORATORY

PWD2-1

BOREHOLE NO. 1

PROJECT : MALABAR COMPLEX OF PRISONS DATE : 21. 7. 86

LOCATION : SECURITY TOWER No. 10 SURFACE RL. :

CONTRACTOR : GROUND TEST P.L. DRILLER : BRIAN LAMB RIG TYPE : PIONEER P 160

DEPTH (m)	WATER	BIT	SAMPLE OR TEST	SOIL GROUP	GRAPHIC LOG	PROFILE DESCRIPTION (type, colour, consistency, grainsize, moisture, rem.
0				1A		REINFORCED CONCRETE (RECENTLY POURED)
1				1B		REINFORCED CONCRETE
2				2		BRICKWORK CONSTRUCTION
3				3		HAWKESBURY SANDSTONE, MED. GRAINED, MASSIVE, WHITE IN COLOUR
						END BORE AT 3.8
4						

SAMPLE OR TEST
U ..... undisturbed
D ..... disturbed
SPT .... standard penetration test
CPT .... cone penetration test

WATER
Water table
Water inflow

DRILLING SUPERVISOR : S. CELOTTO
PROJECT ENGINEER : S. CELOTTO
SHEET 1 OF 1
SCALE 1:50

PWD2-2

PUBLIC WORKS DEPARTMENT
GEOMECHANICS LABORATORY

BOREHOLE NO. 2

PROJECT : MALABAR COMPLEX OF PRISONS DATE : 21.7.86

LOCATION : SECURITY TOWER No. 10 SURFACE RL. :

CONTRACTOR : GROUND TEST P. L. DRILLER : BRIAN LAMB RIG TYPE : PIONEER P 160

DEPTH (m)	WATER	BIT	SAMPLE OR TEST	SOIL GROUP	GRAPHIC LOG	PROFILE DESCRIPTION type, colour, consistency, grainsize, moisture, remarks
0				1A		REINFORCED CONCRETE (RECENTLY POURED) 0.
1				1B		REINFORCED CONCRETE 1.
2				2		BRICKWORK CONSTRUCTION 2
3				3		HAWKESBURY SANDSTONE, MED. GRAINED, MASSIVE, WHITE IN COLOUR
4						END BORE AT 3.9

SAMPLE OR TEST
U ..... undisturbed
D ..... disturbed
SPT .... standard penetration test
CPT .... cone penetration test

WATER
Water table
Water inflow

DRILLING SUPERVISOR : S. CELOTTO
PROJECT ENGINEER : S. CELOTTO
SHEET 1 OF 1
SCALE 1: 50

JK1-14

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 14

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5 Method: SPIRAL AUGER R.L. Surface: 39.65m
Date: 28.5.87 HYDRAPOWER RIG Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
DRY ON COMPLETION						FILL: ashes and sand				
					SM	SILTY SAND: fine to medium grained, dark brown, trace clay		(L)		
AFTER 5 hours ▼	D.S.	N>>11 4,11/7.5mm HAMMER BOUNCING	1			SANDSTONE: medium grained, light grey, extremely weak then highly weathered, very weak				ESTIMATED 'V' BIT REFUSAL; MODERATE 'Tc' BIT RESISTANCE
	D.S.					as above, but orange brown, highly weathered, extremely weak with weak iron cemented bands.				MODERATE RESISTANCE WITH LOW BAND.
	D.S.		3			as above, but light grey, moderately weathered, weak to medium strong.				MODERATE TO HIGH RESISTANCE
	D.S.		3.5m			END OF BOREHOLE				
			4							
			5							
			6							
			7							

JK1-16

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 16

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 28·5·87
Method: SPIRAL AUGER HYDRAPOWER RIG
R.L. Surface: 42·95m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
DRY ON COMPLETION						FILL: gravelly sand, fine grained, dark grey some silt with wire netting, concrete fragments nylon sheeting	M			POORLY COMPACTED
			1		SP	SAND: fine to medium grained, light brown then orange brown, some silt	M	L		
	D.S.	N>>13 2,5,8/30mm								
			2			SANDSTONE: medium grained, light orange brown, highly weathered, weak				ESTIMATED 'V' BIT REFUSAL; MODERATE TO HIGH 'TC' BIT RESISTANCE
	D.S.					very weak bond, grey brown				MODERATE 'TC' BIT RESISTANCE
			3			as above, but light grey, moderately weathered, medium strong.				MODERATE TO HIGH 'TC' BIT RESISTANCE
	D.S.		4·0							
			4			END OF BOREHOLE				
			5							
			6							
			7							

JK1-17

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 17

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5 Method: SPIRAL AUGER R.L. Surface: 40.19m
Date: 28.5.87 HYDRAPOWER RIG Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
						FILL: gravelly sand				
					SP	SAND: fine to medium grained, orange brown some silt	M	MD		
	D.S.	N>16 9,7,9/125mm	1							ESTIMATED 'V' BIT REFUSAL
		HAMMER BOUNCING				SANDSTONE: medium grained, light grey, highly weathered, weak				MODERATE 'TC' BIT RESISTANCE
						as above, but moderately weathered, medium strong some ironstaining				HIGH 'TC' BIT RESISTANCE
			2			as above, but mainly light grey, moderately weathered, weak				MODERATE TO HIGH 'TC' BIT RESISTANCE
	D.S.		3.03m 3							
						END OF BOREHOLE				
			4							
			5							
			6							
			7							

JEFFERY AND KATAUSKAS PTY. LTD.

JK1-104

Borehole No. 104.

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED SPECIAL PURPOSE PRISON
Location: LONG BAY GAOL, MALABAR. N.S.W

Job No. 5212 JS
Date: 28·7·87
Method: SPIRAL AUGER, JACRO RIG
R.L. Surface: 40·5m APPROX.
Datum: STANDARD

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
			0			FILL: silty sand, fine to medium grained, brownish grey with some gravels	M			APPEARS POORLY COMPACTED
AFTER 5 hours	D.S.	N = 12 3, 4, 8	1		SM	SILTY SAND: fine to medium grained, brown with some clay	M W	MD		
	D.S.	N > 7 7/20mm AND BOUNCING	2		CL	SANDY CLAY: low plasticity, yellow brown and light grey, fine to medium grained sand	MC>PL			ESTIMATED 'V' BIT REFUSAL
	D.S.		2.5m			SANDSTONE: fine to medium grained, whitish brown and light grey, highly weathered, weak.				HIGH 'TC' BIT RESISTANCE
			3			END OF BOREHOLE				
			4							
			5							
			6							
			7							

JK1- 105

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 105

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED SPECIAL PURPOSE PRISON
Location: LONG BAY GAOL, MALABAR. N.S.W

Job No. 5212 JS
Date: 28·7·87
Method: SPIRAL AUGER, JACRO RIG.
R.L. Surface: 38·1 metres APPR
Datum: STANDARD

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
DRY ON COMPLETION						FILL: silty sand, fine to medium grained, grey with some gravels.	M			APPEARS POORLY COMPACTED
		N > 12 12/150mm								ESTIMATED 'V' BIT REFUSAL
	D.S.	AND BOUNCING								
			1			SANDSTONE: fine to medium grained, brownish white and light grey, highly weathered, very weak				HIGH 'TC' BIT RESISTANCE
	D.S.		1.2m			END OF BOREHOLE				
			2							
			3							
			4							
			5							
			6							
			7							

APPENDIX B – AREA D

OTHER CONSULTANTS ENGINEERING LOGS

TEST PIT REPORT

DP-1

CLIENT MORRISON WHITTEN & NICEY PTY.LTD. DATE 6/3/86 PIT No. 1

SITE LONG BAY HOSPITAL CONTRACT No. SSI/9508

LOCATION ANZAC PARADE, LONG BAY SURFACE LEVEL APPROX 35.5

Depth (metres)	Description of Strata	Sampling and In-situ Testing			
		Sampling		Dynamic Penetrometer	
		Type	Depth	Depth	Blows/150mm.
S.L.					
	FILLING - dense medium grained grey sand with sandstone, road metal and ash	D	0.30		
0.50		B	0.50		
	FILLING - dense medium grained gravel sized slag with reddish brown medium grained sand and rootlets	D	0.55		
0.60		D	1.00		
	SAND - dense medium grained light grey sand				
1.40					
	CEMENTED SAND - dense dark brown medium grained cemented sand	D	1.50		
1.50					
	SAND - dense light yellowish brown, medium grained sand	D	2.00		
		D	2.50		
2.70		D	2.70		
	TEST PIT DISCONTINUED AT 2.70 METRES.				

EQUIPMENT Backhoe TECHNICIAN Willey

PIT SIZE 3 m x 0.5 m

WATER LEVEL No free ground water observed

REMARKS

SAMPLE TYPE
D Disturbed Sample
B Bulk Sample
U Undisturbed Sample

D.J.Douglas & Partners

TEST PIT REPORT

DP-2

CLIENT MORRISON WHITTEN & NICEY PTY. LTD DATE 6/3/86 PIT No. 2

SITE LONG BAY HOSPITAL CONTRACT No. SSI/9508

LOCATION ANZAC PARADE, LONG BAY SURFACE LEVEL Approx. 34.5

Depth (metres)	Description of Strata	Sampling and In-situ Testing			
		Sampling		Dynamic Penetrometer	
		Type	Depth	Depth	Blows/150mm.
S.L.					
0.25	TOPSOIL - dark brown silty sand with rootlets				
		2B	0.50		
		D	1.00		
	SAND - medium dense very light brown, medium grained sand, grading to dense with depth				
		D	1.50		
		D	2.00		
2.40	SANDSTONE - medium strong very light brown medium grained sandstone	D	2.40		
	REFUSAL AT 2.40 METRES.				

EQUIPMENT Backhoe TECHNICIAN Willey

PIT SIZE 5 m x 3 m

WATER LEVEL No free ground water observed

REMARKS

SAMPLE TYPE
D Disturbed Sample
B Bulk Sample
U Undisturbed Sample

D.J.Douglas & Partners

TEST PIT REPORT

DP-3

CLIENT MORRISON WHITTEN & NICEY PTY. LTD DATE 6/3/86 PIT No. 3

SITE LONG BAY HOSPITAL CONTRACT No. SS1/9508

LOCATION ANZAC PARADE, LONG BAY SURFACE LEVEL Approx. 35.6

Depth (metres)	Description of Strata	Sampling and In-situ Testing			
		Sampling		Dynamic Penetrometer	
		Type	Depth	Depth	Blows/150mm.
S.L.					
	TOPSOIL - dark grey silty medium grained sand with rootlets				
0.40					
		2B	0.50		
	SAND - dense light grey, medium grained sand	D	1.00		
1.40					
	SAND - dense dark brown medium grained weakly cemented sand	D	1.50		
1.50					
	SAND - dense yellowish brown medium grained sand	D	2.00		
2.50		D	2.50		
	TEST PIT DISCONTINUED AT 2.50 METRES, DUE TO EXCESSIVE CAVING.				

EQUIPMENT Backhoe TECHNICIAN Willey

PIT SIZE 3 m x 0.5 m

WATER LEVEL No free ground water observed

REMARKS

SAMPLE TYPE
D Disturbed Sample
B Bulk Sample
U Undisturbed Sample

D.J.Douglas & Partners

TEST PIT REPORT

DP-4

CLIENT MORRISON WHITTEN & NICEY PTY. LTD. DATE 6/3/86 PIT No. 4

SITE LONG BAY HOSPITAL CONTRACT No. SSI/9508

LOCATION ANZAC PARADE, LONG BAY SURFACE LEVEL Approx. 36.0

Depth (metres)	Description of Strata	Sampling and In-situ Testing			
		Sampling		Dynamic Penetrometer	
		Type	Depth	Depth	Blows/150mm.
S.L.	FILLING - dense dark brown silty medium grained sand with rubble, scrap metal and concrete				
0.70		2B	0.70		
	SAND - very dense light grey medium grained sand	D	1.00		
1.60		D	1.50		
1.75	SAND - dense dark brown weakly cemented medium grained sand				
		D	2.00		
	SAND - very dense yellowish brown medium grained sand				
2.50		D	2.50		
	TEST PIT DISCONTINUED AT 2.50 METRES.				
	DUE TO EXCESSIVE CAVING.				

EQUIPMENT Backhoe TECHNICIAN Willey

PIT SIZE 3 m x 1 m

WATER LEVEL No free ground water observed

REMARKS

SAMPLE TYPE
D Disturbed Sample
B Bulk Sample
U Undisturbed Sample

D.J.Douglas & Partners

TEST PIT REPORT

DP-5

CLIENT MORRISON WHITTEN & NICEY PTY. LTD. DATE 6/3/86 PIT No. 5

SITE LONG BAY HOSPITAL CONTRACT No. SSI/9508

LOCATION ANZAC PARADE, LONG BAY SURFACE LEVEL Approx. 33.5

Depth (metres)	Description of Strata	Sampling and In-situ Testing			
		Sampling		Dynamic Penetrometer	
		Type	Depth	Depth	Blows/150mm.
S.L.					
	FILLING - medium dense dark grey silty sand with sandstone concrete bricks and scrap metal				
2.60	REFUSAL AT 2.60 METRES.				

EQUIPMENT Backhoe TECHNICIAN Willey

PIT SIZE 3 m x 1 m

WATER LEVEL No free ground water during digging.

REMARKS Free ground water observed at 2.50 m after ½ hour.

SAMPLE TYPE
D Disturbed Sample
B Bulk Sample
U Undisturbed Sample

D.J.Douglas & Partners

TEST PIT REPORT

DP-6

CLIENT MORRISON WHITTEN & NICEY PTY. LTD. DATE 6/3/86 PIT No. 6

SITE LONG BAY HOSPITAL CONTRACT No. SSI/9508

LOCATION ANZAC PARADE, LONG BAY SURFACE LEVEL Approx. 32.5

Depth (metres)	Description of Strata	Sampling and In-situ Testing			
		Sampling		Dynamic Penetrometer	
		Type	Depth	Depth	Blows/150mm.
S.L.					
		B	0.50		
		D	1.00		
	FILLING - dense dark grey silty sand with bricks, concrete, scrap metal, cloth and plastic	D	1.50		
		D	2.00		
		D	2.50		
2.60	SANDSTONE - medium strong very light brown sandstone				
	REFUSAL AT 2.60 METRES.				

EQUIPMENT Backhoe TECHNICIAN Willey

PIT SIZE 3 m x 1 m

WATER LEVEL Free ground water observed at 2.50 m.

REMARKS Water level at 2.50 m after 1 hour.

SAMPLE TYPE
D Disturbed Sample
B Bulk Sample
U Undisturbed Sample

D.J.Douglas & Partners

TEST PIT REPORT

DP-7

CLIENT MORRISON WHITTEN & NICEY PTY. LTD. DATE 6/3/86 PIT No. 7

SITE LONG BAY HOSPITAL CONTRACT No. SSI/9508

LOCATION ANZAC PARADE, LONG BAY SURFACE LEVEL Approx.

Depth (metres)	Description of Strata	Sampling and In-situ Testing			
		Sampling		Dynamic Penetrometer	
		Type	Depth	Depth	Blows/150mm.
S.L.					
	FILLING - dark brown silty sand with sandstone, road metal				
0.50					
	SAND - light yellowish brown medium grained sand				
1.50					
	TEST PIT DISCONTINUED AT 1.50 METRES.				

EQUIPMENT Backhoe TECHNICIAN Willey

PIT SIZE 3 m x 1 m

WATER LEVEL No free ground water observed

REMARKS

SAMPLE TYPE
D Disturbed Sample
B Bulk Sample
U Undisturbed Sample

D.J.Douglas & Partners

TEST PIT REPORT

DP-8

CLIENT MORRISON WHITTEN & NICEY PTY. LTD. DATE 6/3/86 PIT No. 8

SITE LONG BAY HOSPITAL CONTRACT No. SSI/9508

LOCATION ANZAC PARADE, LONG BAY SURFACE LEVEL Approx. 31.5

Depth (metres)	Description of Strata	Sampling and In-situ Testing			
		Sampling		Dynamic Penetrometer	
		Type	Depth	Depth	Blows/150mm.
S.L.					
		B	0.50		
		D	1.00		
	FILLING - dark brown silty sand with scrap metal, bricks, bottles, sandstone, plastic	D	1.50		
		D	2.00		
2.40	SAND - light grey medium grained sand	D	2.50		
2.60					
	TEST PIT DISCONTINUED AT 2.60 METRES,				
	DUE TO EXCESSIVE CAVING.				

EQUIPMENT Backhoe TECHNICIAN Willey

PIT SIZE 3 m x 1 m

WATER LEVEL Free ground water observed at 2.10 m.

REMARKS Water level at 2.10 m after 1 hour 50min

SAMPLE TYPE
D Disturbed Sample
B Bulk Sample
U Undisturbed Sample

D.J.Douglas & Partners

LOCATION / DEPTH (m)	PENETRATION RESISTANCE BLOWS / 150 mm.											
	DP -1	DP -2	DP -3	DP -4	DP -5	DP -6	DP -8	DP -9	DP -10	DP -11	DP -12	
0·00 – 0·15	4	1	4	10	3	8	10/20mm	4	4	1	4	
0·15 – 0·30	6	3	14	9	4	5		8	7	4	2	
0·30 – 0·45	6	5	14	12	6	6		8	7	4	2	
0·45 – 0·60	6	3	13	20	3	7		11	9	3	1	
0·60 – 0·75	11	4	11	10	3	7		12	20/80	3	2	
0·75 – 0·90	6	4	8	10	3	10		12		3	2	
0·90 – 1·05	7	4	7	18	1	11		13/50		8	2	
1·05 – 1·20	4	4	6	17	2	11				7	2	
1·20 – 1·35	7	4	9	14	3	9				4	3	
1·35 – 1·50	5	5	12	10	3	8				4	5	
1·50 – 1·65	5	6	11	9/30mm	8	6				4	7	
1·65 – 1·80	5	6	9		7	5				4	4	
1·80 – 1·95												
1·95 – 2·10												
2·10 – 2·25												
2·25 – 2·40												
2·40 – 2·55												
2·55 – 2·70												
2·70 – 2·85												
2·85 – 3·00												
3·15 – 3·30												
3·30 – 3·45												
3·45 – 3·60												
3·60 – 3·75												
3·75 – 3·90												
3·90 – 4·05												
4·05 – 4·20												
4·20 – 4·35												

AUSTRALIAN STANDARD AS 1289 F3·2, F3·3

RESULTS OF DYNAMIC PENETROMETER TESTING

SITE ANZAC PARADE, LONG BAY

CLIENT MORRISON WHITTEN AND NICEY PTY. LTD.

REPORT No. 9508 DATE 6/3/86

This Laboratory is registered by the National Association of Testing Authorities, Australia. The test(s) reported herein have been performed in accordance with its terms of registration.

GROUND TEST PTY LIMITED

An associate of D.J. Douglas & Partners Pty. Ltd.

LOCATION	REFER SITE PLAN		
SURFACE ELEVATION		DATUM	
INCLINATION	VERTICAL	AZIMUTH	-
DRILL TYPE	X2 POWER AUGER	DATE	25.5.81

GA2-25

BORE HOLE No. 25

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2A
SHEET 1 OF 2

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m^3)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) φ',(degrees)	OTHER
SILTY SAND (Topsoil) some organics, dark grey-black		0												
SAND /SILTY SAND (SP) medium grained, brown, wet, moderately dense		1												0.7m during augering
some thin rust brown ('Indurated') layers		2	SP 1		29						3			
grey trace silt/clay, moderately dense		3	SP 2		20									
SANDY CLAY (CL) light and dark grey, quite sandy (fine-medium grained)														
CLAYEY SAND light grey with trace yellow some darker grey clayey patches, very dense		4	SP 3		47/210						17			v. stiff drilling (near) V Bit Refusal
		5												V Bit Refusal @ 5.6m
SANDSTONE (HW-XW) grey and yellow, medium-fine grained		6												
		7												Attempted SPT @ 7.3m but cave-in of hole @ 5m
HW-MW		8												
XW (grey silty clay, v. stiff-hard, retrieved orange)		9												
		10												

GOLDER ASSOCIATES

LOCATION	REFER SITE PLAN		
SURFACE ELEVATION		DATUM	
INCLINATION	VERTICAL	AZIMUTH	-
DRILL TYPE	X2 POWER AUGER	DATE	25.5.81

GA2-25

BORE HOLE No. 25

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2B
SHEET 2 OF 2

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m^3)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS S_u (kPa) C' (kPa) ϕ' (degrees)	OTHER
SANDSTONE (XW)		10												
HW-MW light grey and yellow		11												
		12												
		13												
		14												No TC "Bit" refusal @ 15.0m (max. depth possible with particular drilling rig on the day)
END OF BORING @ 15.0m		15												

GOLDER ASSOCIATES

LOCATION REFER SITE PLAN

SURFACE ELEVATION — DATUM

INCLINATION VERTICAL — AZIMUTH -

DRILL TYPE X2 POWER AUGER — DATE 25.5.81

BORE HOLE No. GA2-26

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2C
SHEET 1 OF 2

STRATIGRAPHY	GRAPHIC LOG	ELEV'N. / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degree)	OTHER
SANDY PEAT black-v. dark brown, organic peat, silt and some sand, smelly, wet, v. soft		0	AS 1				42	Organic content				=	6 %	▼ 0.8m water table during augering
SAND (SP) brown, medium grained, very loose, wet		1	SP 2		4									
SANDY CLAY grey and darker grey, soft, wet		2												
SANDY CLAY (CH) grey, very moist, quite silty, stiff														
CH/CL, some fine sand, firm-stiff		3	SP 3		13			27	13	6		* pp	150-200kPa	
CL		4												
SAND (SP) siliceous, grey and dark grey, medium grained, moderately dense			SP 4		31									
very dense, grading to XW sandstone		5												
		6												
CLAY (CL) silty clay XW sandstone some sandy layers		7												
		8												
		9												
thin layers 0.2-0.3 peaty brown, indurated sand		10												

* pp - Pocket Penetrometer test, measures UCS value

GOLDER ASSOCIATES

LOCATION REFER SITE PLAN

SURFACE ELEVATION — DATUM

INCLINATION VERTICAL — AZIMUTH -

DRILL TYPE X2 POWER AUGER — DATE 25.5.81

GA2-26

BORE HOLE No. 26

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2D
SHEET 2 OF 2

STRATIGRAPHY	GRAPHIC LOG	ELEV'N. / DEPTH metres	SAMPLE TYPE	SAMPLE LOST; DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE %	% FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	PARAMETERS: S_u (kPa), C' (kPa), Ø' (degree)	OTHER
SILTY CLAY (CL) grey, some sandy layers		10												
		11												
SANDSTONE (XW) grey, medium grained some ironstone		12												
		13												V Bit Refusal @ 13.5m
(HW-MW) grey and yellow		14												Very stiff drilling @ 14.5m
END OF BORING @ 15m		15												

GOLDER ASSOCIATES

LOCATION REFER SITE PLAN

SURFACE ELEVATION — DATUM

INCLINATION VERTICAL — AZIMUTH -

DRILL TYPE X2 POWER AUGER — DATE 25.5.81

GA2-27

BORE HOLE No. 27

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2E
SHEET 1 OF 2

STRATIGRAPHY	GRAPHIC LOG	ELEV'N. / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE %	% FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	PARAMETERS Su,(kPa) C',(kPa) ø',(degrees)	OTHER
SANDY PEAT/LOAM v. dark brown		0												
SAND (SP) yellow brown, loose, medium-fine grained		1												
light grey/white			SP 1		11									during augering
yellow brown layers, wet, some silt		2												
		3	SP 2		16									
		4												
SILTY/SANDY CLAY (CH/CL) grey, quite silty, some fine sand, very moist, firm-stiff		5	SP 3		10									
SANDY CLAY grey brown														
SAND (SP) seams light grey, moderately dense		6												No SPT's possible below 5.5m depth due to cave-in of hole
		7												
		8												
SANDY CLAY (CL) grey, red brown and yellow banded/mottled		9												
		10												

GOLDER ASSOCIATES

SURFACE ELEVATION		DATUM	
INCLINATION	VERTICAL	AZIMUTH	-
DRILL TYPE	X2 POWER AUGER	DATE	25.5.81

BORE HOLE No. 27
GA2-27

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2F
SHEET 2 OF 2

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST; DISTURBED	BLOWS/ DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
SANDY CLAY (CL) grey, red brown and yellow banded		10												
		11												
		12												
CLAYEY SAND (SC) grey/yellow		13												Very slow drilling @ 13m
		14												V Bit Refusal @ 14.1m
END OF BORING @ 15m		15												Augered to 15m with TC Bit

GOLDER ASSOCIATES

LOCATION	REFER SITE PLAN		
SURFACE ELEVATION		DATUM	
INCLINATION	VERTICAL	AZIMUTH	-
DRILL TYPE	X 2 POWER AUGER	DATE	25.5.81

BORE HOLE No. 28

GA2-28

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2G
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
SILTY SANDY PEAT dark grey brown/black		0												
SAND (SP) light (siliceous) grey and rust brown, medium grained		1												
			SP 1		11									
light yellow grey, moderately dense, trace silt		2												
		3	SP 2		17									
light yellow grey, some black specks, wet		4												▽ during augering
			SP 3		27									
seems grey		5												tried SPT @ 5.8m but hole caved-in @ 5.0m
CLAYEY SAND (SC) yellow grey		6												
SAND (SP) wet possibly thin clay layers		7												firm drilling penetration
		8												
		14												Not much retrieved on augers when rods pulled up. Therefore assume sand stratigraphy to 15m
E.O.B. @ 15m		15												

GOLDER ASSOCIATES

LOCATION	REFER SITE PLAN
SURFACE ELEVATION	DATUM
INCLINATION	VERTICAL
AZIMUTH	-
DRILL TYPE	X2 POWER AUGER
DATE	26.5.81

BORE HOLE No. 29

GA2-29

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2H
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE %	% FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	PARAMETERS Su,(kPa) C',(kPa) ø',(degrees)	OTHER
SILTY PEATY SAND black-v.dk. brown, highly organic SAND (SP) medium-fine grained, dark grey some silt, rust brown clayey-yellow brown		0												
SANDSTONE (HW-MW) light grey/white and yellow/brown banded, medium grained, mostly friable		1	AS1											V Bit Refusal @ 0.7m Slow auger progress - jerky TC Bit Refusal @ 1.5m
END OF BOREHOLE @ 1.5m GROUNDWATER NOT ENCOUNTERED		2												

LOCATION	REFER SITE PLAN
SURFACE ELEVATION	DATUM
INCLINATION	VERTICAL
AZIMUTH	-
DRILL TYPE	X2 POWER AUGER
DATE	26.5.81

BORE HOLE No. 30

GA2-30

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE
SHEET OF

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE %	% FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	PARAMETERS Su,(kPa) C',(kPa) ø',(degrees)	OTHER
TOPSOIL silty sand, dk. grey/black, rootlets, organics, v.moist/wet		0												
SANDSTONE (MW-HW) light grey/white some thin brown bands		1												V Bit Refusal @ 0.6m TC Bit Refusal @ 1.5m
END OF BOREHOLE @ 1.5m GROUNDWATER NOT ENCOUNTERED		2												

LOCATION	REFER SITE PLAN
SURFACE ELEVATION	DATUM
INCLINATION	VERTICAL
AZIMUTH	-
DRILL TYPE	X2 POWER AUGER
DATE	26.5.81

BORE HOLE No. 31

GA2-31

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE
SHEET OF

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE %	% FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	PARAMETERS Su,(kPa) C',(kPa) ø',(degrees)	OTHER
TOPSOIL silty sand, black/brown, highly organic		0												
SILTY SAND (SM) dark grey dark rust brown, indurated sand														V Bit Refusal @ 0.9m
SANDSTONE (MW-HW) light grey/white/yellow, medium grained		1												TC Bit Refusal @ 1.5m
END OF BOREHOLE @ 1.5m GROUNDWATER NOT ENCOUNTERED														

GOLDER ASSOCIATES

LOCATION	REFER SITE PLAN		
SURFACE ELEVATION		DATUM	
INCLINATION	VERTICAL	AZIMUTH	-
DRILL TYPE	X2 POWER AUGER	DATE	26.5.81

BORE HOLE No. 32

GA2-32

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2J
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N. / DEPTH (metres)	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degree)	OTHER
FILL ash and sand, black		0												
SILTY SAND (SP) grey, fine-medium grained, loose														
CLAYEY SAND (SC) brown, some v. dk-black layers, (indurated sand)		1												1.3m during augering ▽
wet														
SANDSTONE (XW-HW) yellow brown and grey		2	SPT											Hard. abrasive augering
END OF BOREHOLE @ 2.5m		3												TC Bit Refusal @ 2.5m
		4												

LOCATION	REFER SITE PLAN		
SURFACE ELEVATION		DATUM	
INCLINATION	VERTICAL	AZIMUTH	-
DRILL TYPE	X2 POWER AUGER	DATE	26.5.81

BORE HOLE No. 33

GA2-33

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE
SHEET OF

STRATIGRAPHY	GRAPHIC LOG	ELEV'N. / DEPTH (metres)	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degree)	OTHER
SILTY PEATY SAND dark brown, organics		0												
SAND (SP) grey white, moist														
fine-medium grained		1												▽ Bit Refusal @ 1.6m
dark brown, clayey														
SANDSTONE (HW-MW) light grey/white, some yellow, medium grained		2												
END OF BOREHOLE @ 2.5m		3												TC Bit Refusal @ 2.5m

LOCATION REFER SITE PLAN

SURFACE ELEVATION		DATUM	
INCLINATION	VERTICAL	AZIMUTH	- -
DRILL TYPE	X 2 POWER AUGER	DATE	26.5.81

BORE HOLE No. 34

GA2-34

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2K
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø,(degrees)	OTHER
FILL sand, sandstone gravels and cobbles and silt, grey brown and white mixed		0												
SAND (SP) grey brown light grey, medium grained, moist, mod. dense		1												
		2												▽ during augering
black, some silt (indurated sand)		3												V Bit Refusal @ 3.1m
SANDSTONE (HW-MW) light grey/white, friable		4												Stiff going, some softer patches
END OF BOREHOLE @ 4.8m		5												TC Bit Refusal @ 4.8m

GOLDER ASSOCIATES

LOCATION	REFER SITE PLAN		
SURFACE ELEVATION		DATUM	
INCLINATION	VERTICAL	AZIMUTH	-
DRILL TYPE	X2 POWER AUGER	DATE	26.5.81

BORE HOLE No. 35

GA2-35

PROJECT 31181 - HOSPITAL/LONG BAY GAOL

FIGURE 2L
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N. / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
FILL silty sand, some sandstone cobbles, light grey/dark brown		0												
SAND (SP) grey brown / dark rust brown (Indurated) / orange brown		1												V Bit Refusal @ 1.0m
SANDSTONE (MW) yellow/brown and grey														TC Bit Refusal @ 1.3m
END OF BOREHOLE @ 1.3m		1.3												
		2												

GOLDER ASSOCIATES

LOCATION REFER SITE PLAN

SURFACE ELEV. DATUM

METHOD BACKHOE - JCB DATE 25.5.81

GROUNDWATER 1.6m DATE 25.5.81

TEST PIT 1 TP1

FIGURE 3A

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST, DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 80% silt, sand with some grass, rootlets and other organics 20% bricks, building rubble etc. (black-dark grey, smelly)												
SILTY SAND (SP) brown, fine to medium grained seems moderately dense		1 2										1.6m Pit tended to cave-in during excavation
SANDY/SILTY CLAY (CL) grey with brown mottling seems firm-stiff		3										No backhoe refusal

DEPTH OF PIT: 3.9m

LOCATION REFER SITE PLAN

SURFACE ELEV. DATUM

METHOD BACKHOE - JCB DATE 25.5.81

GROUNDWATER 2.3m approx. DATE 25.5.81

TEST PIT 2 TP2

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST, DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 50% bricks, brickbats, tiles, parts of brickwalls, etc. 20% timber (bed frames, cupboards etc). 10% metal - plumbing pipes, springs, etc. 20% sand, dark grey brown (Fill difficult to excavate, mainly due to pipes, uncompacted, some voids evident)		1 2										
wet												2.3m during excavation
sandier		3										
BAND (SP) some silt, grey, seems moderately dense												No backhoe refusal

DEPTH OF PIT: 4.0m

LOCATION REFER SITE PLAN

SURFACE ELEV. DATUM

METHOD BACKHOE - JCB DATE 25.5.81

GROUNDWATER Not Encountered DATE 25.5.81

TEST PIT 3 TP3

FIGURE 3B

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST, DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 70% sand and silt, yellow grey with some dark grey brown (topsoil and indurated sand) 20% sandstone cobbles and boulders, concrete slabs to 1m wide 10% timber and bits of metal, eg pipe rubble (Pit slightly smelly, Fill seems loose except on surface)		1 2										
SANDSTONE - XW-MW light grey (MW)		3										Backhoe refusal @ 3.1m

DEPTH OF PIT: 3.1m

LOCATION REFER SITE PLAN

SURFACE ELEV. DATUM

METHOD BACKHOE - JCB DATE 25.5.81

GROUNDWATER Not Encountered DATE 25.5.81

TEST PIT 4 TP4

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 70% sand and silt, very dark grey/ black 25% bricks, brickbats and concrete slabs to 0.5m wide 5% timber, cloth rags, organics, etc. (Pit slightly smelly, fill seems loose except on surface)		1 2										
SANDSTONE (HW-MW) grey												Backhoe refusal @ 2.4m
(MW)		3										

DEPTH OF PIT: 2.4m

TEST PIT 5 TP5

FIGURE 3C

LOCATION REFER SITE PLAN
SURFACE ELEV. DATUM
METHOD BACKHOE - JCB DATE 25.5.81
GROUNDWATER 1.4m DATE 25.5.81

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST, DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 50% silty sand 50% bricks and sandstone boulders/ cobbles		1										Caveing in of pit @ 1.4m During excavation
approximately: 80% bricks, sandstone boulders and concrete slabs to 0.7m wide wet 20% timber, metal and some organic matter (Pit quite smelly)		2										
Possibly sandstone below 2.7m depth	?	3										Backhoe refusal Not certain due to collapse of pit from 1.4m

DEPTH OF PIT: 2.7m

TEST PIT 6 TP6

LOCATION REFER SITE PLAN
SURFACE ELEV. DATUM
METHOD BACKHOE - JCB DATE 25.5.81
GROUNDWATER Not Encountered DATE 25.5.81

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 80% sand - yellow, grey and dark brown with some black (indurated) layers 20% granular fill eg sandstone boulders to 0.3m wide, brickbats		1										
lot of rags and other smelly organic matter		2										
SAND (SP) yellow grey												Backhoe refusal @ 2.3m
SANDSTONE (MW)		3										

DEPTH OF PIT: 2.3m

TEST PIT 7 TP7

FIGURE 3D

LOCATION REFER SITE PLAN
SURFACE ELEV. DATUM
METHOD BACKHOE - JCB DATE 25.5.81
GROUNDWATER 2.1m approx. DATE 25.5.81

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST, DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 90% sand - grey and yellow, some black/grey (organic topsoil) layers moist, trace bricks etc. 10% organics (black) and other granular material, eg bricks		1										
		2										Very sloppy material below 2.1m Pit caveing in @ 2.5m
sandier												
		3										
seems natural lime sand												No backhoe refusal

DEPTH OF PIT 3.9m

TEST PIT 8 TP8

LOCATION REFER SITE PLAN
SURFACE ELEV. DATUM
METHOD BACKHOE - JCB DATE 25.5.81
GROUNDWATER 2.7m approx. DATE 25.5.81

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately 80%-90% sand - grey and yellow with some dark grey/black layers seems moderately dense 10%-20% granular fill, eg timber, sandstone cobbles, rags, and metal rubble, smelly		1										
		2										2.7m
		3										
SANDSTONE (XW-HW) yellow and white, medium grained												
Possibly large floater though												Backhoe refusal @ 3.8m

DEPTH OF PIT: 3.8m

GOLDER ASSOCIATES

LOCATION REFER SITE PLAN

SURFACE ELEV. DATUM

METHOD BACKHOE - JCB DATE 25.5.81

GROUNDWATER 3.0m DATE 25.5.81

TEST PIT 9 TP9

FIGURE 3E

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST, DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLACTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately 90% sand - organe brown, fine grained 10% granular rubble, eg timber, bricks, sandstone cobbles, etc.		1										
a lot of rags, timber and other smelly organics @ 1.9m												
SANDY CLAY/CLAYEY SAND brown (possibly fill)		2										Sides of pit vertical below 2.0m
peaty zone, many roots, dark brown @ 3.0m		3										During augering Sloppy black material retrieved below 3.0m
												No backhoe refusal (stiff digging too)

DEPTH OF PIT: 4.0m

LOCATION REFER SITE PLAN

SURFACE ELEV. DATUM

METHOD BACKHOE - JCB DATE 25.5.81

GROUNDWATER 3.1m DATE 25.5.81

TEST PIT 10 TP10

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 80% sand - mostly dark grey-black, medium grained 20% bricks, timber, concrete blocks to 1½m wide, bits of reinforcing wire etc.		1										
clayier zone		2										Sides of pit near vertical below 2.5m
SAND (SP) dark brown, some silt, indurated sand, seems original topsoil 3.0 to 3.2m		3										3.1m No backhoe refusal

DEPTH OF PIT 4.0m

GOLDER ASSOCIATES

LOCATION REFER SITE PLAN

SURFACE ELEV. DATUM

METHOD BACKHOE - JCB DATE 25.5.81

GROUNDWATER 3.2m DATE 25.5.81

TEST PIT 11 TP11

FIGURE 3F

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST, DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 70% sand - dark grey/black 30% building rubble, eg timber, tyres, many steel or iron water pipes, concrete slabs to ½m wide, bricks, corrugated iron, rags and other miscellaneous fill (smelly)		1 2 3										▼ 3.2m Mainly black slop retrieved below 3.3m No backhoe refusal
Seems original topsoil (black peaty sand) from 4.0 to 4.2m		4										

DEPTH OF PIT: 4.2m

LOCATION REFER SITE PLAN

SURFACE ELEV. DATUM

METHOD BACKHOE - JCB DATE 25.5.81

GROUNDWATER Not Encountered DATE 25.5.81

TEST PIT 12 TP12

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST, DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 70% sand - dark grey brown 30% metal pipes (similar to type used in scaffolding), wire screens, sheet iron		1 2 3										Backhoe unable to dig thru metal pipe and sheeting iron tangle

DEPTH OF PIT: 2.0m

TEST PIT 13 TP13

FIGURE 3G

LOCATION REFER SITE PLAN
SURFACE ELEV. DATUM
METHOD BACKHOE - JCB DATE 25.5.81
GROUNDWATER Not Encountered DATE 25.5.81

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST, DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
TOPSOIL silt and sand, dark grey brown/ black, organic												
SILTY SAND (SM) dark grey some rust brown indurated layers												
SANDSTONE (HW-MW)		1										Backhoe refusal @ 0.7m
		2										
		3										

DEPTH OF PIT: 0.7m

TEST PIT 14 TP14

LOCATION REFER SITE PLAN
SURFACE ELEV. DATUM
METHOD BACKHOE - JCB DATE 25.5.81
GROUNDWATER 3.4m DATE 25.5.81

STRATIGRAPHY	LOG	ELEV'N / DEPTH metres	SAMPLE DATA: TYPE	SAMPLE LOST DISTURBED	BLOWS PER 0·3 METRES	MOIST. DENSITY: DRY DENSITY Mg/m³	NATURAL MOISTURE CONT.(%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE, percent	% FINES (< No.200)	TEST RESULTS REMARKS
FILL - approximately: 70% sand (silty), very dark grey-black and dark brown layered, moist 20% sandstone cobbles, boulders and similar granular fill 10% organics (topsoil, black, grass, smelly vegetation etc)		1										
		2										
		3										▼ 3.4m No backhoe refusal

DEPTH OF PIT: 3.6m

GOLDER ASSOCIATES

LOCATION Refer Site Plan		BORE HOLE No. 1 GA1-1	FIGURE 2A
SURFACE ELEVATION 41.2	DATUM Std.		SHEET 1 OF 1
INCLINATION Vertical	AZIMUTH -		
DRILL TYPE Gemco	DATE 8.10.79	PROJECT Long Bay	

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS/300 DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø,(degrees)	OTHER
FILL SILTY SAND, grey slightly organic Some bricks, concrete pieces Loose		0												TC Bit auger
		1	SP	1	9									
SILTY SAND (SP) Dark grey & brown moist organic			AS	2										
SANDSTONE MW-SW Medium grained, light grey		2												
Grey with occas. thin brown and orange streaking		3	NMLC - RC 1	0										Joints moderately to widely spaced @ 20° to horiz., clean. NMLC rock coring
		4												
Grey with thin darker grey streaking		5	NMLC - RC 2	0										-10mm sandy clay filled joints
END OF BORING @ 5.8m GROUNDWATER NOT ENCOUNTERED		6												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	37.1	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	8.10.79

BORE HOLE No. 2

GA1-2

PROJECT Long Bay

FIGURE 2B
SHEET 1 OF 1

STRATIGRAPHY	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS / 300 DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su (kPa) C' (kPa) Ø' (degrees)	OTHER
FILL (SAND) Dark grey, slightly organic	0												
Light grey, some darker grey loose	1	SP	1	7									
		AS	2										
SILTY SAND (SP) Dark brown, slightly organic fine grained, yellow brown		AS	3										
moist - orange-brown	2	AS	4										
grey brown		SP	5	6/150	Refusal 22					2			80% passing 0.425mm
SANDSTONE MW Light grey	3												
Becoming MW													
END OF BOREHOLE @ 4.0m GROUNDWATER NOT ENCOUNTERED	4												
	5												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	37.1	DATUM Std.	
INCLINATION	Vertical	AZIMUTH -	
DRILL TYPE	Gemco	DATE 8.10.79	

BORE HOLE No. 3

GA1-3

PROJECT Long Bay

FIGURE 2C

SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / 300 DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
SILTY SAND (SP) grey, slightly organic Orange-brown fine grained		0												TC auger
			SP	1	15/100									
SANDSTONE HW-MW yellow & orange, medium grain		1												
softer														
MW grey		2												▽ 12.10.79
v. hard pieces		3												
		4												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	35.2	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	8.10.79

BORE HOLE No. 4

GA1-4

PROJECT Long Bay

FIGURE 2D

SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / 300 DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
SILTY SAND (SP) fine grained, dark grey slightly organic (topsoil)		0												TC Auger
loose														
		1	SP	1	7									
grey-brown														
														▽ 12.10.79
light grey moist-wet														
SANDSTONE MW light grey, some yellow		2												
		3												
END OF BOREHOLE @ 3.0m														Water level 1.83m 8.00am 9.10.79
		4												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	34.9	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	8.10.79

BORE HOLE No. 5

GA1-5

PROJECT Long Bay

FIGURE 2E
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C,(kPa) Ø,(degrees)	OTHER
SILTY SAND dark grey, fine grained, slightly organic		0												TC Bit Auger
SANDSTONE MW-SW grey & orange & brown banded		0.43 1	NMLC - RC 1	0			Joints moderately widely spaced @ 20° to horiz.							NMLC rock coring 12.10.79
BORING ENDED @ 2.0m		2 3												Water level 0.83m 8.00am 9.10.79

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	34.7	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	9.10.79

BORE HOLE No. 6

GA1-6

PROJECT Long Bay

FIGURE 2F
SHEET 1 OF 1

STRATIGRAPHY	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS / 300 DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
SILTY SAND (SP) V. dark grey-black & rust-brown fine grained	0												V-bit auger
loose	1	SP	1	5		4				3			92% passing 0.524mm
Orange & rust brown ('waterloo rock') weakly cemented	2												
loose v.wet		SP	2	7						1.4			93% passing 0.425mm
SAND (SP) pale yellow brown, fine grained	3												
moderately dense		SP	3	16									
SILT (OH) organic, black	4	AS	4										
SILTY CLAY (CL) grey becoming sandy	5												
SILTY SAND (SP) medium grained light brown	6												
		SP	5	19/250		'Bouncing' Refusal							
coarse grained dense	7												
SANDY CLAY (CL) grey CLAYEY SAND	8	AS	6			35							organic content 13%
SILT (OH) stiff, dark brown-black, organic		SP	7			'Bouncing' refusal of SPT							
SANDSTONE HW-XW													TC Auger
	9												
	10	AS	8										

END OF BORING @ 10.0m
GROUNDWATER NOT MEASURED

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	33.1	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	9.10.79

BORE HOLE No. 7

GA1-7

PROJECT Long Bay

FIGURE 2G
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / 300 DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) c',(kPa) ø',(degrees)	OTHER
SILTY SAND (SP) V. Dark grey-black organic fine grained loose		0												V. Bit augered
Dark brown-grey weakly cemented ('Waterloo Rock')		1	SP	1	11/180									
SAND (SP) v.wet fine grained light brown loose		2	SP	2	8									
dark brown		3	AS	3										
CLAYEY SAND (SC) grey loose		4	SP	4	8									
SANDY CLAY (CL) CLAYEY SAND (SC) Firm												PP	qu, 150 kPa	
Grey & light brown, some organics		5	AS	5										
SANDSTONE HW-XW			SP	6	7/150 'Bouncing' Refusal									TC Bit augered
getting harder		6	AS	7										
END OF BORING @ 6.9m GROUNDWATER NOT MEASURED		6.9 7												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	32.8	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	7.10.79

BORE HOLE No. 8

GA1-8

PROJECT Long Bay

FIGURE 2H

SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/300 DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
SILTY SAND (SP) V.dark grey-black, organic.		0												V Bit augered
SANDY SILT (OL) black, organic			AS	1										organic content 6.5%
		1												▽ 12.10.79
loose			SP	2	6		56							organic content 9%
v. wet		2												
SILTY SAND(SP) grey,														
CLAYEY SAND			AS	3										Tricon roller
		3												
SANDY CLAY (CL) grey v. moist firm			SP	4	7		16	29	17		54	PP	qu,100	89% passing 0.425mm
		4												
CLAYEY SAND (SC) dense			SP	5	29						3			82% passing 0.425mm
		5												
SANDSTONE XW grey, occas. darker grey streaking			2MLC1 - RC1				Joints widely spaced							
		6												
HW			2MLC - RC2											
		7												
		8												
			2MLC - RC3				Joints moderately widely-closely spaced							
MW		9												
END OF BORING @ 9.7m		10												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	32.8	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	8.10.79

BORE HOLE No. 9

GA1-9

PROJECT Long Bay

FIGURE 2I
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
FILL Silty Sand, dark grey slightly organic Grey - light brown		0												TC Bit auger
SANDY SILT (OL) v. dark grey-black organic moist-wet loose		1	SP	1	3									12.10.79
(brown-black) Highly organic			AS	2										
SAND (SP) medium - coarse grain light brown-grey		2	SP	3	10									
CLAYEY SAND (SC) grey moist-wet medium-fine grain loose		3												
moderately dense		4	SP	4	13									
moderately dense		5												
			SP	5	25									
light grey brown medium grain		6												
		7			29	solid cone								
SANDY CLAY (CL), bands of stiff grey clay grey firm-stiff		8	AS	6										
		9												
SANDSTONE HW-XW		10												

Water 0.85m
10.9.79

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	32.8	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	8.10.79

BORE HOLE No. 9 Cont.

GA1-9

PROJECT Long Bay

FIGURE 2J
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/ DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su, (kPa) C', (kPa) Ø, (degrees)	OTHER
getting harder HW-MW		10												
		11												
		11.5												
END OF BORING @ 11.5m		12												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	34.0 approx.	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	9.10.79

BORE HOLE No. 10

GA1-10

PROJECT Long Bay

FIGURE 2K
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m^3)	NATURAL MOISTURE (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS	OTHER
FILL Silty Sand and small gravel bits of paper, plastic etc. dark brown		0												V. Bit auger
dark grey (organic) loose		1	SP	1	10									12.10.79
Ash - grey and silty sand														
SAND (SP) wet fine grained light grey-brown mod. dense		2	SP	2	14/200 'Bouncing' refusal									
CLAYEY SILT (ML) fine sand light grey-yellow v. stiff		3	AS	3										TC auger
SANDY CLAY firm														
SANDSTONE HW-XW		4												
		5	AS	4										
		5.4												
END OF BORING @ 4.5m		6												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan	BORE HOLE No. 11 GAI-11	FIGURE 2L
SURFACE ELEVATION	DATUM		SHEET 1 OF 1
INCLINATION	Vertical AZIMUTH		
DRILL TYPE	Gemco DATE 9.10.79	PROJECT Long Bay	

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/ DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) ø',(degrees)	OTHER
FILL Silty sand, & concrete blocks & bricks		0												
		1												
Unable to penetrate concrete or steel		2												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	33.5	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	-
DRILL TYPE	Gemco	DATE	9.10.79

BORE HOLE No. 12
GA1-12

PROJECT Long Bay

FIGURE 2M
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
SILTY SAND (SP) grey-dark grey sl. organic		0												V Bit Auger
SAND ('Waterloo Rock') dark brown-rust brown, weakly cemented		1												12.10.79
SAND (SP) v. wet fine grained yellow-brown		2			V. Bit Refusal									
SANDSTONE HW-XW		3.8												TC Bit auger
END OF BORING @ 3.8m		4												
		5												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	33.8	DATUM Std.	
INCLINATION	Vertical	AZIMUTH -	
DRILL TYPE	Gemco	DATE 8.10.79	

BORE HOLE No. 13

GA1-13

PROJECT Long Bay

FIGURE 2N
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N. / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C,(kPa) Ø,(degrees)	OTHER
SILTY SAND (SP) grey & darker grey slightly organic Fine grained		0												V Bit Auger
		1	SP	1	18									
INDURATED SAND brown-black ('Waterloo' Rock') weakly cemented			NMLC-RC1											12.10.79
SAND (SP) orange brown med. grained		2												
SILTY CLAY (CL) grey, organic inclusions		3												
SANDY CLAY (CL) grey brown soft-firm (moist)		4										V Bit Refusal		
SANDSTONE XW Grey, some grey streaking @ 10°		5	NMLC - RC 2		Joints moderately widely spaced horizontal									NMLC rock coring
HW		6			Joints closely spaced									
END OF BORING @ 6.51m		7												Water level 1.35m 8.00am 9.10.79

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	36.6	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	
DRILL TYPE	Gemco 210B	DATE	6.12.79

BORE HOLE No. 14

GAI-14

PROJECT Long Bay Hospital

FIGURE 2A
SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE %	% FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
FILL Silty sand, bricks, and concrete rubble		0												
SAND (SP)														
Grey		1												
Rust brown			SP	1	14/300									
Yellow - brown		2												
Orange brown Fine-med grained		3												
							'V' Bit Refusal @ 3.2m							
END OF BORING @ 3.2m GROUNDWATER NOT ENCOUNTERED		4												

LOCATION	Refer Site Plan		
SURFACE ELEVATION	36.2	DATUM	Std
INCLINATION	Vertical	AZIMUTH	
DRILL TYPE	Gemco 210B	DATE	6.12.79

BORE HOLE No. 15

GAI-15

PROJECT Long Bay Hospital

FIGURE
SHEET OF

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	PLASTICITY INDEX	LINEAR SHRINKAGE %	% FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
FILL Silty Sand, loose dark grey-black		0												
SAND (SP) loose - med.dense fine grained grey		1												
Rust brown ('Waterloo Rock')			SP	1	9/300									
		2					'V' Bit Refusal @ 2.2m							
END OF BORING @ 2.2m GROUNDWATER NOT ENCOUNTERED DURING AUGERING		3												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan
SURFACE ELEVATION	35.1
DATUM	Std.
INCLINATION	Vertical
AZIMUTH	
DRILL TYPE	Gemco 210B
DATE	6.12.79

BORE HOLE No. 16

GAI-16

PROJECT Long Bay Hospital

FIGURE 28
SHEET 1 OF 1.

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C,(kPa) Ø,(degrees)	OTHER
SAND (SP) Loose - mod. dense fine grained Orange brown		0 1 2	SP	1	12/300									'Bouncing' Refusal 'V' Bit Refusal @ 2.2m
END OF BORING @ 2.2m GROUNDWATER NOT ENCOUNTERED														

LOCATION	Refer Site Plan
SURFACE ELEVATION	35.6
DATUM	Std.
INCLINATION	Vertical
AZIMUTH	
DRILL TYPE	Gemco 210B
DATE	6.12.79

BORE HOLE No. 17

GAI-17

PROJECT Long Bay Hospital

FIGURE
SHEET OF

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C,(kPa) Ø,(degrees)	OTHER
FILL Silty Sand dark grey black Grey Occas. bit of refuse		0 1	SP	1	14/300									V Bit augered
SAND (SP) Mod. dense Grey-brown Fine grained Grey orange moist-wet		2 3 4 5	SP	2	22/300									during augering v.slow drilling 'V' Bit Refusal @ 5.8m
END OF BORING @ 5.8m		6												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	34.5	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	
DRILL TYPE	Gemco 210B	DATE	6.12.79

BORE HOLE No. 18

GA1-18

PROJECT: Long Bay Hospital

FIGURE 2C

SHEET 1 OF 1

STRATIGRAPHY	ELEV'N / DEPTH (metres)	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C,(kPa) Ø,(degrees)	OTHER
FILL Silty Sand dark grey Silty Sand, bricks, concrete blocks, metal & plastic waste	0 1												TC Bit Augered
SAND (SP) loose fine grained yellow grey sloppy	2	SP	1	10/3-0									During Drilling
orange brown	3	SP	2	"Bouncing" Refusal									Refusal of 'V' Bit
END OF BOIRNG @ 3.1m													

LOCATION	Refer Site Plan		
SURFACE ELEVATION	34.0 approx.	DATUM	Std
INCLINATION	Vertical	AZIMUTH	
DRILL TYPE	Gemco 210B	DATE	7.12.79

BORE HOLE No. 19

GA1-19

PROJECT: Long Bay Hospital

FIGURE

SHEET OF

STRATIGRAPHY	ELEV'N / DEPTH (metres)	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE CONTENT (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C,(kPa) Ø,(degrees)	OTHER
FILL Sand, some bricks loose	0 1												
SAND (SP) fine grained Grey brown wet	2	SP	1	8/300									
	3	SP	2	14/300									During Drilling
	4			'V' Bit Refusal @ 3.8m 'TC' Bit Refusal @ 4.0m									
END OF BORING @ 4.0m													

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	33.7 approx.	DATUM Std	
INCLINATION	Vertical	AZIMUTH	
DRILL TYPE	Gemco 210B	DATE 7.12.79	

BORE HOLE No. 20

GA1-20

PROJECT Long Bay Hospital

FIGURE 2D

SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C,(kPa) Ø,(degrees)	OTHER
FILL Sand, ash some bricks, timber and other building waste Organic, black - dk. grey sloppy		0 1 2	SP	1	8/300									During Drilling
SAND (SP) fine grey		3	SP	2	5	'Bouncing'	Refusal							
SANDY CLAY (CL) grey			AS	3										'V' Bit Refusal @ 3.5m
END OF BORING @ 3.5m		4												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	33.2 approx.	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	
DRILL TYPE	Gemco 210B	DATE	7.12.79

BORE HOLE No. 21

GA1-21

PROJECT Long Bay Hospital

FIGURE 2E

SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) c',(kPa) ø,(degrees)	OTHER
FILL Sand, gravel some bricks, ash, and other building rubble dark grey		0												TC Bit augered thru. fill
		1												
			SP	1	4/300									
SAND/CLAYEY SAND (SC) sloppy fine-med grained		2												During Augering ▽
														V Bit augered
SILTY CLAY (CL-CH) v. stiff si.moist m sl< PL Grey, thin black band		3	SP	2	30/300									
		4												
SANDY CLAY (CL) v. stiff hard grey			SP	3	38/300									
		5												
		6												
														v.stiff drilling
		7												
Grey & darker grey si organic		8	AS	4										
														'V' Bit Refusal @ 8.4m
END OF BORING @ 8.4m		9												

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	33.8	DATUM	Std.
INCLINATION	Vertical	AZIMUTH	
DRILL TYPE	Gemco 210B	DATE	5.12.79

BORE HOLE No. 22

GA1-22

PROJECT Long Bay Hospital

FIGURE 2F

SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST / DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m³)	NATURAL MOISTURE (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (< No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C',(kPa) Ø',(degrees)	OTHER
SILTY SAND loose, dark grey, sl. organic		0												
CLAYEY SAND		1	SP	1	12/300									
SAND (SP) Mod dense Fine grained Grey-brown wet		2	SP	2	17/300									During Drilling ▽
		3	AS	3										
CLAYEY SAND (SC) Fine grained Grey, some brown		4	SP	4	51/300									
		5												
		6												
SANDY CLAY/CLAYEY SAND		7												
		8												Stiffer Drilling
		9												
END OF BORING @ 10.4m		10			'V' Bit Refusal @ 10.4m									

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	33.2	DATUM	Std
INCLINATION	Vertical	AZIMUTH	
DRILL TYPE	Gemco 2108	DATE	5.12.79

BORE HOLE No. 23

GA1-23

PROJECT Long Bay Hospital

FIGURE 2G

SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS/DISTANCE (mm)	DRY DENSITY (Mg/m^3)	NATURAL MOISTURE (%)	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS Su,(kPa) C,(kPa) Ø,(degrees)	OTHER
SILTY SAND (SM) loose fine grained black. sl. organic some rootlets		0	SP	1	18/300									7.12.79 ▽
mod. dense grey brown sloppy		1	SP	2	14/300									During Augering ▽
SILTY CLAY (CL-CH) stiff grey, brown sl.red mottled q.moist m > PL		2	AS	3										
(CL) grey sl.moist m ~ PL		3	SP	4	11/300									
		4												
		5	SP	5	25/300									
		6												
CLAYEY SAND (SC) Fine grained Grey, sl.brown mod. dense		7	AS	6										
		8												
		9												
END OF BORING @ 10.7m		10												

'V' Bit Refusal @ 10.7m

GOLDER ASSOCIATES

LOCATION	Refer Site Plan		
SURFACE ELEVATION	33.0	DATUM	Std
INCLINATION	Vertical	AZIMUTH	
DRILL TYPE	Gemco 210B	DATE	5.12.79

BORE HOLE No. 24

GA1-24

PROJECT Long Bay Hospital

FIGURE 2H

SHEET 1 OF 1

STRATIGRAPHY	GRAPHIC LOG	ELEV'N / DEPTH metres	SAMPLE TYPE	SAMPLE LOST, DISTURBED	BLOWS / DISTANCE (mm)	DRY DENSITY (Mg/m^3)	NATURAL MOISTURE (%) CONTENT	CLASSIFICATION DATA: LIQUID LIMIT	CLASSIFICATION DATA: PLASTICITY INDEX	CLASSIFICATION DATA: LINEAR SHRINKAGE %	CLASSIFICATION DATA: % FINES (No. 200)	STRENGTH DATA: TYPE OF TEST	STRENGTH DATA: PARAMETERS S_u,(kPa) C',(kPa) Ø',(degrees)	OTHER
SILTY SAND (SM-SP) Fine grained v. loose Dark brown-black. sl. organic		0												
			SP	1	1/300									
grey, brown		1												7.12.79 ▽
sloppy														
			SP	2	7/150									During Augering ▽
SANDY CLAY (CL) stiff Grey, fine sandy grained		2												
moist m > PL		3	SP	3	13/300									
		4	AS	4										
CLAYEY SAND (SC) mod. dense fine grained dark grey-sl. bluish grey		5												Stiffer Drilling
			AS	5										
		6												
		7												
		8												
SANDSTONE (XW-HW)		9			'V' Bit Refusal @ 8.9m									
		10												

'TC' Bit Refusal @ 10.5m

END OF BORING @ 10.5m

GOLDER ASSOCIATES

DPWS1-1

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH1

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0	N.G.E	TC		FILL		FILL - SILTY SAND with clayey silt lumps, some organics and grass roots; uncontrolled (very loose); dry.
				ROCK		0.30 SANDSTONE; medium to coarse grained; moderately weathered; weak; light grey and yellow-brown.
						END at 0.60
1						
2						
3						
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

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DPWSI-2

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH2

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0	No Groundwater Encountered	TC		FILL		FILL - SILTY SAND with some gravel-sized sandstone fragments mantled by a thin layer of silty topsoil with grass roots;
				FILL		light grey-brown; uncontrolled (very loose); dry. 0.30 becoming dark grey to black; contains coke fragments and ash.
				SM (v)		0.60 SILTY SAND; dark brown; loose; moist. 0.75
1				ROCK		SANDSTONE; highly weathered; very weak to weak; light grey, yellow, orange and brown. END at 1.10
2						NOTE: Slow, hard drilling for a TC bit below 1m - rock ground down to a silt powder. No refusal.
3						
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

DPWS1-3

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH3

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0						
1				FILL		FILL - SILTY SAND with some gravel and grass roots; contains occasional fragments of wood, plastic, charcoal/slag; coarse gravel/cobbles in pockets (0.5-0.7mm) 1.2m - 1.3m; grey-brown; uncontrolled (very loose); dry to moist below 0.9m, becoming wet at 1.9m.
2	▼	TC				
				SP/SM (v)		2.30 SAND with some silt; fine to medium grained; dark grey-brown; medium dense; wet. (possibly fill)
3				ROCK		2.80 SANDSTONE; extremely weathered to highly weathered; extremely weak; light grey with some yellow, orange and brown.
4						END at 3.80 NOTE: Firm to hard drilling for a TC bit below 3.7m. No refusal.

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
▼ Water Table
➤ Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

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DPWS1-4

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH4

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0						
		TC		FILL		FILL - SILTY SAND with occasional gravel and grass roots; rare pieces of plastic and glass, coarse gravel to cobble-sized sandstone fragments at 0.4m and 0.6m to 0.85m; dark grey-brown; uncontrolled (very loose); dry to 0.6m then moist.
1						
	▼			FILL		1.60 FILL - cobbles and boulders in sandy matrix; grey-brown; wet.
						END at 1.80
2						NOTE: TC bit refusal at 1.8m depth - interpreted to be on a boulder within fill.
3						
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
▼ Water Table
➤ Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

DPWS1-5

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH5

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0	N.G.E	TC		FILL		FILL - SILTY SAND with grass roots; pockets of clayey silt; grey-brown and brown; uncontrolled (very loose); dry
				ROCK		0.40 SANDSTONE; highly weathered; very weak; light grey, yellow and orange-brown. END at 0.60
						NOTE: TC bit refusal at 0.6m depth.
1						
2						
3						
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

DPWS1-6

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH6

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0	No Groundwater Encountered	TC	D	FILL		FILL - SILTY SAND with blue metal gravel; trace of organics; grey-brown; uncontrolled (very loose); dry.
				FILL		FILL - SAND with traces of silt; occasional coarse gravel-sized fragments at 0.75m and 1.4m; dark grey-brown; uncontrolled (very loose); moist to very moist with depth.
1			D	SM (v)		SILTY SAND with traces of gravel; fine to medium grained; brown; loose; wet. 1.60
				ROCK		SANDSTONE; highly weathered to moderately weathered; very weak; light grey. 1.80
2						END at 2.10
						NOTE: TC bit refusal at 2.1m. No groundwater in the borehole at completion of drilling; however, the sand below 1.6m is in a wet state. Some seepage likely if long term monitoring was undertaken.
3						
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

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DPWS1-7

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH7

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0	No Groundwater Encountered	TC		FILL		FILL - SILTY SAND with traces of clay and gravel; dark grey-brown; very loose; moist.
				FILL		0.35 FILL - gravel and cobbles in a silty sand and sand matrix; gravel is coke/slag, blue metal and sandstone fragments; contains traces of clay 0.7m to 0.9m; grey-brown to 1.0m then black; uncontrolled (very loose to loose); moist to very moist with wet pockets below 0.7m.
1				ROCK		1.40 SANDSTONE; moderately weathered; medium strong; light grey. END at 1.60
						NOTE: TC bit refusal at 1.6m. No groundwater in the borehole at completion of drilling; however, the fill below 0.7m is in a wet state.
2						
3						
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

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DPWSI-8

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH8

PROJECT: LONG BAY CORRECTIONAL CENTRE
LOCATION: AREA 1
CONTRACTOR: SAXON
DRILLER: P. CLOSE
DATE: 1/11/01
SURFACE RL:
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0				FILL		FILL - SAND with silt and gravel; light grey-brown to brown; uncontrolled (very loose); dry.
				FILL		0.70 FILL - gravel and cobbles in sandy matrix; grey-brown; medium dense; moist with wet pocket at 0.8m.
1				FILL		1.10 FILL - SILTY SAND to CLAYEY SILTY SAND; black; unontrolled (loose); very moist to 1.5m then wet.
	▼	TC				
2				SP/SM (v)		2.10 SAND with some silt; medium grained; grey-brown; loose; wet.
				CL/SC (v)		2.30 SANDY CLAYEY SILT/CLAYEY SILTY SAND with some roots; dark chocolate brown; firm; moist to very moist.
		SPT	3,5/110, N = R			2.60 INDURATED SAND (coffee rock); dark chocolate brown; dense; moist. Strong H2S odour.
3				SC/CI (v)		3.10 CLAYEY SAND/SANDY CLAY; light grey; stiff; very moist.
				ROCK		3.35 SANDSTONE; highly weathered; extremely weak; light grey and yellow-brown. END at 3.60
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
▼ Water Table
➤ Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

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DPWSI-9

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH9

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0				SP/SM (v)		SAND with some silt and grass roots; fine to medium grained; mid grey; loose; dry.
				SP (v)		0.40 becoming light grey-brown; medium dense and moist.
			D	SM (v)		0.60 SILTY SAND; dark grey-brown; loose; very moist to wet.
1				SC (v)		0.85 CLAYEY SILTY SAND; dark chocolate-brown; medium dense; very moist.
						1.10 INDURATED SAND (coffee rock); dark chocolate-brown to black; dense; moist.
2		TC	SPT 8/50,-,- N = R			
				ROCK		2.50 SANDSTONE; extremely weathered; extremely weak; light grey; moist to very moist.
3						END at 3.45
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

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DPWS1-10

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH10

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0	No Groundwater Encountered	TC		SP/SM (v)		SAND with some silt, fine gravel and grass roots; mid grey; loose; dry.
				SM (v)		0.40 SILTY SAND with some gravel and traces of organics; dark grey-brown; loose to medium dense; very moist.
1				ROCK		0.60 SANDSTONE; highly weathered; very weak; light grey and yellow-brown.
						END at 1.10
2						
3						
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

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DPWSH 11

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH11

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 1/11/01
LOCATION: AREA 1
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0	N.G.E	TC		FILL		FILL - SAND with silt and gravel; mid to dark grey; uncontrolled (loose); dry.
				ROCK		0.40 SANDSTONE; highly weathered to moderately weathered; very weak to weak; light grey and yellow-brown.
1						END at 0.87 NOTE: TC bit refusal at 0.87m depth.
2						
3						
4						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 1 SHEETS
SCALE 1 :20

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DPWS1-12

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH12

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 2/11/01
LOCATION: AREA 2
SURFACE RL:
CONTRACTOR: SAXON
DRILLER: P. CLOSE
RIG TYPE: EXPLORER MKI

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0				FILL		FILL - SAND with silt, gravel and grass roots; gravel is sandstone fragments; yellow-brown and grey-brown; uncontrolled (loose); dry.
						0.60
1	No Groundwater Encountered		SPT 3,4,4 N = 8			SAND with trace of silt; medium grained; golden yellow-brown; loose; moist to very moist with depth.
2		TC		SP (v)		
3			SPT 3,5,5 N = 10			
4						- becoming medium dense to dense.

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: C. KARWAJ
PROJECT COORDINATOR: C. KARWAJ
SHEET 1 OF 2 SHEETS
SCALE 1 :20

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DPWS2-1

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES **GEOTECHNICAL & ENVIRONMENTAL**

BOREHOLE BH1

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 25.01.02
LOCATION: HALFWAY HOUSE
SURFACE RL:
CONTRACTOR: SAXONS
DRILLER: P.CLOSE
RIG TYPE: EXPLORER MK.1

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
5						--- (continued from previous sheet) --- SAND with a trace of silt; medium grained; grey brown; medium dense; wet.
6				SP (v)		
7		Vee				7.10
			D	SP (v)		- becomes interbedded with silty clay lenses.
8						8.30
			D	SC (v)		ORGANIC (PEATY) CLAYEY SAND; black and dark grey; stiff; very moist.
9						END at 9.00
						NOTE: Vee bit refusal at 9.0m on what is inferred to be a moderately weathered sandstone.
10						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: M.ASHOVER
PROJECT COORDINATOR: C.KARWAJ
SHEET 2 OF 2 SHEETS
SCALE 1 :25

DPWS2-2

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES

GEOTECHNICAL & ENVIRONMENTAL

BOREHOLE BH2

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 25.01.02
LOCATION: HALFWAY HOUSE
SURFACE RL:
CONTRACTOR: SAXONS
DRILLER: P.CLOSE
RIG TYPE: EXPLORER MK.1

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
0				SP (v)		**TOPSOIL** - sand with traces of silt; dark grey to mid grey; very loose; moist. 0.25
			SPT 2,2,2 N = 4	SP (v)		**SAND;** medium grained; light brown, occasional dark brown lenses or pockets; very loose; just moist. 1.00
1	1.1m		D	SM (v)		**SILTY SAND** with traces of clay and organics; anoxic odour; medium grained; very loose; wet. 1.40
	1.4m		SPT 1,2,3 N = 5	SP (v)		**SAND** with traces of silt; traces of decomposed organics and roots; dark grey; loose; wet. 3.00
2		Vee				
3			SPT 3,12,20 N = 32	SP (v)		**SAND;** fine to medium grained; light to mid brown; medium dense; wet. 3.90
4				SC (v)		**SILTY SAND** with clay; light grey; medium dense; very moist to wet.
5						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: M.ASHOVER
PROJECT COORDINATOR: C.KARWAJ
SHEET 1 OF 2 SHEETS
SCALE 1 :25

DPWS2-2

NSW DEPARTMENT OF PUBLIC WORKS AND SERVICES **GEOTECHNICAL & ENVIRONMENTAL**

BOREHOLE BH2

PROJECT: LONG BAY CORRECTIONAL CENTRE
DATE: 25.01.02
LOCATION: HALFWAY HOUSE
SURFACE RL:
CONTRACTOR: SAXONS
DRILLER: P.CLOSE
RIG TYPE: EXPLORER MK.1

DEPTH (m)	WATER	BIT	SAMPLE or TEST	SOIL GROUP	GRAPHIC LOG	SOIL DESCRIPTION Soil type, colour, consistency, grainsize, moisture, remarks
5				SC (v)		--- (continued from previous sheet) --- SILTY SAND with clay; light grey; medium dense; very moist to wet.
						5.50
6		Vee	D	SC/OH (v)		CLAYEY SAND with SILTY CLAY interbeds; black and dark grey banded; medium dense/stiff; very moist.
						6.40
				ROCK		SANDSTONE; highly weathered; very weak. END at 6.60
7						NOTE: Vee bit refusal at 6.6m.
8						
9						
10						

SAMPLE OR TEST
U.....Undisturbed
D.....Disturbed
SPT....Standard Penetration Test
CPT....Cone Penetration Test

v : visual
l : laboratory

WATER
Water Table
Water Inflow

DRILLING SUPERVISOR: M.ASHOVER
PROJECT COORDINATOR: C.KARWAJ
SHEET 2 OF 2 SHEETS
SCALE 1 :25

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JK2-1

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 1 1/3

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 20·5·87
Method: SPIRAL AUGER HYDRAPOWER RIG
R.L. Surface: 37·12 m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
		Nc = 14 / 10 | 75mm TEST ABONDONED-OBSTRUCTION IN HOLE	1			FILL: Gravelly sand, fine to medium grained, brown, some silt. Gravel of sandstone fragments. Occasional fragments of brick, concrete and timber to cobble? size	M			FILL APPEARS POOR TO MODERATE COMPACTION
			2							
		Nc = 4 / 6 / 7 / 10	3							
MOISTURE ON CPT CONE (TEST AT 4·7m)			4							NC: VALUE PROBABLY AFFECTED BY OBSTRUCTION IN HOLE
		Nc = 10 / 12 | 100mm TEST ABONDONED-OBSTRUCTION IN HOLE	5				M-W			
	D.S.				SM	SILTY SAND: fine to medium grained, grey brown	W	(MD)		ALLUVIUM (HOLE COLLAPSED TO 5·2m WHEN AUGERS WITHDRAWN FROM 6·2m)
		NC: ATTEMPTED BUT OBSTRUCTION IN HOLE AT 5·2m	6							10mm 12mm
			7							

JEFFERY AND KATAUSKAS PTY. LTD.

JK2-1

Borehole No. 1 2/3

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 20·5·87
Method: SPIRAL AUGER, HYDRAPOWER RIG
R.L. Surface: 37·12 m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
			7		SM	SILTY SAND: fine to medium grained, grey brown.	W	(MD)		60mm LOW - MODERATE DRILLING RESISTANCE
					CL/SC	SANDY CLAY/CLAYEY SAND: medium plasticity, fines, mainly fine grained sand, grey	MC>PL	(St-VSt)		55mm, 60mm, 50mm, 100mm, 85mm
	D.S.		8							
			9							
			10		SM	SILTY SAND: fine to medium grained, brown	W	(MD)		70mm, 25mm, 20mm, 15mm, 10mm, 30mm
			11							
			12							
			13		CL/SM	INTERBEDDED PEAT and SAND: Peat; fibrous and silty, dark brown, dense. Sand; silty, fine to medium grained, grey	M	H/D		MODERATE DRILLING RESISTANCE
			14							

JR2-1

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 1 3/3

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 20·5·87
Method: SPIRAL AUGER HYDRAPOWER RIG
R.L. Surface: 37·12m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
	D.S.		15		OL / SM	INTERBEDDED PEAT and SAND as above, peat predominates	M	H/D		MODERATE DRILLING RESISTANCE
			16			INTERBEDDED PEAT and CLAY: Peat; dark brown, silty. Clay; low plasticity, grey bedding <100mm	MC>PL	V.St		VERY LOW DRILLING RESISTANCE 5mm 0mm 20mm 40mm 10mm 30mm A FEW MODERATE BANDS 60mm
			17							
			18							
			19			Becomes mainly clay				
	D.S.		20			Possibly SAND AT BASE OF HOLE				
			20.5m			END OF BOREHOLE				

JK2-2

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 2.

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5
Date: 20·5·87
Method: SPIRAL AUGER HYDRAPOWER RIG
R.L. Surface: 35·55 m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
						FILL: topsoil (100mm) over brown fine to medium grained, sand	M	V.L		FILL
			1		SP	SAND: medium grained, light brown, trace silt	M	V.L		DUNE SAND/ ALLUVIUM
	D.S.	Nc = 1, 2, 1								
HOLE COLLAPSED ON 28·5·87			2							
		Nc = 4, 5, 6, 6, 5	3					M D		
			4			as above, grey brown	M-W			
							W			
			5					D		
		Nc = 30	6							
			7.5m							

END OF BOREHOLE

JEFFERY AND KATAUSKAS PTY. LTD.

JK2-3

Borehole No. 3 1/3

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5
Date: 20·5·87
Method: SPIRAL AUGER / HYDRAPOWER RIG
R.L. Surface: 33.26 m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
28·5·87 ▽	D.S.	Nc = 4, 6, 8, 8	1		SM	SILTY SAND: fine to medium grained, dark brown, peaty	M	(V.L)		ALLUVIUM
							W	(L)		
			2					MD		
	D.S.		3		CL	CLAY: medium plasticity, banded light grey and orange brown	MC>PL	(St)		MODERATE DRILLING RESISTANCE
		N = 17 (3, 7, 10)	4		SP/CL	SAND: fine to medium grained, light brown, some silt, interbedded with clay, medium plasticity, light grey and orange brown. Some peaty sand around 4.4m	W/MC>PL	MD/St		LOW RESISTANCE
						clay band, as above				MODERATE RESISTANCE
			5			mainly sand, as above				LOW RESISTANCE
	D.S.	Nc = 5, 11, 13	6			clay band, as above				MODERATE RESISTANCE
			7							LOW RESISTANCE

JK2-3

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 3 2/3

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5
Date: 20·5·87
Method: SPIRAL AUGER HYDRAPOWER RIG
R.L. Surface: 33·26m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
			7		SM	SILTY SAND: fine to medium grained, grey brown	W	(MD)		ALLUVIUM RELATIVE DENSITY ASSESSED ONLY LOW DRILLING RESISTANCE
			8							
			9							
			10							
			11			Probably				
					CL	clay band	MC>PL	(St)		MODERATE RESISTANCE
			12			Probably				
					SC	CLAYEY SAND: fine to medium grained, grey brown	M	(MD)		MODERATE RESISTANCE WITH LOW BANDS
			13							
			14							

JK2-3

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 3 3/3

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 20.5.87
Method: SPIRAL AUGER HYDRAPOWER RIG
R.L. Surface: 33.26m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
			15		SC/SP	CLAYEY SAND/SAND: with some clay, fine to medium grained, light grey	M	(MD)		ALLUVIUM (RELATIVE DENSITIES ASSESSED ONLY)
			16			as above, but with a few brown organic bands				
			17			as above, with interbedded PEAT, fibrous brown				
			17.8m							
			18			END OF BOREHOLE				AUGER REFUSAL
			19							
			20							

JK2-4

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 4 1/2

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 20·5·87
Method: SPIRAL AUGER HYDRAPOWER RIG
R.L. Surface: 33·88m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
						TOPSOIL: peaty sand, dark brown				ALLUVIUM
ON S.P.T RODS			1		SP	SAND: fine to medium grained, brown some silt	M	L		
22·5·87							W			
	D.S.	Nc = 4, 6, 3, 9	2		SM	SILTY SAND: fine to medium grained, dark brown organic		MD		
	D.S.	N=8 2,3,5	3		CL	CLAY: low plasticity, light grey and orange brown, trace sand	MC>PL	St.	140-280	
	D.S.	Nc = 5, 9, 13	4		SM	SILTY SAND: fine to medium grained, brown	W	MD		
			5							
			6		CL	CLAY: low plasticity, light grey, trace to some fine sand.	MC≈PL	St		60mm 20mm 10mm 55mm
			7							

JK2-4

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 4 2/2

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 20·5·87
Method: SPIRAL AUGER HYDRAPOWER RIG
R.L. Surface: 33·88m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
	D.S.		7 - 5m		CL	CLAY: as above	MC≒PL	(ST)		
			8			END OF BOREHOLE				
			9							
			10							
			11							
			12							
			13							

JK2-5

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 5

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5 Method: SPIRAL AUGER R.L. Surface: 34·20m
Date: 21·5·87 HYDRAPOWER RIG Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
						TOPSOIL: silty sand, fine to medium grained, dark brown	M			
					SP	SAND: fine to medium grained, light grey	M	L		
						Grading to				
			1		SM	SILTY SAND: fine to medium grained with moderately cemented iron indurated zones, dark brown		MD		
BOREHOLE COLLAPSED ON COMPLETION						Grading to				
	D.S.	Nc = 5, 6, 7			SP	SAND: fine to medium grained, yellow brown	W			
ON RODS AFTER SPT AT 3·0m			2							
	D.S.									
	D.S.	N=16 8, 9, 7	3		Pt	PEAT: black fibrous with strong organic odour	MC>PL	S to F		
					CL/SC	CLAYEY SAND/SANDY CLAY: fine to medium grained, low to medium plasticity, light grey with interbedded layers of sand. fine to medium grained, yellow brown	(MC>PL) (W)	V.St to H (MD)	220 330 >600 >600	
		Nc = 5, 8, 12	4							
			5							
			6			as above, clay becoming medium to high plasticity with depth				
			7							

END OF BOREHOLE AT 7·5m

0mm
30mm
0mm

JEFFERY AND KATAUSKAS PTY. LTD.

JK2-6

Borehole No. 6.

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 22·5·87
Method: SPIRAL AUGER, HYDRAPOWER RIG
R.L. Surface: 35·83m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
						TOPSOIL: silty sand, fine to medium grained, dark grey	M	L		
			1		SP	SAND: fine to medium grained, white	M	L		
						Grading to				
					SM	SILTY SAND: fine to medium grained, dark brown and yellow				
						brown				
	D.S.	N=5 2,2,3				Grading to				
			2		SP	SAND: fine to medium grained, yellow				
			3							
28.5.87 ▼	D.S.	N=9 3,5,4								
						Grading to				
ON RODS AFTER TEST AT 4·5m ▼			4		CL/SC	CLAYEY SAND/SANDY CLAY: fine to medium grained, medium plasticity, light grey	W	V.St to H/MD		
	D.S.	N=17 5,8,9							380 410 340 550 580	
			5							40mm 20mm 10mm
	D.S.		6·0m 6							
						END OF BOREHOLE				

JEFFERY AND KATAUSKAS PTY. LTD.

JK2-7

Borehole No. 7 1/2

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5 Method: SPIRAL AUGER R.L. Surface: 35.68m
Date: 21.5.87 HYDRAPOWER RIG Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
						FILL: silty sand, fine to medium grained with gravel dark grey brown	M			POORLY COMPACTED
					SP	SAND: fine to medium grained, white	M	L		
						Grading to				
	D.S.	N=6 3,3,3	1		SM	SILTY SAND: fine to medium grained with weakly cemented iron indurated zones, dark brown				
						Grading to				
					SP	SAND: fine to medium grained, yellow brown				
	D.S.	N=8 2,4,4	2							
BOREHOLE COLLAPSED ON COMPLETION										
			3				W			
ON RODS AFTER S.P.T AT 3.8m										
	D.S.	N=3 1,2,1	4			as above, becoming		VL		
			5							
						Grading to				
	D.S.	N=17 6,7,10	6		SC	CLAYEY SAND: fine to medium grained, light grey with interbedded layers of sand, fine to medium grained, yellow brown and CLAY medium to high plasticity, yellow brown		MD		
								L		60mm
			7							90mm

JK2-7

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 7 2/2

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5 Method: SPIRAL AUGER HYDRAPOWER RIG R.L. Surface: 35.68m
Date: 21.5.87 Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
			7		SC	CLAYEY SAND: fine to medium grained, no interbedded clay or sand layers evident	W	L-MD		50mm 70mm 125mm 30mm
			8							
			9.0			END OF BOREHOLE				
			9							
			10							
			11							
			12							
			13							

JK2-8

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 8

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 22·5·87
Method: SPIRAL AUGER HYDRAPOWER RIG
R.L. Surface: 34·95m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
						FILL: silty sand, fine to medium grained with gravel	M			POORLY COMPACTED
					SP	SAND: fine to medium grained, light grey	M			
	D.S.	N > 16 3,5, 11/150mm	1		SC	Grading to CLAYEY SAND: fine to medium grained grey and light grey				ESTIMATED 'V' BIT REFUSAL
	D.S.	HAMMER BOUNCING				Grading to SANDSTONE: fine to medium grained, extremely weathered, extremely weak, with iron indurated silty sand zones orange brown				LOW 'TC' BIT RESISTANCE WITH OCCASIONAL MODERATE BANDS.
			2			SANDSTONE: fine to medium grained, highly weathered, weak yellow brown becoming light grey				MODERATE 'TC' BIT RESISTANCE
ON COMPLETION	D.S.		3							
			4			as above, but moderately weathered medium strong, light grey				MODERATE TO HIGH 'TC' BIT RESISTANCE
	D.S.		4.5m							
						END OF BOREHOLE				
			5							
			6							
			7							

JEFFERY AND KATAUSKAS PTY. LTD.

JK2-15

Borehole No. 15 1/2

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 JS
Date: 28·5·87
Method: SPIRAL AUGER, HYDRAPOWER RIG
R.L. Surface: 34·53m
Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
						FILL: gravelly sand, fine to medium grained, dark brown	D-M			POORLY COMPACTED
					SP	SAND: fine to medium grained, light grey brown	M	L		ALLUVIUM
AFTER 4 hours	D.S.	N>>22 10,13,9/130mm	1		SM	SILTY SAND: fine to medium grained, dark brown	M	MD-D		
			2		SP/SC	SAND: fine to medium grained, brown, some silt, some clayey bonds	W			
	D.S.	N=28 6,12,16	3							
					SC	CLAYEY SAND: fine to medium grained, light brown				
		Nc=80/175mm HAMMER BOUNCING	4							
			5							
			6							
			7							

JK2-15

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 15 2/2

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5 Method: SPIRAL AUGER R.L. Surface: 34·53m
Date: 28·5·87 HYDRAPOWER RIG Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
			7		SC	CLAYEY SAND: as above				ESTIMATED 'V'-BIT REFUSAL
			8			SANDSTONE: medium grained, light grey brown, highly weathered, very weak to weak.				MODERATE TO HIGH 'TC' BIT RESISTANCE
			9·0m 9							LOW 'TC' BIT RESISTANCE
						END OF BOREHOLE				
			10							
			11							
			12							
			13							

JK2-19

JEFFERY AND KATAUSKAS PTY. LTD.

Borehole No. 19

BOREHOLE LOG

Client: PUBLIC WORKS DEPARTMENT
Project: PROPOSED NEW BUILDING
Location: KATINGAL AREA, LONG BAY GAOL. N.S.W.

Job No. 5070 J5 Method: SPIRAL AUGER R.L. Surface: 36·20m
Date: 28·5·87 HYDRAPOWER RIG Datum: SITE

Groundwater record	Samples	FIELD TESTS	Depth (m.)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition	Consistency/ Rel. Density	Hand Penetrometer Readings kPa.	Remarks
			1			FILL: sand, medium grained, some silt with some brick and sandstone frogments	M			
		SPT ATTEMPTED	2		SP	SAND: medium grained, light brown				(ESTIMATED) 'V' BIT REFUSAL
		REFUSAL ON SANDSTONE				SANDSTONE: medium grained, light brown, moderately weathered, weak to medium strong				MODERATE TO HIGH 'TC' BIT RESISTANCE
	D.S.		3			as above, but weak				MODERATE 'TC' BIT RESISTANCE
	D.S.		4			as above, but medium strong, light grey				MODERATE TO HIGH 'TC' BIT RESISTANCE
			4.5m			END OF BOREHOLE				
			5							
			6							
			7							

APPENDIX C

LABORATORY TEST RESULTS

Coffey Geosciences Pty Ltd A.C.N. 056 335 516

Geotechnical | Resources | Environmental | **Technical** | Project Management

Unit 8, 12 Mars Road, Lane Cove West,NSW,2066
Ph: (02) 9911 1000 Fax (02) 9911 1001

california bearing ratio test results

client : ***DEPARTMENT OF COMMERCE***
job no : ***E12723/3***
principal :
laboratory : ***SYDNEY***
project : ***ENVIRONMENTAL & GEOTECHNICAL INVESTIGATION***
report date : ***November 23, 2004***
location : ***LONGBAT CORRECTIONAL COMPLEX - MALABAR, NSW***
test report :

test procedure : ***AS1289 6.1.1***
laboratory compaction method : ***AS1289 5.1.1***

sample number :			***AREA B - CBH8***	***AREA D - CBH9***	
depth:		m	***0.6-1.6***	***0.6-1.8***	
location:			-	-	
date sampled:			-	-	
date tested:			***19/11/04***	***19/11/04***	
material description:			***(SP) SAND: fine to medium, grey.***	***(SP) SAND: fine to medium, brown.***	
maximum dry density:		t/m^3	***1.81***	***1.71***	
optimum moisture content:		%	***11.0***	***13.3***	
field moisture content		%	***5.6***	***9.7***	
retained on 19mm AS sieve:		%	***0***	***0***	
+19mm material included:			***Not Applicable***	***Not Applicable***	
C.B.R. test	before soaking	dry density t/m^3	***1.80***	***1.71***	
		density ratio %	***99.0***	***100.0***	
		moisture content %	***11.8***	***13.1***	
		moisture ratio %	***107.0***	***98.0***	
	after soaking	dry density t/m^3	***1.79***	***1.70***	
		density ratio %	***99.0***	***99.0***	
		moisture content %	***14.0***	***15.2***	
	number of days soaked:		***4***	***4***	
	surcharge:	kg	***4.5***	***4.5***	
	moisture content after test %	top 30 mm	***13.7***	***16.0***	
		remaining sample	***13.9***	***15.1***	
	swell after soaking:	%	***0.5***	***0.5***	
	penetration:	mm	***2.5/5.0***	***2.5/5.0***	
	C.B.R. value:	%	***20/25***	***20/20***	

remarks :
Samples supplied by the client on the 5/11/04.

NATA Accredited Laboratory No. 431
Date : ***23 November 2004***
Authorised Signature:
Garry Collins
Senior Technical Officer

Coffey Geosciences Pty Ltd A.C.N. 056 336 516

Geotechnical | **Resources** | Environmental | **Technical** | Project Management

Unit8, 12 Mars Road, Lane Cove West, NSW, 2066
Ph: (02) 9911 1000 Fax (02) 9911 1001

test results

client : ***DEPARTMENT OF COMMERCE***

job no : ***E12723/3***

principal :

laboratory : ***SYDNEY***

project : ***ENVIRONMENTAL & GEOTECHNICAL iNVESTIGATION***

report date : ***23 Novenber, 2004***

location : ***LONGBAY CORRECTIONAL COMPLEX - MALABAR, NSW***

test report :

test procedure : ***AS1289.5.1.1***

test date : ***9/11/04***

SAMPLE IDENTIFICATION	STANDARD MAXIMUM DRY DENSITY (t/m3)	STANDARD OPTIMUM MOISTURE CONTENT (%)	MATERIAL RETAINED ON THE 19mm SIEVE (%)
AREA A - Bulk Sample (0.2-0.5m)	***1.80***	***12.3***	***0***
AREA B - CBH8 (0.6-1.6m)	***1.81***	***11.0***	***0***
AREA D - CBH9 (0.6-1.8m)	***1.71***	***13.3***	***0***

remarks : ***Samples supplied on the 5/11/04.***

NATA Accredited Laboratory No. 431

Date : ***23 November, 2004***

Authorised Signature:

Garry Collins
Senior Technical Officer

Coffey Geosciences Pty Ltd ACN 056 335 516

Point Load Strength Index Test Results

Job No	*E12723/04*
Sheet	*3* of *3*

Client	***NSW DEPT. OF COMMERCE***	Office	***SYDNEY***
Principal	***NSW DEPT. OF CORRECTIONAL SERVICES***	Date	***30/6/2005***
Project	***LONG BAY CORRECTIONAL COMPLEX***	By	***SG***
Location	***MALABAR***	Checked	

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NMLC triple tube diamond coring*	Sampling Date	*10-16/03/2005*
		Storage History	*Coffey Sydney office indoor core storage area*	Testing Date	*18/3/2005*
Test Machine	*GSA (bench-mounted)*	Moisture Condition	*Natural*	Tested By	*SG*
Calibration Date	*27/4/2004*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							Strength Classification
		(m)	D (mm)	L (mm)	P (kN)	$I_{s(50)}$ (MPa)	Failure Mode	W (mm)	D (mm)	L (mm)	P (kN)	I_s (MPa)	$I_{s(50)}$ (MPa)	Failure Mode	
Sandstone	***CBH76***	***1.95***	*51*	*170*	*1.98*	***0.77***	*Parallel to bedding*	*51*	*38*	-	*1.93*	*0.78*	***0.78***	*Through substance*	***M***
Sandstone	***CBH76***	***2.95***	*51*	*400*	*2.63*	***1.02***	*Parallel to bedding*	*51*	*35*	-	*2.84*	*1.25*	***1.22***	*Through substance*	***H***
Sandstone	***CBH76***	***3.95***	*51*	*950*	*1.97*	***0.76***	*Parallel to bedding*	*51*	*33*	-	*1.97*	*0.92*	***0.89***	*Through substance*	***M***

Coffey Geosciences Pty Ltd ACN 056 335 516

Point Load Strength Index Test Results

Job No	*E12723/04*
Sheet	*1* of *3*

Client	***NSW DEPT. OF COMMERCE***	Office	***SYDNEY***
Principal	***NSW DEPT. OF CORRECTIONAL SERVICES***	Date	***30/6/2005***
Project	***LONG BAY CORRECTIONAL COMPLEX***	By	***SG***
Location	***MALABAR***	Checked	

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NMLC triple tube diamond coring*	Sampling Date	*10-16/03/2005*
		Storage History	*Coffey Sydney office indoor core storage area*	Testing Date	*18/3/2005*
Test Machine	*GSA (bench-mounted)*	Moisture Condition	*Natural*	Tested By	*SG*
Calibration Date	*27/4/2004*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							Strength Classification
			D	L	P	$I_{s(50)}$	Failure Mode	W	D	L	P	I_s	$I_{s(50)}$	Failure Mode	
		(m)	(mm)	(mm)	(kN)	(MPa)		(mm)	(mm)	(mm)	(kN)	(MPa)	(MPa)		
Sandstone	***CBH91***	***0.95***	*51*	*90*	*1.89*	***0.73***	*Parallel to bedding*	*51*	*39*	-	*1.73*	*0.68*	***0.69***	*Through substance*	***M***
Sandstone	***CBH91***	***1.95***	*51*	*110*	*1.3*	***0.5***	*Parallel to bedding*	*51*	*39*	-	*1.6*	*0.63*	***0.63***	*Through substance*	***M***
Sandstone	***CBH91***	***2.95***	*51*	*110*	*1.13*	***0.44***	*Parallel to bedding*	*51*	*34*	-	*1.35*	*0.61*	***0.59***	*Through substance*	***M***
Sandstone	***CBH91***	***3.85***	*51*	*550*	*0.54*	***0.21***	*Parallel to bedding*	*51*	*41*	-	*0.33*	*0.12*	***0.13***	*Through substance*	***L***

Coffey Geosciences Pty Ltd ACN 056 335 516

Job No *E12723/04*

Sheet *1* of *2*

Point Load Strength Index Test Results

Client	*NSW DEPT. OF COMMERCE*	Office	*SYDNEY*
Principal	*NSW DEPT. OF CORRECTIONAL SERVICES*	Date	*30/6/2005*
Project	*LONG BAY CORRECTIONAL COMPLEX*	By	*SG*
Location	*MALABAR*	Checked	

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NMLC triple tube diamond coring*	Sampling Date	*10-16/03/2005*
		Storage History	*Coffey Sydney office indoor core storage area*	Testing Date	*18/3/2005*
Test Machine	*GSA (bench-mounted)*	Moisture Condition	*Natural*	Tested By	*SG*
Calibration Date	*27/4/2004*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							Strength Classification
		(m)	D (mm)	L (mm)	P (kN)	$I_{s(50)}$ (MPa)	Failure Mode	W (mm)	D (mm)	L (mm)	P (kN)	I_s (MPa)	$I_{s(50)}$ (MPa)	Failure Mode	
Sandstone	***CBH94***	***1.95***	*51*	*60*	*0.82*	***0.32***	*Parallel to bedding*	*51*	*30*	-	*1.54*	*0.79*	***0.75***	*Through substance*	***M***
Sandstone	***CBH94***	***2.95***	*51*	*170*	*2.95*	***1.14***	*Parallel to bedding*	*51*	*38*	-	*2.85*	*1.15*	***1.15***	*Through substance*	***H***
Sandstone	***CBH94***	***3.95***	*51*	*240*	*1.33*	***0.52***	*Parallel to bedding*	*51*	*35*	-	*2.06*	*0.91*	***0.89***	*Through substance*	***M***
Sandstone	***CBH94***	***4.15***	*51*	*100*	*1.46*	***0.57***	*Parallel to bedding*	*51*	*29*	-	*1.22*	*0.65*	***0.61***	*Through substance*	***M***

Coffey Geosciences Pty Ltd ACN 056 335 516

Coffey

Point Load Strength Index Test Results

Job No	*E12723/04*
Sheet	*2* of *2*

Client	***NSW DEPT. OF COMMERCE***	Office	***SYDNEY***
Principal	***NSW DEPT. OF CORRECTIONAL SERVICES***	Date	***30/6/2005***
Project	***LONG BAY CORRECTIONAL COMPLEX***	By	***SG***
Location	***MALABAR***	Checked	

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NMLC triple tube diamond coring*	Sampling Date	*10-16/03/2005*
		Storage History	*Coffey Sydney office indoor core storage area*	Testing Date	*18/3/2005*
Test Machine	*GSA (bench-mounted)*	Moisture Condition	*Natural*	Tested By	*SG*
Calibration Date	*27/4/2004*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							Strength Classification
		(m)	D (mm)	L (mm)	P (kN)	$I_{s(50)}$ (MPa)	Failure Mode	W (mm)	D (mm)	L (mm)	P (kN)	I_s (MPa)	$I_{s(50)}$ (MPa)	Failure Mode	
Sandstone	***CBH122***	***1.95***	*51*	*500*	*1.01*	***0.39***	*Parallel to bedding*	*51*	*45*	-	*0.84*	*0.29*	***0.3***	*Through substance*	***L / M***
Sandstone	***CBH122***	***2.95***	*51*	*70*	*0.44*	***0.17***	*Parallel to bedding*	*51*	*37*	-	*0.4*	*0.17*	***0.17***	*Through substance*	***L***
Sandstone	***CBH122***	***3.95***	*51*	*60*	*2.85*	***1.11***	*Parallel to bedding*	*51*	*36*	-	*2.23*	*0.95*	***0.94***	*Through substance*	***M / H***
Sandstone	***CBH122***	***4.30***	*51*	*240*	*1.62*	***0.63***	*Parallel to bedding*	*51*	*29*	-	*1.71*	*0.91*	***0.85***	*Through substance*	***M***

Coffey Geosciences Pty Ltd ACN 056 335 516

Job No *E12723/4*

Sheet *1* of *1*

Point Load Strength Index Test Results

Client	*NSW DEPT. OF COMMERCE*	Office	*SYDNEY*
Principal	*NSW DEPT. OF CORRECTIONAL SERVICES*	Date	*24/3/2005*
Project	*LONG BAY CORRECTIONAL COMPLEX*	By	*CFW*
Location	*MALABAR*	Checked	

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NMLC triple tube diamond coring*	Sampling Date	*16/3/2005*
		Storage History	*Coffey Sydney office indoor core storage area*	Testing Date	*24/3/2005*
Test Machine	*GSA (bench-mounted)*	Moisture Condition	*Natural*	Tested By	*CFW*
Calibration Date	*8/9/2000*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							Strength Classification
		(m)	D (mm)	L (mm)	P (kN)	$I_{s(50)}$ (MPa)	Failure Mode	W (mm)	D (mm)	L (mm)	P (kN)	I_s (MPa)	$I_{s(50)}$ (MPa)	Failure Mode	
Sandstone	***CBH105***	***12.90***	*50*	*220*	*0.13*	***0.05***	*Parallel to bedding*	*41*	*50*	*41*	*0.1*	*0.04*	***0.04***	*Through substance*	***VL***
Sandstone	***CBH105***	***13.55***	*50*	*110*	*0.33*	***0.13***	*Parallel to bedding*	*22*	*50*	*22*	*0.08*	*0.06*	***0.05***	*Through substance*	***VL / L***
Sandstone	***CBH105***	***14.10***	*50*	*100*	*0.22*	***0.09***	*Parallel to bedding*	*25*	*50*	*25*	*0.19*	*0.12*	***0.11***	*Through substance*	***VL / L***
Sandstone	***CBH99***	***12.60***	*50*	*200*	*0.38*	***0.15***	*Parallel to bedding*	*30*	*50*	*30*	*0.4*	*0.21*	***0.2***	*Through substance*	***L***
Sandstone	***CBH99***	***13.60***	*50*	*60*	*0.75*	***0.3***	*Parallel to bedding*	*25*	*50*	*25*	*0.48*	*0.3*	***0.27***	*Through substance*	***L***
	CBH99	***14.20***	*50*	*60*	*0.54*	***0.22***	*Parallel to bedding*	*28*	*50*	*28*	*0.32*	*0.18*	***0.17***	*Through substance*	***L***

Coffey Geosciences Pty Ltd ACN 056 335 516

Job No *E12723/04*

Sheet *1* of *3*

Point Load Strength Index Test Results

Client	***NSW DEPT. OF COMMERCE***	Office	***SYDNEY***
Principal	***NSW DEPT. OF CORRECTIONAL SERVICES***	Date	***30/6/2005***
Project	***LONG BAY CORRECTIONAL COMPLEX***	By	***SG***
Location	***MALABAR***	Checked	

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NMLC triple tube diamond coring*	Sampling Date	*10-16/03/2005*
		Storage History	*Coffey Sydney office indoor core storage area*	Testing Date	*18/3/2005*
Test Machine	*GSA (bench-mounted)*	Moisture Condition	*Natural*	Tested By	*SG*
Calibration Date	*27/4/2004*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							Strength Classification
		(m)	D (mm)	L (mm)	P (kN)	$I_{s(50)}$ (MPa)	Failure Mode	W (mm)	D (mm)	L (mm)	P (kN)	I_s (MPa)	$I_{s(50)}$ (MPa)	Failure Mode	
Sandstone	***CBH100***	***5.60***	*46*	*140*	*0.48*	***0.22***	*Parallel to bedding*	*46*	*34*	-	*0.4*	*0.2*	***0.19***	*Through substance*	***L***
Sandstone	***CBH100***	***6.50***	*51*	*350*	*1.14*	***0.44***	*Parallel to bedding*	*51*	*37*	-	*0.94*	*0.39*	***0.39***	*Through substance*	***M***
Sandstone	***CBH100***	***7.10***	*51*	*150*	*1.84*	***0.71***	*Parallel to bedding*	*51*	*40*	-	*2.39*	*0.92*	***0.93***	*Through substance*	***M***

Coffey Geosciences Pty Ltd ACN 056 335 516

Job No *E12723/04*

Sheet *2* of *3*

Point Load Strength Index Test Results

Client	***NSW DEPT. OF COMMERCE***	Office	***SYDNEY***
Principal	***NSW DEPT. OF CORRECTIONAL SERVICES***	Date	***30/6/2005***
Project	***LONG BAY CORRECTIONAL COMPLEX***	By	***SG***
Location	***MALABAR***	Checked	

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NMLC triple tube diamond coring*	Sampling Date	*10-16/03/2005*
		Storage History	*Coffey Sydney office indoor core storage area*	Testing Date	*18/3/2005*
Test Machine	*GSA (bench-mounted)*	Moisture Condition	*Natural*	Tested By	*SG*
Calibration Date	*27/4/2004*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							Strength Classification
		(m)	D (mm)	L (mm)	P (kN)	$I_{s(50)}$ (MPa)	Failure Mode	W (mm)	D (mm)	L (mm)	P (kN)	I_s (MPa)	$I_{s(50)}$ (MPa)	Failure Mode	
Sandstone	***CBH109***	***0.90***	*51*	*70*	*0.17*	***0.07***	*Parallel to bedding*	*51*	*36*	-	*0.29*	*0.12*	***0.12***	*Through substance*	***VL / L***
Sandstone	***CBH109***	***1.95***	*51*	*170*	*0.51*	***0.2***	*Parallel to bedding*	*51*	*37*	-	*0.38*	*0.16*	***0.16***	*Through substance*	***L***
Sandstone	***CBH109***	***2.90***	*51*	*650*	*1.98*	***0.77***	*Parallel to bedding*	*51*	*43*	-	*1.84*	*0.66*	***0.68***	*Through substance*	***M***
Sandstone	***CBH109***	***3.75***	*51*	*170*	*0.59*	***0.23***	*Parallel to bedding*	*51*	*42*	-	*1.66*	*0.61*	***0.62***	*Through substance*	***L / M***

Coffey Geosciences Pty Ltd ACN 056 335 516

Job No ***E12723/04***

Sheet ***3*** of ***3***

Point Load Strength Index Test Results

Client	***NSW DEPT. OF COMMERCE***	Office	***SYDNEY***
Principal	***NSW DEPT. OF CORRECTIONAL SERVICES***	Date	***30/6/2005***
Project	***LONG BAY CORRECTIONAL COMPLEX***	By	***SG***
Location	***MALABAR***	Checked	

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NMLC triple tube diamond coring*	Sampling Date	*10-16/03/2005*
		Storage History	*Coffey Sydney office indoor core storage area*	Testing Date	*18/3/2005*
Test Machine	*GSA (bench-mounted)*	Moisture Condition	*Natural*	Tested By	*SG*
Calibration Date	*27/4/2004*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							Strength Classification
		(m)	D (mm)	L (mm)	P (kN)	$I_{s(50)}$ (MPa)	Failure Mode	W (mm)	D (mm)	L (mm)	P (kN)	I_s (MPa)	$I_{s(50)}$ (MPa)	Failure Mode	
Sandstone	***CBH108***	***2.95***	*51*	*140*	*1.52*	***0.59***	*Parallel to bedding*	*51*	*38*	-	*1.81*	*0.73*	***0.73***	*Through substance*	***M***
Sandstone	***CBH108***	***3.90***	*51*	*250*	*1.36*	***0.53***	*Parallel to bedding*	*51*	*35*	-	*1.38*	*0.61*	***0.59***	*Through substance*	***M***
Sandstone	***CBH108***	***4.95***	*51*	*220*	*0.71*	***0.28***	*Parallel to bedding*	*51*	*37*	-	*1.17*	*0.49*	***0.48***	*Through substance*	***L / M***
Sandstone	***CBH108***	***5.20***	*51*	*60*	*1.27*	***0.49***	*Parallel to bedding*	*51*	*32*	-	*1.14*	*0.55*	***0.53***	*Through substance*	***M***

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A.C.N. 003 614 695
A.B.N. 81 829 182 852

ANALYTICAL REPORT for:

COFFEY GEOSCIENCES PTY LTD

PO BOX 125
NORTH RYDE 2113

ATTN: PHILIP CARVA

JOB NO: SAL15286

CLIENT ORDER: E12723/3

DATE RECEIVED: 09/11/04

DATE COMPLETED: 19/11/04

TYPE OF SAMPLES: SOILS

NO OF SAMPLES: 2

NATA Accredited Laboratory
Number: 1884

NATA ENDORSED TEST REPORT
This document shall not be reproduced, except in full.

.....
Issued on 26/11/04
Lance Smith
(Chief Chemist)

ANALYTICAL REPORT

JOB NO: SAL15286
CLIENT ORDER: E12723/3

	SAMPLES	pH 1:5	Cl %	SO4 %
1	AREA B-CBH8/1.0	5.5	0.002	0.001
2	AREA D-CBH9/1.0	7.3	0.002	0.002
	MDL	0.1	0.001	0.001
	Method Code	WA1	WA4	WA6
	Preparation	P5	P5	P5

RESULTS ON DRY BASIS

ANALYTICAL REPORT

JOB NO: SAL15286
CLIENT ORDER: E12723/3

METHODS OF PREPARATION AND ANALYSIS

The tests contained in this report have been carried out on the samples as received by the laboratory.

P5	Sample dried, split and crushed to -150um
WA1	pH - 1:5 soil/water extract Determined by APHA 4500B
WA4	Chloride - 1:5 soil/water extract Determined by APHA 4110B
WA6	Sulphate - 1:5 soil/water extract Determined by APHA 4110B

A preliminary report was faxed on 19/11/04

AS4419-NS Natural Soil or Soil Blend Analysis

Test Type AS4419-NS (no lge parts)
Order No 24236 Job No:
Reference
Sample Name Area D
Sample No. 85063a
Date Received 12/11/2004 Total No Pages: 1 of 1
Client: Coffey Geosciences Pty Ltd
James Russell

LANE COVE WEST NSW 2066

Quality System™ Quality Endorsed Company

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Specialists in Soil Chemistry and Agronomy

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Telephone:(02) 9980 6554
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Email: sesl@sesl.com.au

Characteristic	Unit	Results:	Acceptance Range	Comments
Bulk Density	kg/L	1.2	>0.7	acceptable
Organic Matter Content				
By Loss On Ignition	% dry wt		3-15	
By Walkely-Black	% dry wt	2.33	3-15	slightly low
Wettability	mm/min	600.0	> 5	acceptable
pH in water 1:5	pH units	7.5	5.5-7.5	acceptable
EC	mS/cm 1:5	0.09	< 1.2	acceptable
Ammonium	mg/L		NR	
Phosphorus	mg/kg	11.2	< 5 very P Sensitive < 20 moderately P Sensitive	acceptable
Dispersibility				
in water 1:5	Category	3	1-2	dispersive
in $CaCl_2$ 1:5	Category	1	1-2	acceptable
Toxicity Index	mm	<5	≥ 70	very low
N Drawdown Index	-		> 0	
Permeability	cm/hr	8.6	2-100	acceptable
Texture		light sandy clay loam		
Large Particles				
< 10mm	%			
10-20mm	%		< 8	
> 20mm	%		< 2	
Sieve - Top Dressing				
Minerals > 2mm	%		0	
Organic 2-5mm	%		< 15	
Organic > 5mm	%		2	

Summary and Recommendations

This soil appears to have some good physical properties and an acceptable chemistry, however the toxicity index shows the seedlings did not grow in this mix. We find this to be a strange result as no chemical properties are greatly outstanding and would result in toxicity to the seeds, therefore we are going to re-test this mix. Currently the mix would fail the requirements of the AS4419, due to other factors. The results do indicate that the soil is slightly dispersive, again we recommend applying gypsum at 200g/m^2 to improve the soils stability. Organic matter could also be applied to the soil as well composted green waste.

Method: AS4419- 2003
Test results apply to the sample submitted for analysis and do not necessarily imply that the product meets all the requirements of this standard.

Checked by Principal.....
Simon Leake Date of Report 23/11/2004

Consultant.....
C. Moore

AS4419-NS Natural Soil or Soil Blend Analysis

Test Type AS4419-NS (no lge parts)
Order No 24236 Job No:
Reference
Sample Name Area B
Sample No. 85061a
Date Received 12/11/2004 Total No Pages: 1 of 1
Client: Coffey Geosciences Pty Ltd
James Russell

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Characteristic	Unit	Results:	Acceptance Range	Comments
Bulk Density	kg/L	1.3	>0.7	acceptable
Organic Matter Content				
By Loss On Ignition	% dry wt		3-15	
By Walkely-Black	% dry wt	2.00	3-15	slightly low
Wettability	mm/min	360.0	> 5	acceptable
pH in water 1:5	pH units	5.8	5.5-7.5	acceptable
EC	mS/cm 1:5	0.03	< 1.2	acceptable
Ammonium	mg/L		NR	
Phosphorus	mg/kg	3	< 5 very P Sensitive < 20 moderately P Sensitive	acceptable
Dispersibility				
in water 1:5	Category	3	1-2	slightly dispersive
in $CaCl_2$ 1:5	Category	1	1-2	acceptable
Toxicity Index	mm	39	≥ 70	low
N Drawdown Index	-		> 0	
Permeability	cm/hr	6.8	2-100	acceptable
Texture		sandy loam		
Large Particles				
< 10mm	%			
10-20mm	%		< 8	
> 20mm	%		< 2	
Sieve - Top Dressing				
Minerals > 2mm	%		0	
Organic 2-5mm	%		< 15	
Organic > 5mm	%		2	

Summary and Recommendations

This soil has very good physical properties, however its chemistry is slightly unbalanced. This would cause it to fail the requirements of the AS4419 for Natural soil. The organic matter of the soil is slightly low, this could be improved by the addition of organic matter such as well composted green waste to the soil mix. Alternatively organic matter can be applied as mulch to the surface of the soil. The results also indicate this soil is slightly dispersive, this is related to the low Calcium content. We recommend applying gypsum to the soil at 200g/m^2, this will add Calcium to the soil aand therefore improve its stability.

Method: AS4419-2003
Test results apply to the sample submitted for analysis and do not necessarily imply that the product meets all the requirements of this standard.

Checked by Principal.....
Simon Leake Date of Report 23/11/2004

Consultant.....
C. Moore

Soil Chemistry Profile

Test Type: FS
Order No: 24236 Job No:
Reference
Sample Name: Area B
Sample No: 85061
Date Received 12/11/2004 Total No Pages: 1 of 1
CLIENT: Coffey Geosciences Pty Ltd
James Russell

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TEST	RESULT	COMMENTS
pH in water 1:2	5.7	medium acidity
pH in $CaCl_2$ 1:2	4.5	very strong acidity
EC mS/cm 1:2	0.06	very low
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Comment	meq%	% of ECEC	Comment
Sodium			.11	7.30	elevated
Potassium			.06	4.00	low - deficient
Calcium			.77	51.00	low - deficient
Magnesium			.51	33.80	high
Aluminium			.06	4.00	elevated
		ECEC	1.51		
		Ca/Mg	1.50		unbalanced

	mg/kg	
Phosphate as P	1.1	deficient - inadequate for all but some ntives
Ammonium as N	7.6	low
Nitrate as N	4.6	low
Sulphate as S	8	low
Iron	44.2	slightly low
Zinc	5.8	adequate
Copper	.9	low - possibly inadequate
Manganese	3.2	low
Boron		

Recommendations

This sample show very similar chemistry to the previous sample. The chemistry shows the soil to be deficient in major nuitrients, however this can be easiliy fixed with the addition of fertilisers. The soil has a medium to strong acidity. An application of lime at 500g/m^2 would be suitable to create more neutral conditions. The lime should then be followed by an application of the *Patons No. 27 (RED)* or equivalent at 50g/m^2. In this area it may also be suitable to apply a complete trace element mix at 10g/m^2 to improve the balance of these in the soil.

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report 19/11/2004

Consultant.....
C. Moore

Soil Chemistry Profile

Test Type: FS
Order No: 24236 Job No:
Reference
Sample Name: Area D
Sample No: 85063
Date Received 12/11/2004 Total No Pages: 1 of 1
CLIENT: Coffey Geosciences Pty Ltd
James Russell

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Email: sesl@sesl.com.au

TEST	RESULT	COMMENTS
pH in water 1:2	7.8	slight alkalinity
pH in $CaCl_2$ 1:2	7.0	neutral
EC mS/cm 1:2	0.17	very low - not saline
Chlorides mg/kg		

CATION ANALYSIS

TEST	SOLUBLE		EXCHANGEABLE		
Unit	meq%	Constant	meq%	% of ECEC	Comment
Sodium			.11	1.80	low - good
Potassium			.09	1.40	low - deficient
Calcium			5.63	89.60	high
Magnesium			.45	7.20	very low
Aluminium					
		ECEC	6.28		
		Ca/Mg	12.50		unbalanced

	mg/kg	
Phosphate as P	18.4	adequate for pasture
Ammonium as N	6.4	low
Nitrate as N	7.8	low
Sulphate as S	11	low
Iron	52.9	slightly low
Zinc	20.3	adequate
Copper	8.5	adequate
Manganese	5.9	adequate
Boron		

Recommendations

This chemistry of this soil is slightly unbalanced. The pH is slightly alkaline and could be slightly acidified with an application of Iron Sulphur at 100g/m^2. This will also improve the Iron levels in the soil. The general nutrient levels are low and should be increased with the addition of fertiliser. We recommend applying *Patons Nitroca* or equivalent at 30-40g/m^2 as this should create optimal growth conditions in this soil.

Explanation of the Methods:
pH, EC, Soluble Cations, Nitrate: Bradley et al (1983). **Exchangeable Cations, ECEC:** Method 15A1 Rayment & Higginson (1992)
Chloride: Vogel (1961). **Aluminium:** Method 3500 APHA (1992). **Phosphate:** Method 9E1 Rayment & Higginson (1992). **Ammonium, Sulphate, Iron, Copper, Manganese + Zinc:** Method 83-1 to 83-5 Black (1983). **Boron:** Method 12C2 Rayment & Higginson (1992).

Checked by Principal.....
Simon Leake Date of Report

Consultant.....
C. Moore